
 Verification and certification report form for CDM programme of activities (version 02.0)		
Complete this form in accordance with the instructions attached at the end of this form.		
BASIC INFORMATION		
Title and UNFCCC reference number of the programme of activities (PoA)	Up Energy Improved Cookstove Programme, Uganda 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	04	
Completion date of the verification and certification report	06/12/2018	
Monitoring period number and duration of this monitoring period	Monitoring period number 03 01/11/2016 to 31/10/2017 (including both the days)	
Number and version number of the monitoring report to which this report applies	Monitoring report number: 1 Version number of the monitoring report: 5.0	
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 linked to the applied methodologies	3: Energy demand	
Conditional sectoral scopes linked to the applied methodologies, 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	9956-0001 GHG emission reductions: 44,874 tCO ₂ e 9956-0002 GHG emission reductions: 44,980 tCO ₂ e 9956-0003 GHG emission reductions: 44,980 tCO ₂ e 9956-0004 GHG emission reductions: 44,980 tCO ₂ e 9956-0005 GHG emission reductions: 37,463 tCO ₂ e Total: : 217,277 tCO ₂ e	
Certified amount of GHG emission reductions or GHG removals for this monitoring period for the included CPAs covered in this report	9956-0001 GHG emission reductions: 30,616 tCO ₂ e 9956-0002 GHG emission reductions: 37,120 tCO ₂ e 9956-0003 GHG emission reductions: 34,320 tCO ₂ e 9956-0004 GHG emission reductions: 33,265 tCO ₂ e 9956-0005 GHG emission reductions: 6,654 tCO ₂ e Total: : 141,975 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” and “Up Energy Improved Cookstove Programme, Uganda – CPA No 005”.

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 01/11/2016 to 31/10/2017.

The purpose of verification is to review the monitoring results and verify that the monitoring methodology was implemented according to the monitoring plan and monitoring data 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 registered programme of activities.

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 01/11/2016 to 31/10/2017 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 9956-0001, 9956-0002, 9956-0003, 9956-0004, and 9956-0005, as described in the revised and accepted CPA-DDs Version 06 dated 17/05/2018, Version 05 dated 17/05/2018, Version 04, dated 17/05/2018, Version 04 dated 17/05/2018, Version 03 dated 08/06/2018 respectively /B04/ and the Monitoring report, Version 5.0, dated 06/12/2018 /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 01.0 /B01-1/.

The component project activity was correctly implemented according to selected monitoring methodology, monitoring plan and the registered/included 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 141,975 tCO₂e emission reductions during the third monitoring period.

CCIPL, 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	

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	<i>All the ER spreadsheet data of the stoves, 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/.</i>	<i>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.</i>
2.	<i>Information System: Use of spreadsheets without adequate controls related to data changes/updates, version tracking, traceability, security</i>	Medium	<i>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.</i>	<i>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.</i>
3.	<i>Accuracy of the measuring equipment</i>	Low	<i>Check the calibration records for the measurement equipment used for efficiency test.</i>	<i>The risk due to accuracy of the measuring equipment was ensured by planning to check calibration certificates of the</i>

				<i>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 § 307 of CDM VVS for PoAs, version 01.0 /B01-1/. It was concluded that the materiality threshold applicable to the project activity based on actual emission reductions achieved is 5% of 141,975 tCO₂e which is equal to 7,098 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 7,098 tCO₂e is determined in line with para 307 (d) of CDM VVS for PoAs, version 01.0.

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 /B04/ 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: 27/08/2018 to 29/08/2018				
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	27/08/2018 to 29/08/2018	Sanjay Kumar Agarwalla Debrah Busingye
2.	A review of information flows for generating, aggregating and reporting the monitoring parameters	Uganda	27/08/2018 to 29/08/2018	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	27/08/2018 to 29/08/2018	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	27/08/2018 to 29/08/2018	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	27/08/2018 to 29/08/2018	Sanjay Kumar Agarwalla Debrah Busingye
6.	A review of calculations and assumptions made in determining the GHG data and emission reductions	Uganda	27/08/2018 to 29/08/2018	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	27/08/2018 to 29/08/2018	Sanjay Kumar Agarwalla Debrah Busingye

D.3. Interviews

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

1.	Lohia	Rohit	Climate-Secure Services	27/08/2018 to 29/08/2018	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.	Nihar	Climate-Secure Services	Climate-Secure Services	27/08/2018 to 29/08/2018	Monitoring report	Sanjay Kumar Agarwalla Debrah Busingye
3.	Krywyj	Yuonne	UpEnergy Uganda	27/08/2018 to 29/08/2018	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	Araka	Florence	UpEnergy Uganda	27/08/2018 to 29/08/2018	Project implementation and operation, Sales/Distribution records	Sanjay Kumar Agarwalla Debrah Busingye
5	Sekibombo	Jesse	UpEnergy Uganda	27/08/2018 to 29/08/2018	Project implementation and operation, Sales/Distribution records	Sanjay Kumar Agarwalla Debrah Busingye
6	Olinga	Denis Bull	UpEnergy Uganda	27/08/2018 to 29/08/2018	Project implementation and operation, Sales/Distribution records	Sanjay Kumar Agarwalla Debrah Busingye
7	Kanyaka	Andrew	UpEnergy Uganda	27/08/2018, 29/08/2018	Project implementation and operation, Sales/Distribution records	Sanjay Kumar Agarwalla Debrah Busingye
8	Amone	Moses	UpEnergy Uganda	27/08/2018, 29/08/2018	Project implementation and operation, Sales/Distribution records	Sanjay Kumar Agarwalla Debrah Busingye
9	Wurster	Erik	UpEnergy	04/09/2018 (via skype)	Project implementation	Sanjay Kumar Agarwalla

