Verification and certification 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.

BASIC INFORMATION

Title and UNFCCC reference number of the programme of activities (PoA)	Up Energy Improved Cookstove Programme, Uganda UN reference number: 9956
Version number(s) of the PoA-DD(s) to which this report applies	Version 4.0
Version number of the verification and certification report	Version 4.1
Completion date of the verification and certification report	05/06/2018
Monitoring period number and duration of this morning period	MP No.2 11/12/2015-31/10/2016
Number and version number of the monitoring report to which this report applies	Monitoring Report Number: 01 Version 10, dated 05/06/2018
Coordinating/managing entity (CME)	Up Energy Group

Host Parties

Host Parties of the PoA	Is this a host Party to a CPA covered in this report? (yes/no)
Uganda	Yes

Applied methodologies and standardized baselines	Methodology: AMS-II.G.: "Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass" (Version 05.0) Standardized Baseline: Not Applicable
Mandatory sectoral scopes linked to the applied methodologies	Sectoral Scope: 3, Energy Demand
Conditional sectoral scopes linked to the applied methodologies, if applicable	N/A

Estimated amount of GHG emission reductions or GHG removals for this monitoring period in the included CPAs covered in this report

Specific-case CPA reference number	Value estimated in ex ante calculation in the included CPA-DD(s)
9956-0001	39,976
9956-0002	40,070
9956-0003	40,070
9956-0004	40,070
Total	**160,186**

Certified amount of GHG emission reductions or GHG removals for this	80,899 tCO_2e

monitoring period for the included CPAs covered in this report	
Name and UNFCCC reference number of the DOE	Earthood Services Private Limited E-0066
Name, position and signature of the approver of the verification and certification report	 Dr. Kaviraj Singh, Managing Director

SECTION A. Executive summary

The PoA involves the dissemination of highly efficient biomass fired Improved Cookstoves (ICS). The cook stoves disseminated through this programme replace the inefficient three-stone fired or equivalent with stoves which combust wood/charcoal more efficiently, and improve thermal transfer to pots, hence saving fuel and lowering greenhouse gas emissions. Each CPA supports the project's goals of reducing fuel consumption, improving health, and reducing deforestation in Uganda. The target areas are all regions of Uganda with traditional biomass stove users.
UpEnergy Group is the CME for the PoA, which provides the framework and incentives to rest of parties involved in achieving implementing CPAs.
The CME keeps the track of the list of CEP installations concerning to the PoA in the electronic Credit Tracker Platform. The ICS users sign a title transfer with the CME while purchasing the product.

Total achieved emission reduction during the current monitoring period is 80,899 tCO_2e.

Scope of verification:
The verification is an independent and objective review and ex-post determination of the monitored reductions in GHG emissions by the DOE. The verification includes the implementation and operation of the PoA as set out in the registered PoA-DD & revised CPA-DDs viz., 9956-0001, 9956-0002, 9956-0003 and 9956-0004 in the monitoring period. The verification tests the data and assertions set out in the monitoring report based on the following:
(i) The approved methodology AMS II.G version 05 "Energy efficiency measures in thermal applications of non-renewable biomass", applied in the PoA-DD & CPA-DDs.
(ii) The registered PoA-DD & revised CPA-DD and monitoring plan.
(iii) UNFCCC criteria referred to in the Kyoto Protocol criteria and the CDM modalities and procedures as agreed in the Bonn Agreement and the Marrakech Accords.
(iv) The CDM Validation and Verification Standard (VVS) for PoA version 1.0
(v) The CDM Project Standard (PS) for PoA version 1.0 and Project Cycle Procedure (PCP) for PoA version 1.0.
(vi) Relevant decisions, guidance and clarifications of the CMP and CDM Executive Board and any other information and references relevant to the project activity's reported emission reductions

The verification has considered both quantitative and qualitative aspects on stated/reported emission reductions. The monitoring report (all versions) and corresponding supporting documentation was assessed in accordance with the rules defined by UNFCCC, as appropriate to the PoA. The verification is not meant to provide any consulting or recommendations to the CME/others. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the monitoring activities.

Verification Process:
The verification process is conducted as per internal CDM Quality Manual, which includes the following steps;

a) Contract with UpEnergy Group and appointment of verification team and technical review team (refer Section B.1 and B.2 of this report)
b) Completeness check of Monitoring Report
c) Publication of Monitoring Report at UNFCCC website
d) Desk review (refer Section D.1 of this report) of Monitoring Report and corresponding ER sheet by verification team and planning of onsite audit (including sampling approach (refer Section D.4 of this report) to be applied)
e) On site audit (refer Section D.2 of this report) (physical implementation and interview with relevant stakeholders) by verification team consistent of Team Leader and all Technical Experts, as a minimum
f) Follow up activities e.g., interviews (refer Section D.3 of this report)
g) Reporting and closure of findings (CARs/CLs/FARs) and preparation of draft verification report (refer Section D.5 of this report)
h) Independent technical review (refer Section F of this report) of the draft verification report and final/revised documentation (e.g., Monitoring Report, corresponding ER sheet and evidences)
i) Reporting and closure of TR comments/findings (refer Section D.5 of this report) (CARs/CLs/FARs) and final approval for the decision made (refer Section G and H of this report).
j) Issuance of final verification report to contracted CME (or authorized representatives) and submission of request for issuance, as appropriate.

Verification Conclusion:

Based on the outcome of the verification process of the registered PoA "Up Energy Improved Cookstove Programme, Uganda" and its 04 CPAs (9956-0001, 9956-0002, 9956-0003, and 9956–0004) for the monitoring period 11/12/2015-31/10/2016 (including both dates) we confirm that the implementation of referenced registered PoA and CPAs is complying with applicable CDM rules and regulations as stated in the Monitoring Report (final) Version 10 dated 05/06/2018. The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodologies, AMS II.G Version 05 and the monitoring plan contained in the PoA-DD and the revised CPA DDs.

Earthood Services Private Limited is able to certify that the emission reductions from the registered CDM PoA UN#9956 "Up Energy Improved Cookstove Programme, Uganda" in Uganda during the period 11/12/2015-31/10/2016 (including both days) amount to 80,899 tCO_2e. Therefore, this is being submitted for request for issuance, as per UNFCCC procedures.

SECTION B. Verification team, technical reviewer and approver

B.1. Verification team members

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection*	Interview(s)	Verification findings
1.	Team Leader	IR	Mahala	Deepika	Central Office	Y	N	N	Y
2.	Technical Expert(3.1)	IR	Mahala	Deepika	Central Office	Y	N	N	Y
3.	Verifier	IR	Mahala	Deepika	Central Office	Y	N	N	Y
4.	Methodology Expert	IR	Mahala	Deepika	Central Office	Y	N	N	Y
5.	Local Expert	EI	Khaukha	Julius	Central Office	Y	N	N	N
6.	Team Leader*	IR	Deka	Nayan Jyoti	Central Office	Y	Y	Y	Y
7.	Technical Expert	IR	Deka	Nayan Jyoti	Central Office	Y	Y	Y	Y
8.	Methodology Expert	IR	Deka	Nayan Jyoti	Central Office	Y	Y	Y	Y

*site visit was conducted by the previous team leader, Nayan J Deka.

B.2. Technical reviewer and approver of the verification and certification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer	IR	Gautam	Ashok	Central Office
2	Expert to TR (3.1)	IR	Gautam	Ashok	Central Office
3	Approver	IR	Singh	Kaviraj	Central Office

SECTION C. Application of materiality in conducting the verification

C.1. Consideration of materiality in planning the verification

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	Human error in recording/concluding the data from surveys and tests	Low	Recording of data for most of the parameters is done	Verification team randomly select the samples from CME surveyed households and

			manually through sampling tests.	checked the recorded survey forms during DOE field observations. Trainings of the personnel conducting the test to avoid such errors.
2.	Error in transferring the data to ER sheet	High	Transfer of data from source to ER calculation involve human intervention and might lead to some readings being copy and pasted inconsistently in the ER sheet from the source data.	The values reported in ER sheet to be checked with their respective source data.

C.2. Consideration of materiality in conducting the verification

In accordance with CDM VVS for PoA Version 1.0 para 307 the prescribed thresholds for materiality for CDM PAs are as under;

Emission Reductions (tCO2e)/year	**500,000 or more**	**300,000 to 500,000**	**300,000 or less**	**Small Scale CDM CPAs under the PoA**	**Micro Scale CDM CPAs under the PoA**
Materiality Threshold (para 307)	**0.5%**	**1.0%**	**2.0%**	**5.0%**	**10.0%**

The applicable materiality threshold is 5% as PoA includes only small-scale CPAs.

Particulars / Monitoring Report	**MR Version (Public)**	**MR Version (Revised/Final)**
Emission Reductions Achieved (tCO2e) in this monitoring period	107,256 tCO2e	80,899tCO2e**
Applicable Threshold (%) as per para 307 of CDM VVS for PoA Version 1.0	5%	5%

The verification team has identified the impact of errors observed and those were corrected by PP during verification for all monitoring parameter at individual level. The extrapolated impact on ERs is also provided for parameters individually and in aggregated manner in the end.

Monitored Parameter (Symbol / Description)	**Reporting Frequency**	**Number of Discrete Data (Total)** **RRR (100%)**	**Sample selected for verificat-ion** **XX(YY%)**	**Type of error identified**	**Impact on ERs**	
					ERs impacted (Sample)	**ERs impacted (Population based on extrapolation)**
μ_{old}	Annually	140(out of 47,891 stoves)	Please read the comment below*.	No error identified	No impact	No impact
η_{new}	Annually	78(out of 47,891 stoves)	All the sample results.	No error identified	No impact	No impact
N_y	Measured continuously and aggregated annually	47,891 (100%)	Please read the comment below*.	No error identified	No impact	No impact

U_y	Annual	157(out of 47,891 stoves)	Please read the comment below*.	No error identified	No impact	No impact

*Accordingly, the verification team has verified the 20 samples for each type of ICS (there were 3 types of ICS distributed) across the CPAs (taking two additional samples in order to meet minimum requirement of 18 samples of Standard 'Sampling and surveys for CDM project activities and programme of activities' /36/).

**The value of all the parameters were found to be correct when checked with their evidences. However, the PRC proposed has changed the value of one of the ex-ante parameters, as a conservative approach. The revised calculation method to determine the value of U_y and n_{new} parameter have also impacted the ER calculation. The revised calculation has reduced the emission significantly than the public monitoring report.

Based on the above table, it can be confirmed that the materiality threshold applicable for the registered PoA as per CDM VVS for PoA version 1.0 is not breached.

SECTION D. Means of verification

D.1. Desk/document review

The desk review involves;

- A review of the data and information presented to verify their completeness;
- A review of the monitoring plan, the monitoring methodology including applicable tool(s) and, where applicable, the applied standardized baseline, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures;
- A review of calculations and assumptions made in determining the GHG data and emission reductions;
- An evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions;

The list of documents/evidences reviewed during the verification is provided under Appendix 3 of this report.

