




**Verification and certification report form for
CDM programme of activities
(Version 03.0)**

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 UNFCCC PoA 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	03.0	
Completion date of the verification and certification report	13/03/2020	
Monitoring period number and duration of this monitoring period	Fifth Monitoring period 16/08/2018-15/08/2019 (including both the days)	
Number and version number of the monitoring report to which this report applies	Monitoring report number 1, version 03.0	
Coordinating/managing entity (CME)	UpEnergy 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	AMS-II.G., version 05, "Energy efficiency measures in thermal applications of non-renewable biomass"	
Mandatory sectoral scopes	3: Energy demand	
Conditional sectoral scopes, if applicable	Not applicable	
Estimated amount of GHG emission reductions or GHG removals for this monitoring period in the included CPAs covered in this report	9956-P1-0001-CP1 -- 44,874 tCO ₂ e 9956-P1-0002-CP1 -- 44,980 tCO ₂ e 9956-P1-0003-CP1 -- 44,980 tCO ₂ e 9956-P1-0004-CP1 -- 44,980 tCO ₂ e 9956-P1-0005-CP1 -- 44,980 tCO ₂ e 9956-P1-0006-CP1 -- 44,980 tCO ₂ e 9956-P1-0007-CP1 -- 44,980 tCO ₂ e 9956-P1-0008-CP1 -- 44,980 tCO ₂ e 9956-P1-0009-CP1 -- 44,980 tCO ₂ e 9956-P1-0010-CP1 -- 44,980 tCO ₂ e 9956-P1-0011-CP1 -- 44,980 tCO ₂ e 9956-P1-0012-CP1 -- 44,980 tCO ₂ e Total -- 539,654 tCO ₂ e	
Certified amount of GHG emission reductions or GHG removals for this monitoring period for the included CPAs covered in this report	9956-P1-0001-CP1 -- 27,173 tCO ₂ e 9956-P1-0002-CP1 -- 42,335 tCO ₂ e 9956-P1-0003-CP1 -- 41,836 tCO ₂ e 9956-P1-0004-CP1 -- 41,052 tCO ₂ e 9956-P1-0005-CP1 -- 42,624 tCO ₂ e 9956-P1-0006-CP1 -- 42,648 tCO ₂ e 9956-P1-0007-CP1 -- 42,578 tCO ₂ e	

	9956-P1-0008-CP1 -- 42,444 tCO ₂ e 9956-P1-0009-CP1 -- 37,062 tCO ₂ e 9956-P1-0010-CP1 -- 16,151 tCO ₂ e 9956-P1-0011-CP1 -- 7,795 tCO ₂ e 9956-P1-0012-CP1 -- 4,228 tCO ₂ e Total -- 387,926 tCO ₂ e
Name and UNFCCC reference number of the DOE	Carbon Check (India) Private Ltd. E-0052
Name, position and signature of the approver of the verification and certification report	Amit Anand, CEO 

SECTION A. Executive summary

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Introduction:

The Co-ordinating Managing Entity/Project Participant has commissioned the DOE, Carbon Check (India) Private Ltd. (CC IPL) to perform an independent verification of the CDM Programme of Activities “Up Energy Improved Cookstove Programme, Uganda” in Uganda (hereafter referred to as “Programme of Activities or PoA”) for the CPAs titled “Up Energy Improved Cookstove Programme, Uganda – CPA No 001”; “Up Energy Improved Cookstove Programme, Uganda – CPA No 002”; “Up Energy Improved Cookstove Programme, Uganda – CPA No 003”; “Up Energy Improved Cookstove Programme, Uganda – CPA No 004”; “Up Energy Improved Cookstove Programme, Uganda – CPA No 005”; “Up Energy Improved Cookstove Programme, Uganda – CPA No 006”; “Up Energy Improved Cookstove Programme, Uganda – CPA No 007”; “Up Energy Improved Cookstove Programme, Uganda – CPA No 008”; “Up Energy Improved Cookstove Programme, Uganda – CPA No 009”; “Up Energy Improved Cookstove Programme, Uganda – CPA No 010”; “Up Energy Improved Cookstove Programme, Uganda – CPA No 011” and “Up Energy Improved Cookstove Programme, Uganda – CPA No 012”.

The PoA involves replacement of less efficient cooking stoves using woody biomass with improved cooking stoves (ICS) which are more efficient. The ICS distributed under CPAs of the PoA are more efficient in transferring heat from the fuel to the pot when compared to the stoves typically used in baseline. By replacing inefficient stoves, the PoA will save on consumption of woody biomass.

The CPAs are designed to generate emission reductions by distribution of the fuel-efficient fuel wood / charcoal stoves. The fuel-efficient cook stoves are replacing the less efficient baseline stoves in common use (baseline scenario). The CME and CPA implementer are responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the component project activities.

This report summarises the findings of the verification of the project, performed on the basis of paragraph 62 of the CDM Modalities & Procedures, as well as criteria given to provide for consistent project operations, monitoring and reporting and the subsequent decisions by the CDM Executive Board. Verification is required for all registered CDM project activities intending to confirm their achieved emission reductions and proceed with request for issuance of CERs. This report contains the findings and resolutions from the verification and a certification statement for the certified emission reductions.

Objective:

Verification is the periodic independent review and ex-post determination of both quantitative and qualitative information by a Designated Operational Entity (DOE) of the monitored reductions in GHG emissions that have occurred as a result of the registered CDM project activity during a defined monitoring period.

Certification is the written assurance by a DOE that, during a specific period in time, a project activity achieved the emission reductions as verified.

The objective of this verification was to verify and certify emission reductions reported for the “Up Energy Improved Cookstove Programme, Uganda” in the host country Uganda for the period 16/08/2018 to 15/08/2019.

The purpose of verification is to review the monitoring results and verify that the monitoring was implemented according to the monitoring methodology and the monitoring plan in the PoA-DD /CPA-DDs /B04/ and used to confirm the reductions in anthropogenic emissions by sources, is sufficient, definitive and presented in a concise and transparent manner. CC IPL’s objective is to

perform a thorough, independent assessment of the implementation of the registered programme of activities / CPA-DDs /B04/.

In particular, the monitoring plan, monitoring report and the project's compliance with relevant UNFCCC and host Party criteria are verified in order to confirm that the component project/s has/have been implemented in accordance with the previously registered/included component project design and conservative assumptions, as documented. It is also confirmed if the monitoring plan is in compliance with the registered/included CPA-DDs and the approved monitoring methodology.

Scope:

The scope of the verification is:

- To verify the project implementation and operation with respect to the registered/included CPA-DDs or approved revised CPA-DDs
- To verify the implemented monitoring plan with the registered/included CPA-DDs or approved revised CPA-DDs and applied baseline and monitoring methodology.
- To verify that the actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan.
- To evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement.
- To verify that reported GHG emission data is sufficiently supported by evidence.

The verification shall ensure that the reported emission reductions are complete and accurate, in order, to be certified.

The verification comprises a review of the monitoring report covering the monitoring period from 16/08/2018 to 15/08/2019 and based on the registered/included CPA-DDs including the monitoring plan, emission reduction calculation spreadsheet, monitoring methodology and all related evidence provided by project participant.

On-site visit and stakeholders' interviews are also performed as part of the verification process.

The verification team assigned by the DOE concludes that the PoA-DD (Version 4.0, dated 30/06/2014) /B04/, CPAs 9956-P1-0001-CP1, 9956-P1-0002-CP1, 9956-P1-0003-CP1, 9956-P1-0004-CP1, 9956-P1-0005-CP1, 9956-P1-0006-CP1, 9956-P1-0007-CP1, 9956-P1-0008-CP1, 9956-P1-0009-CP1, 9956-P1-0010-CP1, 9956-P1-0011-CP1 and 9956-P1-0012-CP1 as described in the revised and accepted CPA-DDs /B04/ and the Monitoring report, Version 03.0, dated 11/03/2020 /2/, meets all relevant requirements of the UNFCCC for CDM project activities including article 12 of the Kyoto Protocol and paragraph 62 of CDM M & P, the modalities and procedures for CDM (Marrakesh Accords) and the subsequent decisions by the COP/MOP and CDM Executive Board. The verification has been conducted in-line with the CDM VVS for PoAs requirements Version 02.0 /B01-1/.

The component project activities were correctly implemented according to selected monitoring methodology, monitoring plan and the approved revised CPA DD/s. The monitoring system was installed, maintained in a proper manner, while collected monitoring data allowed for the verification of the amount of achieved GHG emission reductions. Through the review and on site visit the verification team confirms that the PoA has resulted in the 387,926 tCO₂e emission reductions during the fifth monitoring period.

CC IPL, as a DOE, is therefore pleased to issue a positive verification opinion expressed in the attached Certification statement.

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/ Technical Expert	IR	Agarwalla	Sanjay	CC IPL	X	X	X	X
2.	Local Expert	EI	Busingye	Debrah	CC IPL		X	X	
3.	Team Member	IR	Chaudhari	Tushar	CC IPL	X			X

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	Singh	Vikash Kumar	CC IPL
2.	Approver	IR	Anand	Amit	CC IPL

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: Recording and reporting of the information in the ER spreadsheet.	Medium	All the input data in the ER spreadsheet including sales database, determination of parameter for efficiency testing including data calculation. This includes all the parameters to be monitored ex-post as per the PoA-DD/CPA-DDs /B04/.	The risk was mitigated by the training of the personnel involved in the data capture, calculation and by following the monitoring responsibilities. The training records were reviewed which was also confirmed during the on-site visit interviews. Verification team, based on the above, confirms that the risk is appropriately mitigated.
2.	Information System: Use of spreadsheets without adequate controls related to data changes/updates, version tracking, traceability, security	Medium	The data is recorded in the spreadsheets based on the raw data collected during the field visits. The access to the spreadsheets for calculation of ERs, monitoring and sales database and Stove efficiency testing records is controlled.	The identified risk was mitigated by managing access to the records. It was confirmed through interviews that the raw data is collected by the field personnel and then transmitted and stored electronically to the CME's office. The data quality control is maintained by the CME.
3.	Accuracy of the measuring equipment	Low	Check the calibration records for the measurement equipment	The risk due to accuracy of the measuring equipment was ensured by planning to check

			<i>used for efficiency test.</i>	<i>calibration certificates of the measuring equipment used for stove efficiency (water boiling tests).</i>
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C.2. Consideration of materiality in conducting the verification

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The threshold of materiality was evaluated based on §13 of “Guideline: Application of materiality in verifications” Version 02.0 /B08/ and § 308 of CDM VVS for PoAs, version 02.0 /B01-1/. It was concluded that the materiality threshold applicable to the project activity based on actual emission reductions achieved is 1% of 387,926 tCO₂e which is equal to 3,879 tCO₂e.

In planning the verification, verification team took cognizance of para 11 and 12 of the “Guideline: Application of materiality in verifications” Version 02.0 /B08/. A materiality threshold of 3,879 tCO₂e is determined in line with para 308 (b) of CDM VVS for PoAs, version 02.0.

Based on the above, activities in which risks were assessed were:

1. Monitoring system including the data input procedure (including relevant personnel and applicable template forms used)
2. Copy of the agreement between household and Project Participant (s) (origin of data)
3. Stove unique ID system
4. ER sheet (application of data)
5. Data flow
6. Data control procedures
7. Stove efficiency test (WBT) records

In conducting the verification, DOE took cognizance of para 13-17 of the “Guideline: Application of materiality in verifications” Version 02.0 /B08/ and based on the input of data from different sources checked through sampling of records during on-site and off-site. Data flow was checked through comparison of data in hand-written forms /5/, electronic database /6/ and ER sheet /4/. The competence of the personnel involved in conducting the stove efficiency testing, recording of data and calculation of the emission reductions data has been checked by the verification team by means of on-site visit interviews.

The risks identified can be mitigated through cross check with all sets of documents. The verification team performed the following checks in order to mitigate the effects of the above-identified sources of error:

Mitigation of Human error risks: The verification team mitigated the risk by checking the training records of the personnel and during the on-site visit interviews. Further, data was crosschecked with the ER calculation spreadsheet /4/ and the raw data.

Mitigation due to error in Information system: Verification team by conducting interviews with the personnel responsible for such activities mitigated the risk due to error in information system. It was confirmed through interviews that the raw data is collected by the field personnel and then transmitted and stored electronically at CME’s office. The data quality control is maintained by the CME.

Accuracy of the measuring equipment: The risk due to inaccuracy in measurements was mitigated by reviewing calibration certificates of all the project equipment.

As no material errors, omissions or misstatements could be found, a reasonable level of assurance is achieved.

SECTION D. Means of verification**D.1. Desk/document review**

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The verification was performed primarily based on the review of the Monitoring report /1/ and the supporting documentation. This process included review of data and information presented to verify their completeness and review of the monitoring plan and monitoring methodology /B02/. Documents reviewed or referenced during the verification are listed in Appendix 3 below.