					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	
10	Arineitwe	Joseph Ndemere	CIRCODU	29/08/2018	Monitoring Survey and WBT procedure and records	Sanjay Kumar Agarwalla
11	Caroline	Gabeya	CIRCODU	29/08/2018	Monitoring Survey and WBT procedure and records	Sanjay Kumar Agarwalla
12	Isabirye	Fred	CIRCODU	29/08/2018	Monitoring Survey and WBT procedure and records	Sanjay Kumar Agarwalla

D.4. Sampling approach

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As assessed in above sections, emission reductions for the five CPAs, (9956-0001, 9956-0002, 9956-0003, 9956-0004 and 9956-0005), are being claimed for this monitoring period and the total population of the stoves under these five CPAs are 13,293, 16,995, 17,000, 17,000 and 10,691 respectively.

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})

Simple random 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}) sampling frames were chosen for the respective 3 models of stoves distributed and considered for monitoring (AES, SHS and EZY) separately. 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 24 of the Sampling Standard, version 07 /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 25 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 27 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 33 (c) of the sampling standard, version 07 /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 0.5 % and UQL of 20 %, producer risk 10 % and consumer risk 20 %. Acceptance number (c) thus determined for the sample is 0. DOE visited 9 samples. It was observed that out of the 9 samples, 8 stoves were found to be operational and 1 stove was non-operational, 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 § 32 of the sampling standard, version 07 /B07/. Verification team has cross verified these sample documents during the on-site visit.

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 Simple Random Sampling procedure in line with the applied methodology. As the registered PoA-DD /B04/ mentions the option for Simple Random 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	00	00	00
Remaining forward action requests from validation and/or previous verification	00	00	00
CPA(s) considered for verification and covered in this report	00	00	00
Programme of activities			
Compliance of the programme implementation with the registered PoA-DD	00	00	00
Implementation and operation of the management system	00	00	00
Post-registration changes	00	00	00
<ul style="list-style-type: none"> Temporary deviations from the registered monitoring plan, applied methodology or applied standardized baseline 	00	00	00
<ul style="list-style-type: none"> Corrections 	00	00	00
<ul style="list-style-type: none"> Inclusion of a monitoring plan 	00	00	00
<ul style="list-style-type: none"> Permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodology, standardized baseline or other applied standards or tools 	00	00	00
<ul style="list-style-type: none"> Changes to the programme design or project design 	00	00	00
<ul style="list-style-type: none"> Change of coordinating/managing entity 	00	00	00
<ul style="list-style-type: none"> Changes specific to afforestation and reforestation activities 	00	00	00
Component project activities			
Compliance of the CPA implementation with the included CPA design document	01	00	00
Post-registration changes	01	00	00
<ul style="list-style-type: none"> Temporary deviations from registered monitoring plan, applied methodology or applied standardized 	00	00	00

baseline			
• Corrections	00	00	00
• Changes to the start date of the crediting period of component project activities	00	00	00
• Inclusion of a monitoring plan	00	00	00
• Permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodology, standardized baseline or other applied standards or tools	00	00	00
• Changes to the programme design of project design	00	00	00
• Changes specific to afforestation and reforestation component project activities	00	00	00
Compliance of the registered monitoring plan with the methodology including applicable tool(s) and standardized baseline	00	00	00
Compliance of monitoring activities with the registered monitoring plan	00	00	00
• Data and parameters fixed ex ante or at renewal of crediting period	00	00	00
• Data and parameters monitored	02	01	
• Implementation of sampling plan	01	00	00
Compliance with the calibration frequency requirements for measuring instruments	00	00	00
Assessment of data and calculation of emission reductions or net removals	-	-	-
• Calculation of baseline GHG emissions or baseline net GHG removals by sinks	01	01	00
• Calculation of project GHG emissions or actual net GHG removals by sinks	00	00	00
• Calculation of leakage GHG emissions	00	00	00
• Summary of calculation of GHG emission reductions or net GHG removals by sinks	00	00	00
• Comparison of actual GHG emission reductions or net GHG removals by sinks with estimates in included CPA	00	00	00
• Remarks on difference from estimated value in included CPA	00	00	00
Assessment of reported sustainable development co-benefits	00	00	00
Global stakeholder consultation	00	00	00
Others (please specify)	00	00	00
Total	06	02	00

SECTION E. Verification findings

E.1. General

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

Means of verification	Document Review
Findings	-
Conclusion	<p>CME has used the Monitoring report form for CDM programme of activities, Version 02.0 /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> <p>CC IPL, had made the version 1.0, dated 13/07/2018 of the monitoring report /1/, covering the monitoring period from 01/11/2016 to 31/10/2017 (both days inclusive) publicly available on 16/07/2018.</p>

