



**Monitoring report form for CDM programme of activities
(Version 02.0)**

Complete this form in accordance with the instructions attached at the end of this form.

MONITORING REPORT

Title of the PoA	Up Energy Improved Cookstove Programme, Uganda	
UNFCCC reference number of the PoA	9956	
Version numbers of the PoA-DD applicable to this monitoring report	04	
Version number of this monitoring report	10.0	
Completion date of this monitoring report	05/06/2018	
Monitoring period number	Monitoring Period #2	
Duration of this monitoring period	11/12/2015 – 31/10/2016	
Monitoring report number for this monitoring period	NA	
Coordinating/managing entity	UpEnergy Group	
Host Parties	Host Party of the PoA	Is this the host Party of a CPA covered in this monitoring report? (yes/no)
	Uganda	Yes
Sectoral scopes	Sectoral Scope 3: Energy Demand	
Applied methodologies and standardized baselines	AMS-II.G: "Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass" (Version 05.0)	
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by all CPAs covered in this monitoring report in this monitoring period	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013
	NA	80,899 tCO ₂ e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the CPA-DDs for the CPAs covered in this monitoring report	160,186	

PART I Monitoring of programme of activities (PoA)

SECTION A. Description of PoA

A.1. General description of PoA

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The PoA is located in the Republic of Uganda and involves the distribution of highly efficient biomass fired Improved Cookstoves (ICS). ICSs replace the traditional biomass fired stoves with lesser efficiency. The PoA supports the intended 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.

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 PoA 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

PoA 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. Corresponding generic component project activities (CPAs)

Title and reference number of the corresponding generic CPA	Version of the PoA-DD	Sectoral scopes	Applied methodologies and standardized baselines
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. CPAs included in the PoA

Title and UNFCCC reference number of the CPA	Title and reference number of the corresponding generic CPA	Version of the PoA-DD	Crediting period type and duration	Covered in this monitoring report? (yes/no)
Up Energy Improved Cookstoves Programme, Uganda – CPA No 001 9956-0001	Up Energy Improved Cookstove Programme, Uganda Date: 30/06/2014 Part II	Version: 04	22/07/2014 – 21/07/2021	Yes
Up Energy Improved Cookstoves Programme, Uganda – CPA No 002 9956-0002	Up Energy Improved Cookstove Programme, Uganda Date: 30/06/2014 Part II	Version: 04	17/03/2015 – 16/03/2022	Yes
Up Energy Improved Cookstoves Programme, Uganda – CPA No 003 9956-0003	Up Energy Improved Cookstove Programme, Uganda Date: 30/06/2014 Part II	Version: 04	17/04/2015 – 16/04/2022	Yes
Up Energy Improved Cookstoves Programme, Uganda – CPA No 004 9956-0004	Up Energy Improved Cookstove Programme, Uganda Date: 30/06/2014 Part II	Version: 04	17/04/2015 – 16/04/2022	Yes

A.2. Coordinating/managing entity

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Mr. Erik Wurster

Up Energy Uganda Ltd. (CME)

Email: erik@upenergygroup.com

The detailed contact information of CME is provided in Annexure 1.

SECTION B. Implementation of PoA**B.1. Description of implemented 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 compliance 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 compliance 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 ensured training of all on-site staff with respect to adherence to the Monitoring Plan of the project activity. Records of the training are 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 were 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 is unique.

The quality control and quality assurance procedures avoids 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 is 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 other CDM project activities 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

An ICS database for the CPAs is maintained continuously. Till the end of the monitoring period, all the data recorded during ICS registration process was captured via electronic means using handheld electronic device. 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 limited to the maximum units fixed by the CPA.

The database is available to select a random, representative sample for monitoring and verification purposes. This sample set is 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 is engaged in continuous review and improvement of the overall SSC-PoA management system. CME is satisfied with the overall performance of the CPA implementer and database maintenance.