D.2. On-site inspection

Duration of on-site inspection: 09/01/2017 to 13/01/2017				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	Physical site visit : Households visited (implementation of PoA)	Uganda	09/01/2017 to 13/01/2017	Nayan Jyoti Deka
2	Review of information flows for generating, aggregating and reporting the monitoring parameters	Uganda	09/01/2017 to 13/01/2017	Nayan Jyoti Deka
3	Cross check between information provided in the monitoring report and data from other sources such as, purchase records or similar data sources;	Uganda	09/01/2017 to 13/01/2017	Nayan Jyoti Deka
4	A check of the monitoring equipment including calibration performance and observations of monitoring practices against the applicable requirements	Uganda	09/01/2017 to 13/01/2017	Nayan Jyoti Deka
5	identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters	Uganda	09/01/2017 to 13/01/2017	Nayan Jyoti Deka

D.3. Interviews

No.	**Interviewee**			**Date**	**Subject**	**Team member**
	Last name	**First name**	**Affiliation**			
1.	Lohia	Rohit	Climate Secure	23/11/2017 11/01/2018	Post registration	Deepika Mahala

				25/01/2018	changes (via meeting, email and phone)	
2	Melana	Sandeep	Climate connect	09/01/2017 to 13/01/2017	Sampling & ER calculation, survey sheet, WBT calculation etc.	Nayan Jyoti Deka
3	Kumar	Ajay	Climate connect	09/01/2017 to 13/01/2017	MR related issues, monitoring survey	Nayan Jyoti Deka
4	Julius	Khaukha	Local expert	13/01/2017	Local host country rules & regulation	Nayan Jyoti Deka
5	Amone	Mosses	Upenergy	09/01/2017 to 13/01/2017	Overall PoA description, QA/QC procedures	Nayan Jyoti Deka
6	Seribombo	Jesse	Upenergy	09/01/2017 to 13/01/2017	Monitoring and survey	Nayan Jyoti Deka
7	Samuel	Kasasirh	Upenergy	09/01/2017	Stoves sales & sales database, tracking	Nayan Jyoti Deka
8	Nabande	Andrew	Upenergy	09/01/2017 to 13/01/2017	Data recording and monitoring	Nayan Jyoti Deka
9	Arinaitwe	Josheph	CIRCODU	13/01/2017	Third part monitoring survey, WBT etc.	Nayan Jyoti Deka
10	Amone	Moses	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
11	Juliet	Lugolobi	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
12	Charles	Sentumbwe	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
13	Richard	Kiyingi	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
14	Justine	Mureba	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
15	Teddy	Naava	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
16	Andrew	Nabende	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
17	Slagi	Gyagenda	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka

18	Serwadda	Joseph	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
19	Namuddu	Robinah	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
20	Gorreti	Kayaga	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
21	Nakidde	Jannet	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
22	Nabaggala	Nuru	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
23	Nansubuga	Kevina	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
24	Nyirimaholo	Kalija	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
25	Nambi	Assa	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
26	Namwebe	Gertrude	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
27	Mbasalisa	Maria	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
28	Namatovu	Yowanina	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
29	Nabawanuka	Cecilia	ICS user	09/01/2017 13/01/2017	ICS Usages	Nayan Jyoti Deka
30	Buyinza	Veronica	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
31	Lukia	Nankabirwa	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
32	Namuswe	Betty	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
33	Namutebi	Sarah	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
34	Gayita	Maama	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
35	Sumaya	Maama	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
36	Kizito	Simon	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
37	Shirat	Maama	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka

38	David	Mugabi	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
39	Maria	Maama	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
40	Rose	Nabisere	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
41	Auntie	Sara	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
42	Sarah	Nakilayi	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
43	Olivia	Walugembe	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
44	Goretti	Namugerwa	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
45	Gorett	Namugerwa	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
46	Teddy	Nambi	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
47	Rebecca	Basilika	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
48	Betty	Namatovu	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
49	Juliet	Nalugo	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
50	Joyce	Nankya	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
51	Dorothy	Nabweteme	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
52	Mubiwa	Christine	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
53	Henry	Kayabwe	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
54	Irene	Walukamba	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
55	Gerald	Selwanja	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
56	Prossy	Biyinzika	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
57	Richard	Matovu	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka

58	Kalid	Mugoya	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
59	Janet	Ntula	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
60	Mariah	Naidibya	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
61	Teddy	Nanyonjo	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
62	Patrick	Wandera	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
63	Amuke	Christine	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
64	M	Ogwanga	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
65	Deborah	Ilukor	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
66	Simon	Mugabi	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
67	K	Kayongo	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
68	Beatrice	Achom	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka
69	Martin	Vuni	ICS user	09/01/2017 to 13/01/2017	ICS Usages	Nayan Jyoti Deka

D.4. Sampling approach

CME's sampling approach:

A single sampling plan was carried out across all specific case CPAs covered in this monitoring period. The CME has applied Simple Random Sampling across a group of CPAs for different monitoring parameters as per validated PoA DD and revised CPA DDs. 95/10 confidence precision was mainly applied by CME in the sampling, which is better than the 90/10 confidence precision prescribed in sampling tool for a period less than a year. The confidence and precision level applied by the CME meets the methodological requirements. The sampling approach undertaken by CME is duly explained under Section E.3.4.3 of monitoring report.

DOE's sampling approach:

In order to meet the requirements of paragraph 21 and 22 of Standard for Sampling and surveys for CDM project activities and programmes of activities, Version 5.0/36/, the verification team applied acceptance sampling in the verification (in accordance with para 24). The verification team selected random samples of CME's sampled records, checked the acceptability of the data for each such record with CME's sample records, and then based on the number of records where there is agreement, determined if the CME's sample records meet the requirements.

The verification team determined the sample size for acceptance sampling by evaluating the following, using its own professional judgment and guidance in the Standard 'Sampling and surveys for CDM project activities and programme of activities' /36/:

- The proportion of discrepancies between the CME's data and verification team's (field or onsite inspection results) data that can be considered acceptable. This is referred to as the AQL (Acceptable Quality Level): 1.0% was considered in this verification.
- The proportion of discrepancies between the CME's data and verification team's (field or onsite inspection results) data that would be considered unacceptable. This is the UQL (Unacceptable Quality Level): 20% was considered in this verification.

In accordance with paragraph 26 of the Standard 'Sampling and surveys for CDM project activities and programme of activities' /36/, the producer risk and consumer risk were considered as 10% each for determination of the sampling size.
Considering the above input values, a sample size of 18 was required as per Table 1 in the referred Standard. Accordingly, Acceptance number (c) thus determined for the sample size is 1. A sample size of 18 meets the criteria.
Accordingly, the verification team together has verified the 20 samples for each type of ICS (there were 3 types of ICS distributed) across the CPAs (taking two additional samples in order to meet minimum requirement of 18 samples) to verify the parameter Uy (Average usage rate of appliance type being deployed as a part of SSC CPA) during site visit and observed that the sampling survey results of the CME for all the ICSs checked were consistent with DOE's field survey results. In all the verification team, visited 60 households.

For other parameters viz. η_{new} (results of stove efficiency test) & μ_{old} (Quantity of woody biomass used in the project activity by traditional stoves), the verification team has checked from the document/evidence submitted by the CME.

D.5. Clarification requests, corrective action requests and forward action requests raised

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
General		-	-
Compliance of the monitoring report with the monitoring report form	-	-	-
Remaining forward action requests from validation and/or previous verification	-	-	-
CPA(s) considered for verification and covered in this report	-	-	-
Programme of activities	-	-	-
Compliance of the programme implementation with the registered PoA-DD	CL#01	CAR#02	-
Implementation and operation of the management system	-	CAR#06	-
Post-registration changes	-	-	-
• Temporary deviations from the registered monitoring plan, applied methodology or applied standardized baseline	-	-	-
• Corrections	-	-	-
• Inclusion of a monitoring plan	-	-	-
• Permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodology, standardized baseline or other applied standards or tools	-	-	-
• Changes to the programme design or project design	-	-	-
• Change of coordinating/managing entity	-	-	-
• Changes specific to afforestation and reforestation activities	-	-	-
Component project activities	-	-	-
Compliance of the CPA implementation with the included CPA design document	-	-	-
Post-registration changes	-	-	-
• Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline	-	-	-
• Corrections	-	-	-
• Changes to the start date of the crediting period of component project activities	-	-	-
• Inclusion of a monitoring plan	-	-	-
• Permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodology, standardized baseline or other applied standards or tools	-	-	-

• Changes to the programme design of project design	-	-	-
• Changes specific to afforestation and reforestation component project activities	-	-	-
Compliance of the registered monitoring plan with the methodology including applicable tool(s) and standardized baseline	-	-	-
Compliance of monitoring activities with the registered monitoring plan	-	CAR#02	-
• Data and parameters fixed ex ante or at renewal of crediting period	-	-	-
• Data and parameters monitored	-	CAR#08	-
• Implementation of sampling plan	-	CAR#02, CAR#03, CAR#04 CAR#05, CAR#08	-
Compliance with the calibration frequency requirements for measuring instruments	-	-	-
Assessment of data and calculation of emission reductions or net removals	-	CAR#06, CAR#07	-
• Calculation of baseline GHG emissions or baseline net GHG removals by sinks	-	-	-
• Calculation of project GHG emissions or actual net GHG removals by sinks	-	-	-
• Calculation of leakage GHG emissions	-	-	-
• Summary of calculation of GHG emission reductions or net GHG removals by sinks	-	-	-
• Comparison of actual GHG emission reductions or net GHG removals by sinks with estimates in included CPA	-	-	-
• Remarks on difference from estimated value in included CPA	-	-	-
Assessment of reported sustainable development co-benefits	-	-	-
Global stakeholder consultation	-	-	-
Others (please specify)	-	-	-
Total	1	7	-

SECTION E. Verification findings

E.1. General

E.1.1. Compliance of the monitoring report with the monitoring report form

Means of verification	Monitoring report is prepared using the correct template i.e. CDM-PoA-MR-FORM Version 02.0/49/. The verification team confirms that the monitoring report has been appropriately prepared using the latest applicable monitoring report form, and that all sections are completed.
Findings	No findings
Conclusion	Latest version of MR has been used and all the guidelines of the template have been followed by the CME to prepare the Monitoring Report/13/.

E.1.2. Remaining forward action requests from validation and/or previous verifications

There were 4 FARs from the validation/02/ that has been resolved during first verification/14/. There is no FAR raised from the previous verification/14/.

E.1.3. CPAs considered for verification and covered in this report

Title and UNFCCC reference number of the CPA included in the PoA as of the end of this monitoring period	Is the CPA considered for this verification? (yes/no)	The date when the CPA was included	Version of the PoA-DD	Confirmation that a request for issuance including the CPA has been published for the previous monitoring period (Y/N)
Up Energy Improved Cookstoves Programme, Uganda – CPA No 001 9956-0001	Yes	22/07/2014	Version 4, dated 30/06/2014	Yes
Up Energy Improved Cookstoves Programme, Uganda – CPA No 002 9956-0002	Yes	17/03/2015	Version 4, dated 30/06/2014	Yes
Up Energy Improved Cookstoves Programme, Uganda – CPA No 003 9956-0003	Yes	17/04/2015	Version 4, dated 30/06/2014	Yes
Up Energy Improved Cookstoves Programme, Uganda – CPA No 004 9956-0004	Yes	17/04/2015	Version 4, dated 30/06/2014	Yes

E.2. Programme of activities

E.2.1. Compliance of the programme implementation with the registered programme design document

Means of verification

The registered PoA involves the promotion, distribution and sale of improved cook stoves (ICS) in Uganda. CME has implemented the CPAs through coordination with the monitoring team and further with local/channel sellers/distributors. The overall responsibility of implementation and operation is with CME (UpEnergy), which was also evident during the site visit. This is consistent with PoA DD /01/. This monitoring period includes the implementation and monitoring of 04 CPAs as part of registered PoA.

The implementation of all CPAs, as referenced above, are within the geographical boundary of the PoA DD/1/, which constitutes the physical boundary as well.

The type CEP (Clean Energy Product) models deployed under each CPA is verified as following:

CPA (9956 – 0001):

Cook stove deployed/ Model	Number
EZY Stove	13293
SHS	-
AES Stove	-
Total	13293

CPA (9956 – 0002):

Cook stove deployed/ Model	Number
SHS	11284
AES Stove	256
Total	11540

CPA (9956 – 0003):

Cook stove deployed/ Model	Number
SHS	8137
AES Stove	3400
Total	11537

CPA (9956 – 0004):

Cook stove deployed/ Model	Number
SHS	8633
AES Stove	2888
Total	11521

The verification team is able to confirm that the quantity, specification and target group of the ICSs is consistent with the PoA DD /1/ and revised CPA DDs/44-47/. Further, based on the review of sales data base /19/, physical observations and interview conducted during the site visit, the verification team found that:

- The CPA(s) are implemented within the boundary of the PoA as described in the registered PoA-DD/1/.
- The CME is same as that mentioned in the registered PoA-DD/1/
- The implementation and operation of the project activity has been conducted in accordance with the description contained in the registered PoA-DD/1/ and revised CPA-DDs/44-47/.
- All physical features of the CPA proposed in the revised CPA-DDs/44-47/ are in place.
- The project participants/CPA implementer has operated the CPAs as per the revised CPA-DDs/44-47/.