	This confirms compliance with the §337 and §338 of CDM VVS for PoAs, version 01.0 /B01-1/.
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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 (second) 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 9956-0001	Yes	22/07/2014	Version 4.0	Y
Up Energy Improved Cookstove Programme, Uganda – CPA No 002 9956-0002	Yes	17/03/2015		Y
Up Energy Improved Cookstove Programme, Uganda – CPA No 003 9956-0003	Yes	17/04/2015		Y
Up Energy Improved Cookstove Programme, Uganda – CPA No 004 9956-0004	Yes	17/04/2015		Y
Up Energy Improved Cookstove Programme, Uganda – CPA No 005 9956-0005	Yes	28/11/2016		N
Up Energy Improved Cookstove Programme, Uganda – CPA No 006 9956-0006	No	28/11/2016		N
Up Energy Improved Cookstove Programme, Uganda – CPA No 007 9956-0007	No	28/11/2016		N
Up Energy Improved Cookstove Programme, Uganda – CPA No 008 9956-0008	No	28/11/2016		N

Up Energy Improved Cookstove Programme, Uganda – CPA No 009 9956-0009	No	31/05/2017		N
Up Energy Improved Cookstove Programme, Uganda – CPA No 010 9956-0005	No	31/05/2017		N
Up Energy Improved Cookstove Programme, Uganda – CPA No 011 9956-0011	No	31/05/2017		N
Up Energy Improved Cookstove Programme, Uganda – CPA No 012 9956-0012	No	31/05/2017		N

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 and metering 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 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 § 339, § 340 and § 341 of CDM VVS for PoAs, Version 01.0 /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 survey and WBTs have been done by a third party, Center for Integrated Research and Community Development Uganda (CIRCODU). 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</p>

	<p>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 § 339 (a), § 346 (b) (iv) and § 346 of CDM VVS PoAs. Version 01.0 /B01-1/.</p>
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E.2.3. Post-registration changes

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

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

E.2.3.2. 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.2.3.3. Inclusion of a monitoring plan

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

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

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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.2.3.5. Changes to the programme design or project design

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

E.2.3.6. Change of coordination/managing entity

>>

Not applicable

E.2.3.7. Changes specific to afforestation and reforestation activities

>>

Not applicable to the type of the programme of activity.

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	CL 01 had been raised and successfully resolved. Please refer to Appendix 4 for further details.	
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:	9956-0001
	Date of inclusion:	22/07/2014
	CPA start of operation:	Sale/Distribution of stoves – 02/01/2013 /6/
	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:	01/11/2016 to 31/10/2017
	Title of the CPA:	Up Energy Improved Cookstove Programme, Uganda – CPA No 002
	CPA reference number:	9956-0002
	Date of inclusion:	17/03/2015
	CPA start of operation:	Sale/Distribution of stoves – 09/05/2014 /6/
	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:	01/11/2016 to 31/10/2017
	Title of the CPA:	Up Energy Improved Cookstove Programme, Uganda – CPA No 003
	CPA reference number:	9956-0003
	Date of inclusion:	17/04/2015
	CPA start of operation:	Sale/Distribution of stoves – 02/04/2015 /6/
	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:	01/11/2016 to 31/10/2017

Title of the CPA:	Up Energy Improved Cookstove Programme, Uganda – CPA No 004
CPA reference number:	9956-0004
Date of inclusion:	17/04/2015
CPA start of operation:	Sale/Distribution of stoves – 03/04/2015 /6/
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:	01/11/2016 to 31/10/2017

Title of the CPA:	Up Energy Improved Cookstove Programme, Uganda – CPA No 005
CPA reference number:	9956-0005
Date of inclusion:	28/11/2016
CPA start of operation:	Sale/Distribution of stoves – 04/05/2016 /6/
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:	01/01/2017 to 31/10/2017

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 CPA has been confirmed by the monitoring database /5/ and as stated below:

Stove Distribution (Model & CPA wise)				
Year	AES	EZY	SHS	Total
CPA-01	0	13,293	0	13,293
CPA-02	1,918	0	15,077	16,995
CPA-03	3,017	0	13,983	17,000
CPA-04	3,267	0	13,733	17,000
CPA-05	763	0	9,928	10,691
Total	8,965	13,293	52,721	74,979

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

CPA	GWh _{th}	Comment
CPA 1	127.1	Less than the CPA-DD requirement of 180 GWh _{th} for small scale project

CPA 2	154.1	Less than the CPA-DD requirement of 180 GWh _{th} for small scale project
CPA 3	142.48	Less than the CPA-DD requirement of 180 GWh _{th} for small scale project
CPA 4	138.1	Less than the CPA-DD requirement of 180 GWh _{th} for small scale project
CPA 5	27.63	Less than the CPA-DD requirement of 180 GWh _{th} for small scale project

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 registered/included 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 included/registered CPA-DDs /B04/.

The Monitoring report /2/, reports for the third monitoring period (01/11/2016 to 31/10/2017) for CPA 1 to CPA 5 only. The reported monitoring report is a first batch to be reported after the second monitoring period and is after the end date of the second monitoring period (11/12/2015 to 31/10/2016).