B.2. Post-registration changes to PoA**B.2.1. Corrections**

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N/A

B.2.2. Inclusion of monitoring plan

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N/A

B.2.3. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools

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N/A

B.2.4. Changes to programme design

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N/A

PART II Monitoring of CPAs

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SECTION C. Implementation of CPAs**C.1. Description of implemented CPAs**

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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. 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 end of the monitoring period is:

Improved cookstoves – 13,293.

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 used in the first SSC-CPA in Uganda.

Stove Type	Efficiency	Size/Weight
Ezy Stove (portable)	23.65%	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.);

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	22/07/2014
Date of first stove sold	02/01/2013
Implementation period under this MR	11/12/2015 – 31/10/2016

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 20,307 tCO₂.

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. 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 end of monitoring period is:

Improved cookstoves – 11,540.

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)	25.68%	11"Ø x 10.2" high; 28 cm Ø x 26 cm high 24.3 lbs/11 kgs
AES Stove (portable)	24.94%	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	11/12/2015 – 31/10/2016

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 22,503 tCO₂.

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. 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 end date of monitoring period is:

Improved cookstoves – 11,537

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)	25.68%	11"Ø x 10.2" high; 28 cm Ø x 26 cm high 24.3 lbs/11 kgs
AES Stove (portable)	24.94%	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	11/12/2015 – 31/10/2016

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 are 22,384 tCO₂.

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. 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 end of monitoring period is:

Improved cookstoves – 11,521.

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)	25.68%	11"Ø x 10.2" high; 28 cm Ø x 26 cm high 24.3 lbs/11 kgs
AES Stove (portable)	24.94%	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	11/12/2015 – 31/10/2016

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 15,705 tCO₂.

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.

C.2. Location of CPAs

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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

- (e) Host Party = Uganda
- (f) Region/state/province = All the regions of Uganda
- (g) City/town/community = All the cities of Uganda
- (h) 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

- (i) Host Party = Uganda
- (j) Region/state/province = All the regions of Uganda
- (k) City/town/community = All the cities of Uganda
- (l) 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

C.3. Post-registration changes to CPAs**C.3.1. Temporary deviations from the monitoring plans in the included CPA-DDs, applied methodologies or standardized baselines**

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Not Applicable

C.3.2. Corrections

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The following corrections have been made to 9956-0001, 9956-0002, 9956-0003 and 9956-0004

- Several typographic corrections have been made.
- Appendix 3 of CPA-DD: Applicability of the selected methodology(ies) has been added to Appendix 3 of the revised CPA-DDs in light of change in the CPA-DD template.
- Reference to Section and Figure numbers are corrected according to latest version (v 08.1) of the CDM-CPA-DD-FORM.
- To comply with the requirement of latest version (v 08.1) of the CDM-CPA-DD-FORM, few Sections have been improved.

C.3.3. Changes to the start date of the crediting period

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Not Applicable

C.3.4. Inclusion of monitoring plan

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Not Applicable

C.3.5. Permanent changes to the included monitoring plans, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools

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The following changes to the included monitoring plans of the CPAs have been made to CPA 9956-0001, 9956-0002, 9956-0003 and 9956-0004¹ have been made.

¹ In line with para 228 of CDM PS for PoA, version 1.0, Post registration changes to an included CPA do not require approval by the Board, but such changes shall be notified to the secretariat as referred to in para 251. The changes explained above are in line with registered PoA-DD and generic CPA-DD and are therefore not deemed as changes from the registered PoA.

1. Revision of Ex-ante parameter value for B_{old} (Quantity of woody biomass used in the absence of the project activity in tonnes per household, tons wood/ HH-year)

The CPAs define B_{old} value as follows:

Description	9956-0001	9956-0002	9956-0003	9956-0004
Ex-ante parameter value for B_{old} (ton wood /HH-year) specified in included CPA-DD	4.97 for rural population; 7.02 for urban population	7.02 for urban population	7.02 for urban population	7.02 for urban population
Proposed Revision in revised CPA-DD	4.97 for entire CPA population	4.97 for entire CPA population	4.97 for entire CPA population	4.97 for entire CPA population
Conservative Justification	<p>1. In the last issuance, CPA 01 demonstrated a weighted average B_{old} value of 6.12 ton/HH-year (based on monitored urban / rural population ratio).</p> <p>2. The “Appendix - 2 Baseline Study Up Energy Uganda CPA No 001”, submitted at the time of PoA registration to CDM-EB and available at: https://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/1TX2IRHF0B5VGDQPWSC4MUJKLEAZ63/view, page 7, mentions 85% Ugandan population as rural.</p> <p>3. The latest Ugandan census 2014, table 2.7, page 12, http://uganda.unfpa.org/sites/default/files/pub-pdf/CENSUS%202014%20Final%20Results0.pdf gives the rural population as 78.5% (total Urban population = 7,425,864, total rural population = 27,208,786)</p> <p>Hence the revised B_{old} value of 4.97 ton/HH-year for 100%entire CPA population is deemed conservative.</p>			

Compliance with applied methodology (para 266 of VVS for PoA, v1.0)	Yes - The Ex-ante parameter value for B_{old} is in compliance with AMS II.G. version 5.0. (the methodology allows use of historical data or survey of local usage to define relevant baseline appliance types as described in the baseline scenario. The CPAs utilize a survey of local usage to establish B_{old} for the target user group "Residential" biomass stove users as provided in CPA-DD Appendix 3.
Reduction in accuracy of monitoring compared to requirements contained in registered monitoring plan (para 266 of VVS for PoA, v1.0)	No - The revision in the ex-ante parameter value does not reduce the accuracy of the monitoring compared to monitoring requirements contained in registered monitored plan. The proposed revision applies the lower of the two values for B_{old} to entire CPA population irrespective of their category (urban / rural) as a conservative measure
Reduction in the accuracy of the calculation of GHG emission reductions or net anthropogenic GHG removals (para 267 of VVS for PoA, v1.0)	No - The revision in the ex-ante parameter value does not reduce the accuracy of ER calculations. The proposed revision applies the lower of the two values for B_{old} to entire CPA population irrespective of their category (urban / rural) as a most conservative measure / assumption.

The CPAs description does not limit the CPAs to Urban / Rural population and only refer to residential users. Thus, all the aforesaid CPAs by virtue of the description in section A.1 (General description of CPA), A.3 (Technologies/measures) and F (Eligibility for inclusion) are open to all residential users alike (i.e. urban or rural) hence the aforesaid is not deemed as changes to project design.

Also, although the ex-ante parameter value is being revised, it is not deemed a permanent correction as the change is not attributed to mistake but is being revised as a conservative measure.

2. Changes to the sampling plan in light of above, to remove reference to urban / rural users.

The CPAs define sampling plan as follows:

Description	9956-0001	9956-0002	9956-0003	9956-0004
Sampling frame defined in included CPA-DD	Sampling Frame for CPA is: <ul style="list-style-type: none">Uganda-Rural / EzyStove / Residential, andUganda-Urban / EzyStove / Residential Different sample groups could be formed to ensure sample populations were homogenous	Sampling Frame for CPA is: Uganda-Urban / Smart Home Charcoal / Residential	Different sample groups could be formed to ensure sample populations were homogenous	
Proposed Revision in revised CPA-DD	Sampling Frame for CPA is: Uganda / ICS Typetype / Residential	Sampling Frame for CPA is: Uganda / ICS Type / Residential		
Compliance with applied methodology (para 266 of VVS for PoA, v1.0)	Yes - The revised approach follows the confidence / precision requirements prescribed by the methodology for annual / biennial monitoring / sampling.			
Reduction in accuracy of monitoring compared to requirements contained in registered monitoring plan (para 266 of VVS for PoA, v1.0)	No - The proposed revision eliminates the variation in the CPA population on the basis of region (baseline consumption 7.02 ton/HH-year for urban and 4.97 ton/HH-year for rural) by prescribing a single value of 4.97 ton/HH-year for entire CPA population. The CPA population no more remains heterogeneous on the basis of region and becomes homogenous wrt to region (wrt the associated baseline consumption).			