D.2. On-site inspection

Duration of on-site inspection: 11/02/2020 to 12/02/2020				
No.	Activity performed on-site	Site location	Date	Team member
1.	An assessment of the implementation and operation of the registered project activity as per the registered PoA-DD/B04/, registered/included CPA-DDs/B04/.	Uganda	11/02/2020 to 12/02/2020	Sanjay Kumar Agarwalla Debrah Busingye
2.	A review of information flows for generating, aggregating and reporting the monitoring parameters	Uganda	11/02/2020 to 12/02/2020	Sanjay Kumar Agarwalla Debrah Busingye
3.	Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the CPA-DDs/B04/	Uganda	11/02/2020 to 12/02/2020	Sanjay Kumar Agarwalla Debrah Busingye
4.	A cross check between information provided in the monitoring report and data from other sources such as plant logbooks, inventories, purchase records or similar data sources	Uganda	11/02/2020 to 12/02/2020	Sanjay Kumar Agarwalla Debrah Busingye
5.	A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the CPA-DDs/B04/ and the selected methodology and corresponding tool(s), where applicable	Uganda	11/02/2020 to 12/02/2020	Sanjay Kumar Agarwalla Debrah Busingye
6.	A review of calculations and assumptions made in determining the GHG data and emission reductions	Uganda	11/02/2020 to 12/02/2020	Sanjay Kumar Agarwalla Debrah Busingye
7.	An 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	11/02/2020 to 12/02/2020	Sanjay Kumar Agarwalla Debrah Busingye

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			

CDM-PoA-VCR-FORM

1.	Nihar	-	Climate-Secure Services	11/02/2020 to 12/02/2020	Project implementation and operation, monitoring procedure, data and information flow, Quality Assurance – Management and operating system, Monitoring records, MR and ER calculation	Sanjay Kumar Agarwalla Debrah Busingye
2.	Lohia	Rohit	Climate-Secure Services (through skype)	12/02/2020	Project implementation and operation, monitoring procedure, data and information flow, Quality Assurance – Management and operating system, Monitoring records, MR and ER calculation	Sanjay Kumar Agarwalla
3.	Krywyj	Yuonne	UpEnergy Uganda	11/02/2020 to 12/02/2020	Project implementation and operation, monitoring procedure, data and information flow, Roles and responsibility, Quality Assurance – Management and operating system, Sales/Distribution records, Survey records, Qualification and Training	Sanjay Kumar Agarwalla Debrah Busingye
4.	Wanyaka	Andrew	UpEnergy Uganda	11/02/2020 to 12/02/2020	Project implementation and operation, Sales/Distribution records	Sanjay Kumar Agarwalla Debrah Busingye
5.	Chu	Lafelle	UpEnergy Uganda	11/02/2020 to 12/02/2020	Project implementation and operation, Sales/Distribution records	Sanjay Kumar Agarwalla Debrah Busingye
6.	Anayo	Sheila	UpEnergy Uganda	11/02/2020 to 12/02/2020	Project implementation and operation, Sales/Distribution records	Sanjay Kumar Agarwalla
7.	Davis	Kintu	CIRCODU	12/02/2020	WBT procedure and records	Sanjay Kumar Agarwalla

8.	Waweyo	Patrick	CIRCODU	12/02/2020	WBT procedure and records	Sanjay Kumar Agarwalla
9.	Mubiriu	Julius	Monitoring surveyor	12/02/2020	Monitoring Survey procedure and records	Sanjay Kumar Agarwalla
10.	Hadijja	Naiwumbwe	Monitoring surveyor	12/02/2020	Monitoring Survey procedure and records	Sanjay Kumar Agarwalla

D.4. Sampling approach

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As assessed in above sections, emission reductions for the twelve CPAs, (9956-P1-0001-CP1, 9956-P1-0002-CP1, 9956-P1-0003-CP1, 9956-P1-0004-CP1, 9956-P1-0005-CP1, 9956-P1-0006-CP1, 9956-P1-0007-CP1, 9956-P1-0008-CP1, 9956-P1-0009-CP1, 9956-P1-0010-CP1, 9956-P1-0011-CP1 and 9956-P1-0012-CP1), are being claimed for this monitoring period and the total population of the stoves under these twelve CPAs are as below:

SI .No.	CPA Reference No.	Number of ICS Distributed
1	9956-P1-0001-CP1	11,279
2	9956-P1-0002-CP1	18,000
3	9956-P1-0003-CP1	18,000
4	9956-P1-0004-CP1	18,000
5	9956-P1-0005-CP1	18,000
6	9956-P1-0006-CP1	18,000
7	9956-P1-0007-CP1	18,000
8	9956-P1-0008-CP1	18,000
9	9956-P1-0009-CP1	18,000
10	9956-P1-0010-CP1	18,000
11	9956-P1-0011-CP1	18,000
12	9956-P1-0012-CP1	17,884
Total		209,163

The monitoring parameters required to be monitored through the sampling plan are:

1. The thermal efficiency of the ICS distributed (%) (η_{new})
2. The average usage rate of the appliance (U_y)
3. The quantity of woody biomass used in the project activity by traditional stoves (μ_{old})

Stratified sampling was applied by the CME for selection of the monitoring samples with 95/10 confidence/precision for cross-CPA sampling for all the parameters which is deemed acceptable as per the registered PoA DD / CPA DDs. For the thermal efficiency of the stoves (η_{new}) and the average usage rate of the appliance (U_y), sampling frames were chosen for the respective models of stoves distributed and considered for monitoring separately whereas the quantity of woody biomass used in the project activity by traditional stoves (μ_{old}) sampling frame was chosen for the vintage wise stove distributed (which is in line with the PoA-DD, page 40 where it is stated “A weighted average of stove sales for each vintage will be applied”). Please refer to the section E.3.4.3 of this report on detailed assessment on sampling plan opted by the CME.

As per paragraph 25 of the Sampling Standard, version 08 /B07/, the verification team has to verify whether the project participants or the coordinating/managing entity have implemented the sampling and surveys according to the sampling plan in the registered monitoring plan. The verification includes determining:

- (a) Whether the required confidence/precision has been met;
- (b) Whether the selected sample was representative of the population.

In line with paragraph 26 of the Sampling Standard, the verification team has applied a sampling approach for on-site visits surveys as part of verification. Now as the CME had applied sampling approach, the verification team has chosen acceptance sampling in accordance with paragraph 28 of the sampling standard /B07/.

DOE used sampling during verification for checking the operational status and to check if the WBT tests have been done in the households and it was confirmed that WBT tests were conducted in their households. Considering that Uganda is a Least Developed Country, applying paragraph 39 (c) of the sampling standard, version 08 /B07/, a sample size of 8 households was chosen (with no discrepant records). A sample size of 8 was required, based on an AQL of 1.0% and UQL of 20%, producer risk 10% and consumer risk 20%. Acceptance number (c) thus determined for the sample is 0. DOE visited 8 samples (each, for monitoring survey and WBTs conducted). It was observed that out of the 8 samples, all the 8 stoves were found to be operational and all the 8 households, where the WBTs were conducted, has confirmed that their stoves were taken by the CME for conducting water boiling tests and they received a new cookstoves as a replacement /12/ and this matched with the CME's records and hence no discrepant records were observed with the published MR /2/ and ER sheet /4/ and thus c=0. Thus, CME's set of records has been accepted in line with § 33 of the sampling standard, version 08 /B07/. Verification team has cross verified these sample documents during the on-site visit.

The following table illustrates the agenda covered during the acceptance sampling by the verification team which is as per Table 1, paragraph 37 of "Standard: Sampling and surveys for CDM project activities and programmes of activities (version 08.0);

Parameter	How the CME conducted sampling surveys (to obtain the project participants' or the coordinating/managing entities' records)	How the DOE could obtain records for verification	Criteria for deciding what ultimately constitutes a discrepancy
% of improved cook stoves (ICS) in operation	Sampling based survey (questionnaire survey/interviews)	Cross-check of a sample of project participants' samples (questionnaire operation surveys/interviews) including but not limited to following: <ul style="list-style-type: none"> • Consistency between the information as contained in Survey sheet and revealed from the on-site inspection interviews • Baseline scenario of the household • Enquire/observe the pre-project/baseline stove/s and its operation during the project scenario. • Enquire/observe parallel use of any other stove and their fuel • Enquire/observe source /storage of fuelwood /charcoal or any other fuel • Enquire number of meals cooked (along with family 	DOE results, accounting for duly justified differences.

		size of household) on project cook stove or any other baseline and/or stoves utilizing other fuel/s.	
Efficiency of improved cook stoves (ICS)	Water Boiling Test as the procedure allowed for efficient test prescribed by applied CDM methodology	Check the test reports/methods; check qualifications/ capabilities of testers; Witnessing of testing (if feasible)	Whether conducted by qualified institutions/testers; Whether conducted in accordance with approved established international/national standards, procedures and test methods prescribed by applicable CDM methodologies.

The sampling plan implemented by the CME is in accordance with the applied approved monitoring methodology /B02/ and the PoA-DD/CPA-DDs /B04/. The CME has appropriately performed Stratified Sampling procedure in line with the applied methodology. As the registered PoA-DD /B04/ mentions the option for Stratified Sampling procedure, it is acceptable to the verification team.

The necessary confidence / precision of 95/10 each of the parameters is met. This has been cross verified by the verification team from the supporting documents submitted /4/.

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	02	01	-
Remaining forward action requests from validation and/or previous verifications	-	-	-
CPAs considered for verification and covered in this report	-	-	-
Programme of activities	-	-	-
Compliance of the programme implementation with the registered PoA-DD	-	-	-
Implementation and operation of the management system	-	-	-
Post-registration changes	-	-	-
• Corrections	-	-	-
• Inclusion of a monitoring plan	-	-	-
• Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents ¹	-	-	-
• Changes to the programme design	-	-	-
• Addition of CPA inclusion template	-	-	-
• Change of coordinating/managing entity	-	-	-
• Changes specific to afforestation and reforestation activities	-	-	-
Component project activities	-	-	-
Compliance of the CPA implementation with the included	-	-	-

¹ Other standards, methodologies, methodological tools and guidelines (to be) applied in accordance with the applied(selected) methodologies are collectively referred to as the other (applied) methodological regulatory documents).

CPA design document			
Post-registration changes	-	-	-
<ul style="list-style-type: none"> Temporary deviations from registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents 	-	-	-
<ul style="list-style-type: none"> Corrections 	-	-	-
<ul style="list-style-type: none"> Changes to the start date-of the crediting period 	-	-	-
<ul style="list-style-type: none"> Inclusion of a monitoring plan 	-	-	-
<ul style="list-style-type: none"> Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents 	-	-	-
<ul style="list-style-type: none"> Changes to the project design 	-	-	-
<ul style="list-style-type: none"> Changes specific to afforestation and reforestation activities 	-	-	-
Compliance of the registered monitoring plan with applied methodologies and standardized baselines	-	-	-
Compliance of monitoring activities with the registered monitoring plan	-	-	-
<ul style="list-style-type: none"> Data and parameters fixed ex ante or at renewal of crediting period 	-	-	-
<ul style="list-style-type: none"> Data and parameters monitored 	-	01	-
<ul style="list-style-type: none"> Implementation of sampling plan 	-	-	-
Compliance with the calibration frequency requirements for measuring instruments	-	-	-
Assessment of data and calculation of emission reductions or net removals	-	-	-
<ul style="list-style-type: none"> Calculation of baseline GHG emissions or baseline net GHG removals by sinks 	-	-	-
<ul style="list-style-type: none"> Calculation of project GHG emissions or actual net GHG removals by sinks 	-	-	-
<ul style="list-style-type: none"> Calculation of leakage GHG emissions 	-	-	-
<ul style="list-style-type: none"> Summary of calculation of GHG emission reductions or net GHG removals by sinks 	-	-	-
<ul style="list-style-type: none"> Comparison of actual GHG emission reductions or net GHG removals by sinks with estimates in included CPA 	-	-	-
<ul style="list-style-type: none"> Remarks on difference from estimated value in included CPA 	-	-	-
Assessment of reported sustainable development co-benefits	-	-	-
Global stakeholder consultation	-	-	-
Others (please specify)	-	-	-
Total	02	02	-

SECTION E. Verification findings

E.1. General

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

Means of verification	DR, I
Findings	CAR 01, CL 01 and CL 02 had been raised and resolved. Please refer to Appendix 4 for further details.
Conclusion	CME has used the Monitoring report form for CDM programme of activities, Version 03.0 /B03/. Verification team confirms that the latest available version of the Monitoring report template /B03/ has been used by the CME and the MR is in compliance of the monitoring report form and instructions therein /B03/.

	<p>CC IPL, had made the version 1.0, dated 07/01/2020 of the monitoring report /1/, covering the monitoring period from 16/08/2018 to 15/08/2019 (both days inclusive) publicly available on 14/01/2020.</p> <p>This confirms compliance with the §338 and §339 of CDM VVS for PoAs, version 02.0 /B01-1/.</p>
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E.1.2. Remaining forward action requests from validation and/or previous verifications

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There were 4 forward action requests from validation which were resolved during first periodic verification and there is no FAR from previous (fourth) verification of the PoA.