CC IPL's verification team considers the project description of the project contained in the registered PoA-DD and the 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 § 341 of CDM VVS for PoAs, version 01 /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 registered 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 01.0. 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 § 341 (c) of CDM VVS for PoAs, Version 01.0 /B01-1/, information (data and variables) provided in the monitoring report that are different from that stated in the registered 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- 14,831	CPA 1- 13,293; CPA 2- 16,995; CPA 3- 17,000; CPA 4- 17,000; CPA 5- 10,691	Verification team noted that the actual number of cook-stoves distributed under the CPA 2, CPA 3, CPA 4 and CPA 5 are higher than the number indicated in the respective registered CPA-DDs /B04/. This difference is acceptable based on the following: • CPA-DDs do not restrict the number of

				<p>cook stoves as the stated values are just indicative values (as explained below);</p> <ul style="list-style-type: none"> • 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 registered 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 paragraphs of CPA-DD 4:</p> <p><i>“Ex-post monitoring shall monitor stove performance including stove efficiency and usage. In the case that ex-post monitoring results in lower thermal energy savings, or AES stoves are sold with lower thermal efficiency, the CME may choose to adjust the installation cap to maximize the threshold of 180 GWh_{th}/yr thermal energy savings for this CPA, but in all cases will not exceed the 180 GWh threshold required by the methodology”.</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 180GWh_{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</p>
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				change.
	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%	Weighted average values of 24.49 % for all the CPAs together	The weighted average efficiency of the cook-stoves (η_{new}) monitored ex-post for the current monitoring period is less than the estimated ex-ante values in the CPA-DDs. Verification team based on its sectoral expertise confirms that decrease in efficiency in actual project condition is a realistic condition and thus this issue does not require further assessment, as it does not lead to increase in emission reductions.
	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 five CPAs for ex ante ER estimation	0.537 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 (Uy)	A value of 1 was assumed for all the five CPAs for ex ante ER estimation	0.9211	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 1- 2.3; CPA 2- 2.18; CPA 3- 2.02; CPA 4- 1.96; CPA 5- 0.62	The ERs per stove is less than the ex-ante estimated values in the CPA-DDs.
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				

	<p>project activity has been conducted in accordance with the description contained in the registered PoA-DD and registered/included CPA-DDs.</p> <p>The verification team took cognizance of § 339, § 340 and § 341 of the CDM VVS for PoAs, version 01 /B01-1/ to conduct the verification and conducted a site visit in accordance with the § 320 and 321 of the CDM VVS for PoAs, version 01 /B01-1/.</p>
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E.3.2. Post-registration changes

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

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

E.3.2.2. Corrections

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There are some minor changes made in CPA 5 to comply with the latest CPA-DD template. As per paragraphs 228 and 251 of Project Standard for PoAs /B01-2/, this PRC does not require prior approval and is being notified to the UNFCCC secretariat in line with paragraph 171 of the PCP for PoAs /B01-3/. The PRC has been approved on 03/12/2018 (<https://cdm.unfccc.int/PRCContainer/DB/prcp827754113/view>).

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

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

E.3.2.4. Inclusion of a monitoring plan

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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 methodology, standardized baseline, or other applied standards or tools

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The following changes in the monitoring plan are proposed for CPA 5:

- Revision of B_{old} value (lowest available value is being applied as a conservative approach)
- Revision of sampling frame in the sampling plan to remove reference of urban or rural population in light of the above lowest value of B_{old} being applied.

Please refer to the PRC validation opinion for the detailed assessment /20/.

CL 02 had been raised in this respect and successfully closed. Please refer to Appendix 4 for further details.

The PRC has been approved on 03/12/2018
(<https://cdm.unfccc.int/PRCContainer/DB/prcp827754113/view>).

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

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

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

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Not applicable to the type of the programme of activity.

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

Means of verification	Document Review, Interview
Findings	-
Conclusion	<p>The verification team is able to confirm that the monitoring plan contained in the registered 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 § 342 to § 344 of CDM VVS for PoAs, Version 01.0 /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 registered 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 registered 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 § 345 of CDM VVS for PoAs, Version 01.0 /B01-1/.</p>

E.3.4.2. Data and parameters monitored

Means of verification	Document Review, Interview
Findings	CL 03, CL 04 and CAR 01 had been raised and successfully resolved. 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 registered 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 § 345, § 346(c), §357 and §358 of CDM VVS for PoAs, Version 01.0 /B01-1/.</p>

E.3.4.3. Implementation of sampling plan

Means of verification	Document Review, Interview
Findings	CL 05 had been raised and successfully resolved. Please refer to Appendix 4 for further details.
Conclusion	<p>The total population of the stoves under the five CPAs is 74,979. 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 simple random sampling was applied for the five 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 parameters usage rate (U_y) and quantity of woody biomass used in the project activity by traditional stoves (μ_{old}), CME has used one single sampling frame as the population is homogeneous considering that all the end users are domestic households and the geographical area is Uganda.</p>

For the thermal efficiency of the stoves (η_{new}) sampling frames were chosen for the respective 3 models of stoves distributed and considered for monitoring (AES, SHS and EZY) separately.

CME has used simple random sampling where samples were randomly selected from the population. Applying the random number generator, the ICS were randomly chosen 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)	7	12
η_{new} (SHS)	7	12
η_{new} (EZY)	7	10
Uy	43	76
μ_{old}	7	18

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 monitoring parameters Uy 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 except for μ_{old} for which higher bound value was applied in a conservative manner which was deemed acceptable in accordance with the registered PoA-DD, CPA-DDs and the applied methodology.