	This removes the need for separate sampling frames for Urban and Rural regions as a common baseline is now applicable to both the regions alike. Hence any reduction in accuracy is not deemed effected and the proposed revision is deemed conservative in light of application of rural population weightage of 100% for B _{old} .
Reduction in the accuracy of the calculation of GHG emission reductions or net anthropogenic GHG removals (para 267 of VVS for PoA, v1.0)	No - The revision in the sampling approach will not reduce the accuracy of ER calculations. The proposed revision eliminates the variation in the CPA population on the basis of region (baseline consumption 7.02 ton/HH-year for urban and 4.97 ton/HH-year for rural) by prescribing a single value of 4.97 ton/HH-year for entire CPA population. Thus, irrespective of the region, the same B _{old} value will be applied for ER calculations for both regions alike.

C.3.6. Changes to project design

>>

Not Applicable

SECTION D. Description of monitoring system of CPAs

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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 AMS II.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_y] Each CPA have a specific Project Database that records each ICS crediting in the corresponding CPA. Every ICS listed in the Total Sales Record is transferred into the Project Database of requisite CPA as needed, limited to 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)
 - 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. Besides, the usage of baseline stove is determined and is considered in ER calculations to ensure that the fuel-wood consumption of baseline stoves is excluded from B_{old} .

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 (e.g. 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"> ▪ Experience conducting surveys/tests ▪ Experience conducting door-to-door surveys of biomass consumption ▪ Local language skills (especially important for input to questionnaire design and interviewing of end users) ▪ English language skills ▪ Cultural awareness ▪ Numerical proficiency ▪ Data entry skills

SECTION E. Data and parameters

E.1. Data and parameters fixed ex ante

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

Data/Parameter	B_{old}
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: 4.97 tonnes 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. The CPAs utilize a survey of local usage to establish B_{old} 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/parameter	Calculation of baseline emissions
Additional comments	-

Data/Parameter	η_{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/parameter	Calculation of baseline emissions
Additional comments	Applicable because CPA uses η_{old} to determine $B_{y,savings}$. During ICS dissemination, the type of baseline cookstove (traditional or improved) replaced is recorded and emission reductions is accounted only for the cases when ICS replaces traditional, unimproved cookstoves.

Data/Parameter	L_y
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	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/parameter	Calculation of baseline emissions
Additional comments	None

Data/Parameter	$NCV_{biomass}$
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: http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	None

Data/Parameter	$EF_{projected_fossil_fuel}$
Unit	tCO ₂ /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 ₂ /TJ has been used as stipulated in the methodology AMS-II.G V5.
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	None

Data/Parameter	f_{NRB,y}
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 _{NRB}) 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/parameter	Calculation of baseline emissions
Additional comments	None

Data/Parameter	$\eta_{specified}$
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% 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 of 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/parameter	Calculation of baseline emissions
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 η_{new} is a monitored parameter to reflect possible changes in efficiency during the lifetime of the ICS.

E.2. Data and parameters monitored

Data/Parameter	μ_{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	0.4891
Monitoring equipment	Not Applicable
Measuring/reading/recording frequency	Annually

Calculation method (if applicable)	<p>The μ_{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.</p> <p>In calculating μ_{old}, as per Para 28 of AMS II.G. version 5, PP took the upper bound of the confidence interval as reliability targets were missed. It was used to conservative estimation of emission reductions.</p>
QA/QC procedures	To conduct the survey, independent surveyor/third party was appointed; the monitoring equipment 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/parameter	Calculation of baseline emissions
Additional comments	It is used to calculate $B_{y,saving}$