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 Cookstove Programme, Uganda – CPA No 001; 9956-P1-0001-CP1	Yes	22/07/2014	Version 4.0	Y
Up Energy Improved Cookstove Programme, Uganda – CPA No 002; 9956-P1-0002-CP1	Yes	17/03/2015		Y
Up Energy Improved Cookstove Programme, Uganda – CPA No 003; 9956-P1-0002-CP1	Yes	17/04/2015		Y
Up Energy Improved Cookstove Programme, Uganda – CPA No 004; 9956-P1-0004-CP1	Yes	17/04/2015		Y
Up Energy Improved Cookstove Programme, Uganda – CPA No 005; 9956-P1-0005-CP1	Yes	28/11/2016		Y
Up Energy Improved Cookstove Programme, Uganda – CPA No 006; 9956-P1-0006-CP1	Yes	28/11/2016		Y
Up Energy Improved Cookstove Programme, Uganda – CPA No 007; 9956-P1-0007-CP1	Yes	28/11/2016		Y

Up Energy Improved Cookstove Programme, Uganda – CPA No 008; 9956-P1-0008-CP1	Yes	28/11/2016		Y
Up Energy Improved Cookstove Programme, Uganda – CPA No 009; 9956-P1-0009-CP1	Yes	31/05/2017		Y
Up Energy Improved Cookstove Programme, Uganda – CPA No 010; 9956-P1-0010-CP1	Yes	31/05/2017		Y
Up Energy Improved Cookstove Programme, Uganda – CPA No 011; 9956-P1-0011-CP1	Yes	31/05/2017		Y
Up Energy Improved Cookstove Programme, Uganda – CPA No 012; 9956-P1-0012-CP1	Yes	31/05/2017		Y

E.2. Programme of activities

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

Means of verification	Document Review, Interview
Findings	-
Conclusion	<p>CC IPL by means of an on-site inspection and document review, assessed that all physical features (technology, project equipment, and monitoring equipment) of the included CPAs in the registered PoA-DD are in place and that the coordinating/managing entity has operated the PoA and the CPAs as per the registered PoA-DD and the approved revised CPA-DDs.</p> <p>There are no deviations or proposed or actual changes in the implementation or operation of the PoA and the included CPAs.</p> <p>The verification team confirms actual operation of the CPAs and PoA implementation and operation in compliance with the registered PoA-DD / CPA-DDs in order to confirm the compliance of § 340, § 341 and § 342 of CDM VVS for PoAs, Version 02.0 /B01-1/.</p>

E.2.2. Implementation and operation of the management system

Means of verification	Document Review, Interview
Findings	-
Conclusion	<p>The PoA management system including the record-keeping system has been explained in the registered PoA-DD /B04/. During the course of verification, verification team based on review of provided documents and OSV interview/observation has assessed this management system. Verification team evaluated the management systems in place to implement the monitoring of the project activity. This included the roles and responsibilities, data collection, transfer and aggregation procedures, data storage and archiving for the monitoring system.</p> <p>Monitoring surveys were conducted by an external independent consultant /11-2/ and WBTs have been done by a third party, Center for Integrated Research and</p>

	<p>Community Development Uganda (CIRCODU) /11-1/. The data is further periodically checked by the CME to ensure there is no double counting. The records of sales database /6/ have been verified during the course of verification.</p> <p>In order to ensure completeness and accuracy of monitoring information, electronic database is operated and maintained by the CME / CPA implementer. This information is further maintained by the CME, who verifies the reported sales with the number of stoves produced by the manufacturer. This provision for the avoidance of double counting as outlined in the PoA management system has been verified by means of review records of sales database /6/ and OSV interview/observation during the course of verification. This unique serial numbering system and the data from manufacturer were further cross-checked (on a sampling basis) during the site visit physical inspection.</p> <p>It was confirmed during the OSV and by checking the monitoring system that all the roles and responsibilities related to monitoring are fulfilled by representatives of CME and the CPA implementer.</p> <p>The responsibilities and authorities for monitoring and reporting are in accordance with the responsibilities and authorities stated in the monitoring plan /B04/.</p> <p>The details about monitoring system have been provided in Section D of the Monitoring report /2/. The data flow and management and reporting structure was also checked during the on-site visit.</p> <p>The verification team confirms that the monitoring management system of the CDM PoA is in place, with the responsibilities properly identified and in place. This confirms the compliance of § 340 (a) and § 347 (b) (iv) of CDM VVS PoAs. Version 02.0 /B01-1/.</p>
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E.2.3. Post-registration changes

E.2.3.1. Corrections

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There are no corrections applicable to the monitoring period that have been approved by the Board during this monitoring period or to be submitted with the request for issuance.

E.2.3.2. Inclusion of a monitoring plan

>>

There are no inclusions of monitoring plan to the registered programme of activities has been approved by the Board during this monitoring period.

E.2.3.3. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents

>>

There are no permanent changes to the registered monitoring plan or permanent deviation of the monitoring from the applied methodology during the current monitoring period.

E.2.3.4. Changes to the programme design

>>

There are no changes to the programme design of the registered PoA-DD.

E.2.3.5. Addition of CPA inclusion template

>>

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	Document Review, Interview	
Findings	-	
Conclusion	The implementation status of the PoA and the component project activities is:	
	Co-ordinating and Managing entity/Project Participants:	UpEnergy Group
	Title of the PoA:	Up Energy Improved Cookstove Programme, Uganda
	UNFCCC registration No:	PoA - 9956
	Applied Baseline and monitoring methodology:	AMS-II.G, Version 05
	Title of the CPA:	Up Energy Improved Cookstove Programme, Uganda – CPA No 001
	CPA reference number:	9956-P1-0001-CP1
	Date of inclusion:	22/07/2014
	CPA implementer	UpEnergy Uganda Ltd
	Project Scale:	Small scale
	Location of the CPA:	Uganda
	CPA crediting period:	22/07/2014 to 21/07/2021
	Reported monitoring Period verified in this verification:	16/08/2018 to 15/08/2019
	Title of the CPA:	Up Energy Improved Cookstove Programme, Uganda – CPA No 002
	CPA reference number:	9956-P1-0002-CP1
	Date of inclusion:	17/03/2015
	CPA implementer	UpEnergy Uganda Ltd
	Project Scale:	Small scale
	Location of the CPA:	Uganda
	CPA crediting period:	17/03/2015 to 16/03/2022
	Reported monitoring Period verified in this verification:	16/08/2018 to 15/08/2019
	Title of the CPA:	Up Energy Improved Cookstove Programme, Uganda – CPA No 003
	CPA reference number:	9956-P1-0003-CP1
	Date of inclusion:	17/04/2015
	CPA implementer	UpEnergy Uganda Ltd
	Project Scale:	Small scale
	Location of the CPA:	Uganda
	CPA crediting period:	17/04/2015 to 16/04/2022
	Reported monitoring Period verified in this verification:	16/08/2018 to 15/08/2019
	Title of the CPA:	Up Energy Improved Cookstove Programme, Uganda – CPA No 004

CPA reference number:	9956-P1-0004-CP1
Date of inclusion:	17/04/2015
CPA implementer	UpEnergy Uganda Ltd
Project Scale:	Small scale
Location of the CPA:	Uganda
CPA crediting period:	17/04/2015 to 16/04/2022
Reported monitoring Period verified in this verification:	16/08/2018 to 15/08/2019

Title of the CPA:	Up Energy Improved Cookstove Programme, Uganda – CPA No 005
CPA reference number:	9956-P1-0005-CP1
Date of inclusion:	28/11/2016
CPA implementer	UpEnergy Uganda Ltd
Project Scale:	Small scale
Location of the CPA:	Uganda
CPA crediting period:	01/01/2017 to 31/12/2023
Reported monitoring Period verified in this verification:	16/08/2018 to 15/08/2019

Title of the CPA:	Up Energy Improved Cookstove Programme, Uganda – CPA No 006
CPA reference number:	9956-P1-0006-CP1
Date of inclusion:	28/11/2016
CPA implementer	UpEnergy Uganda Ltd
Project Scale:	Small scale
Location of the CPA:	Uganda
CPA crediting period:	01/01/2017 to 31/12/2023
Reported monitoring Period verified in this verification:	16/08/2018 to 15/08/2019

Title of the CPA:	Up Energy Improved Cookstove Programme, Uganda – CPA No 007
CPA reference number:	9956-P1-0007-CP1
Date of inclusion:	28/11/2016
CPA implementer	UpEnergy Uganda Ltd
Project Scale:	Small scale
Location of the CPA:	Uganda
CPA crediting period:	01/01/2017 – 31/12/2023
Reported monitoring Period verified in this verification:	16/08/2018 to 15/08/2019

Title of the CPA:	Up Energy Improved Cookstove Programme, Uganda – CPA No 008
CPA reference number:	9956-P1-0008-CP1
Date of inclusion:	28/11/2016
CPA implementer	UpEnergy Uganda Ltd
Project Scale:	Small scale
Location of the CPA:	Uganda
CPA crediting period:	01/01/2017 – 31/12/2023
Reported monitoring Period verified in this verification:	16/08/2018 to 15/08/2019

Title of the CPA:	Up Energy Improved Cookstove Programme, Uganda – CPA No 009
CPA reference number:	9956-P1-0009-CP1
Date of inclusion:	31/05/2017
CPA implementer	UpEnergy Uganda Ltd
Project Scale:	Small scale
Location of the CPA:	Uganda
CPA crediting period:	15/07/2017 – 14/07/2024

Reported monitoring Period verified in this verification:	16/08/2018 to 15/08/2019
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Title of the CPA:	Up Energy Improved Cookstove Programme, Uganda – CPA No 010
CPA reference number:	9956-P1-0010-CP1
Date of inclusion:	31/05/2017
CPA implementer	UpEnergy Uganda Ltd
Project Scale:	Small scale
Location of the CPA:	Uganda
CPA crediting period:	20/08/2017 – 19/08/2024
Reported monitoring Period verified in this verification:	16/08/2018 to 15/08/2019

Title of the CPA:	Up Energy Improved Cookstove Programme, Uganda – CPA No 011
CPA reference number:	9956-P1-0011-CP1
Date of inclusion:	31/05/2017
CPA implementer	UpEnergy Uganda Ltd
Project Scale:	Small scale
Location of the CPA:	Uganda
CPA crediting period:	25/09/2017 –24/09/2024
Reported monitoring Period verified in this verification:	16/08/2018 to 15/08/2019

Title of the CPA:	Up Energy Improved Cookstove Programme, Uganda – CPA No 012
CPA reference number:	9956-P1-0012-CP1
Date of inclusion:	31/05/2017
CPA implementer	UpEnergy Uganda Ltd
Project Scale:	Small scale
Location of the CPA:	Uganda
CPA crediting period:	21/10/2017 –20/10/2024
Reported monitoring Period verified in this verification:	16/08/2018 to 15/08/2019

As a part of the site visit, the verification team was able to confirm that the Programme of activities and the component project activities' implementation are in accordance with the project description contained in the included CPA-DDs /B04/.

The CPAs include distribution of energy efficient improved cooking stoves. The CPA implementer is UpEnergy Uganda Ltd. The portable improved cook stoves (ICS) under the CPAs use charcoal / woodfuel /7/ as fuel. These ICSs are efficient in transferring heat from the fuel to the pot, thus saving charcoal / wood fuel compared to the traditional stoves.

The number of stoves deployed under each CPAs has been confirmed by the monitoring database /5/ and as stated below:

SI .No.	CPA Reference No.	Number of ICS Distributed
1	9956-P1-0001-CP1	11,279
2	9956-P1-0002-CP1	18,000
3	9956-P1-0003-CP1	18,000
4	9956-P1-0004-CP1	18,000
5	9956-P1-0005-CP1	18,000
6	9956-P1-0006-CP1	18,000
7	9956-P1-0007-CP1	18,000
8	9956-P1-0008-CP1	18,000
9	9956-P1-0009-CP1	18,000
10	9956-P1-0010-CP1	18,000

11	9956-P1-0011-CP1	18,000
12	9956-P1-0012-CP1	17,884
Total		209,163

The annual energy savings in GWh_{th} for the CPAs for the monitoring period were as follows:

CPA	GWh _{th}	Comment
CPA 1	112.78	In all the cases, energy savings is less than the CPA-DDs requirement of 180 GWh _{th} for small scale project
CPA 2	175.70	
CPA 3	173.63	
CPA 4	170.38	
CPA 5	176.90	
CPA 6	177.00	
CPA 7	176.71	
CPA 8	176.15	
CPA 9	153.82	
CPA 10	67.03	
CPA 11	32.35	
CPA 12	17.55	

It was confirmed during the OSV that UpEnergy Group is the Coordinating/Managing Entity for the PoA. The actual component project activity/ies are in line with the approved revised CPA-DDs /B04/. UpEnergy Uganda Ltd is the CPA implementers for the CPAs.

The information (including data and variables) provided in the MR /2/ is in line with the details provided in the approved revised CPA-DDs /B04/.

The Monitoring report /2/, reports for the fifth monitoring period (16/08/2018 to 15/08/2019) for CPA 1 to CPA 12. The reported monitoring report is a first batch to be reported after the fourth monitoring period and is after the end date of the fourth monitoring period (01/11/2017 to 15/08/2018).

CC IPL's verification team considers the project description of the project contained in the registered PoA-DD and the approved revised CPA-DDs /B04/ to be complete and accurate. The CPA-DDs comply with the relevant methodology, tools, forms and guidance at the time of CPA-DDs submission for registration/inclusion.

In accordance with § 342 of CDM VVS for PoAs, version 02 /B01-1/, the verification team confirms that there is no information (data and variables) in the current monitoring period that are different from that stated in the approved revised CPA-DDs which has caused an increase in the estimates of GHG emission reductions.

Verification team has assessed the project in order to check any proposed or actual changes to the project design in accordance with § 269 of CDM VVS for PoAs, Version 02.0. In the opinion of CC IPL, there is no change to the project design. CC IPL's verification team confirms that the CPAs are implemented within the boundary of the PoA as described in the registered PoA-DD.