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 33 (c) of the sampling standard, version 07 /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 0.5 % and UQL of 20 %, producer risk 10 % and consumer risk 20 %. Acceptance number (c) thus determined for the sample is 0. DOE visited 9 samples. It was observed that out of the 9 samples, 8 stoves were found to be operational and 1 stove was non-operational, 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 § 32 of the sampling standard, version 07 /B07/. Verification team has cross verified these sample documents during the on-site visit.

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 Simple 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 Simple Random 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/.

The verification took cognizance of § 347 of CDM VVS for PoAs, Version 01.0 /B01-1/.

E.3.4.4. 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 monitored data were collected and surveyed 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. However, the verification team has cross checked the calibration status of the monitoring equipment used in carrying WBT. 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 /12/. 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 01 /B01-1/.</p>

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

In line with the requirement of § 357 and 358 of CDM VVS for PoAs, Version 01.0 /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 registered CPA-DDs /B04/ and the methodology AMS-II.G, Version 05 /B02/.

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

Means of verification	Document Review, Interview
Findings	CL 06, CAR 01 and CAR 02 had been raised and successfully resolved. Please refer to Appendix 4 for further details.
Conclusion	<p>The equations for baseline emissions, as provided in the Monitoring report /2/ and confirmed with the registered CPA-DD /B04/ and the methodology AMS-II.G, Version 05 /B02/, are:</p> $ER_y = (B_{y,savings} \times N_y \times U_y) \times (f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossilfuel})$ <p>Where:</p> <p>ER_y = Emission reductions during the year y in tCO₂e</p> <p>$B_{y,savings}$ = Quantity of biomass that is saved in tonnes per appliance</p> <p>$f_{NRB,y}$ = 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%)</p> <p>$NCV_{biomass}$ = Net calorific value of the non-renewable biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne)</p> <p>$EF_{projected_fossilfuel}$ = Emission factor for the substitution of non-renewable biomass by similar consumer (Default value of 81.6 tCO₂/TJ).</p> <p>N_y = Number of appliances of the type being deployed during the period y</p> <p>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</p> <p>By savings = $[(B_{old} - \mu_{old}) \times L] \times (1 - \eta_{old} / \eta_{new})$</p> <p>$B_{old}$ = Quantity of biomass used in the absence of the project activity in tonnes/year (4.97 as per the CPA-DDs)</p> <p>η_{old} = Efficiency of the system being replaced (fixed 10% ex ante)</p> <p>η_{new} = The result obtained from independent testing is used. Efficiency of</p>

	<p>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)</p> <p>L = Net to gross Adjustment factor (0.95) applied in accordance with AMS-II.G v. 05</p> <p>μ_{old} = Quantity of woody biomass for the continued use of old stoves</p> <p>From the above equation and the parameter values, emission reductions are calculated as:</p> <p>9956-0001: 30,616 tCO₂e 9956-0002: 37,120 tCO₂e 9956-0003: 34,320 tCO₂e 9956-0004: 33,265 tCO₂e 9956-0005: 6,654 tCO₂e Total ER_y = 141,975 tCO₂e</p> <p>The verification team confirms that the calculation of baseline emission and emission reductions is in accordance with the applied methodological equation and the registered CPA-DDs. Calculations have been checked and confirmed from the ER spread sheet /4/.</p> <p>The verification took cognizance of § 357 of CDM VVS for PoAs, version 01.0 /B01-1/.</p>
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E.3.5.2. 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.3.5.3. 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 registered CPA-DDs /B04/.</p>

E.3.5.4. 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 registered CPA-DDs. The total number of ERs achieved during the monitoring period is 141,975 tCO₂e.</p> <p>In summary, verification team confirms that actual emission reduction is lower than the estimate of the registered (included)/approved CPA-DDs /B04/ for the current monitoring period.</p> <p>The verification took cognizance of § 357 of CDM VVS PoAs, version 01 /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	30,616	-	-	0	30,616	30,616
9956-0002	37,120	0	0	0	37,120	37,120
9956-0003	34,320	0	0	0	34,320	34,320
9956-0004	33,265	0	0	0	33,265	33,265
9956-0005	6,654	-	-	0	6,654	6,654
Total	141,975	0	0	0	141,975	141,975

E.3.5.5. 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 § 357 of CDM VVS for PoAs, version 01 /B01-1/.

Title and UNFCCC reference number of the CPA	Value estimated in ex ante calculation in the included CPA-DD(s)	Actual values achieved by the CPAs during this monitoring period
9956-0001	44,874	30,616
9956-0002	44,980	37,120
9956-0003	44,980	34,320
9956-0004	44,980	33,265
9956-0005	37,463	6,654
Total	217,277	141,975

E.3.5.6. 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.3.6. 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 § 360 of CDM VVS PoAs, version 01 /B01-1/.

E.3.7. 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 § 369 of CDM VVS PoAs, version 01 /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 CC IPL'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 third 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" and "Up Energy Improved Cookstove Programme, Uganda – CPA No 005".

The verification team assigned by the DOE concludes that the PoA-DD (Version 4.0, dated 30/06/2014), CPAs 9956-0001, 9956-0002, 9956-0003, 9956-0004 and 9956-0005, as described in the revised and accepted CPA-DDs Version 06 date 17/05/2018, Version 05 dated 17/05/2018, Version 04, dated 17/05/2018, Version 04 dated 17/05/2018 and Version 03 dated 08/06/2018 respectively /B04/ and the Monitoring report (Version 5.0, dated 06/12/2018) /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 01.0 /B01-1/.