The verification team has visited the sampled households during site visit; It was observed that each ICS was assigned a unique identification number (serial number). The unique serial number on each ICS, personal information of ICS owners and date of purchase of ICS was cross checked with the sales database/19/ available with the CME. The operation of the ICSs was confirmed through interviews of owners/representatives (of ICSs) during the site visit.
The emission reductions being claimed during this monitoring period are lesser than the estimated emission reductions in the registered CPA-DDs/7-10/, as given in the table below:

CPA	**Value estimated in ex ante calculation in the included CPA-DD(s) (tCO_2e)**	**Actual values achieved by the specific-case CPA(s) during this monitoring period (tCO_2e)**
9956-0001	39,976	20,307
9956-0002	40,070	22,503
9956-0003	40,070	22,384
9956-0004	40,070	15,705
Total	**160,186**	**80,899**

The information (including data and variables) provided in the MR/13/ is found to be in line with the details provided in the registered PoA-DD/1/.
The verification team considers the project description of the project contained in the registered PoA-DD/1/ is complete and accurate. The monitoring report was compared and verified against the description provided in the registered PoA-DD/1/ and found to be correct.

Findings	CL #01 was raised and closed.
Conclusion	The verification team confirms that the physical features (technology/type of ICS) of the implementation were in accordance with the registered PoA DD/1/.

	• The distribution of ICS is still ongoing as it has not yet reached the estimated quantity given in the respective revised specific case CPA DDs/44-47/. • The actual operation is in line to respective CPA DDs/44-47/, which is further explained under Section E.3.1 of this report. • The number of installations in any CPA for the type of CEP were either equal to or within the quantity estimated in the respective revised CPA DDs. The actual CERs for CPAs were slightly less for comparable monitoring period. Apart from this, no information with regard to data and variables was identified that may surpass the estimated quantity of ERs in the respective revised CPA DDs. The emission reductions achieved for each specific case CPA DDs were within the estimated quantity in the revised CPA DDs/44-47/.

E.2.2. Implementation and operation of the management system

Means of verification	The verification team during the site visit assessed the management systems in place to implement the monitoring of the PoA. This included the roles and responsibilities, data collection, transfer and aggregation procedures, data storage and archiving for the monitoring system through physical inspection. The assessment team has also checked training of the monitoring & data recording personnel, the maintenance schedules/records of the stoves and also cross checked the sales data records /19/ with the actual sales receipts /20/. The roles and responsibilities data collection transfer and aggregation procedures, data storage and archiving for the monitoring system have been provided in the MR /13/.
Findings	No finding was raised.
Conclusion	The verification team confirms that the monitoring management system of the PoA is in place with the responsibilities properly identified and established.

E.2.3. Post-registration changes

E.2.3.1. Temporary deviations from the registered monitoring plan, applied methodology or applied standardized baseline

Not Applicable

E.2.3.2. Corrections

Not Applicable

E.2.3.3. Inclusion of a monitoring plan

Not Applicable

E.2.3.4. Permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodology, standardized baseline or other applied standards or tools

Not Applicable

E.2.3.5. Changes to the programme design or project design

Not Applicable

E.2.3.6. Change of coordination/managing entity

Not Applicable

E.2.3.7. Changes specific to afforestation and reforestation activities

Not Applicable

E.3. Component project activities

E.3.1. Compliance of the CPA implementation with the included CPA design document

Means of verification

The CPAs are grouped together in this section for the purpose of verification and reporting as these are of similar in nature (technology and type). The CPAs involves the promotion and installation of ICS (portable) in Uganda. The product is disseminated in residential households of the area.

The current verification which includes verification of 4 CPAs viz. 9956-0001(CPA -01), 9956-0002 (CPA -02), 9956-0003 (CPA -03) & 9956-0004 (CPA -04). The implementation status of the ICS has been verified by physically verifying the samples of ICS from the PP's sample. Three types of model of ICS were installed viz. AES, EZY & SHS type model have been installed by the CME, which is in line to the PoA DD/1/.

ICS installed Break-up CPA &Technology wise				
	CPA -01	**CPA -02**	**CPA -03**	**CPA -04**
EZY	13293	-	-	-
SHS	-	11284	8137	8633
AES	-	256	3400	2888
Total	13293	11540	11537	11521

UpEnergy is the CME for the implementation of the CPAs and is also responsible for coordinating and managing the implementation of each element of the monitoring plan. The details of each CPA are as follows:

	CPA -01	CPA -02	CPA -03	CPA -04	
CPA ref.#	9956-0001	9956-0002	9956-0003	9956-0004	The reference numbers have been checked from the UN website/39/.
Inclusion date	22/07/2014	17/03/2015	17/04/2015	17/04/2015	The dates have been checked from the UN website/39/.
Location	Across Uganda	Across Uganda	Across Uganda	Across Uganda	Verified from the onsite audit, PoA DD/1/ and revised CPA DDs/44-47/.
ICS types	EZY	SHS, AES	SHS, AES	SHS, AES	Verified from the sales database/19/.
ICS sales start date	02/01/2013	09/05/2014	02/04/2015	03/04/2015	Verified from the PoA DD/01/ and the revised CPA DDs/44-47/.
Total ICS sold	13293	11540	11537	11521	Verified from the sales database/19/.
Implementation period under this MR	11/12/2015-31/10/2016	11/12/2015-31/10/2016	11/12/2015-31/10/2016	11/12/2015-31/10/2016	-

The model/ types of ICS have been verified during the on-site inspection of sample verifications in order to assess that all physical features of the registered CPA DDs/7-10/ are in place and the CME have operated the PoA & CPA as per the registered PoA – DD/1/ and revised CPA – DDs/44-47/.

Findings

CAR#02 ad CAR#06 were raised and closed

Conclusion	• The verification team is in opinion that physical features of the CPAs have been implemented in accordance with the registered PoA DD/1/ and revised CPA-DDs/44-47/. • No specific monitoring equipment had to be installed according to the monitoring plan. • It is also confirmed, through the physical site visit and review of the supporting documentation that physical features of the component CPAs have been implemented in accordance with the revised CPA-DDs/44-47/. • The CPAs were also found to be completely operational in line with the revised CPA-DDs/44-47/. • The information provided in the relevant sections of the monitoring report are appropriately describe the implementation and operational status of the PoA.

E.3.2. Post-registration changes

E.3.2.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline

Not Applicable

E.3.2.2. Corrections

Minor changes were made to comply with the revised CPA-DD template guidelines.

As per the para 228 of PS for PoA/34/, the PRC does not prior approval and will be notified to the secretariat in line with the para 171 of the PCP for PoA/35/.
Detailed assessment of the change is presented in PRC validation opinion/48/.

E.3.2.3. Changes to the start date of the crediting period of component project activities

Not Applicable

E.3.2.4. Inclusion of a monitoring plan

Not applicable

E.3.2.5. Permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodology, standardized baseline, or other applied standards or tools

Following changes have been proposed to the CPA DD:

- Revision of B_{old} (Applying lowest value of B_{old} to all the CPAs as a conservative approach).
- Revision of sampling frame in the sampling plan, to remove reference to urban or rural population in light of above.

Detailed assessment of the change is presented in PRC validation opinion/48/.
As per the para 228 of PS for PoA/34/, the PRC does not prior approval and will be notified to the secretariat in line with the para 171 of the PCP for PoA/35/.

E.3.2.6. Changes to the programme design or project design

E.3.2.7. Changes specific to afforestation and reforestation component project activities

Not Applicable

E.3.3. Compliance of the registered monitoring plan with the methodology including applicable tool(s) and standardized baseline

Means of verification	The monitoring plan as contained in respective revised CPA DDs/44-47/ were reviewed against the monitoring requirements of the applied methodology AMS-II.G version 05 /11/ as well as PoA DD/01/ with reference to the technology involved. Based on this review it was found the monitoring plan contained in the revised CPA DDs/44-47/ includes all the required parameters to be monitored in the context of the CPA design and description and allows proper determination of

	emission reductions in accordance with PoA DD/1/ and applied methodology AMS-II.G version 05/11/.
Findings	No finding was raised.
Conclusion	The monitoring plan is in accordance with the approved methodology, AMS-II.G version 05 /11/, that is included in each respective revised CPA DDs/44-47/.

E.3.4. Compliance of monitoring activities with the registered monitoring plan

E.3.4.1. Data and parameters fixed ex ante or at renewal of crediting period

B_{old} - Quantity of woody biomass used in the absence of the project activity in tonnes per household (ton wood/ HH-year)

Means of verification	The registered CPA DDs give a value 4.97 for rural areas and 7.02 for urban areas, which were determined during at the time of validation/7-10/. However, following the proposed changes to CPA-DDs the value of B_{old}(as conservative assumption), a value of 4.97 has been applied to all the CPAs/48, 44-47/.

CPA ref no.	Value applied
CPA -01	4.97 tons wood-eq/HH-yr
CPA -02	4.97 tons wood-eq/HH-yr
CPA -03	4.97 tons wood-eq/HH-yr
CPA -04	4.97 tons wood-eq/HH-yr

Findings	No finding was raised.
Conclusion	The value in the monitoring report and corresponding emission reduction calculations spreadsheet are consistent with the revised CPA DDs/44-47/. The applied value is the most conservative value determined.

η_{old}- Efficiency of the system being replaced, measured using representative sampling methods or based on referenced literature values (percent)

Means of verification	The value was found consistent with the revised CPA DDs/44-47/.

CPA ref no.	Value applied
CPA -01	10%
CPA -02	10%
CPA -03	10%
CPA -04	10%

Findings	No finding was raised.
Conclusion	The value in the monitoring report and corresponding emission reduction calculations spreadsheet are consistent with the revised CPA DDs/44-47/. The applied value is correct and justified.

L_y - Leakage Factor is multiplied by a net to gross adjustment factor to account for leakages

Means of verification	The value of this parameter is a default value sourced from applied methodology/11/. The value was also found consistent with the revised CPA DDs/44-47/ and the regd. PoA-DD/01/.

CPA ref no.	Value applied
CPA -01	95%
CPA -02	95%
CPA -03	95%
CPA -04	95%

Findings	No finding was raised.
Conclusion	The value in the monitoring report and corresponding emission reduction calculations spreadsheet are consistent with the registered PoA-DD/1/, revised

	CPA DDs/44-47/ and applied methodology/11/. The applied value is correct and justified.

$NCV_{biomass}$ - Net calorific value for biomass

Means of verification	The value of this parameter is a default value sourced from applied methodology/11/. The value was also found consistent with the revised CPA DDs/44-47/ and the regd. PoA-DD/01/.CPA ref no.	Value applied	
	CPA -01	0.015 TJ/tonne	
	CPA -02	0.015 TJ/tonne	
	CPA -03	0.015 TJ/tonne	
	CPA -04	0.015 TJ/tonne	
Findings	No finding was raised.		
Conclusion	The value in the monitoring report and corresponding emission reduction calculations spreadsheet are consistent with the registered PoA-DD/1/, revised CPA DDs/44-47/ and applied methodology/11/. The applied value is correct and justified.		

$EF_{projected\_fossil\_fuel}$ - Emission factor for the substitution of non-renewable woody biomass by similar consumers.