In accordance with § 342 (c) of CDM VVS for PoAs, Version 02.0 /B01-1/, information (data and variables) provided in the monitoring report that are different from that stated in the approved revised CPA-DDs /B04/, have been assessed. The assessment is summarized below:

Parameter	Ex-ante value in the CPA-DDs	Actual operation for the reported monitoring period	Assessment by the verification team
Number of appliances (N _y)	CPA 1- 14,430; CPA 2- 14,831; CPA 3- 14,831; CPA 4- 14,831; CPA 5-14,856;	CPA 1- 11,279; CPA 2- 18,000; CPA 3- 18,000; CPA 4- 18,000; CPA 5- 18,000;	Verification team noted that the actual number of cook-stoves distributed under the CPA 2 to CPA 12 are higher than the number indicated in the respective approved revised CPA-DDs /B04/. This

		CPA 6-14,831; CPA 7-14,831; CPA 8-14,831; CPA 9-14,831; CPA 10-14,831; CPA 11-14,831; CPA 12-14,831;	CPA 6- 18,000; CPA 7- 18,000; CPA 8- 18,000; CPA 9- 18,000; CPA 10-18,000; CPA 11-18,000; CPA 12-17,884	<p>difference is acceptable based on the following:</p> <ul style="list-style-type: none"> • CPA-DDs do not restrict the number of cook stoves as the stated values are just indicative values (as explained below); • Energy savings in the CPAs during the monitoring period is less than the threshold limit of 180 GWh_{th}/year for small scale project activities. <p>Verification team further noted that the cook-stove numbers as indicated in the approved revised CPA-DDs is not a fixed number (thus this cannot be categorized under a design change) and this assessment has been based on review of following statement in the CPA-DDs:</p> <p><i>“Though we have calculated the installation cap of this CPA is 14,831 operational ICS per year. Please note that this represents operational stove numbers only and is based on other variables as well which might change ex-post during the crediting period. As long as the CPA does not exceed the 180 GWh_{th} energy savings/year threshold, any number of operational stoves can be added in the CPA. This relation will vary according to the results obtained from the field on the monitoring of the ex-post parameters for each verification period in the specific CPA”.</i></p> <p>The number of cook-stoves stated in the CPA-DDs is only an indicative number based on the small-scale annual energy saving threshold of 180 GWh_{th}/year. The verification team noted that with the increase in number of stoves, the CPAs still remain under the limit of small scale and hence this is not deemed as any design change.</p>
	Efficiency of the ICS (η_{new})	CPA 1- 27.1%; CPA 2- 26.0%; CPA 3- 26.0%; CPA 4- 26.0%; CPA 5- 26.0%; CPA 6- 26.0%; CPA 7- 26.0%; CPA 8- 26.0%; CPA 9- 26.0%; CPA 10- 26.0%; CPA 11- 26.0%; CPA 12- 26.0%	Weighted average values of 29.28 % for all the CPAs together	<p>The weighted average efficiency of the cook-stoves (η_{new}) monitored ex-post for the current monitoring period is slightly higher than the estimated ex-ante values in the CPA-DDs. Verification team noted that the assumed value of thermal efficiency in the CPA-DDs of 26% was only for SmartHome Charcoal stoves and 25.3% for AES model stoves (for AES model stoves the actual monitored thermal efficiency is 23.24% which is less than the CPA-DDs value). This weighted average value is for the 11 different implemented stove models. The CPA-DDs mention the stove</p>

				models to be distributed are SmartHome Charcoal Stove and the African Energy Stove (AES) as an example. Hence the verification team deemed acceptable the other models of stoves distributed in the CPA-DDs. In actual, the CPA-DDs involve various other models of stoves and their actual monitored efficiencies are less/greater than (for various models) the design values. The verification team confirms that the CME had randomly picked the samples from the different models of the stoves and conducted the WBTs. Hence the WBT results are deemed acceptable.
	Quantity of woody biomass used in the project activity by traditional stoves (μ_{old})	A value of 0 tonnes/year was assumed for all the twelve CPAs for ex ante ER estimation	0.57 tonnes/year	The amount of woody biomass consumption that is consumed through the continued use of old stoves is based on the actual monitored ex-post value for the current monitoring period. The monitored value is more than the ex-ante estimated ex-ante value in the CPA-DDs. As the value is based on the actual monitored values as verified during the on-site visit and survey records, this is deemed acceptable to the verification team.
	Average usage rate of appliance (U_y)	A value of 1 was assumed for all the twelve CPAs for ex ante ER estimation	87.20%	The average usage rate of the stove is based on the actual monitored ex-post value for the current monitoring period. The monitored value is less than the ex-ante estimated ex-ante value in the CPA-DDs. As the value is based on the actual monitored values as verified during the on-site visit and survey records, this is deemed acceptable to the verification team.
	Emission reductions per stove/year (tCO_2)	CPA 1- 3.10; CPA 2- 3.03; CPA 3- 3.03; CPA 4- 3.03; CPA 5- 3.03; CPA 6- 3.03; CPA 7- 3.03; CPA 8- 3.03; CPA 9- 3.03; CPA 10- 3.03; CPA 11- 3.03; CPA 12- 3.03	CPA 1- 2.41; CPA 2- 2.35; CPA 3- 2.32; CPA 4- 2.28; CPA 5- 2.37; CPA 6- 2.37; CPA 7- 2.37; CPA 8- 2.36; CPA 9- 2.06; CPA 10- 0.90; CPA 11- 0.43; CPA 12- 0.24	The ERs per stove is less than the ex-ante estimated values in the CPA-DDs.
	<p>In the opinion of CCIPL, there is no change to the project design. CCIPL's verification team confirms that the CPAs are implemented within the boundary of the PoA as described in the registered PoA-DD and the implementation and operation of the project activity has been conducted in accordance with the description contained in the registered PoA-DD and approved revised CPA-DDs.</p> <p>The verification team took cognizance of § 340, § 341 and § 342 of the CDM VVS for PoAs, version 02 /B01-1/ to conduct the verification and conducted a site visit in accordance with the § 321 and 322 of the CDM VVS for PoAs, version 02 /B01-1/.</p>			

E.3.2. Post-registration changes**E.3.2.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents**

>>

There are no temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline during the monitoring period.

E.3.2.2. Corrections

>>

There are no corrections made to any CPAs (CPA1 to CPA 12) during the current monitoring period.

PRC for CPA 1 to CPA 4 was approved on 06/09/2018
(https://cdm.unfccc.int/PoAIssuance/iss_db/poaiss960826622/view)

PRC for CPA 5 was approved on 03/12/2018

(<https://cdm.unfccc.int/PRCContainer/DB/prcp827754113/view>)

PRC for CPA 6 to CPA 12 was approved on 17/09/2019

(<https://cdm.unfccc.int/PRCContainer/DB/prcp614688312/view>).

E.3.2.3. Changes to the start-date of the crediting period

>>

There are no changes to the start date of the crediting period for the CPAs.

E.3.2.4. Inclusion of a monitoring plan

>>

There are no inclusions of monitoring plan to included CPA-DDs.

E.3.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents

>>

There are no permanent changes to the registered monitoring plan or permanent deviation of the monitoring from applied methodologies during the current monitoring period.

PRC for CPA 1 to CPA 4 was approved on 06/09/2018
(https://cdm.unfccc.int/PoAIssuance/iss_db/poaiss960826622/view)

PRC for CPA 5 was approved on 03/12/2018

(<https://cdm.unfccc.int/PRCContainer/DB/prcp827754113/view>)

PRC for CPA 6 to CPA 12 was approved on 17/09/2019

(<https://cdm.unfccc.int/PRCContainer/DB/prcp614688312/view>).

E.3.2.6. Changes to the project design

>>

There are no changes to the programme design of the included CPA-DDs.

E.3.2.7. Changes specific to afforestation and reforestation activities

>>

Not applicable

E.3.3. Compliance of the registered monitoring plan with applied methodologies and standardized baselines

Means of verification	Document Review, Interview
Findings	-
Conclusion	<p>The verification team is able to confirm that the monitoring plan contained in the approved revised CPA-DDs is in accordance with the approved methodology applied by the project activity, i.e. AMS-II. G, version 05 /B02/.</p> <p>The monitoring plan is in accordance with the approved methodology, AMS-II. G, version 05 /B02/, applied by the component project activities and as provided in the CPA-DDs /B04/.</p> <p>The verification took cognizance of § 343 to § 345 of CDM VVS for PoAs, Version 02.0 /B01-1/.</p>

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

The monitoring has been carried out in accordance with the monitoring plan contained in the approved revised CPA-DDs /B04/. This conclusion has been made based on assessment below in section E.3.4.1, E.3.4.2 and E.3.4.3 below.

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

Means of verification	Document Review, Interview
Findings	-
Conclusion	<p>Verification team confirms that the Data and parameters fixed ex ante are in compliance with the approved revised CPA-DDs /B04/ and the monitoring plan. Please refer Annex 1 for detailed analysis of the ex-ante parameters.</p> <p>The verification took cognizance of § 346 of CDM VVS for PoAs, Version 02.0 /B01-1/.</p>

E.3.4.2. Data and parameters monitored

Means of verification	Document Review, Interview
Findings	CAR 02 has been raised. Please refer to Appendix 4 for further details.
Conclusion	<p>The Verification team confirms that the Data and parameters monitored are in compliance with the approved revised CPA-DDs /B04/ and the monitoring plan /B04/. A complete assessment of each of the monitored parameters has been provided in Annex 2 of the verification report.</p> <p>The verification took cognizance of § 346, § 347(c), §358 and §359 of CDM VVS for PoAs, Version 02.0 /B01-1/.</p>

E.3.4.3. Implementation of sampling plan

Means of verification	Document Review, Interview
Findings	-
Conclusion	<p>The total population of the stoves under the twelve CPAs considered for the monitoring period is 209,163. The monitoring parameters required to be monitored through the sampling plan are:</p> <ol style="list-style-type: none"> 1. The thermal efficiency of the ICS distributed (%) (η_{new}) 2. The average usage rate of the appliance (U_y) 3. The quantity of woody biomass used in the project activity by traditional stoves (μ_{old}) <p>Cross-CPA stratified sampling was applied for the twelve CPAs by CME for selection of the monitoring samples with 95/10 confidence/precision for all the three parameters for annual monitoring which is deemed acceptable as per the registered PoA-DD /CPA-DDs. For the thermal efficiency of the stoves (η_{new}) and the average usage rate of the appliance (U_y), sampling frames were chosen for the respective models of stoves distributed and considered for monitoring separately whereas the quantity of woody biomass used in the project activity by traditional stoves (μ_{old}) sampling frame was chosen for the vintage wise stove distributed.</p>

Applying the random number generator, the ICS were randomly picked from the defined population upto the required sample size as calculated by the CME /14/. The verification team confirms that the applied method for sample size calculation is in accordance with the PoA-DD / CPA-DDs /B04/.

The number of samples for each of the parameters covered during the monitoring activity is as given below:

Parameter	Sample Size (n) required	Samples covered during monitoring
η_{new} (AES)	2	3
η_{new} (EZY)	2	4
η_{new} (SHS)	2	3
η_{new} (SHS-GBE)	2	3
η_{new} (SHS-ILF)	2	3
η_{new} (SHS-BOLD)	2	3
η_{new} (Lugwana)	2	3
η_{new} (Energy Empire)	2	3
η_{new} (BME)	2	3
η_{new} (FSL)	2	3
η_{new} (SpendSmart)	2	3
U_y (AES)	2	5
U_y (EZY)	3	8
U_y (SHS)	11	20
U_y (SHS-GBE)	9	14
U_y (SHS-ILF)	6	13
U_y (SHS-BOLD)	11	18
U_y (Lugwana)	4	6
U_y (Energy Empire)	4	4
U_y (BME)	2	4
U_y (FSL)	2	5
U_y (SpendSmart)	2	6
μ_{old} (2013)	2	2
μ_{old} (2014)	2	2
μ_{old} (2015)	2	2
μ_{old} (2016)	2	2
μ_{old} (2017)	2	5
μ_{old} (2018)	3	6
μ_{old} (2019)	2	5

The actual sample size in all the cases was not less than either the calculated sample size or the minimum sample size as per the PoA-DD. For the mean parameters, Student's t-distribution has been used since the resulting sample size was less than 30 and this is deemed acceptable in line with the Standard for sampling and surveys for CDM project activities and Programme of Activities, version 08 /B07/.

For the monitoring parameters U_y and μ_{old} , data were collected following a specially designed survey form. For thermal efficiency of the stoves WBTs (Water Boiling Tests) were conducted.

The verification team has checked and found that for all the parameters the confidence/precision of 95/10 was met.

DOE used sampling during verification for checking the operational status and to check if the WBT tests have been done in the households and it was confirmed that the WBT tests were conducted. Considering that Uganda is a Least Developed Country, applying paragraph 39 (c) of the sampling standard, version 08 /B07/, a sample size of 8 households was chosen (with no discrepant records). A sample size of 8 was required, based on an AQL of 1.0% and UQL of 20%, producer risk

	<p>10% and consumer risk 20%. Acceptance number (c) thus determined for the sample is 0. DOE visited 8 samples (each, for monitoring survey and WBTs conducted). It was observed that out of the 8 samples, all the 8 stoves were found to be operational and all the 8 households, where the WBTs were conducted, has confirmed that their stoves were taken by the CME for conducting water boiling tests and they received a new cookstoves as a replacement /12/ and this matched with the CME's records and hence no discrepant records were observed with the published MR /2/ and ER sheet /4/ and thus c=0. Thus, CME's set of records has been accepted in line with § 33 of the sampling standard, version 08 /B07/. Verification team has cross verified these sample documents during the on-site visit.</p> <p>The sampling plan implemented by the CME is in accordance with the applied approved monitoring methodology /B02/ and the PoA-DD/CPA-DDs /B04/. The CME has appropriately performed Stratified Random Sampling procedure in line with the applied methodology and best suited for this type of project. As the registered PoA-DD /B04/ mentions the option for Stratified Random Sampling procedure, it is acceptable to the verification team.</p> <p>The necessary confidence / precision of 95/10 each of the parameters is met. This has been cross verified by the verification team from the supporting documents submitted /4/.</p> <p>The verification took cognizance of § 348 of CDM VVS for PoAs, Version 02.0 /B01-1/.</p>
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E.3.5. Compliance with the calibration frequency requirements for measuring instruments

Means of verification	Document Review, Interview
Findings	-
Conclusion	<p>The stove efficiency testing has been determined by WBTs conducted in line with the guidance provided by the CME in the CPA-DDs /B04/ /15/. The WBTs were conducted by a third party, CIRCODU. During the on-site visit interviews, it was confirmed that the appointed third party has relevant experience and competence in monitoring cookstove projects in Uganda. Since the data was provided by third party and PP was not involved in the WBT, thus no monitoring equipment was directly used by the CME. The monitoring equipment used for conducting the stove efficiencies by WBTs are thermometer, weighing machine and moisture meter. All the monitoring equipment were duly calibrated and hence deemed acceptable /13/. The appropriate QA/QC procedures have been followed for the monitoring parameters.</p> <p>The verification took cognizance of section 10.2.6 of CDM VVS for PoAs, version 02 /B01-1/.</p>

E.3.6. Assessment of data and calculation of emission reductions or net removals

In line with the requirement of § 358 and § 359 of CDM VVS for PoAs, Version 02.0 /B01-1/, the verification team has reviewed the Monitoring report /2/ and ER spread sheets /4/ to check the arithmetic calculation of the emission reductions. The equation used for the calculation is compared with those provided in the approved revised CPA-DDs /B04/ and the methodology AMS-II.G, Version 05 /B02/.