Verification methodology and process:

The Verification team confirms the contractual relationship signed on 15/02/2018 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 01.0 /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 99656-0001, 9956-0002, 9956-0003, 9956-0004 and 9956-0005 (Version 06 date 17/05/2018, Version 05 dated 17/05/2018, Version 04, dated 17/05/2018, Version 04 dated 17/05/2018 and Version 03 dated 08/06/2018 respectively /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 and Monitoring Period 2 /B09/;
- Publication of the MR on the UNFCCC website (version 1.0, 13/07/2018) on 16/07/2018
- Desk review of the validation report, MR and other relevant documents including documents related to the projects 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 (27/08/2018 – 29/08/2018)
- 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 registered/included 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 141,975 tCO₂e emission reductions during the third monitoring period.

Verified emission reductions (CPA 1): 30,616 tCO₂e

Verified emission reductions (CPA 2): 37,120 tCO₂e

Verified emission reductions (CPA 3): 34,320 tCO₂e

Verified emission reductions (CPA 4): 33,265 tCO₂e

Verified emission reductions (CPA 5): 6,654 CO₂e

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	141,975

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 01/11/2016 to 31/10/2017.

— 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, 3.0, 4.0 and 5.0 dated 13/07/2018, 18/09/2018, 26/09/2018, 10/10/2018 and 06/12/2018 respectively.

This statement covers verification period from 01/11/2016 to 31/10/2017.

The DOE had raised 06 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 registered/included CPA-DDs are fairly stated.


The DOE, hereby certifies that the project activity, achieved emission reductions by sources of GHG equal to 141,975 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	141,975

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

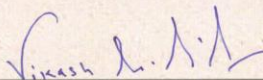
has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 06.0):

For following functions:

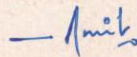
Validator	<input checked="" type="checkbox"/>	Team Leader	<input checked="" type="checkbox"/>	Technical reviewer	<input checked="" type="checkbox"/>
Verifier	<input checked="" type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>	Local Expert ¹	<input checked="" type="checkbox"/>

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"/>
TA 1.2	<input checked="" type="checkbox"/>	TA 4.1	<input checked="" type="checkbox"/>	TA 8.1	<input type="checkbox"/>	TA 10.1	<input type="checkbox"/>	TA 14.1	<input type="checkbox"/>
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
24/12/2017

Valid Till
23/12/2018

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
24/12/2017	Annual Revision

¹India

CARBON CHECK (INDIA) PRIVATE LIMITED
Registered in India: U74930DL2012PTC232495
Regd. Off: 2071/38, 2nd Floor, Naiwala, Karol Bagh, New Delhi - 110005
Corporate off: G 49 & 50, 3rd Floor, Sector - 3, NOIDA (Uttar Pradesh) - 201301
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e-mail: info@carboncheck.co.in



Carbon Check (India) Private Ltd.

Vikash Kumar Singh

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 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"/>
TA 1.2	<input checked="" type="checkbox"/>	TA 4.1	<input checked="" type="checkbox"/>	TA 8.1	<input type="checkbox"/>	TA 10.1	<input type="checkbox"/>	TA 14.1	<input type="checkbox"/>
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
24/12/2017

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¹India, South Africa

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 e-mail: info@carboncheck.co.in

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	UpEnergy	a. Webhosted Monitoring report b. Interim Monitoring report c. Monitoring report d. Monitoring report	Version 1.0, dated 13/07/2018 Version 2.0, dated 18/09/2018 Version 3.0, dated 26/09/2018 Version 4.0, dated 10/10/2018	CME
2	UpEnergy	Final Monitoring report	Version 5.0, dated 06/12/2018	CME
3	UpEnergy	Emission reduction calculation spread sheets for the five CPAs (9956-0001, 9956-0002, 9956-0003, 9956-0004 and 9956-0005) corresponding to /1/	-	CME
4	UpEnergy	Emission reduction calculation spread sheets for the five CPAs (9956-0001, 9956-0002, 9956-0003, 9956-0004 and 9956-0005) corresponding to /2/	-	CME
5	UpEnergy	Survey records for the monitoring period (for Uy and μ_{old})	-	CME
6	UpEnergy	CPA distribution records including evidence for the dates of distribution	-	CME
7	UpEnergy	Stove specifications for SHS, EZY and AES 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 personnel on 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	Copy of contract in between UpEnergy and CIRCODU		
12	UpEnergy	Water boiling test records	-	CME
13	UpEnergy	Calibration records for the monitoring equipment	-	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 Up Energy 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 Survey and WBT	-	CME
19	UpEnergy	Copies of the contracts with stove manufacturers	-	CME
20	UPEnergy	Validation opinion for PRC in CPA 5	Version 01, dated 27/09/2018	Carbon