Means of verification	The value of this parameter is a default value sourced from applied methodology/11/. The value was also found consistent with the revised CPA DDs/44-47/ and the regd. PoA-DD/01/.CPA ref no.	Value applied	
	CPA -01	81.6 tCO_2/TJ	
	CPA -02	81.6 tCO_2/TJ	
	CPA -03	81.6 tCO_2/TJ	
	CPA -04	81.6 tCO_2/TJ	
Findings	No finding was raised.		
Conclusion	The value in the monitoring report and corresponding emission reduction calculations spreadsheet are consistent with the registered PoA-DD/1/, revised CPA DDs/44-47/ and applied methodology/11/. The applied value is correct and justified.		

$f_{NRB,y}$ - Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass

Means of verification	The value of this parameter is a default	Value applied	

	value sourced from CDM website approved under /50/. The value was also found consistent with the revised CPA DDs/44-47/ and the regd. PoA-DD/01/.CPA ref no.	
	CPA -01	82%
	CPA -02	82%
	CPA -03	82%
	CPA -04	82%
Findings	No finding was raised.	
Conclusion	The value in the monitoring report and corresponding emission reduction calculations spreadsheet are consistent with the registered PoA-DD/01/ & revised CPA DDs/44-47/ and the source/50/. The applied value is correct and justified.	

$\eta_{specified}$ - Efficiency of the system being deployed at the time of CPA inclusion

Means of verification	The value of the parameter was determined as per the manufacturer's specifications for each type of ICS disseminated under the project activity. This was checked with the regd. CPA DDs/44-47/. Stove type: Values stated in CPA DD EZY: 27.1% (CPA-01) SHS: 26.0% (CPA02, CPA03, CPA04) AES: 25.3% (CPA02, CPA03, CPA04) The efficiencies have been updated as per the actual performance of the stoves. The detailed verification is provided under section E.3.4.2.
Findings	No finding was raised.
Conclusion	The value in the monitoring report and corresponding emission reduction calculations spreadsheet are consistent with the revised CPA DDs/44-47/. The applied value is correct and justified.

E.3.4.2. Data and parameters monitored

μ_{old} - Quantity of woody biomass used in the project activity by traditional stoves, tonnes wood/ year

Means of verification	**Criteria/Requirements**	**Assessment/Observation**
	Measuring /Reading /Recording frequency	Measured annually
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The measuring and reporting frequency are in line to registered CDM PoA DD/1/ and applied methodology.
	Monitoring equipment	Not applicable

	Calibration frequency /interval:	Not applicable
	Is(are) calibration(s) valid for the whole reporting period?	Not applicable
	How were the values in the monitoring report verified?	The CPAs measure changes in B_{old} displaced by the project activity through this independent parameter. A random sampling is applied in the survey or field test conducted to determine the amount of fuel-wood still used in the project activity by traditional stoves. Survey questionnaires administered to a sample of end users elicit visual inspections of the household and if necessary an interview to confirm whether they are still using a baseline stove and, to obtain self-reported estimates of the amount of non-renewable biomass used per day in traditional stoves in parallel to the improved stove during various seasons. The quantity of woody biomass still used by traditional stoves (μ_{old}) is excluded from B_{old}. Alternatively, field testing measure fuel consumption by traditional stoves. A weighted average of stove sales for each vintage is applied. The value of the parameter for all the CPAs i.e. CPA1, CPA 2, CPA 3 & CPA 4 is 0.4891 tonnes wood/ year. It is noteworthy that PP has done sampling across the CPA due to the similar nature of the technology employed in the PoA. 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
	If applicable, has the reported data been cross-checked with other available data?	The survey results/24/, assumptions and sales records were checked by the verification team and were found acceptable. The results are reproducible in the corresponding ER sheet/16/ of final Monitoring Report. The verification team randomly selected 20 samples of each ICS type for DOE's field survey and via on-site interview found out amount of woody biomass consumed per household per year, which was consistent with the CME's sample survey result.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. The QA/QC procedure are in place, internal checks have been done by the CPA implementer and established during the onsite assessment. During the site visit, the assessment team has duly verified the CME's QA/QC procedures in which the data transfer from hard copies (field survey reports etc.) to excel sheets are randomly cross checked by the senior management either from the hard copies/ sales receipts/ telephonic calls to ascertain the reliability and correctness of the entered data in the excel sheet.

	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	No such issues.
Findings	No finding was raised.	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/1/ (as per measurement methods and procedures to be applied) and applied methodology/11/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan/1/.	

η_{new} - Efficiency of the system being deployed as part of the project activity (percentage), as determined using the Water Boiling Test (WBT) protocol

Means of verification	**Criteria/Requirements**	**Assessment/Observation**
	Measuring /Reading /Recording frequency	Measured annually
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The measuring and reporting frequency are in line to registered CDM PoA DD/1/ and applied methodology/11/. It was checked that the WBT tests for previous monitoring period /14/ was performed in August 2015. The WBT tests for this monitoring period were conducted between Aug 2016 to Oct 2016 with 95% confidence level at 10% precision. Hence, the assessment team concluded that the annual frequency of measurement is followed.
	Monitoring equipment	The WBT tests/26/ were conducted by third party CIRCODU and undertaken following a simplified version of WBT protocol 4.2.3 /29/ by an experienced party. The PoA DD or revised CPA DDs/44-47/ do not prescribe any specific monitoring equipment but weighing scale and thermometer were required and used to conduct WBT.
	Calibration frequency /interval:	Not applicable
	Is(are) calibration(s) valid for the whole reporting period?	Not applicable
	How were the values in the monitoring report verified?	The efficiency results of the Water boiling test conducted by third party/26/ were verified from WBT raw data sheets/41/. WBT was conducted for sampled number of stoves. The samples were taken for each type of ICS. The weighted of average of the efficiency was then calculated through two ways: 1. with population size of each ICS type and average efficiency of each type (25.02%) 2. with adjusted population size considering date of deployment and average efficiency of each type (25.07%). The lower, among the two values was used for the calculation of ERs. The approach was found to be conservative.

		The sampling size for efficiency of each stove type was calculated separately in accordance with the PoA-DD /01/ and Guidelines for sampling and surveys /37/. The sampling size calculations are presented in the Sample Size Calculation excel workbook/17/. The resultant sample considered for the WBT of stoves consisted of 25 EZY, 41 SHS & 12 AES stoves aggregating to sample size of 78 stoves. The sample size was determined applying 95/10 confidence precision and reliability check has also been clearly presented in the ER sheet/16/. Hence, the sampling plan was found representative of the population. (Please refer to section E.3.4.3 for more details on sampling size)
	If applicable, has the reported data been cross-checked with other available data?	The WBT results/26,41/, assumptions and sales records/19/ were checked by the verification team and were found acceptable. The results are reproduced in the corresponding ER sheet/16/ of final Monitoring Report/13/. The verification team has checked all the stove efficiency test (WBT) results and found out the efficiency of the ICS are consistent with the CME's and actual WBT results and sample survey result as reported in the final MR/13/ and corresponding ER spreadsheet/16/.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. The QA/QC procedure are in place, internal checks have been done by the CPA implementer and the testing agency (CIRCUDO) established during the onsite assessment like visiting the testing agency premises and interviewing the personnel involved in the WBT tests. The WBT tests were undertaken following a simplified version of WBT protocol 4.2.3 /26,41/ by an experienced team. Each stove undergoes three set of tests to ensure the correction of the efficiency test. The PoA DD or revised CPA DDs do not prescribe any specific monitoring equipment, but calibrated weighing scale and thermometer were required and used to conduct WBT. The value of the parameter for each sample point was determined on annual basis using the water boiling test (WBT) protocol carried out in accordance with internationally accepted WBT protocol 4.2.3 /29/.
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	No such issues.
Findings	CAR#08 was raised and resolved.	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/1/ (as per measurement methods and procedures to be applied) and applied methodology/11/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.	

N_y - Number of appliances deployed during period as part of the SSC-CPA, Number of Appliances

Means of verification	Criteria/Requirements	Assessment/Observation

	Measuring /Reading /Recording frequency	Measured continuously and aggregated annually
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The measuring and reporting frequency are in line to registered CDM PoA DD/1/ and applied methodology/11/.
	Monitoring equipment	Not applicable
	Calibration frequency /interval:	Not applicable
	How were the values in the monitoring report verified?	The values in the MR/13/ have been verified from the sales database/19/. The value of the parameter for all the CPAs i.e. CPA1, CPA 2, CPA 3 & CPA 4 are 9956-0001= 13,293 9956-0002= 11,540 9956-0003= 11,537 9956-0004= 11,521
	If applicable, has the reported data been cross-checked with other available data?	The sales records/19/ were checked by the verification team and were found acceptable. The results are reproducible in the corresponding ER sheet/16/ of final Monitoring Report/13/. The verification team randomly selected 20 samples of each ICS type for DOE's field survey and via on-site interview found out that all the ICS which are picked up for sampling are installed at the household and are in working condition, which was consistent with the CME's sample survey result.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. The QA/QC procedure are in place, internal checks have been done by the CPA implementer and established during the onsite assessment. During the site visit, the assessment team has duly verified the CME's QA/QC procedures in which the data transfer from hard copies to excel sheets are randomly cross checked by the senior management either from the hard copies/ sales receipts/ telephonic calls to ascertain the reliability and correctness of the entered data in the excel sheet.
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	No such issues.
Findings	CCAR#07 was raised and resolved.	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/1/ (as per measurement methods and procedures to be applied) and applied methodology/11/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan/1/.	

U_y - Average usage rate of appliance type being deployed during as part of the SSC-CPA.

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Measured annually
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The measuring and reporting frequency are in line to registered CDM PoA DD/1/ and applied methodology/11/.
	Monitoring equipment	Not applicable
	Calibration frequency /interval:	Not applicable
	How were the values in the monitoring report verified?	The value of the parameter was determined as ratio of total number of stove samples found operational by total number of stove samples monitored. The calculated value is 91.72%. The survey was conducted by a third party CIRCODU. The Usage Survey sheet was checked. It is noteworthy that PP has done sampling across the CPA due to the similar nature of the technology employed in the PoA. The sample size was determined applying 95/10 confidence precision and reliability check has also been clearly presented in the ER sheet/16/. The team leader has also visited a sampled number of households during the site visit. The end users in these households reported that their ICSs is in use since installation.
	If applicable, has the reported data been cross-checked with other available data?	The survey results/25/, assumptions and sales records/19/ were checked by the verification team and were found acceptable. The results are reproducible in the corresponding ER sheet/16/ of final Monitoring Report. The verification team randomly selected 20 samples of each ICS type for DOE's field survey and via on-site interview found out the usage of the installed ICS which was consistent with the CME's sample survey result.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. The QA/QC procedure are in place, internal checks have been done by the CPA implementer and established during the onsite assessment. During the site visit, the assessment team has duly verified the CME's QA/QC procedures in which the data transfer from hard copies (field survey reports etc.) to excel sheets are randomly cross checked by the senior management either from the hard copies/ sales receipts/ telephonic calls to ascertain the reliability and correctness of the entered data in the excel sheet.

	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	No such issues.
Findings	CAR#02 and CAR#08 were raised and resolved.	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/1/ (as per measurement methods and procedures to be applied) and applied methodology/11/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan/1/.	