E.3.6.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

Means of verification	Document Review, Interview
Findings	--
Conclusion	<p>The equations for baseline emissions, as provided in the Monitoring report /2/ and confirmed with the approved revised CPA-DDs /B04/ and the methodology AMS-II.G, Version 05 /B02/, are:</p> $ER_y = (B_{y,savings} \times N_y \times U_y) \times (f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossilfuel})$

Where:

ER_y = Emission reductions during the year y in tCO₂e
 $B_{y,savings}$ = Quantity of biomass that is saved in tonnes per appliance
 $f_{NRB,y}$ = Fraction of biomass saved by the project activity in year y that can be established as non-renewable biomass using survey results, national or local statistics or other sources of information (fixed ex ante as 82%)
 $NCV_{biomass}$ = Net calorific value of the non-renewable biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne)
 $EF_{projected_fossilfuel}$ = Emission factor for the substitution of non-renewable biomass by similar consumer (Default value of 81.6 tCO₂/TJ).
 N_y = Number of appliances of the type being deployed during the period y
 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

$$\text{By savings} = [(B_{old} - \mu_{old}) * L] * (1 - \eta_{old} / \eta_{new})$$

B_{old} = Quantity of biomass used in the absence of the project activity in tonnes/year (4.97 as per the CPA-DDs)
 η_{old} = Efficiency of the system being replaced (fixed 10% ex ante)
 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. (monitored ex post during the monitoring period)
 L = Net to gross Adjustment factor (0.95) applied in accordance with AMS-II.G, ver 05
 μ_{old} = Quantity of woody biomass for the continued use of old stoves

From the above equation and the parameter values, emission reductions are calculated as:

9956-P1-0001-CP1	--	27,173 tCO ₂ e
9956-P1-0002-CP1	--	42,335 tCO ₂ e
9956-P1-0003-CP1	--	41,836 tCO ₂ e
9956-P1-0004-CP1	--	41,052 tCO ₂ e
9956-P1-0005-CP1	--	42,624 tCO ₂ e
9956-P1-0006-CP1	--	42,648 tCO ₂ e
9956-P1-0007-CP1	--	42,578 tCO ₂ e
9956-P1-0008-CP1	--	42,444 tCO ₂ e
9956-P1-0009-CP1	--	37,062 tCO ₂ e
9956-P1-0010-CP1	--	16,151 tCO ₂ e
9956-P1-0011-CP1	--	7,795 tCO ₂ e
9956-P1-0012-CP1	--	4,228 tCO ₂ e
Total	--	387,926 tCO ₂ e

The verification team confirms that the calculation of baseline emission and emission reductions is in accordance with the applied methodological equation and the approved revised CPA-DDs. Calculations have been checked and confirmed from the ER spread sheet /4/.

The verification took cognizance of § 358 of CDM VVS for PoAs, version 02.0 /B01-1/.

E.3.6.2. Calculation of project GHG emissions or actual net GHG removals by sinks

Means of verification	Document Review, Interview
Findings	-
Conclusion	There are no project emissions identified in the monitoring methodology /B02/ and

the CPA-DDs /B04/.

E.3.6.3. Calculation of leakage GHG emissions

Means of verification	Document Review, Interview
Findings	-
Conclusion	<p>Net-to-gross adjustment factors for leakage (fixed default values of 0.95 as per AMS II.G. version 05) /B02/ was applied to the project activity to calculate Emission Reductions of this Monitoring Period.</p> <p>Verification team confirms that all parameters are used correctly in the calculations, all results are verifiable and transparent, all assumptions are described and based on verifiable evidence and calculations are done in accordance with the pre-defined formulae from approved revised CPA-DDs /B04/.</p>

E.3.6.4. Summary of calculation of GHG emission reductions or net GHG removals by sinks

Means of verification	Document Review, Interview
Findings	-
Conclusion	<p>The verification team confirms that all parameters are used correctly in the calculations, all results are verifiable and transparent, all assumptions are described and based on verifiable evidence and calculations are done in accordance with the pre-defined formulae from approved revised CPA-DDs. The total number of ERs achieved during the monitoring period is 387,926 tCO₂e.</p> <p>In summary, verification team confirms that actual emission reduction is lower than the estimate of the approved revised CPA-DDs /B04/ for the current monitoring period.</p> <p>The verification took cognizance of § 358 of CDM VVS PoAs, version 02 /B01-1/.</p>

Title and UNFCCC reference number of the CPA	Baseline emissions or baseline net GHG removals by sinks (tCO ₂ e)	Project emissions or actual net GHG removals by sinks (tCO ₂ e)	Leakage (tCO ₂ e)	GHG emission reductions or net GHG removals by sinks (tCO ₂ e)		
				Amount achieved before 1 January 2013	Amount achieved from 1 January 2013	Amount achieved in the entire monitoring period
9956-0001	27,173	-	-	0	27,173	27,173
9956-0002	42,335	0	0	0	42,335	42,335
9956-0003	41,836	0	0	0	41,836	41,836
9956-0004	41,052	0	0	0	41,052	41,052
9956-0005	42,624	-	-	0	42,624	42,624
9956-0006	42,648				42,648	42,648
9956-0007	42,578				42,578	42,578
9956-0008	42,444				42,444	42,444
9956-0009	37,062				37,062	37,062
9956-0010	16,151				16,151	16,151
9956-0011	7,795				7,795	7,795
9956-0012	4,228				4,228	4,228
Total	387,926	0	0	0	387,926	387,926

E.3.6.5. Comparison of actual GHG emission reductions or net GHG removals by sinks with estimates in included CPA

Means of verification	Document Review
Findings	-
Conclusion	Comparison of the actual GHG emission reductions with the estimates in the included specific CPAs is given in the below table. The verification team took cognizance of § 358 of CDM VVS for PoAs, version 02 /B01-1/.

Title and UNFCCC reference number of the CPA	Actual values achieved by the CPAs during this monitoring period	Value estimated in ex ante calculation in the included CPA-DD(s)
9956-0001	27,173	44,874
9956-0002	42,335	44,980
9956-0003	41,836	44,980
9956-0004	41,052	44,980
9956-0005	42,624	44,980
9956-0006	42,648	44,980
9956-0007	42,578	44,980
9956-0008	42,444	44,980
9956-0009	37,062	44,980
9956-0010	16,151	44,980
9956-0011	7,795	44,980
9956-0012	4,228	44,980
Total	387,926	539,654

E.3.6.6. Remarks on difference from estimated value in included CPA

Means of verification	Document review
Findings	-
Conclusion	The actual emission reductions are less than the ex-ante estimated values in the CPA-DDs.

E.3.7. Assessment of reported sustainable development co-benefits

Means of verification	Not applicable (as there are no sustainable development co-benefits required as per the registered CDM PoA-DD)
Findings	-
Conclusion	Not applicable The verification took cognizance of § 361 of CDM VVS PoAs, version 02 /B01-1/.

E.3.8. Global stakeholder consultation

Means of verification	Not applicable (as this is not first Monitoring report)
Findings	-
Conclusion	Not applicable (this is not first Monitoring report) The verification took cognizance of § 370 of CDM VVS PoAs, version 02 /B01-1/.

SECTION F. Internal quality control

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The final verification report passed a technical review before being submitted to the UNFCCC Executive Board. A technical reviewer qualified in accordance with the CCIPL's qualification scheme for CDM validation and verification has performed the technical review.

SECTION G. Verification opinion

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Carbon Check (India) Private Ltd. has performed the fifth periodic verification of the registered CDM Programme of Activities "Up Energy Improved Cookstove Programme, Uganda" in Uganda

(hereafter referred to as “Programme of Activities or PoA”) for the CPAs titled “Up Energy Improved Cookstove Programme, Uganda – CPA No 001”; “Up Energy Improved Cookstove Programme, Uganda – CPA No 002”; “Up Energy Improved Cookstove Programme, Uganda – CPA No 003”; “Up Energy Improved Cookstove Programme, Uganda – CPA No 004”; “Up Energy Improved Cookstove Programme, Uganda – CPA No 005”; “Up Energy Improved Cookstove Programme, Uganda – CPA No 006”; “Up Energy Improved Cookstove Programme, Uganda – CPA No 007”; “Up Energy Improved Cookstove Programme, Uganda – CPA No 008”; “Up Energy Improved Cookstove Programme, Uganda – CPA No 009”; “Up Energy Improved Cookstove Programme, Uganda – CPA No 010”; “Up Energy Improved Cookstove Programme, Uganda – CPA No 011” and “Up Energy Improved Cookstove Programme, Uganda – CPA No 012”.

The verification team assigned by the DOE concludes that the PoA-DD (Version 4.0, dated 30/06/2014), CPAs 9956-P1-0001-CP1, 9956-P1-0002-CP1, 9956-P1-0003-CP1, 9956-P1-0004-CP1, 9956-P1-0005-CP1, 9956-P1-0006-CP1, 9956-P1-0007-CP1, 9956-P1-0008-CP1, 9956-P1-0009-CP1, 9956-P1-0010-CP1, 9956-P1-0011-CP1 and 9956-P1-0012-CP1 as described in the revised and accepted CPA-DDs /B04/ and the Monitoring report (Version 3.0, dated 11/03/2020) /2/, meet all relevant requirements of the UNFCCC for CDM project activities including article 12 of the Kyoto Protocol and paragraph 62 of CDM M& P, the modalities and procedures for CDM (Marrakesh Accords) and the subsequent decisions by the COP/MOP and CDM Executive Board. The verification has been conducted in-line with the CDM VVS for programme of activities requirements version 02.0 /B01-1/.

Verification methodology and process:

The Verification team confirms the contractual relationship signed on 04/01/2020 between the DOE, Carbon Check (India) Private Ltd. and the Co-ordinating Managing Entity/ Project Participant, (UpEnergy Group). The team assigned to the verification meets the Carbon Check (India) Private Ltd.’s internal procedures including the UNFCCC requirements for the team composition and competence. The verification team has conducted a thorough contract review as per UNFCCC and Carbon Check’s procedures and requirements.

The verification is being performed as per the requirements described in the CDM VVS for PoAs, version 02.0 /B01-1/ and constitutes the review and completion of the following steps:

- Reviewing the approved revised / registered PoA-DD (Version 4.0, date 30/06/2014), the approved revised CPA DDs for 9956-P1-0001-CP1, 9956-P1-0002-CP1, 9956-P1-0003-CP1, 9956-P1-0004-CP1, 9956-P1-0005-CP1, 9956-P1-0006-CP1, 9956-P1-0007-CP1, 9956-P1-0008-CP1, 9956-P1-0009-CP1, 9956-P1-0010-CP1, 9956-P1-0011-CP1 and 9956-P1-0012-CP1 (/B04/), including the monitoring plan and the corresponding validation report/s /B04/;
- Previous verification and certification reports and the monitoring reports for Monitoring Period 1, Monitoring Period 2, Monitoring Period 3 and Monitoring Period 4 /B09/;
- Publication of the MR on the UNFCCC website (version 1.0, 07/01/2020) on 14/02/2020
- Desk review of the validation report, MR and other relevant documents including documents related to the project activities in emission reductions
- Review of the applied monitoring methodology (AMS-II.G, version 05);
- Review of any CMP and EB decisions, clarifications and guidance;
- On-site assessment (11/02/2020-12/02/2020)
- Resolution of CARs and CLs raised during verification (to be done)
- Issuance of Verification Report

The component project activities were correctly implemented according to the selected monitoring methodology, monitoring plan and the approved revised CPA-DDs. The monitoring system was installed, maintained in a proper manner, while collected monitoring data allowed for the verification of the amount of achieved GHG emission reductions. Through the review and on-site visit, the verification team confirms that the PoA has resulted in the 387,926 tCO₂e emission reductions during the fifth monitoring period.

Verified emission reductions:

9956-P1-0001-CP1 -- 27,173 tCO₂e
 9956-P1-0002-CP1 -- 42,335 tCO₂e
 9956-P1-0003-CP1 -- 41,836 tCO₂e
 9956-P1-0004-CP1 -- 41,052 tCO₂e
 9956-P1-0005-CP1 -- 42,624 tCO₂e
 9956-P1-0006-CP1 -- 42,648 tCO₂e
 9956-P1-0007-CP1 -- 42,578 tCO₂e
 9956-P1-0008-CP1 -- 42,444 tCO₂e
 9956-P1-0009-CP1 -- 37,062 tCO₂e
 9956-P1-0010-CP1 -- 16,151 tCO₂e
 9956-P1-0011-CP1 -- 7,795 tCO₂e
 9956-P1-0012-CP1 -- 4,228 tCO₂e

The break-up of emission reduction upto 31st December 2012 and 1st January 2013 onwards as verified during the course of verification are as below:

Item	Emission reductions up to 31 December 2012	Emission reductions from 1 January 2013 onwards
Emission reductions (t CO ₂ e)	0	387,926

CC IPL as a DOE is therefore pleased to issue a positive verification opinion in the attached Certification statement.

SECTION H. Certification statement

>>

Carbon Check (India) Private Ltd., the DOE, has performed the verification of the registered Programme of Activities, UNFCCC Registration Number 9956, "Up Energy Improved Cookstove Programme, Uganda" in Uganda. The PoA involves replacement of less efficient cooking stoves using woody biomass with ICS which are more efficient. The ICS distributed under CPAs of the PoA are more efficient in transferring heat from the fuel to the pot when compared to the stoves typically used in baseline. By replacing inefficient stoves, the PoA will save on consumption of woody biomass (either wood or charcoal made of wood).