Data/Parameter	η_{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	<table border="1"> <thead> <tr> <th>Stove Model</th><th>Average Efficiency</th></tr> </thead> <tbody> <tr> <td>AES</td><td>24.94%</td></tr> <tr> <td>EZY</td><td>23.65%</td></tr> <tr> <td>SHS</td><td>25.68%</td></tr> </tbody> </table> <p>Weighted average efficiency: 25.02% For detail refer "Assumption" Worksheet in ER calculator</p>	Stove Model	Average Efficiency	AES	24.94%	EZY	23.65%	SHS	25.68%
Stove Model	Average Efficiency								
AES	24.94%								
EZY	23.65%								
SHS	25.68%								
Monitoring equipment	The tests were conducted following WBT protocol by trained field personnel by third party.								
Measuring/reading/recording frequency	Annual								
Calculation method (if applicable)	<p>The WBTs were carried out in accordance with WBT protocol 4.2.3.</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.</p> <p>Since the monitoring period includes 3 stove types with different ages ranging from 2013 to 2016, the weighted average mean efficiency based on sales of each stove type in different year is used across the CPAs.</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 equipment used by the surveyor were calibrated as per manufacturer guidance to ensure quality/accuracy in results. The results of the WBT will be stored in an electronic database for a minimum of 2 years after the end of the crediting period of the CPA. 95/10 confidence/precision was applied on the sampling parameters for WBT.</p>								
Purpose of data/parameter	Calculation of baseline emissions								
Additional comments	-								

Data/Parameter	N _y
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= 13,293 9956-0002= 11,540 9956-0003= 11,537 9956-0004= 11,521
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/parameter	Calculation of baseline emissions
Additional comments	Data is transparent

Data/Parameter	U _y
Unit	%
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	91.72%
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/parameter	Calculation of baseline emissions
Additional comments	All data is transparent and verifiable.

E.3. Implementation of sampling plan

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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.

Table 1: Total number of stoves in the project

CPA #	AES	EZY	SHS	Grand Total
CPA-01		13293		13293
CPA-02	256		11284	11540
CPA-03	3400		8137	11537
CPA-04	2888		8633	11521
Grand Total	6544	13293	28054	47891

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: μ_{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 47,891 stoves. Since all the models of stoves distributed under the PoA were small and distributed to homogenous end users (i.e. domestic households), it was decided that one single sampling frame would be appropriate for two parameters i.e. Usage Rate (U_y)² and Quantity of woody biomass used in the project activity by traditional stoves (μ_{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.

²In the Project Activity, PP deployed all three types of stoves in CPA 1 to 4. Usage rate for project has been calculated in two steps. In first step, Usage Rate of each stove type is calculated. The sampling for each stove type is done basis their sales number. In step 2, the final usage rate is calculated as the weighted average of sales of each stove type. This approach adjusts the variation of each stove model, if any.

For the thermal efficiency of the stoves (η_{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. The samples have been picked through simple random sampling approach for all the stove types separately. Samples were randomly selected using a random number generator on data organized by date of distribution. The sample frame was then compared to the overall target population to ensure representativeness.

(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 initial estimates for these values which were applied for calculating the sampling size for the 1st monitoring period as there was no other source of knowledge (about these parameters) available to CME. For this monitoring period, the CME considered that the most updated knowledge about the expected values of the parameters can be obtained from the survey results of last monitoring period which also meets the requirements of para 12 (b) & (c) of the standard "Sampling and surveys for CDM project activities and programme of activities" Version 4. Hence the mean values and standard deviation obtained from last monitoring period were applied for calculating the sampling size for this monitoring period. The application of results of previous monitoring period is also allowed as per the registered PoA-DD. The requirements of para 12 (a) of the standard are met in the application of different equations for type of parameter for calculation of sampling size which is described below.

- The parameter U_y is a proportional value, therefore the sample size has been calculated according to the following equations³:

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

Where:

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

- The parameters μ_{old} and $\eta_{\text{new},y}$ are mean values, therefore the sample size has been calculated according to the following equations⁴:

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

Where:

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

⁴ Refer Equation 1 & 3 of Annex 05 of registered PoA-DD (Page 61)

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

Based on the assumptions following calculation has been done⁵:

Description	U _y ⁶ (fraction)	μ _{old} ⁷ (kg)	η _{new,y} , (EZY) ⁸ (%)	η _{new,y} , (SHS) (%)	η _{new,y} , (AES) (%)
Expected mean / proportion	0.87	1862	0.23	0.25	0.25
Expected standard deviation	--	1002	0.05	0.08	0.03
Sales	47,891	47,891	13,293	28,054	6,544
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	0.148	0.290	0.042	0.093	0.016
Sample Size needed	57	112	16	36	7
Apply t-distribution	No	No	Yes	No	Yes
Adjusted Sample Size	57	112	19	36	9
Expected Response rate	80%	80%	100%	100%	100%
Thus, the sample size required is	71	140	19	36	9
Samples covered during monitoring - higher than calculator to adjust outliers	157	140	25	41	12

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

Data was collected using surveys 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. Surveyor visited premises, visual inspection and interview with ICS end-user. CIRCODU Surveyor staff is competent and experienced enough to perform surveying and inspection activities for cookstoves. 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.

⁵ Detailed calculation in spreadsheet has been provided to DoE.

⁶ From last survey (last issuance)

⁷ From last surveys (last issuance)

⁸ From last surveys for all cook-stove type (last issuance)

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 factored into the emissions reduction calculations.

Parameter	Result
U_y	91.72%
μ_{old}	489.14 Kg
$\eta_{new,y,l}$ (EZY)	23.65%
$\eta_{new,y,l}$ (SHS)	25.68%
$\eta_{new,y,l}$ (AES)	24.94%

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	23.65%	%	Calculated
Total number of Stoves	13,293	Number	Sales records
Sample Size	25	Number	Sampling Records
Precision	2.49%	%	Calculated – Refer to WBT Sheet
Result	Acceptable	--	Calculated

$\eta_{new,y,l}$ – SHS	25.68%	%	Calculated
Total number of Stoves	28,054	Number	Sales records
Sample Size	41	Number	Sampling Records
Precision	1.23%	%	Calculated – Refer to WBT Sheet
Result	Acceptable	--	Calculated

$\eta_{new,y,l}$ – AES	24.94%	%	Calculated
Total number of Stoves	6,544	Number	Sales records
Sample Size	12	Number	Sampling Records
Precision	2.78%	%	Calculated – Refer to WBT Sheet
Result	Acceptable	--	Calculated

Reliability check has been done as per the approach mentioned in 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 Model	Population Size	adjusted stove Population considering deployment date	Average Efficiency
AES	6544	4649	24.94%
EZY	13293	8633	23.65%
SHS	28054	21110	25.68%
Total	47891	34393	

The Efficiency value used for calculation is 25.02%.

U_y	91.72%	%	Calculated
Total number of Stoves	47,891	Number	Sales records
Sample Size	157	Number	Sampling Records
Precision	4.69%	%	Calculated – Refer to Usage Survey Sheet
Result	Acceptable	--	Calculated

μ_{old}	489.14	Kg/year	Calculated
Total number of Stoves	47,891	Number	Sales records
Sample Size	140	Number	Sampling Records
Precision	35.82	%	Calculated – Refer to Household Survey Sheet
Result	Use higher bound value	--	Calculated

As the desired precision for μ_{old} was not met hence as per paragraph 28 of AMS.II.G. version 5, the higher bound value for μ_{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. 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 F. Calculation of emission reductions or net anthropogenic removals

F.1. Calculation of baseline emissions or baseline net removals

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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 _y	Emission reductions during the period y in tCO ₂ e
f _{NRB,y}	Fraction of woody biomass saved by the project activity in period 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, 0.0156 TJ/tonne)
EF _{projected_fossil fuel}	Emission factor for the substitution of non-renewable woody biomass by similar consumers. Use a value of 81.6 tCO ₂ /TJ
N _y	Number of appliances of the type being deployed during period y as part of the SSC-CPA
U _y	Average usage rate (as opposite to drop-off) of appliances of type being deployed during period y as part of the SSC-CPA
B _{y,savings}	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:

Description	9956-0001	9956-0002	9956-0003	9956-0004	Source
ER _y	20,308	22,503	22,384	15,705	Calculated
f _{NRB,y}	82%	82%	82%	82%	Ex-Ante
NCV _{biomass}	0.015	0.015	0.015	0.015	Ex-Ante