E.3.4.3. Implementation of sampling plan

Means of verification	The monitoring has been carried out in accordance with the monitoring plan contained in the PoA DD /01/ and respective revised CPA DDs/44-47/. A single sampling plan was carried out across all specific-case CPAs covered in this monitoring period. All the 4 CPAs 9956-0001, 9956-0002, 9956-0003 and 9956-0004 were covered in the single sampling plan. <u>Sampling Design</u> CME has used a simple random sampling method, which is in line with the monitoring plan of the revised approved PoA DD (Section B.7.2) as referred in the respective revised CPA DDs/44-47/. The sampling frame considered confidence level and precision as 95/10 in line with the requirement of Standard for sampling and surveys for CDM PAs and PoAs. Since the Sampling Standard allows for sampling across a group of CPAs, where 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. A representative sampling has been undertaken as part of SSC-PoA-wide Sampling Plan (by grouping and sampling across CPAs) in line with the requirements of the Guideline for "Sampling and Surveys for CDM Project Activities and Programme of Activities version 04.0"/36/. Target population: The target population for the three parameters stated above are all ICS recorded in the project database. Sampling frame: For the parameters Usage Rate (Uy) and Quantity of woody biomass used in the project activity by traditional stoves (µold), the CME has used one single sampling frame as the population is homogeneous considering that all the End users are for domestic (household) and Geographical area of the project: all models are being distributed in the same geographical area, Uganda. For the thermal efficiency of the stoves(η_{new}), CME has considered three sampling frames, one for each stove model. <u>Sampling Method:</u> CME has used Simple Random Sampling where the samples were randomly selected from the sub-population units i.e. cook-stove type.

Applying the random number generator, the ICS are randomly chosen from the defined population up to the required sample size as calculated by the CME.

Sample Size (Required and Actual) for Parameter of Interest:
The sampling is applied to the following monitoring parameters:
1. Thermal Efficiency of operational ICS: $\eta_{new,y,i}$ (mean parameter)
2. The fraction by which emission reductions are multiplied to adjust for drop- off of technologies in use per year: U_y (proportional parameter)
3. Quantity of woody biomass used in the project activity by traditional stoves: μold-(mean parameter)
The sampling size were determined following the 95/10 confidence precision and applying the formulas sourced from Guidelines: Sampling and survey for CDM PA and PoA/37/ and para 12 of Standard: sampling and surveys for CDM PA and PoA/36/ to and calculations is clearly presented in the Sample Size Calculation excel workbook /17/.

The assessment team confirms that the applied method for sampling size calculation are in accordance with the provisions of the PoA-DD (paragraph 1 on pg 62)/1/ which allows CME to apply actual data for recalculation of sampling size.

For the parameter n_{new}, following para 12 of Sampling Standard Version 4.0/36/ Student's t-distribution was used since the resulting sample size obtained was less than 30." The detailed calculation has been described in the sample size calculation sheet/17/.

Data collection and analysis:
Data collection and survey were done by a third party "Center for Integrated Research and Community Development Uganda (CIRCODU)" through field surveys. Surveyor 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.
In this regard, sample size calculation spreadsheet /16/ was checked and found correct as per registered monitoring plan.

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
$\eta_{new,y,}$ (EZY)	24.94%
$\eta_{new,y,l}$ (SHS)	23.65%
$\eta_{new,y,l}$ (AES)	25.68%

For efficiency:
The CME has demonstrated the status of precision/confidence for each of the monitored parameters for efficiency in the monitoring report which can be summarized as follows

ICS types	EZY	SHS	AES	Means of verification
Total number of Stoves	13,293	28,054	6,544	Sales records has been checked by the assessment team/19/
Sample Size covered	25	41	12	Sampling records from the sampling calculation sheet has been checked/17/

	Precision (%)	2.49%	1.23%	2.78%	The calculation has been checked from the WBT Results sheet/26/.
	Result	Acceptable	Acceptable	Acceptable	The precision for all the ICS are found to be within the acceptable range.

This monitoring report includes the 3 different type of technologies (ICS) with different years of dissemination, namely 2013-2014-2015 and 2016. For a sampled number of stoves, the efficiency on the basis of type was determined through WBT test. Mean of each stove type was calculated. Weighted average over population (with and without considering the date of deployment) was calculated. The lower, among the two values, has been used for the ER calculation. The efficiency value used for calculation is 25.02%.
The value of the parameter is assessed in detail under section E.3.4.2 of this report.

For parameter U_y and μ_{old}:
The CME has demonstrated the status of precision/confidence for each of the monitored parameters for U_y and μ_{old} in the monitoring report which can be summarized as follows

	U_y	μ_{old}	Means of verification
Total number of Stoves	47,891	47,891	Sales records has been checked by the assessment team/19/.
Sample Size	157	140	Sampling records from the sampling calculation sheet has been checked/17/.
Precision	4.69%	35.82%	The calculation has been checked in the Household Survey sheet.
Result	Acceptable	Use higher bound value	The precision for the monitoring parameter U_y is found to be within the acceptable range. For the parameter, since the precision is out of the acceptable range, so CME has used the higher bound value which is appropriate and conservative.

As the desired precision for µold 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 µold has been determined as a conservative measure.
The value of the parameter is assessed in detail under section E.3.4.2 of this report.

Reliability check
It 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/16/.
The reliability (demonstration of precision achieved after the survey results) is depicted in the ER sheet /16/ corresponding to final Monitoring Report /13/, which were also found correct. Based on the verified results the verification team found that the required precision is met in all the cases and therefore the survey results /24, 25, 26/ were directly used in the calculation of ERs.

Findings	CAR#02, CAR#03 and CAR#08 were raised and resolved.
Conclusion	The verification team confirmed that the sampling plan and the parameter values are in accordance with the monitoring plan provided in PoA DD /01/.

E.3.4.4. Compliance with the calibration frequency requirements for measuring instruments

Means of verification	No monitoring equipment is required to monitor the parameters, as verified through the registered monitoring plan as outline in the CPA-DD/44-47/ and registered PoA-DD/1/. The monitored data was collected and surveyed done by a third party "Center for Integrated Research and Community Development Uganda (CIRCODU)". CIRCODU is having a good experience in monitoring cookstove

	projects in Uganda. Since the data was provided by a third party and PP was not involved in survey test for WBT & Usage, thus no monitoring equipment was used by the PP and thus no need of calibration. However, DOE has checked the calibration certificates/28/ of the third party CIRCUDO and found that equipment used during the survey are duly calibrated.
Findings	No finding was raised.
Conclusion	The verification team confirm that CME has applied good practice by contracting a reputed third party for data collection & sampling survey and the equipment used by the third party for sample surveyed are duly calibrated.

E.3.5. Assessment of data and calculation of emission reductions or net removals

E.3.5.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

Means of verification	The verification team verified that a) A complete set of data for the monitoring period was available for the monitoring period and the verification of each monitoring parameter is elaborated under Section E.3.4.2 of this report. The complete monitoring data is also presented in the corresponding ER calculations sheet /16/ of final Monitoring Report /13/. b) The information provided in the monitoring report was cross checked with other sources, wherever appropriate and available, and such information is also included under Section E.3.4.2 of this report. . c) The calculations of baseline emissions as presented in the corresponding ER calculations sheet of final Monitoring Report were checked and found to be consistent with the formulae and methods described in the registered monitoring plan of each relevant CPA DD/44-47/, PoA DD/1/ and the applied methodology/11/. d) All assumptions used in the emission calculations were found appropriate and therefore justified e) Appropriate emission factors, IPCC default factors and other reference values have been correctly applied. This has also been elaborated under Section E.3.4.1 of this report. f) No standardized baseline was prescribed in the PoA DD/1/ and therefore it has not been applied. g) There is no pro-rata approach was applied in the current monitoring period as entire monitoring period falls into period that is after the end of first commitment period of Kyoto Protocol. The following equations were used to determine the baseline emissions as provided in the monitoring report /13/ and applied in the corresponding ER calculations sheets /16/. The expressions used were found consistent with the registered PoA DD, revised CPA DDs/44-47/ and the applied methodology AMS-II.G, version 05/11/: Total ER reductions achieved in the current monitoring period by all types of ICS distributed in the relevant CPA is calculated using the following expressions: Emission reductions are calculated as follows: $\mathbf{ER_y = (B_{y,savings} * N_y * U_y) * (f_{NRB,y} * NCV_{biomass} * EF_{projected\_fossil\ fuel})}$ **…(1)** Where: ER_y Emission reductions during the period y in tCO2e $f_{NRB,y}$ 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 tCO2/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:

CPAs	9956-0001	9956-0002	9956-0003	9956-0004	**MOV**
ER_y (tCO_2e)	20,307	22,503	22,384	15,705	Calculation checked in ER sheet/16/
$f_{NRB,y}$	82%	82%	82%	82%	Checked from PoA DD/01/ and revised CPA DDs/44-47/.
$NCV_{biomass}$ (TJ/tonne**)**	0.015	0.015	0.015	0.015	Checked from PoA DD/01/ and revised CPA DDs/44-47/.
$EF_{projected\_fossil\ fuel}$ (tCO_2/TJ**)**	81.60	81.60	81.60	81.60	Checked from PoA DD/01/ and revised CPA DDs/44-47/.
N_y	13,293	11,540	11,537	11,521	Checked from Sales Database/19/
Adjusted* Value of N_y	8633	9567	9516	6677	Calculation checked from the ER sheet/16/
U_y	91.72 %	91.72 %	91.72%	91.72%	Third Party Survey Record/25/
$B_{y,savings}$ (ton wood/HH-year)	2.56	2.56	2.56	2.56	Calculation checked in ER sheet/16/

$B_{y,savings,i}$ is estimated using option 2 of the methodology AMS II.G Version 5:
$B_{y,savings} = [(B_{old} - \mu_{old}) * L] * (1 - \eta_{old}/\eta_{new})$

Parameter	Description	Value applied	Means of Verification

B_{old}	Quantity of biomass used in the absence of the project activity in tonnes/ year **(**unit: tonnes wood-eq/HH-yr)	4.97	Verified from revised CPA DDs/44-48/.
μ_{old}	Quantity of woody biomass for the continued use of old stoves	0.4891	Verified from survey records/25/.
η_{old}	Weighted average value is used since the replaced systems are unimproved and improved baseline technologies	10%	Verified from PoA DD/01/ and CPA DDs/44-48/.
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.	25.02%	Checked from third party WBT records/26/.
L	Leakage adjustment factor (percentage)	95%	Verified from the applied methodology AMS-II.G. version 5.0/11/.

*In ER sheet, an equivalent year of each stove credited under the CPA has been determined(column L, sheet titled “Sales”, ER sheet/16/). An average of this value is multiplied with total number of stoves to get adjusted number of stoves(Row 11, sheet titled “Sales”, ER sheet/16/). This value is used as Ny and multiplied with the other factors in equation (1) to get the final emission reduction under each CPA. Sum of emission reduction from all the CPAs gives total emission reductions achieved in the current monitoring period i,e, 80,899 tCO_2e.

	Detailed assessment of all the parameters used to calculate emission reductions is provided under section E.3.4.2.
Findings	CAR#03, CAR#04, CAR#06 (In response to UN comments) and CAR#07(In response to UN comments) were raised and closed.
Conclusion	The verification team confirms that a) The complete data was available and is duly reported; b) As indicated above, the description with regard to cross-check of reported data is included under respective parameter (refer Section E.3.4.2 of this report); c) Appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals were followed; d) Appropriate emission factors, IPCC default factors and other reference values were correctly applied. e) There is no pro-rate approach was applied in the current monitoring period as entire monitoring period falls into period that is after the end of first commitment period of Kyoto Protocol.

E.3.5.2. Calculation of project GHG emissions or actual net GHG removals by sinks

Means of verification	The PoA DD/1/, CPA DD/44-47/ and applied monitoring methodology/11/ does not prescribe any project emissions to be considered. The onsite visit and project design also did not reveal any potential source to be considered in this regard.
Findings	No finding was raised
Conclusion	No project emissions were required to be calculated.

E.3.5.3. Calculation of leakage GHG emissions

Means of verification	The PoA DD/1/, revised CPA DDs /44-47/ and applied monitoring methodology/11/ does not prescribe any leakage emissions to be considered. The onsite visit and project design also did not reveal any potential source to be considered in this regard. However, the leakage adjustment factor that is required to adjust the baseline emissions has been duly accounted in baseline calculations.
Findings	No finding was raised.
Conclusion	No additional leakage emissions (other than what is already considered in baseline calculations) were required in accordance with the methodology AMS-II G, version 05 /11/.