The component project activities of the Programme of Activities are designed to generate emission reductions by distribution of the fuel-efficient charcoal / wood fuel based cook stoves in Uganda. The CME and CPA implementer are responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the component project activity/ies. It is DOE's responsibility to express an independent verification statement on the reported GHG emission reductions from the component project/s. The DOE does not express any opinion on the selected baseline scenario or on the validated and registered PoA-DD/CPA-DD. The verification is carried out in-line with the VVS requirements.

The verification was performed to identify the compliance of the component project /ies with implementation and monitoring requirements, and to verify the actual amount of achieved emission reductions, through obtaining evidence and information on-site that included i) checking whether the provisions of the monitoring methodology and the monitoring plan were consistently and appropriately applied and ii) the collection of evidence supporting the reported data.

The verification is based on:

— PoA-DD Version 4.0 dated 30/06/2014;

— CPA-DD/s included in the registered PoA and its monitoring plan for the monitoring period 16/08/2018 to 15/08/2019.

- Approved monitoring methodology AMS-II.G “Energy efficiency measures in thermal applications of non-renewable biomass”, Version 05;
- Validation report /B04/ for the PoA and the CPA/s;
- Monitoring reports Version 1.0, 2.0 and 3.0 dated 07/01/2020, 17/02/2020 and 11/03/2020 respectively.

This statement covers verification period from 16/08/2018 to 15/08/2019.

The DOE had raised 02 clarification and 02 corrective action requests, all of which have been resolved by the CME.

The DOE considers necessary to give reasonable assurance that reported GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology and the monitoring plan contained in the approved revised CPA-DDs are fairly stated.

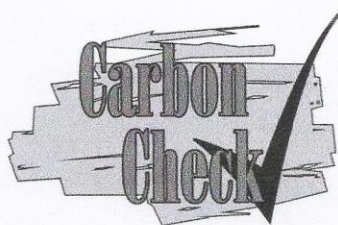
The DOE, hereby certifies that the project activity, achieved emission reductions by sources of GHG equal to 387,926 tCO₂e and all monitoring requirements have been fulfilled and is substantiated by an audit trail that contains evidence and records. The break-up of emission reduction up-to 31/12/2012 and 01/01/2013 onwards as verified during the course of verification are as below:

Item	Emission reductions up to 31 December 2012	Emission reductions from 1 January 2013 onwards
Emission reductions (t CO ₂ e)	0	387,926

Appendix 1. Abbreviations

Abbreviations	Full texts
AQL	Acceptable Quality Limit
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CAR	Corrective Action Request
CC IPL	Carbon Check (India) Private Ltd.
CER	Certified Emission Reduction
CIRCODU	Center for Integrated Research and Community Development Uganda
CL	Clarification Request
CME	Co-ordinating and Managing entity
CPA	Component Project Activity
CPA-DD	Component Project Activity Design Document
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide Equivalent
DR	Document review
DOE	Designated Operational Entities
DVR	Draft Verification Report
EB	CDM Executive Board
EF	Emission Factor
EI	External individual
FA	Final Approval
FAR	Forward Action Request
FVR	Final verification Report
GACC	Global Alliance for Clean Cookstoves
GHG	Greenhouse gas(es)
GWh	Giga Watt Hour
I	Interview
IPCC	Intergovernmental Panel on Climate Change
IR	Internal resource
MP	Monitoring Period
MWh	Mega Watt Hour
MR	Monitoring Report
PoA	Programme of Activities
PoA-DD	Programme of Activities Design Document
PP	Project Participant
OSV	On Site Visit
QC/QA	Quality control /Quality assurance
TA	Technical Area
TR	Technical Review
UNFCCC	United Nations Framework Convention on Climate Change
UQL	Unacceptable Quality Limit
VVS	Validation and Verification Standard
WBT	Water boiling test

Appendix 2. Competence of team members and technical reviewers



Carbon Check (India) Private Ltd.

Sanjay Agarwalla

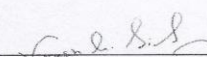
has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 06.0):

For following functions:

Validator	<input checked="" type="checkbox"/>	Team Leader	<input checked="" type="checkbox"/>	Technical reviewer	<input checked="" type="checkbox"/>
Verifier	<input checked="" type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>	Local Expert ¹	<input checked="" type="checkbox"/>

In the following Technical Areas:

TA 1.1	<input checked="" type="checkbox"/>	TA 3.1	<input checked="" type="checkbox"/>	TA 5.2	<input checked="" type="checkbox"/>	TA 9.2	<input checked="" type="checkbox"/>	TA 13.2	<input type="checkbox"/>
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TA 2.1	<input checked="" type="checkbox"/>	TA 5.1	<input checked="" type="checkbox"/>	TA 9.1	<input checked="" type="checkbox"/>	TA 13.1	<input checked="" type="checkbox"/>		


Mr. Vikash Kumar Singh
Compliance Officer


Mr. Amit Anand
CEO

Date of Approval
24/12/2019

Valid Till
23/12/2020

Revision History of the Document

26/12/2014	Initial Adoption
24/12/2015	Annual Revision
20/01/2016	Interim Revision for office address change
23/12/2017	Annual Revision
24/12/2018	Annual Revision
24/12/2019	Annual Revision

¹ India

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Tushar Eknath Choudhari

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For following functions:

Validator ☒ Team Leader ☐ Technical reviewer ☐
 Verifier ☒ Technical Expert ☒ Local Expert¹ ☒

In the following Technical Areas:

TA 1.1 ☒ TA 3.1 ☐ TA 5.2 ☐ TA 9.2 ☐ TA 13.2 ☐
 TA 1.2 ☒ TA 4.1 ☐ TA 8.1 ☐ TA 10.1 ☐ TA 14.1 ☐
 TA 2.1 ☐ TA 5.1 ☐ TA 9.1 ☐ TA 13.1 ☒


 Mr. Vikash Kumar Singh
 Compliance Officer

Date of Approval
 24/12/2019

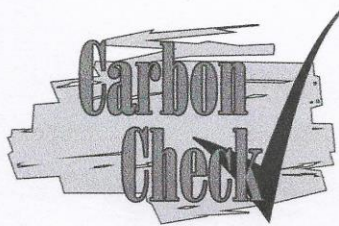

 Mr. Amit Anand
 CEO

Valid Till
 23/12/2020

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Vikash Kumar Singh

has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 07.0):

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Verifier	<input checked="" type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>	Local Expert ¹	<input checked="" type="checkbox"/>

In the following Technical Areas:

TA 1.1	<input checked="" type="checkbox"/>	TA 3.1	<input checked="" type="checkbox"/>	TA 5.2	<input type="checkbox"/>	TA 9.2	<input type="checkbox"/>	TA 13.2	<input checked="" type="checkbox"/>
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TA 2.1	<input type="checkbox"/>	TA 5.1	<input type="checkbox"/>	TA 9.1	<input type="checkbox"/>	TA 13.1	<input checked="" type="checkbox"/>		

Mr. Amit Anand
CEO

Date of Approval
24/12/2019

Valid Till
23/12/2020

Revision History of the Document

26/12/2014	Initial Adoption
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24/12/2017	Annual Revision
24/12/2018	Annual Revision
24/12/2019	Annual Revision

¹ India, South Africa

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Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	UpEnergy	- Webhosted Monitoring report - Monitoring report	Version 1.0, dated 07/01/2020 Version 2.0, dated 17/02/2020	CME
2	UpEnergy	Final Monitoring report	Version 3.0, dated 11/03/2020	CME
3	UpEnergy	Emission reduction calculation spread sheets for the twelve CPAs corresponding to /1/	-	CME
4	UpEnergy	Emission reduction calculation spread sheets for the twelve CPAs corresponding to /2/	-	CME
5	UpEnergy	Survey records for the monitoring period (for U_y and μ_{old})	-	CME
6	UpEnergy	CPA distribution records including evidence for the dates of distribution	-	CME
7	UpEnergy	Stove specifications for EZY, SHS, AES, SHS-GBE, SHS-BOLD, SHS-ILF, Lugwana, SpendSmart, Energy Empire, BME and FSL models used under the monitoring period	-	CME
8	UpEnergy	Proof of Carbon Credits waiver by End user	-	CME
9	UpEnergy	Sample stoves sales receipt / user agreement	-	CME
10	UpEnergy	Training records of CIRCODU / Surveying personnel on the following aspect: <ul style="list-style-type: none"> • Conducting of the monitoring survey using the questionnaire • Checking of the quantity of fuel usage in each of the sampled households for the use of traditional stove • Handling and use of measuring instruments • Conducting water boiling tests using WBT Protocol version 4.2.3 • Data recording 		CME
11	UpEnergy	1. Copy of contract in between UpEnergy and CIRCODU for conducting WBTs 2. Copy of contract in between Upenergy and external independent consultant for conducting Surveys		
12	UpEnergy	1. Water boiling test records (calculation spread sheets and original data sheet) 2. Records of the stoves on which WBT was conducted including the replacement stoves provided to the end users	-	CME
13	UpEnergy	Calibration certificate for each of the monitoring equipment (thermometer, weighing scale, Moisture meter)	-	CME
14	UpEnergy	Evidence for random number generator for sampling	-	CME
15	UpEnergy	WBT conducting methodology for the cook stoves	-	CME

16	UpEnergy	Agreement copy in between the CME and UpEnergy Uganda Ltd (CPA implementer)	-	CME
17	UpEnergy	CME Manual for the PoA along with Organization Structure	-	CME
18	CIRCODU	Competence of the persons who conducted monitoring	-	CME
19	UpEnergy	Copies of the contracts with stove manufacturers	-	CME
B01	UNFCCC	1.Validation and Verification Standard for PoAs, version 02 2.Project Standard for PoAs, version 2 3.Project Cycle Procedure for PoAs, version 02	http://cdm.unfccc.int/	Others
B02	UNFCCC	Applied baseline and monitoring methodology, AMS-II.G, version 05.0	http://cdm.unfccc.int/	Others
B03	UNFCCC	Instructions for filling out the monitoring report form for CDM programme of activities, version 03.0	http://cdm.unfccc.int/	Others
B04	UNFCCC	Registered PoA-DD (Version 4.0 dated 30/06/2014), (CPA-DD for 9956-P1-0001-CP1: Version 06 date 17/05/2018; 9956-P1-0002-CP1: Version 05 dated 17/05/2018; 9956-P1-0003-CP1: Version 04 dated 17/05/2018; 9956-P1-0004-CP1: Version 04 dated 17/05/2018, 9956-P1-0005-CP1: Version 03 dated 08/06/2018; 9956-P1-0006-CP1: Version 03 dated 24/06/2019; 9956-P1-0007-CP1: Version 03 date 24/06/2019; 9956-P1-0008-CP1: Version 03 date 24/06/2019; 9956-P1-0009-CP1: Version 03 date 24/06/2019; 9956-P1-0010-CP1: Version 03 date 24/06/2019, 9956-P1-0011-CP1: Version 03 date 24/06/2019 and 9956-P1-0012-CP1: Version 03 date 24/06/2019) and corresponding validation reports	http://cdm.unfccc.int/	Others
B05	Web sites	Websites: http://cdm.unfccc.int/ http://www.ipcc-nggip.iges.or.jp/ http://www.pciaonline.org/testing http://circodu.org.ug/	==	Others
B06	UNFCCC	Guidelines: Sampling and surveys for CDM project activities and programmes of activities, Version 04.0	http://cdm.unfccc.int/	Others
B07	UNFCCC	Standard: Sampling and surveys for CDM project activities and programmes of activities, version 08.0	http://cdm.unfccc.int/	Others
B08	UNFCCC	Guideline: Application of materiality in verifications" Version 02.0	http://cdm.unfccc.int/	Others
B09	UNFCCC	Monitoring Reports and Verification Reports of the previous four monitoring periods for the PoA 9956	http://cdm.unfccc.int/	Others

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

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

FAR ID	xx	Section no.		Date: DD/MM/YYYY
Description of FAR				
CME response				Date: DD/MM/YYYY
Documentation provided by the CME				
DOE assessment				Date: DD/MM/YYYY

Table 2. CLs from this verification

CL ID	01	Section no.	E.1.1	Date: 13/02/2020
Description of CL				
<p>The name of stove type/model is inconsistently stated in the MR and ER spread sheet (e.g. BME).</p> <p>Survey / WBT period stated in section E.3 of the MR is inconsistent with the provide Survey and WBT records.</p>				
CME response				Date: 17/02/2020
<p>1. The name of stove model (e.g. BME) has been corrected as "BM ESE" in the MR and ER Calculator. Revised MR and ER Calculator are being submitted.</p> <p>2. The surveys and WBTs period in section E.3 of the MR has been made consistent with the monitoring (surveys and WBTs) records submitted. The revised MR is being submitted.</p>				
Documentation provided by the CME				
<p>1. CDM PoA 9956 MP#5 MR ver 2.0 17022020</p> <p>2. CDM PoA 9956 MP#5 ER Calculator ver 2.0 17022020</p>				
DOE assessment				Date: 28/02/2020
CME has submitted revised MR and ER sheet with the stated corrections in the CL. Hence the CL is closed.				

CL ID	02	Section no.	E.1.1	Date: 13/02/2020
Description of CL				
In section A.1 of the MR, CME needs to clarify the statement " <i>No CERs are being claimed neither will they be claimed in future for CPAs 9956-P1-0006-CP1 to 9956-P1-0012-CP1 for period prior to 16/08/2018</i> ", considering that CERs were claimed for CPA 6 to CPA 9 in the previous monitoring period.				
CME response				Date: 17/02/2020
The statement is a typographical error in the MR and has been removed from the revised MR. The revised MR is being submitted				
Documentation provided by the CME				
CDM PoA 9956 MP#5 MR ver 2.0 17022020				
DOE assessment				Date: 28/02/2020
CME has deleted the irrelevant statement. The CL is closed.				