EF_{projected_fossil fuel}	81.6	81.6	81.6	81.6	Ex-Ante
N_y	13,293	11,540	11,537	11,521	Sales Database
N _y (adjusted for year equivalent fraction)	8633	9567	9516	6677	Calculated
U_y	91.72%	91.72%	91.72%	91.72%	Third Party Survey Record
B_{y,savings}	2.56	2.56	2.56	2.56	Calculated

B_{y,savings,i} 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_{old}	Quantity of biomass used in the absence of the project activity in tonnes/ year
μ_{old}	Quantity of woody biomass for the continued use of old stoves
η_{old}	Weighted average value is used since the replaced systems are unimproved and improved baseline technologies.
η_{new}	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)

Description	9956-0001	9956-0002	9956-0003	9956-0004	Source
B_{old}	4.97	4.97	4.97	4.97	Ex-Ante
μ_{old}	0.4891	0.4891	0.4891	0.4891	Third Party Survey Record
η_{old}	10%	10%	10%	10%	Ex-Ante
η_{new}	25.02%	25.02%	25.02%	25.02%	Third Party Survey Record
L_y	95%	95%	95%	95%	Ex-Ante

F.2. Calculation of project emissions or actual net removals

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N/A

F.3. Calculation of leakage emissions

>>
N/A

F.4. Calculation of emission reductions or net anthropogenic removals

CPA UNFCCC reference number	Baseline GHG emissions or baseline net GHG removals (t CO ₂ e)	Project GHG emissions or actual net GHG removals (t CO ₂ e)	Leakage GHG emissions (t CO ₂ e)	GHG emission reductions or net anthropogenic GHG removals (t CO ₂ e)		
				Before 01/01/2013	From 01/01/2013	Total amount
9956-0001	20,307	-	-	0	20,307	20,307
9956-0002	22,503	-	-	0	22,503	22,503
9956-0003	22,384	-	-	0	22,384	22,384

9956-0004	15,705	-	-	0	15,705	15,705
Total	80,899	-	-	0	80,899	80,899

F.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the included CPA-DDs

CPA UNFCCC reference number	Amount achieved during this monitoring period (t CO ₂ e)	Amount estimated ex ante (t CO ₂ e)
9956-0001	20,307	39,976
9956-0002	22,503	40,070
9956-0003	22,384	40,070
9956-0004	15,705	40,070
Total	80,899	160,186

Ex-ante estimate of emission reductions for CPAs

CPA No.	Annual ER	Start Date	End Date	Days Monitored	Pro-rata calculation of ERs
9956-0001	44,874	11/12/2015	31/10/2016	326	39,976
9956-0002	44,980	11/12/2015	31/10/2016	326	40,070
9956-0003	44,980	11/12/2015	31/10/2016	326	40,070
9956-0004	44,980	11/12/2015	31/10/2016	326	40,070
Total					160,186

F.6. Remarks on increase in achieved emission reductions

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The emission reductions achieved in the monitoring period are less than the values estimated in ex-ante calculation.

Annexure 1: Contact information

Coordinating/managing entity	
Organization name	Up Energy Uganda Ltd.
Street/P.O. Box	Plot 3848 P.O. Box 24480
Building	Rwakiseta Road (off Kironde Road),
City	Muyenga
State/Region	Kampala
Postcode	24480
Country	Uganda
E-mail	erik@upenergygroup.com
Website	http://www.upenergygroup.com

Entity responsible for completing the CDM-MR-FORM	
Organization name	Climate-Secure Services
Street/P.O. Box	Club Road
Building	Pragati Apartments
City	West Delhi
State/Region	Delhi
Postcode	110063
Country	India
E-mail	info@climate-secure.com
Website	www.climate-secure.com

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Document information

Version	Date	Description
02.0	7 June 2017	Revision to: <ul style="list-style-type: none"> Ensure consistency with version 01.0 of the “CDM project standard for programmes of activities (CDM-EB93-A07-STAN); Make editorial improvements.
01.0	1 April 2015	Initial publication.
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