E.3.5.4. Summary of calculation of GHG emission reductions or net GHG removals by sinks

Means of verification	As elaborated above, the entire emission reductions from the PoA were based on baseline emissions. The calculations presented in this regard in the final monitoring report /13/ and corresponding ER calculations sheet /16/ were found appropriate and complying with the provisions prescribed in the registered monitoring plan of respective revised CPA DDs/44-47/, PoA-DD/1/ and applied methodology/11/. The verification team confirms that an audit trail that contains the evidence and records that validated the stated figures were checked and found acceptable.
Findings	No finding was raised.
Conclusion	The verification team confirms that: a) The complete data was available and is duly reported; b) As indicated above, the description with regard to cross-check of reported data is included under respective parameter (refer Section E.3.4.2 of this report); c) Appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals, project emissions and leakage emissions were followed; d) Appropriate emission factors, IPCC default factors and other reference values were correctly applied. e) There is no pro-rate approach was applied in the current monitoring period as entire monitoring period falls into period that is after the end of first commitment period of Kyoto Protocol. The total number of ERs achieved during the current monitoring period is 80,899 tCO_2e.

Title and UNFCCC reference number of the CPA	Baseline emissions or baseline net GHG removals by sinks (tCO_2e)	Project emissions or actual net GHG removals by sinks (tCO_2e)	Leakage (tCO_2e)	GHG emission reductions or net GHG removals by sinks (tCO_2e)		
				Amount achieved before 1 January 2013	Amount achieved from 1 January 2013	Amount achieved in the entire monitoring period
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**	**0**	**0**	**80,899**	**80,899**

E.3.5.5. Comparison of actual GHG emission reductions or net GHG removals by sinks with estimates in included CPA

Means of verification	As verified and evident from the final Monitoring Report /13/ and corresponding ER calculations sheet /16/, the actual emission reductions achieved by each CPA that is included in the current monitoring period were found less than the estimated quantity in the respective revised CPA DDs/44-47/ for the comparable period because of the reduced number of ICS in operation and shorter operational days of ICS due to the fact that not every ICS operate for the full length of monitoring period. In the ex-ante calculation, it is assumed that all ICS will be in operational for the whole monitoring period.
Findings	No finding was raised.
Conclusion	The actual emission reductions achieved in each specific CPA are not higher than the estimated quantity of ERs in the respective revised CPA DDs/44-47/. Accordingly, it was accepted by the verification team.

Title and UNFCCC reference number of the CPA	Value estimated in ex ante calculation in the included CPA-DD(s)	Actual values achieved by the CPAs during this monitoring period
Up Energy Improved Cookstoves Programme, Uganda – CPA No 001 9956-0001	39,976	20,307
Up Energy Improved Cookstoves Programme, Uganda – CPA No 002 9956-0002	40,070	22,503
Up Energy Improved Cookstoves Programme, Uganda – CPA No 003 9956-0003	40,070	22,384
Up Energy Improved Cookstoves Programme, Uganda – CPA No 004 9956-0004	40,070	15,705
Total	**160,186**	**80,899**

E.3.5.6. Remarks on difference from estimated value in included CPA

Means of verification	As verified and evident from the final Monitoring Report /13/ and corresponding ER sheet /16/, the actual emission reductions achieved by ICS for CPA that is included in the current monitoring period were found less than the estimated quantity in the respective revised CPA DDs/44-47/ for the comparable period.
Findings	No findings
Conclusion	The actual emission reductions achieved for CEP covered under this Section for specific CPA are not higher than the estimated quantity of ERs in the respective revised CPA DDs/44-47/.

E.3.6. Assessment of reported sustainable development co-benefits

Means of verification	Not applicable
Findings	Not applicable
Conclusion	Not applicable

E.3.7. Global stakeholder consultation

Means of verification	This is not the first monitoring period.
Findings	Not Applicable.
Conclusion	Not applicable.

SECTION F. Internal quality control

A draft verification report prepared by verification team is reviewed by an independent technical review team (one or more members) to confirm whether all the internal procedures established and implemented by ESPL were duly complied with and such opinion/conclusion were reached in an objective manner that complies with the applicable CDM rules/requirements. The technical review team is collectively required to possess the technical expertise of all the technical area/sectoral scope the project activity relates to. All team members of technical review team are independent of the verification team.

During the technical review process additional findings may be identified, or the closed-out findings may be opened, which needs to be satisfactorily resolved before the request for issuance is submitted to UNFCCC. The independent technical reviewer may either approve the report as such or reject/return the same in such case providing the comments/findings/issues that needs to be resolved by the verification team. The decision taken by the Technical Reviewer is final and is authorized by the Managing Director on behalf of Earthood Services Private Limited.

SECTION G. Verification opinion

Earthood Services Private Limited (ESPL), contracted by UpEnergy Group (the CME for the PoA), has performed the second independent verification of the emission reductions for the registered CDM PoA 9956 “UpEnergy Improved Cookstove Programme, Uganda” in Uganda for the monitoring period 11/12/2015-31/10/2016 (both days included) as reported in the Monitoring Report (public) Version 01 dated 25/11/2016. The CME is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity.

This verification report is for the CPAs (9956-0001, 9956-0002, 9956-0003, and 9956-0004), which were included at the UNFCCC webpage at the end of the current monitoring period. A single monitoring report has been prepared by the CME for the same in which implementation of all referred CPAs along with monitoring results is included.

ESPL confirms that the monitoring system is in place and the emission reductions are calculated without material misstatements. This verification report has been prepared using the latest available template specified by UNFCCC and complies with the instructions to follow CDM VVS for PoA Version 1.0.

The verification activities were conducted in accordance with ESPL’s CDM Quality Manual System as per the steps indicated under Section A of this report. The verification process has resulted in conclusion that the included CPAs confirm to the registered PoA DD as well as comply with applicable CDM rules and regulations and in accordance with applied monitoring methodology, AMS II.G Version 05.

As a result, it is confirmed that the emission reductions from the CDM PoA 9956 “UpEnergy Improved Cookstove Programme, Uganda” are correctly reported in the Monitoring Report (final) Version 10 dated 05/06/2018 and corresponding ER sheet for the monitoring period 11/12/2015-31/10/2016 (including both days) amount as 80,899 tCO2e. Therefore, this will be submitted as part of request for issuance as per CDM PCP for PoA Version 1.0.

SECTION H. Certification statement

The verification approach is based on the understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. ESPL planned and performed the verification by obtaining evidence and other information and explanations that ESPL considered necessary to give reasonable assurance that reported GHG emission reductions are fairly stated.
In our opinion the GHG emissions reductions reported for the project activity for the period 11/12/2015-31/10/2016 are fairly stated in the Monitoring Report (final) Version 10 dated 05/06/2018.

ESPL, based on outcome of verification activities, certify in writing that, during the monitoring period 11/12/2015-31/10/2016 (including both days), the registered CDM PoA "UpEnergy Improved Cookstove Programme, Uganda" and all of the included CDM CPAs (9956-0001, 9956-0002, 9956-0003, and 9956–0004) in the registered CDM PoA achieved the verified amount of 80,899 tCO_2e reductions in anthropogenic emissions by sources of greenhouse gases that would not have occurred in the absence of the CPAs.
The verified amount of emission reductions is stated below as per each CPAs and as per commitment period;

	Emission Reductions (Amount) in this monitoring period (in tCO2e)	
CPAs (included in this request)	**Up to 31/12/2012 (1st commitment period)**	**01/01/2013 onwards**
9956-0001	0	20,307 tCO_2e
9956-0002	0	22,503 tCO_2e
9956-0003	0	22,384 tCO_2e
9956-0004	0	15,705 tCO_2e
Total	**0**	**80,899** tCO_2e

Appendix 1. Abbreviations

Abbreviations	Full texts
AQL	Acceptable Quality Level
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM PCP for PoA	Clean Development Mechanism Project Cycle Procedure for Programme Of Activity
CDM PS for PoA	Clean Development Mechanism Project Standard for Programme Of Activity
CDM VVS for PoA	Clean Development Mechanism Validation and Verification Standard for Programme Of Activity
CER	Certified Emission Reduction
CL	Clarification Request
CIRCUDO	Center for Integrated Research and Community Development Uganda
CME	Coordinating or Managing Entity
CPA	Component Project Activity
CP	Crediting period
DOE	Designated Operational Entity
DNA	Designated National Authority
EB	Executive Board
ESPL	Earthood Services Private Limited
FAR	Forward action request
GHG	Green House Gases
GS	Gold standard
ICS	Improve Cook Stoves
IPCC	Intergovernmental Panel on Climate change
MIS	Management Information System
POA	Programme Of Activity
PO	Partner Organization
TA	Technical Area
TR	Technical Reviewer
UNFCCC	United Nation Framework convention on Climate change
WBT	Water Boiling Test
GACC	Global Alliance for Clean Cookstoves

Appendix 2. Competence of team members and technical reviewers

Competence Statement	
Name	Deepika Mahala
Country	India
Education	M. Sc. (Environmental Mgmt), GGSIP University B.Sc. Honour (Chemistry), Sri Venkateshwar College, DU
Experience	2 Years +
Field	Climate Change
Approved Roles	
Team Leader	YES
Validator	YES
Verifier	YES
Methodology Expert	ACM0002, AMS.I.D., AMS.I.A, AMS.III.AV, AMS.II.G

Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	NO		
TA Expert	YES (TA 1.2 & TA 3.1)		
Reviewed by	Abhishek Mahawar	**Date**	01/03/2018
Approved by	Ashok Kumar Gautam	**Date**	01/03/2018

Competence Statement			
Name	Nayan Jyoti Deka		
Country	India		
Education	M.Tech. (Energy Technology), Tezpur University		
Experience	9 Years +		
Field	Climate Change & Energy Management		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS-I.D., AMS-III.H., AMS-I.C., ACM0006, ACM0002, ACM0014, AMS-IIG, AMS-IE., AMS.III.BG		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert	YES (TA 1.1, TA 1.2, TA 13.1)		
Reviewed by	Abhishek Mahawar	**Date**	01/03/2018
Approved by	Ashok Kumar Gautam	**Date**	01/03/2018

Competence Statement			
Name	Ashok Gautam		
Country	India		
Education	M. Sc. (Environmental Sciences) M. Tech. (Energy & Environmental Management)		
Experience	16 Years +		
Field	Energy, Climate Change & Environment		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS-I.D., AMS-I.A., AMS-I.C., AMS-I.E, AMS-II.D., AMS-II.G., AMS-III.E., AMS-III.H., AMS-III.Q, AMS-III.Z., AMS-III.AV., AM0029, AM0025, AM0056, ACM0001, ACM0002, ACM0004, ACM0012, ACM0006, AM0018, ACM0009		
Local expert	YES (India)		
Financial Expert	YES		
Technical Reviewer	YES		
TA Expert	YES (TA 1.1, TA 1.2, TA 3.1, TA 13.1)		
Reviewed by	Abhishek Mahawar	**Date**	01/03/2018

Approved by	Kaviraj Singh	**Date**	01/03/2018

Competence Statement			
Name	Julius Sam Khaukha		
Country	Uganda		
Education	Bachelors in Social Administration		
Experience	7 Years +		
Field	Education and Social Work		
Approved Roles			
Team Leader	NO		
Validator	NO		
Verifier	NO		
Methodology Expert	NO		
Local expert	YES (Uganda)		
Financial Expert	NO		
Technical Reviewer	NO		
TA Expert	NO		
Reviewed by	Abhishek Mahawar	**Date**	01/03/2018
Approved by	Ashok Kumar Gautam	**Date**	01/03/2018