Table 3. CARs from this verification

CAR ID	01	Section no.	E.1.1	Date: 13/02/2020
Description of CAR				

The following sections of the MR have not been completed in accordance with the MR completing guidelines:	
1. In section A.1.2 in the first column, version of the CPA-DD is missing.	
2. In section C.3 of the MR, CME has not provided the reference of the previously approved PRC for all the CPAs in line with the requirements of the MR completing guidelines.	
3. In section A.2 of the MR, CME's name has been incorrectly stated.	
CME response	Date: 17/02/2020
1. The version number and completion date of each CPA-DD has been mentioned in section A.1.2 of the revised MR.	
2. So far, three PRCs to CPAs covered in the monitoring report have been carried out under the PoA.	
a. First PRC applicable to CPA 9956-P1-0001-CP1 to CPA 9956-P1-0004-CP1 was approved under the issuance track during MP2 on 06 Sep 2018	
b. Second PRC applicable to CPA 9956-P1-0005-CP1, was approved under prior approval track on 03 Dec 2018	
c. Third PRC applicable to CPA 9956-P1-0006-CP1 to CPA 9956-P1-0012-CP1, was approved under prior approval track on 17 September 2019.	
The references of the previously approved PRCs have been provided in section C.3 of the revised MR.	
3. The name of the CME has been corrected in section A.2 of the revised MR.	
Documentation provided by the CME	
CDM PoA 9956 MP#5 MR ver 2.0 17022020	
DOE assessment	Date: 28/02/2020
1. Version of the CPA-DDs have been stated in the revised MR section A.1.2.	
2. Reference of the previously approved PRCs have been stated in the revised MR section C.3.	
3. CME name has been corrected in the revised MR.	
The CAR is closed.	

CAR ID	02	Section no.	E.3.4.2	Date: 13/02/2020
Description of CL				
The number of stoves is inconsistent in between the database presented during the onsite visit and MR. Also, it is noted that in the ER sheet, stoves distributed beyond the end date of current monitoring period (i.e. after 15/08/2019) are considered. CME needs to clarify.				
CME response				Date: 17/02/2020
The ER calculator and MR have been revised to mention the number of stoves, same as that mentioned in the sales database. The year of sale for few entries in the ER calculator under "Sales Database-Summary" tab was incorrectly specified as 2019 instead of 2018 as an oversight. These stoves are distributed within the monitoring period. The year of sale has been corrected for all such cases, in the revised ER sheet, to be consistent with the sales database. The revised ER Calculator and MR are being submitted. This correction also results in correction of emission reductions achieved in the monitoring period from 379,263 tCO _{2e} to 387,926 tCO _{2e}				
Documentation provided by the CME				
1. CDM PoA 9956 MP#5 MR ver 2.0 17022020				
2. CDM PoA 9956 MP#5 ER Calculator ver 2.0 17022020				
DOE assessment				Date: 28/02/2020
CME has provided the revised MR and ER spread sheet with the correct database. Also it was found that the year of sale of few stoves was incorrectly stated in the earlier version of the ER sheet which has been corrected and also cross checked with the data base and found to be correct. This correction has increased the emission reductions from 379,263 tCO _{2e} in the web hosted MR to 387,926 tCO _{2e} in the final MR being submitted for issuance request. The CAR is closed.				

Table 4. FARs from this verification

FAR ID	xx	Section No.		Date: DD/MM/YYYY
Description of FAR				
-				
CME response				Date: DD/MM/YYYY
-				
Documentation provided by the CME				
-				
DOE assessment				Date: DD/MM/YYYY

-

Annex 1: Data and parameters fixed ex ante

Parameter	Quantity of woody biomass used in the absence of the project activity in tonnes per household (B_{old})
Data unit:	Ton wood/HH-year
Default values used:	4.97
Purpose of data	Baseline emissions calculation
Source and Verification of the source	The value of this parameter is fixed ex-ante /B04/.

Parameter	Efficiency of the system being replaced (η_{old})
Data unit:	Percentage
Default values used:	10%
Purpose of data	Baseline emissions calculation
Source and Verification of the source	The value of this parameter is fixed ex-ante /B04/.

Parameter	Net to gross adjustment factor to account for leakages (L)
Data unit:	Percentage
Default values used:	0.95
Purpose of data	Baseline emissions calculation
Source and Verification of the source	The value of this parameter is fixed ex-ante /B04/.

Parameter	Net calorific value of the non-renewable biomass that is substituted ($NCV_{biomass}$)
Data unit:	TJ/tonne
Default values used:	0.015
Purpose of data	Baseline emissions calculation
Source and Verification of the source	The value of this parameter is fixed ex-ante /B04/.

Parameter	Emission factor for the substitution of non-renewable woody biomass by similar consumers ($EF_{projected_fossil_fuel}$)
Data unit:	tCO ₂ /TJ
Default values used:	81.60
Purpose of data	Baseline emissions calculation
Source and Verification of the source	The value of this parameter is fixed ex-ante /B04/.

Parameter	Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass. ($f_{NRB,y}$)
Data unit:	Percentage
Default values used:	82%
Purpose of data	Baseline emissions calculation
Source and Verification of the source	The value of this parameter is fixed ex-ante /B04/.

Parameter	Efficiency of the system being deployed at the time of CPA inclusion ($\eta_{specified}$)		
Data unit:	Percentage		
Default values used:		Stove Type	Thermal Efficiency
		EZY	23.39%
		SHS	24.90%
		AES	24.28%
		SHS-GBE	30.00%
		SHS-BOLD	37.30%
		SHS-ILF	38.00%
		Lugwana	34.75%
		SpendSmart	36.30%
		Energy Empire	33.00%

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		BM ESE	31.00%		
		FSL	35.70%		
Purpose of data	Baseline emissions calculation				
Source and Verification of the source	The value of this parameter is based on manufacturer specification /7/				

Annex 2: Data and parameters monitored

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of CPA-DD):	Quantity of woody biomass used in the project activity by traditional stoves (μ_{old})
Measuring frequency/Time Interval:	Annual
Reporting frequency:	Annual
Reported value:	0.57 tonnes wood/year
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	Value obtained from monitoring survey of samples /5/
Is accuracy of the monitoring equipment as stated in the CPA-DD? If the CPA-DD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	NA
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	NA
Is the calibration interval in line with the monitoring plan of the CPA-DD? If the CPA-DD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	NA. QA/QC procedures stated in MR comply with CPA-DDs.
Company performing the calibration(internal or external calibration):	NA
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	NA
Is (are) calibration(s) valid for the whole reporting period?	NA
If applicable, has the reported data been cross-checked with other available data?	Yes, the reported data in MR has been compared with monitoring survey records /5/ and the ER sheet /4/.
How were the values in the monitoring report verified?	NA
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

Monitoring Parameter Requirement	Assessment/ Observation by the DOE		
Data / Parameter: (as in monitoring plan of CPA-DD):	Efficiency of the system being deployed as part of the project activity (η_{new})		
Measuring frequency/Time Interval:	Annual		
Reporting frequency:	Annual		
Reported value:	<table border="1"> <tr> <td>Stove model</td><td>Average efficiency</td></tr> </table>	Stove model	Average efficiency
Stove model	Average efficiency		

	AES	23.24%
	ENERGY EMPIRE	32.55%
	EZY	21.99%
	Lugwana	34.29%
	SHS	23.33%
	SHS-BOLD	36.83%
	SHS-GBE	29.48%
	SHS-ILF	37.25%
	FSL	35.61%
	BME ESE	30.80%
	SpendSmart	36.01%
	Weighted average efficiency with and without considering the date of stove deployment was calculated and the lower of the two values was considered for ER calculation. The considered value of the efficiency is 29.28 %	
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes	
Details of monitoring equipment:	<p>The stove efficiency testing has been determined by WBTs conducted in line with the guidance provided by the CME in the CPA-DDs /B04/ /15/. The monitoring equipment used for conducting the stove efficiencies by WBTs are thermometer, weighing scale, standard mass and moisture meter. All the monitoring equipment were calibrated as per national standard of host country (i.e. Uganda National Bureau of Standards) and hence deemed acceptable /13/.</p> <p>QA/QC procedures stated in MR comply with CPA-DDs.</p>	
Is accuracy of the monitoring equipment as stated in the CPA-DD? If the CPA-DD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	CPA-DDs do not specify the accuracy of the monitoring equipment (thermometer, mass balance and moisture meter). Verification team confirms that the accuracy of the monitoring equipment represent good monitoring practice based on sectoral expertise.	
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	NA	
Is the calibration interval in line with the monitoring plan of the CPA-DD? If the CPA-DD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	Please see the above comment	
Company performing the calibration(internal or external calibration):	NA	
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	NA	
Is (are) calibration(s) valid for the whole reporting period?	NA	
If applicable, has the reported data been cross-checked with other available data?	<p>The data has been cross-checked with the WBT test documents /12/. For the stove efficiency parameter, WBT have been performed and this has been checked by the verification team with the related spreadsheets. Furthermore, the verification team has cross checked all the raw data input records in the WBT calculation spread sheets including the calculation procedure for the sampled households and found them to be correct. All the raw data forms</p>	

	<p>for the WBT carried out for efficiency parameter were checked by the verification team and thus no sampling of data is required.</p> <p>Correctness of the stove thermal efficiency values were verified by the verification team based on the review of the WBT calculation spread sheet for correctness of calculations in line with WBT protocol, original test records and review of measuring equipment used during WBTs for calibration and accuracy.</p>
How were the values in the monitoring report verified?	NA
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	<p>Yes.</p> <p>As the monitoring parameter under consideration is determined by standardized test procedures (WBT), the QA/QC and calibrations are at the test conduction by the measuring team for WBT. Accordingly, the verification team has focused on abilities, qualifications and recognition of involved personnel and institutions of the measuring team involved in the WBT. The WBT has been carried by CIRCODU. The WBT has been carried out by the well-trained personnel and training certificate of the personnel has been provided to the verification team in this respect /10/. The training content /10/ has also been provided to the verification team. The verification team based on on-site visit interviews and review of competency documents /18/ and training records /10/ confirms that the team was qualified to carry out the WBT in line with the protocol.</p>
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

Monitoring Parameter Requirement	Assessment/ Observation by the DOE		
Data / Parameter: (as in monitoring plan of CPA-DD):	Number of appliances deployed (N_y)		
Measuring frequency/Time Interval:	Continuous		
Reporting frequency:	Yearly		
Reported value:		CPA	
		9956-0001	11,279
		9956-0002	18,000
		9956-0003	18,000
		9956-0004	18,000
		9956-0005	18,000
		9956-0006	18,000
		9956-0007	18,000
		9956-0008	18,000
		9956-0009	18,000
		9956-0010	18,000
		9956-0011	18,000
		9956-0012	17,884
Is measuring and reporting frequency in accordance with the monitoring plan and	Yes		

monitoring methodology? (Yes / No)	
Details of monitoring equipment:	Sales database
Is accuracy of the monitoring equipment as stated in the CPA-DD? If the CPA-DD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	An electronic sales database has been maintained for the project activity /6/.
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	NA
Is the calibration interval in line with the monitoring plan of the CPA-DD? If the CPA-DD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	NA. QA/QC procedures stated in MR comply with CPA-DDs.
Company performing the calibration(internal or external calibration):	NA
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	NA
Is (are) calibration(s) valid for the whole reporting period?	NA
If applicable, has the reported data been cross-checked with other available data?	Yes, the value of parameter has been cross-checked with the monitoring database and sample households and the hard copy records were also checked during the OSV.
How were the values in the monitoring report verified?	NA
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of CPA-DD):	Average usage rate of appliance type being deployed (U _y)
Measuring frequency/Time Interval:	Annual
Reporting frequency:	Annual
Reported value:	87.20 %
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	Value obtained from the monitoring survey of samples /5/
Is accuracy of the monitoring equipment as stated in the CPA-DD? If the CPA-DD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	NA
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards /	NA.

manufacturers specification	
Is the calibration interval in line with the monitoring plan of the CPA-DD? If the CPA-DD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	NA. QA/QC procedures stated in MR comply with CPA-DD.
Company performing the calibration(internal or external calibration):	NA
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	NA
Is (are) calibration(s) valid for the whole reporting period?	NA
If applicable, has the reported data been cross-checked with other available data?	Yes, reported data in MR has been compared with monitoring survey records /5/ and the ER sheet /4/
How were the values in the monitoring report verified?	The values in the monitoring report were compared against the values in ER sheet
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place. The sampling surveys has been carried out by third party appointed well-trained personnel /10/. The training content /10/ has also been provided to the verification team. The verification team based on on-site visit interviews and review of competency documents /18/ and training records /10/ confirms that the team was qualified to carry out the monitoring surveys.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA.