CDM-PoA-VCR-FORM

				Check
B01	UNFCCC	1. Validation and Verification Standard for PoAs, version 01.0 2. Project Standard for PoAs, version 01.0 3. Project Cycle Procedure for PoAs, version 01.0	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 02.0	http://cdm.unfccc.int/	Others
B04	UNFCCC	Registered PoA-DD (Version 4.0 dated 30/06/2018), (CPA-DD for 9956-0001: Version 06 date 17/05/2018; 9956-0002: Version 05 dated 17/05/2018; 9956-0003: Version 04 dated 17/05/2018; 9956-0004: Version 04 dated 17/05/2018 and 9956-0005; Version 03 dated 08/06/2018) 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: Standard for sampling and surveys for CDM project activities and Programme of Activities, version 07.0	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 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	CL 01	Section no.	E.3.1	Date : 04/09/2018
Description of CL				
The lifetime of the Ezy stove has been stated as 3 years and for SHS and AES stoves it is stated as 5 years in the CPA-DDs. CME shall clarify how this has been accounted in ER calculation.				
CME response				Date : 20/09/2018
The registered PoA-DD version 04.0 dated 30/06/2014, section A.6, page 4, states the following: <i>"Upon inclusion into the project activity, all appliances will remain valid throughout the life time of the project period until the CME choose to discontinue crediting of the stove."</i> Further the CPA-DDs (CPA 01-05) also state the same. The PP has duly monitored the operational status as well as thermal efficiency of the different ICS models as well as vintages (via simple random sampling) and has calculated emission reductions accordingly, in line with aforesaid.				
Documentation provided by the CME				
-				
DOE assessment				Date: 26/09/2018
CME has clarified that in the registered PoA-DD and CPA-DDs it has been stated that the appliances will remain valid throughout the life time of the project period until the CME chooses to discontinue crediting of the stove. CME has duly monitored the operational status and efficiency from the whole population of the distributed stoves which covers stoves of all ages and accordingly considered in the emission reduction calculation. This is deemed acceptable to the verification team and hence the CL is closed.				

CL ID	CL 02	Section no.	E.3.2.5	Date: 04/09/2018
Description of CL				
CME is requested to provide revised ER spread sheet for CPA 5 for which PRC is being proposed.				
CME response				Date: 20/09/2018
The ex-ante ER calculator for CPA 05 (9956-0005) is being submitted.				
Documentation provided by the CME				
PRC Appendix 3 – 9956 5 CER Calculation v2				
DOE assessment				Date: 26/09/2018
Revised ER calculation spread sheet for CPA 5 has been provided by the CME which has been checked and found to be appropriate. CL is closed.				

CL ID	CL 03	Section no.	E.3.4.2	Date : 04/09/2018
Description of CL				
CME is requested to provide the list of stoves which were provided to the WBT sample households, as a replacement against picking up their stoves for testing.				
CME response				Date: 20/09/2018
The list of ICS provided to the WBT sample households, as a replacement against picking up their ICS for testing, is being submitted.				
Documentation provided by the CME				
WBT replacement stove list by CIRCODU				
DOE assessment				Date: 26/09/2018

CME has provided the list of replacement stoves for which WBTs were conducted. CL is closed.
--

CL ID	CL 04	Section no.	E.3.4.2	Date: 04/09/2018
Description of CL				
CME is requested to provide the evidence of competence and training for the monitoring team and details of the monitoring equipment along with calibration status.				
CME response				Date: 20/09/2018
The Center for Integrated Research and Community Development, Uganda (CIRCODU) has performed the monitoring (surveys and WBTs). A list of personnel involved in the monitoring, their competency and training records like training presentation and attendance sheet is being submitted.				
The following equipment were used for WBTs.				
<ol style="list-style-type: none"> 1. Moisture Meter 2. Thermocouple 3. Weighing Scale 				
The calibration certificates for the equipment is being submitted.				
Documentation provided by the CME				
<ol style="list-style-type: none"> 1. List of personnel involved in monitoring with their professional experience 2. Monitoring training Presentation 3. Training Attendance List 4. Equipment Calibration Certificates 				
DOE assessment				Date: 26/09/2018
CME has provided the evidence for training and competence of the monitoring team. Also the calibration certificates for the monitoring equipment used for WBT have been provided. Hence the CL is closed.				

CL ID	CL 05	Section no.	E.3.4.3	Date: 04/09/2018
Description of CL				
CME needs to clarify on the sample size calculation in the MR and provide the evidence for randomness of the chosen samples.				
CME response				Date: 20/09/2018
Simple random sampling approach was used for identifying samples for monitoring. The sample size were calculated for WBT, Usage & μ_{old} (refer worksheet, "Sample Size Calculation" in the revised ER calculator).				
The sample size were calculated based on 95/10 confidence/precision level for cross-CPA sampling. Few additional stoves were sampled from the database than that required to cover for non-responses.				
Documentation provided by the CME				
PoA 9956 MP#3 ER Calculator v2.0 18092018 Random sampling snapshot				
DOE assessment				Date: 26/09/2018
CME has provided the sample size calculation along with evidence for random number generator for sampling of the population for monitoring. The calculation of the sample size has been checked and found to be appropriate and in line with the requirements of the registered PoA-DD/CPA-DDs. Hence the CL is closed.				

CL ID	CL 06	Section no.	E.3.5.1	Date: 04/09/2018
Description of CL				
CME needs to clarify the calculations of weighted average of efficiency by applying two methods.				
CME response				Date: 20/09/2018
AMS II.G., version 5.0, paragraph 12, on page 6 mentions the following: <i>Use weighted average values if more than one type of system is being introduced by the project activity.</i>				
The weighted average has been therefore calculated using two approaches. In cell H9 of the WBT summary sheet, the weighted average thermal efficiency has been calculated based on model wise population. In cell H10, it has been calculated based on model wise population considering date of deployment.				
Subsequently, the lower of the two values has been used for ER calculations.				
Documentation provided by the CME				
PoA 9956 MP#3 ER Calculator v2.0 18092018				
DOE assessment				Date: 26/09/2018

For emission reduction calculation, CME has used the lower of the two calculated values of stove efficiency which is conservative and deemed acceptable. Hence the CL is closed.