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	CME	PoA DD	Version- 04, dated – 30/06/2014	Others
2	DNV	Validation report	Version- 03, dated – 07/07/2014	Others
3	CME	CPA DD – 1	Version- 04, dated – 30/06/2014	Others
4	CME	CPA DD – 2	Version-03 , dated - 09/03/2015	Others
5	CME	CPA DD – 3	Version- 02, dated – 06/04/2015	Others
6	CME	CPA DD – 4	Version- 02, dated – 06/04/2015	Others
7	DNV	CPA #1 validation report	Version- 04, dated – 07/07/2014	Others
8	TUV NORD	CPA #2 validation report	Version- 0, dated – 16/03/2015	Others
9	TUV NORD	CPA #3 validation report	Version- 0, dated – 16/04/2015	Others
10	TUV NORD	CPA #4 validation report	Version- 0, dated – 16/04/2015	Others
11	UNFCCC	Methodology AMS II G, version 05	-	Others
12	CME	Monitoring report (Publication)	Version- 01, dated – 25/11/2016	CME
13	CME	Monitoring report (Final version)	Version 10 dated 05/06/2018	CME
14	ESPL	Verification Report for Period 22 Jul 2014 - 10 Dec 2015	Version 2.0, dated 20/05/2016	CME

15	CME	ER calculation excel-sheet (Initial)	Version- 01, dated – 25/11/2016	CME
16	CME	ER calculation excel-sheet (Final)	Version 7.0, date 21/12/2017	CME
17	CME	Annex 02-Sample size calculation sheet	-	CME
18	CME	Partner Information - PoA9956 - Iss 2	-	CME
19	CME	Annex 01 - Sales Database - PoA9956 - Iss 2	-	CME
20	CME	Annex 04 - First Sale Receipts	-	CME
21	CME	Annex 08 – Carbon waiver form	-	CME
22	CME	Annex 10 - Calibration Certificate of Electronic weigh Balance - PoA9956 - Iss 2	10/11/2016	CME
23	CME	Annex 09 -Stove Technical Specification - PoA9956 - Iss 2	-	CME
24	CME	Annex 12 - HH Survey - PoA9956 - Iss 2	-	CME
25	CME	Annex 04 - Usage Survey - PoA9956 - Iss 2	-	CME
26	CIRCODU	Annex 03 - UPE WBT Results	-	CME
27	CME	Annex 13 - Urban or Rural Disseminated ICS	-	CME
28	CME	Annex 10 - Calibration Certificate of Thermometer - PoA 9956	10/11/2016	CME
29	GACC	The Water Boiling Test Protocol	Version 4.2.3	Other
30	ESPL	DOE Field Survey	-	Other
31	CME	Sample Photos of the ICS with Unique Serial Number	-	CME
32	IPCC	IPCC Defaults	2006	Other
33	UNFCCC	CDM VVS for PoA	Version 01	Other
34	UNFCCC	CDM PS for PoA	Version 01	Others
35	UNFCCC	CDM PCP for PoA	Version 01	Others
36	UNFCCC	Standard: Sampling and surveys for CDM project activities and programme of activities	4	Others
37	UNFCCC	Guideline: Sampling and surveys for CDM project activities and programme of activities	3.0	Others
38	CME	List of Cookstoves projects in Uganda	-	CME
39	UNFCCC	https://cdm.unfccc.int/ProgrammeOfActivities / registered.html	-	Others
40	Aprovecho Research Centre	Stove Life	October,2012	CME
41	CME	Annex 11- WBT excel sheets - PoA9956 - Iss 2	-	CME
42	Gold Standard	https://mer.markit.com/br-reg/public/project.jsp?project_id=103000000002469	-	GS
43	SHS, AES	Warranty cards (UID-HHKK33, LLRR88, ZZJJRR, YYUUZZ, 8800AA, PPUUJJ, PPAARR, CCYYHH, OOKKUU, UAO2708, UAO2738, AES3248, AES3478, AES3526)	2015, 2016	CME
44	CME	Revised CPA DD for CPA 001	Version 6.0, dated 17/05/2018	CME
45	CME	Revised CPA DD for CPA 002	Version 5.0, dated 17/05/2018	CME
46	CME	Revised CPA DD for CPA 003	Version 4.0, dated 17/05/2018	CME
47	CME	Revised CPA DD for CPA 004	Version 4.0, dated 17/05/2018	CME
48	ESPL	PRC Validation Opinion	Version 2.1, dated 31/05/2018	Other
49	UNFCCC	CDM-PoA-MR-FORM	Version 2.0	Other
50	UNFCCC	List of default f_{NRB}	EB67, Annex 22, Table 2,	Other

Appendix 4. Clarification requests, corrective action requests and forward action requests

Table 1. Remaining FAR from validation and/or previous verification

There is no finding from validation /02, 7-10/ or previous verification report/14/.

Table 2. CL from this verification

CL ID	01	**Section no.**	E.2.1	**Date :** 14/01/2017
Description of CL				
The following documents/records were checked during on-site assessment by the verification team. However the same have not been provided to the verification team in soft copy: • Sample survey questionnaire • Water boiling test results • Interview of selected households • WBT equipment calibration records • Evidence for carbon waiver form • Evidence for training and QA/QC for data management • Technical specifications if ICS				
Project participant response				**Date :** 24/01/2017
Following documents has been provided along with these responses in in soft copies: • Sample survey questionnaire – Submitted as Annex 07 • Water boiling test results – Submitted as Annex 03 & 11 • Interview of selected households – Submitted as Annex 05 & 06 • WBT equipment calibration records – Submitted as Annex 10 • Evidence for carbon waiver form – Submitted as Annex 08 • Evidence for training and QA/QC for data management – Submitted as Annex 12 • Technical specifications if ICS – Submitted as Annex 09				
Documentation provided by project participant				
Annex 07 Annex 03 & 11 Annex 05 & 06 Annex 10 Annex 08 Annex 12 Annex 09				
DOE assessment				**Date:** 02/03/2017
PP has provided the requested documents. Thus CL#01 was closed.				

Table 3. CAR from this verification

CAR ID	02	**Section no.**	E.3.1., E.3.4.2., E.3.4.3.	**Date :** 14/01/2017
Description of CAR				

The following consistency issues were identified
Under section B.2. of MR, the total number of stoves for each type of stoves is not reported.

The values mentioned under the table for sampling size under page 8 of MR are found to be inconsistent with the ER sheet.

Section G.2. - It is not clear how the value of "quantity of biomass used in PA by traditional stove" is same w.r.t last verification. Also this value does not match with the ER sheet.

The value of Uy under page 26 of MR is same for all the CPA s. Please clarify.

Section H. of MR, please correct the limit of the stoves sales for the CPAs.

Project participant response	**Date :** 24/01/2017

1. The total number of stoves for each type of stoves has been mentioned under section B.2. of MR. The revised version of the MR is 02.
2. The values are revised and updated now. The values are consistent with the sampling sheet and ER Sheet.
3. The value of "quantity of biomass used in PA by traditional stove" as mentioned in the section G.2.of MR Version 01 is not same w.r.t last verification; it was a typo error. The values has been revised and updated in MR Version 02.
4. The value of Uy is same for all the CPAs as the monitoring was done cross-CPA. Based on the registered PoA-DD and CPA-DD, 95/10 reliability level was selected for cross-CPA sampling for all the parameters.
5. Corrected.

Documentation provided by project participant

DOE assessment	**Date:** 02/03/2017
The justification provided by PP is found to be satisfactory. Thus CAR#02 was closed.	

CAR ID	03	**Section no.**	E.3.5., E.3.4.3.	**Date :** 02/03/2017

Description of CAR

1. File Sample size calculation sheet– It is not clear why t- distribution is applied in "$\eta_{new,y,l}$ **– SHS**", in which case the sample size comes out to be 36 which is more than the minimum sample requirement of 30 as per the sampling guidance.?

2. In the ER sheet, it has been observed that the ER sheet contains calculations from the last verification which are irrelevant for the current verification, so please remove it or hide it.

3. In the Usage survey, the values of usage results for 2013, 2014, 2015 & 2016 are not matching when compared to the respective sheets viz. sheet EZY, sheet SHS & sheet AES.

It

4. In the ER calculation sheet, the calculation / formula for "Adjusted Sales to represent whole month" is not clear as compare to the last verification.

5. The dates of the surveys and tests for parameters efficiency of project stoves, usage rate and the continued use of baseline stoves to justify that the surveys/tests are done annually are missing.
6. In relation to point above, for parameter efficiency of project stoves, there are 'results' for year 2013, 2014,2015 and 2016, with each result having its sample size. Clarify what the year (2013, 2014, 2015,2016) refers to (e.g. the year of the survey/test, the year of the deployment of the stoves, etc.).also please mention clearly in the WBT sheet.

7. In the ER calculation sheet, Please provide the source for "Quantity of woody biomass used in the project activity by traditional stoves" as mentioned in Cell B18 under Assumption sheet in ER sheet. Also, provide the household survey sheet with the complete details as submitted in the last verification.

Project participant response	**Date :** 16/03/2017

1. It was an error. The Error has been rectified now and the sampling size calculated is 36. The revised sampling calculation sheet is submitted along with these responses as Annex 02.
2. ER Sheet has been revised as per comments.
3. The Usage Survey has been corrected.
4. In the ER calculation sheet, the calculation / formula for "Adjusted Sales to represent whole month" has some error as it was divided by 2 and 3. However the error has been rectified. Now, the emission reductions for sales in 'x' month has been calculated from 'x+1' month conservatively. The ERs has been updated from 108,245. The MR and ER has been updated accordingly.
5. The dates of survey for WBT in Annex-03 were not mentioned in the sheet. The same has been mentioned and submitted along with these responses. The dates usage survey and household survey has been also mentioned clearly and starting date is clearly mentioned in all the surveys. The starting date for all the survey is 1-Aug-2016. Though PP planned to start it in third week of April but due to third-party engagements and limited resources it was stated on 1-Aug-2016. The start dates of the survey is clearly highlighted in the sheets (Annex 03,04 & 14) and the annual frequency was followed.
6. The year refers to deployment of the stoves.
7. In the ER calculation sheet, the source for "Quantity of woody biomass used in the project activity by traditional stoves" as mentioned in Cell B18 is provided. The household survey sheet with the complete details has been provided as Annex 14 with these responses.

Documentation provided by project participant

1 - Annex 02
5 - Annex 03, 04 & 14
7 - Annex 14

DOE assessment	**Date:** 18/03/2017

1. PP has corrected the sampling sheet
2. PP has corrected the ER sheet as per the raised issues.
3. PP has corrected the Usage survey sheet
4. PP has corrected the ER calculation sheet for the calculation / formula for "Adjusted Sales to represent whole month"
5. PP has mentioned the dates of survey for WBT in Annex-03 in the sheet
6. PP has clarified that the years mentioned under results are the year of deployment of the stoves whereas the stove test date are mentioned against the sample test stoves.
7. PP has corrected the ER sheet and provided the correct and update Household survey sheet.

Thus, CAR#03 was closed

CAR ID	04	**Section no.**	E.3.5.	**Date :** 04/04/2017

Description of CAR

1. Please include Title of the table under page 5 of MR.
2. Usage rate (drop-out adjustment factor) may have variation based on the performance of each stove model. Either it shall be confirmed that no such variation is observed, or appropriate corrective action shall be made under page 6.
3. Please mention the Procedure for selecting random samples from the population list under page 6 of MR
4. Since upper bound is used, please include the explanation for the same n this section under page 22 of MR
5. Please also include the confidence level which is applied for WBT.
6. Also address few minor comments mentioned in the MR & ER sheet.

Project participant response	**Date :** 05/04/2017

1. Title of the table included.
2. In 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 basis the weighted average of sales of each stove type. This approach adjusts the variation of each stove model, if any.
3. Procedure for selecting random samples from the population list is mentioned in MR v4.
4. Explanation of upper bound is mentioned.
5. 95/10 confidence/precision was applied on the sampling parameters for WBT. The same has been included in the MR v4.
6. Comments addressed.

Documentation provided by project participant

DOE assessment	**Date:** 07/04/2017
PP has address all the raised issues and also submitted the revised MR & ER sheet which has been checked and found to be satisfactory. Thus, CAR#04 was closed.	