Appendix 6. Assessment of Monitoring parameters monitored through sampling/surveys

SI. No.	Checklist Questions	Assessment															
1.	Does the Monitoring Report apply sampling for determination of ex-post monitoring parameters?	Yes, there are ex-post monitoring parameters determined through the sampling effort.															
2.	Is the applied sampling plan in accordance with the sampling plan proposed in the registered PoA-DD/ PDD?	Yes, the applied sampling plan is in accordance with the sampling plan proposed in the registered PoA-DD.															
3.	List the parameters determined through sampling and respective parameters of interest.	<p>Parameters determined through sampling and respective parameters of interest are:</p> <table> <tr> <th>Parameter</th><th>Description of Parameter</th><th>Parameter of Interest</th></tr> <tr> <td>η_{new}</td><td>Thermal efficiency of the stoves</td><td>Mean</td></tr> <tr> <td>U_y</td><td>Average usage rate of the appliance</td><td>Proportion</td></tr> <tr> <td>μ_{old}</td><td>Quantity of woody biomass used in the project activity by traditional stoves</td><td>Mean</td></tr> </table>	Parameter	Description of Parameter	Parameter of Interest	η_{new}	Thermal efficiency of the stoves	Mean	U_y	Average usage rate of the appliance	Proportion	μ_{old}	Quantity of woody biomass used in the project activity by traditional stoves	Mean			
Parameter	Description of Parameter	Parameter of Interest															
η_{new}	Thermal efficiency of the stoves	Mean															
U_y	Average usage rate of the appliance	Proportion															
μ_{old}	Quantity of woody biomass used in the project activity by traditional stoves	Mean															
4.	Is the sample size calculated in accordance with the formula presented in the registered PoA-DD/PDD?	Yes, the sample size calculated is in accordance with the formula presented in the approved revised PoA-DD/CPA-DDs.															
5.	<p>Are the assumptions used for calculation of sample size appropriate and correct?</p> <p>P.S.: Provide assessment on appropriateness of value of proportion (p), standard deviation (STDEV) or variance (v) used for calculation of sample size.</p>	<p>Stratified sampling was applied for cross CPA sampling for all the three parameters for annually monitoring with 95/10 confidence/precision by the CME for selection of the monitoring samples. The same is deemed acceptable as per the PoA-DD/CPA-DD.</p> <p>The standard deviation (STDEV) or variance (v) used for calculation of sample size is found to be appropriate. All assumptions for the calculation of sample size were used by the CME's experience which has been checked by the verification team and deemed acceptable.</p>															
6.	<p>What are the sample sizes obtained for the parameters being monitored? Is the determined sample size deemed adequate for the parameter of interest being monitored?</p> <p>P.S.: If the sample size calculation returns a value of less than 30 samples, a minimum sample size of 30 shall be chosen when the parameter of interest is a proportion. If the parameter of interest is a numeric mean value (i.e. not a proportion or percentage) the Student's t-distribution shall be used if the resulting sample size is less than 30.</p>	<p>It was found that for all the parameters, the respective confidence/precision was met. The number of samples for each of the parameters covered during the monitoring activity is as given below:</p> <table> <tr> <th>Parameter</th><th>Sample Size required</th><th>Samples covered during monitoring</th></tr> <tr> <td>η_{new} (AES)</td><td>2</td><td>3</td></tr> <tr> <td>η_{new} (EZY)</td><td>2</td><td>4</td></tr> <tr> <td>η_{new} (SHS)</td><td>2</td><td>3</td></tr> <tr> <td>η_{new} (SHS-GBE)</td><td>2</td><td>3</td></tr> </table>	Parameter	Sample Size required	Samples covered during monitoring	η_{new} (AES)	2	3	η_{new} (EZY)	2	4	η_{new} (SHS)	2	3	η_{new} (SHS-GBE)	2	3
Parameter	Sample Size required	Samples covered during monitoring															
η_{new} (AES)	2	3															
η_{new} (EZY)	2	4															
η_{new} (SHS)	2	3															
η_{new} (SHS-GBE)	2	3															

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		<table> <tr><td>η_{new} (SHS-ILF)</td><td>2</td><td>3</td></tr> <tr><td>η_{new} (SHS-BOLD)</td><td>2</td><td>3</td></tr> <tr><td>η_{new} (Lugwana)</td><td>2</td><td>3</td></tr> <tr><td>η_{new} (Energy Empire)</td><td>2</td><td>3</td></tr> <tr><td>η_{new} (BME)</td><td>2</td><td>3</td></tr> <tr><td>η_{new} (FSL)</td><td>2</td><td>3</td></tr> <tr><td>η_{new} (SpendSmart)</td><td>2</td><td>3</td></tr> <tr><td>U_y (AES)</td><td>2</td><td>5</td></tr> <tr><td>U_y (EZY)</td><td>3</td><td>8</td></tr> <tr><td>U_y (SHS)</td><td>11</td><td>20</td></tr> <tr><td>U_y (SHS-GBE)</td><td>9</td><td>14</td></tr> <tr><td>U_y (SHS-ILF)</td><td>6</td><td>13</td></tr> <tr><td>U_y (SHS-BOLD)</td><td>11</td><td>18</td></tr> <tr><td>U_y (Lugwana)</td><td>4</td><td>6</td></tr> <tr><td>U_y (Energy Empire)</td><td>4</td><td>4</td></tr> <tr><td>U_y (BME)</td><td>2</td><td>4</td></tr> <tr><td>U_y (FSL)</td><td>2</td><td>5</td></tr> <tr><td>U_y (SpendSmart)</td><td>2</td><td>6</td></tr> <tr><td>μ_{old} (2013)</td><td>2</td><td>2</td></tr> <tr><td>μ_{old} (2014)</td><td>2</td><td>2</td></tr> <tr><td>μ_{old} (2015)</td><td>2</td><td>2</td></tr> <tr><td>μ_{old} (2016)</td><td>2</td><td>2</td></tr> <tr><td>μ_{old} (2017)</td><td>2</td><td>5</td></tr> <tr><td>μ_{old} (2018)</td><td>3</td><td>6</td></tr> <tr><td>μ_{old} (2019)</td><td>2</td><td>5</td></tr> </table> <p>For the mean parameters, t-distribution has been used since the resulting sample size was less than 30.</p> <p>As the actual sample size in all the cases was not less than either the calculated sample size or the minimum sample size as per the PoA-DD/CPA-DDs, the sample size covered by the CME was accepted.</p>	η_{new} (SHS-ILF)	2	3	η_{new} (SHS-BOLD)	2	3	η_{new} (Lugwana)	2	3	η_{new} (Energy Empire)	2	3	η_{new} (BME)	2	3	η_{new} (FSL)	2	3	η_{new} (SpendSmart)	2	3	U_y (AES)	2	5	U_y (EZY)	3	8	U_y (SHS)	11	20	U_y (SHS-GBE)	9	14	U_y (SHS-ILF)	6	13	U_y (SHS-BOLD)	11	18	U_y (Lugwana)	4	6	U_y (Energy Empire)	4	4	U_y (BME)	2	4	U_y (FSL)	2	5	U_y (SpendSmart)	2	6	μ_{old} (2013)	2	2	μ_{old} (2014)	2	2	μ_{old} (2015)	2	2	μ_{old} (2016)	2	2	μ_{old} (2017)	2	5	μ_{old} (2018)	3	6	μ_{old} (2019)	2	5
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7.	<p>Has reliability specification been applied to determine the sampling requirements for each individual parameter value determined through a sampling effort?</p> <p>P.S.: If there is more than one parameter to be estimated in a CDM project activity, then a sample size calculation should be done for each of them. Then either the largest number for the sample size is chosen for the sampling effort with one common survey, or the sampling effort and survey</p>	<p>It was found that for all the parameters, the confidence/precision was met. The number of samples for each of the parameters covered during the monitoring activity is provided in the above row.</p> <p>For the mean parameters, t-distribution has been used since the resulting sample size was less than 30.</p>																																																																											

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	<p>is repeated for each of the parameters. A random sub-sample within the common survey is allowed as long as: (i) the reliability specification (e.g. 90/10 confidence/precision for small-scale CDM project activities and 95/10 for large scale CDM project activities) is achieved for each individual parameter; and (ii) the random sub-sample is consistent with the design of the survey and the corresponding sample size calculation.</p>													
8.	Is the assumed response rate reasonable (appropriate and correct) for the determination of samples to be surveyed?	Yes, the assumed response rate is reasonable (appropriate and correct) for the determination of samples to be surveyed for each of the parameter of interest.												
9.	Is the sample selected by PP for determination of the monitored parameters unbiased (random) and representative?	Yes, the verification team, based on evidence for random number generator as provided by the CME, confirms that sample selected by the CME for determination of the monitored parameters are random. It can be considered as representative of the population.												
10.	Has minimum target level of precision been achieved based on estimates from the actual samples?	<p>Yes, the minimum target level of precision been achieved based on estimates from the actual samples.</p> <table border="1" style="width: 100%; margin-top: 10px;"> <thead> <tr> <th style="text-align: center;">Parameter</th><th style="text-align: center;">Target precision level</th><th style="text-align: center;">Precision achieved</th></tr> </thead> <tbody> <tr> <td>η_{new}</td><td style="text-align: center;">10%</td><td style="text-align: center;">0.20%</td></tr> <tr> <td>U_y</td><td style="text-align: center;">10%</td><td style="text-align: center;">0.18%</td></tr> <tr> <td>μ_{old}</td><td style="text-align: center;">10%</td><td style="text-align: center;">4.44%</td></tr> </tbody> </table> <p>This has been checked and confirmed by reviewing Survey database and WBT results provided by the CME.</p>	Parameter	Target precision level	Precision achieved	η_{new}	10%	0.20%	U_y	10%	0.18%	μ_{old}	10%	4.44%
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η_{new}	10%	0.20%												
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11.	In case the minimum target level of precision has not been achieved based on estimates from the actual samples, please specify the approach adopted by PP to reach the required precision and also justify the appropriateness of the adopted approach in accordance with the applied methodology or paragraph 18 of Sampling and surveys for CDM project activities and programmes of activities (Version 08).	Not applicable since as assessed above the target level of precision has been achieved.												
12.	<p>Has VT applied acceptance sampling to verify that the results of sampling efforts undertaken by PP for determination of ex-post parameters. If yes, please provide a detailed justification of the approach adopted including information on (but not limited to):</p> <ul style="list-style-type: none"> (a) Selected AQL Level (b) Selected UQL Level (c) Selected Consumer Risk Level (d) Selected Producer Risk Level (e) Sample Size chosen for acceptance sampling (f) Acceptance number (c) 	<p>In line with paragraph 26 of the Sampling Standard, the verification team has applied a sampling approach for on-site visits as part of verification. Now as the CME had applied sampling approach, the verification team has chosen acceptance sampling for the parameters in accordance with paragraph 28 of the sampling standard /B07/.</p> <p>DOE used sampling during verification for checking the operational status and to check if the WBT tests have been done in the households and it was confirmed that the WBT tests were conducted. Considering that Uganda is a Least Developed Country, applying paragraph 39 (c) of the</p>												

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	Approach adopted by VT to in case value of greater than c discrepant records were observed in the sample	sampling standard, version 08 /B07/, a sample size of 8 households was chosen (with no discrepant records). A sample size of 8 was required, based on an AQL of 1.0% and UQL of 20%, producer risk 10% and consumer risk 20%. Acceptance number (c) thus determined for the sample is 0. DOE visited 8 samples (each, for monitoring survey and WBTs conducted). It was observed that out of the 8 samples, all the 8 stoves were found to be operational and all the 8 households, where the WBTs were conducted, has confirmed that their stoves were taken by the CME for conducting water boiling tests and they received a new cookstoves as a replacement /12/ and this matched with the CME's records and hence no discrepant records were observed with the published MR /2/ and ER sheet /4/ and thus c=0. Thus, CME's set of records has been accepted in line with § 33 of the sampling standard, version 08 /B07/. Verification team has cross verified these sample documents during the on-site visit.
13.	Are the procedures for the selected survey and data collection method unambiguously defined and do they adequately provide for minimizing non-sampling errors?	Verification team based on on-site inspection interviews and review of documented procedure confirms that the selected survey and data collection method is unambiguously defined. This also adequately ensure minimizing non-sampling errors.
14.	Have potential sources of bias inherent in the selected data collection method, such as self-selection and under-coverage, been anticipated? Have mechanisms for mitigating these been considered?	Review of sampling records, documented procedure and on-site inspection interviews with the Personnel conducted WBT/Surveys does not any reveal sources of bias inherent in the selected data collection.
15.	Is the quality control and assurance strategy adequate?	Verification team based on review of provided supporting documents and on-site inspection interviews confirms that the quality control and assurance strategy is adequate.
16.	Are the proposed skill sets, qualifications and experience of the personnel/institutions engaged to conduct the standardized tests/data collection exercise adequate?	<p>For the monitoring U_y and μ_{old} parameters, data were collected following a specially designed survey form. For thermal efficiency of the stoves WBT were conducted. As the monitoring parameter under consideration is determined by standardized test procedures, the QA/QC and calibrations are at the test conduction by the measuring team.</p> <p>Accordingly, the verification team has focused on abilities, qualifications and recognition of involved personnel and institutions of the measuring team involved in the WBT. The surveys and WBTs have been carried by CIRCODU. Competence / training evidence of the monitoring personnel have been provided to the verification team. During the on-site visit it was confirmed that the team was qualified as confirmed by reviewed training / competency documents and trained to carry out WBT in line with the protocol. The monitoring equipment used for conducting the stove efficiency tests are thermometer, weighing scale and moisture meter. These equipment are duly calibrated and hence deemed to be acceptable.</p>

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17.	<p>Does the PP have a process in place to ensure data quality is maintained to a high standard? This should include:</p> <ul style="list-style-type: none"> a) Are the personnel trained and experienced? b) What is the level of supervision and guidance provided to staff? c) Is there a standardized system for data entry and analysis to produce final result? d) Is there a system or process in place to minimize the introduction of errors? e) Is there a system in place to ensure all collected data is processed; f) Are quality checks performed on data entered, for example range checks, g) inconsistency checks, checking of subsamples of data by supervisors; h) is there a system to check for errors, record and report errors reported and document the remedial action taken; i) What is the level of security and type of backup processes to guarantee data integrity, for example methods to prevent fraud and accidental deletion? 	<p>Verification team based on review of provided supporting documents and on-site inspection interviews confirms the following:</p> <ul style="list-style-type: none"> ✓ the personnel involved in the WBT/surveys are trained and experienced. ✓ there exists a standardized system for data entry and analysis to produce final result. ✓ there exist a system or process in place to minimize the introduction of errors. ✓ there a system in place to ensure all collected data is processed. ✓ there exists a quality checks of data entered.
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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
03.0	31 May 2019	Revision to: <ul style="list-style-type: none">• Ensure consistency with version 02.0 of the “CDM validation and verification standard for programmes of activities” (CDM-EB93-A08-STAN);• Make structural and editorial improvements.
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 Document Type: Form Business Function: Issuance Keywords: programme of activities, verifying and certifying		