Table 3. CARs from this verification

CAR ID	CAR 01	Section no.	E.3.4.2 / E.3.5.1	Date: 04/09/2018
Description of CAR				
In the web hosted MR, the values of the monitoring parameters (including the ER calculation) do not match with the submitted ER spread sheet. CME needs to provide the correct MR and ER spread sheet along with records of all the monitored data (Survey and WBT).				
CME response				Date: 20/09/2018
The error in the MR have been rectified and the revised MR is now consistent with the ER calculator for all monitoring data. The monitoring records (Survey and WBT sheets) is being submitted.				
Documentation provided by the CME				
CDM PoA 9956 MP#3 MR ver 2.0 18092018 PoA 9956 MP#3 ER Calculator v2.0 18092018 CDM PoA 9956 MP#3 WBT Records CDM PoA 9956 MP#3 Survey Records				
DOE assessment				Date: 26/09/2018
CME has submitted revised MR and ER spread sheet which have been checked and found to be consistent. All the monitoring data submitted by the CME have been cross checked, including the emission reduction calculations and found to be correct. However, it is noted that in the ER spread sheet, in the worksheet "Monitoring Survey" column J:L, the data for total fuel consumed in the sampled household has been specified but the same has not been used for determination of μ_{old} . CME is requested clarify on the calculation of μ_{old} . The CAR remains open.				
CME response				Date: 26/09/2018
The value μ_{old} refers to Quantity of woody biomass used in the project activity by traditional stoves. Thus, this has been calculated directly from the biomass consumption reported for their baseline stoves by the sampled users. The information related to total fuel consumed in the household has been removed from the monitoring survey worksheet to avoid any confusion.				
Documentation provided by the CME				
CDM PoA 9956 MP#3 MR ver 3.0 26092018 PoA 9956 MP#3 ER Calculator v3.0 26092018				
DOE assessment				Date: 28/09/2018
For the calculation of emission reductions, the quantity of continued use biomass stoves for traditional stoves has to be discounted from Bold value. Hence the fuel usage in traditional stoves in the sampled households has been monitored and reported and rightly discounted in the ER calculations. This has been checked and found to be appropriate in line with the registered PoA-DD and the applied methodology. CME has removed the total fuel usage in the revised ER sheet to avoid any confusion which is deemed acceptable. Hence the CAR is closed.				

CAR ID	CAR 02	Section no.	E.3.5.1	Date: 10/10/2018
Description of CAR				
CME needs to justify the consideration of the stoves, sold after the commencement of the monitoring process, for ER calculation of this MP.				
CME response				Date: 10/10/2018
The stoves sold after the commencement of the monitoring process, have been excluded from the ER calculations. Please refer the revised ER sheet and MR.				
Documentation provided by the CME				
2. CDM PoA 9956 MP#3 MR ver 4.0 10102018 Clean 4. PoA 9956 MP#3 ER Calculator version 4.0 10102018 6. CDM PoA 9956 MP#3 CPA Distribution Database 10102018				
DOE assessment				Date: 10/10/2018
In response to the raised CAR, the CME has excluded the stoves from ER calculations which were distributed after the commencement of the monitoring process. CME has submitted the revised ER spread sheet and MR in this respect. 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/.

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:	0.537 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		

	<table border="1"> <tr> <td>AES</td><td>24.28%</td></tr> <tr> <td>EZY</td><td>23.39%</td></tr> <tr> <td>SHS</td><td>24.90%</td></tr> </table> <p>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 24.49 %</p>	AES	24.28%	EZY	23.39%	SHS	24.90%
AES	24.28%						
EZY	23.39%						
SHS	24.90%						
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 and moisture meter. These equipment were duly calibrated /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 as stated in the MR 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?	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 for the WBT carried out for efficiency parameter were checked by the verification team and thus no sampling of data is required.						
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</p>						

	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 the 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.
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_j)												
Measuring frequency/Time Interval:	Continuous												
Reporting frequency:	Yearly												
Reported value:	<table border="1"> <thead> <tr> <th>CPA</th><th></th></tr> </thead> <tbody> <tr> <td>9956-0001</td><td>13,293</td></tr> <tr> <td>9956-0002</td><td>16,995</td></tr> <tr> <td>9956-0003</td><td>17,000</td></tr> <tr> <td>9956-0004</td><td>17,000</td></tr> <tr> <td>9956-0005</td><td>10,691</td></tr> </tbody> </table>	CPA		9956-0001	13,293	9956-0002	16,995	9956-0003	17,000	9956-0004	17,000	9956-0005	10,691
CPA													
9956-0001	13,293												
9956-0002	16,995												
9956-0003	17,000												
9956-0004	17,000												
9956-0005	10,691												
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes												
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 (Uy)
Measuring frequency/Time Interval:	Annual
Reporting frequency:	Annual
Reported value:	92.11%
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 / 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-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 the well-trained personnel of CIRCODU 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 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.

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Document information

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