CAR ID	05	**Section no.**	E.3.4.2	**Date:** 19/06/2017

Description of CAR

For calculating efficiency of the cook-stoves being deployed as part of PA, the paragraph 12 of applied methodology prescribes to use weighted average values if more than one type of system is used.
It is observed that the weighted average value with respect to cook-stove type is applied but it doesn't take into account the Age/Year of Dissemination of the cook-stove. In the opinion of assessment team, the cook-stoves deployed may experience variation in the efficiency due to the usage duration/age. Hence, it shall be justified that why age/dissemination year is not taken into account while calculating weighted average efficiency.

Project participant response	**Date :** 10/07/2017
The ER sheet and MR is revised to include the revised weighted average efficiency. The revised calculation adjusts the efficiency for each type and age with the weight of sales for the same type and age of cook-stove.	

Documentation provided by project participant

Revised MR and ER sheet

DOE assessment	**Date:** 12/07/2017
The revised calculation of efficiency is weighted average for both the type and age of cook-stove. Hence, it is found to be complying the requirements of paragraph 12 of the methodology. Hence, CAR#05 is closed.	

CAR ID	**06**	**Section no.**	**E.3.1**	**Date : 23/08/2017**

Description of CAR

As per the CPA-DDs (page 9 and 30) of CPA-9956-0002, 0003 and 0004, the defined target population group for cookstoves distribution is stated as 'urban' and the parameter 'Bold' has been determined and fixed ex-ante (7.02 tons wood-eq./HH-yr.) only for the residential urban population in the section D.6.2 of respective included CPA-DDs. Further, it was (p 13) verified that cookstove type "EZY Stove" was deployed under CPA 9956-0001, and "SHS" and "AES Stove" were deployed under CPA 9956-0002, 0003 and 0004. However, it has been observed that in annex 04 (usage survey data spreadsheet) submitted by the CME, cookstoves type 'SHS' and 'AES' have been surveyed and identified to be distributed in the 'rural' residential population as well i.e. refer column "Q", rural vs urban in the tab "SHS Any" and "AES Anal" of Annex 4.) Please clarify, how:

1. The implementation and operation of these CPAs is as per the included CPA-DDs and paragraph 226 of CDM PS for PoA v1.0.
2. The calculation of emission reduction as per the CPA-DD which does not define 'B_{old}' for Cookstoves distributed to rural population.

Project participant response	**Date: 19/01/2018**
CPAs 9956-0002, 0003 and 0004 refer to Appendix 3 of CPA-9956-0001 CPA-DD for the parameter 'B_{old}', which states the following on page 40: "- Baseline Scenario 1: "Residential biomass users", which consists of people using biomass for residential purposes. - 1.1: "urban users", being those using charcoal as the main cooking fuel, and,	

- 1.2: “rural users”, being those using firewood as the main cooking fuel”
Thus, from the aforesaid, it is clear that the term ‘urban’ and ‘rural’ populations under section D.6.2 of the CPA-DDs are defined based on the primary / main cooking fuel in the baseline. This Is further evident from CPA 9956-0001, CPA-DD Appendix 3 which details about the baseline surveys that were used to fix the B_{old} ex-ante on page 46:

“*As shown in the tables below, the national landscape contained two subgroups of biomass users due to the distinguished characteristics of each context: 1) rural households, being those showing firewood as the main cooking fuel, and 2) urban households, being those showing charcoal as the main cooking fuel. due to the distinguished characteristics of each context.*

The statistical 90/10 confidence and precision requirement is met for both the rural and urban categories. Thus, the mean value is used for these two divisions: rural and urban.

Although 15 sampled users reported themselves as rural, this may be based on their individual understanding of respective geographical location and not in accordance with the definition of ‘urban’ population as defined in PoA-DD and CPA-DD (referred above). All the 15 samples who reported themselves as ‘rural’ during usage surveys were checked for the primary baseline fuel as reported at the time of sale, in warranty card. A review of warranty cards of all these 15 users confirms that the primary fuel for these users was charcoal and hence these are eligible under the CPA 9956-0002, 9956-0003 and 9956-0004.
However, to ensure that non-urban user, if any, under the CPAs is not credited under urban population baseline, the CPAs 9956-0001, 9956-0002, 9956-0003 and 9956-0004 have been revised to update the value of B_{old} as 5.28 tonnes /HH/year (this is weighted average of usage of urban population (7.02 tonnes wood/ HH-year, 15%) and rural population (4.97 tonnes wood/ HH-year, 85%). The weighted average value 5.28 as B_{old} is calculated in “Baseline Study Up Energy Uganda CPA No 001”, submitted at the time of PoA registration to CDM-EB and is available at:
https://cdm.unfccc.int/filestorage/O/I/K/OIK03RDW4JLAGN9Y8CSQZX2V516EMP/Baseline%20Study_Up%20Energy%20Uganda%20CPA%20No%20001.pdf?t=NG18cDMwbGZufDCurYhONfLF6NNGkwuaQvw7
Given that the CPA 02, CPA 03 and CPA 04 were implemented at primarily urban population and CPA-01 reported a 55% urban population, a consideration of 15% population as urban and 85% population as rural, based on national statistics, is highly conservative with respect to baseline. The ERs have been revised accordingly.

Documentation provided by project participant

Revised ER sheet
Revised Monitoring report

DOE assessment	**Date: 28/01/2018**

It has been checked from CPA DD for 9956-0001 appendix 3 and page 51 of the PoA DD, that the users have been sub grouped on basis of the primary fuel consumed by the end user in the baseline. The warranty cards of the users listed as rural in the usage survey sheet (for SHS and AES stoves) were checked and were found to mention charcoal as the primary fuel in the baseline stove (inefficient portable stove). Thus, these users are urban users as per the criteria defined in the CPA-DD and deemed eligible to use the value of B_{old} (7.02) defined in CPA 9956-0002, 9956-0003 and 9956-0004.

The review of warranty cards substantiates that these 15 users reported themselves as “rural” during the usage survey, being unaware of the basis of the categorization as urban/rural in the project. However, PRC to take weighted averaged of both the type of the population in CPA 002, CPA003 and CPA004 has been proposed by the PP. As a change, the value of the parameter ‘B_{old}’ has been taken as a weighted average of urban and rural population. Same approach has been applied to CPA001, which already includes both types of the population. The final value used in all the CPAs is derived from the baseline study report validated during registration and is also highly conservative. Thus, the approach was accepted by the DoE.

CAR ID	07	**Section no.**	E.3.4.2	**Date :** 23/08/2017

Description of CAR

The CME is requested to how the parameter ‘Adjusted sales to represent whole month’ is determined. In addition, confirm whether the number of operational stoves (Ny) were determined as part of the regular survey in line with the applied methodology, AMS-II.G. v05.

Project participant response	**Date :** 09**/01/2017**

The sales database includes the exact dates when ICS sale took place. For ER calculation, “Adjusted sales to represent whole month” was calculated accounting 50% of the stoves sold in a particular month to start crediting in the same month and rest 50% to start crediting in the following month. However, there was an error in the calculation. The calculation approach has been revised and rectified now (refer Sales worksheet). The revised approach is a simplified approach to determine the date from which a stove should start claiming credits. In the worksheet Sales, this has been calculated under column H, I and J. Thus, the applied calculation ensures that a stove crediting considers various time constraints as applicable (i.e. date of installation, start date of corresponding CPA crediting period and start date of monitoring period). Also, as a conservative measure, the CME has decided to start the credit of a stove from the start of month, following the month in which it has been sold i.e. sales happened in Mar-2016 will start crediting from 01 April-2016 onwards.
Documentation provided by project participant
Revised ER Sheet

DOE assessment	**Date: 16/11/2017**
The PP has revised the calculations and now the ERs are being claimed for a stove, from the beginning of the next month (following month of the stove sale). The approach is found to be conservative and hence deemed acceptable by DoE. However, PP is requested to explain the reason for the change in approach to calculate the emission reductions as well as change in the ER calculations.	

Project participant response	**Date:** 21/12/2017
The increase in ERs is due to adjustment of the error in the previous version of calculator while calculating the adjusted stove sales. The error was in calculating values in row 6 and 7 for CPA 01, 02 and 04. As a result of this error, the number of stoves for which credits were being calculated in a CPA were lower than total number of stoves under the CPA. The revised simplified approach automatically eliminates this error.	
Documentation provided by project participant	
Revised ER sheet. Revised Monitoring report	

DOE assessment	**Date:** 26/12/2017
The explanation provided by PP is deemed correct. The DoE reviewed the previous version of ER calculator and found the error in calculation of ‘adjusted total sales’ and ‘cumulative sales’ as highlighted by PP. Also, the DoE, for verification and cross check, manually corrected the errors highlighted by the PP in the previous version of ER calculator and compared it with the revised ER calculator submitted by PP. A comparison of the ERs in these two versions, revealed that the simplified approach applied in the revised ER calculator is more conservative. Hence the CAR is closed.	

CAR ID	08	**Section no.**	E.3.4.2., E.3.4.3.	**Date :** 03/05/2018
Description of CAR				
1. The CME shall explain how is a weighted average of Uy, by vintage (i.e. 94.27% "Usage survey-Usage result-Cell CC28) is appropriate instead of overall operational rate (i.e. 91.72% "Usage survey-Usage Result-Cell BV12), considering that the sampling size is calculated for all types of cookstove for all vintages as a single target group, instead of separated samplings for each type and vintage. 2. The weighted average of efficiency (25.05%) is calculated from the survey data for different types and different vintages. In the ER spreadsheet, the weighted average of efficiency for three different types of cookstoves is applied not considering the operation duration (due to different deployment date) of the individual cook stove. 3. 95/10 precision has been applied for cross CPA sampling, however it was observed that in Annex 11 - WBT Excel Sheets, 90/10 precision has been applied				
Project participant response				**Date :** 17/05/2018

1. For parameter Uy, the weightage average by vintage approach has been revised and a simple average has been used instead across the entire samples monitored. The MR has been revised accordingly. 2. AMS II.G., paragraph 12, on page 6 mentions the following: Use weighted average values if more than one type of system is being introduced by the project activity. Thus, the average efficiency has been calculated as the minimum of 1. weighted average efficiency based on model wise population and 2. weighted average efficiency based on model wise population considering date of deployment. Refer ER calculator worksheet "efficiency" cell I6:L40 for details on calculations 3. Please refer ER calculator worksheet "efficiency" cell I15:L40 for details on reliability / precision assessment based on 95/10. The 90/10 mentioned in Annex 11 has not been considered for assessing the average efficiency values.
Documentation provided by project participant
9956 ER Calculation version 9.0 17052018 *PoA 9956-MR_MP2_v9.0 17052018*
DOE assessment **Date:** 31/05/2018
1. For parameter Uy, the simple average has been applied across the entire samples monitored. The revised MR and revised ER sheet were checked and found to have consistent value. Closed. 2. the average efficiency has been calculated through two ways: 1. weighted average efficiency based on model wise population and 2. weighted average efficiency based on model wise population considering date of deployment. The minimum of two has been used for ER calculation. Closed. 3. The 90/10 mentioned in Annex 11 was found to be not considered for calculation of average efficiency values. The ER calculator worksheet "efficiency" cell I15:L40 were checked and found to demonstrate that the required reliability / precision (95/10) has been met. Closed. Thus, the CAR stands closed.

Table 4. FAR from this verification.
There is no FAR from verification.

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Document information

Version	*Date*	*Description*
02.0	29 December 2017	Revision to align with the requirements of the "CDM validation and verification standard for programme of activities" (version 01.0).
01.0	5 June 2015	Initial publication.

Decision Class: Regulatory
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History of the document*						
Version	Date of issue	Nature of Revision	Prepared by		Reviewed by	
			Name	Date	Name	Date
1.0	04/05/2018	Guidelines updated	Shreya Garg	04/05/2018	Anshika Gupta	04/05/2018
**This table is for ESPL internal document control purpose only*						