# VERIFICATION REPORT
# JP MORGAN VENTURES

## VERIFICATION OF THE
## EFFICIENT COOKING WITH
## UGASTOVES

REPORT NO.BVC/KENYA-VR/002/2013

REVISION NO. 02

BUREAU VERITAS CERTIFICATION

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Report No: BVC/Kenya-VR/002/2013 rev. 02

# VERIFICATION REPORT

| Date of first issue: | Organizational unit: |
|---|---|
| 27/02/2013 | Bureau Veritas Certification Holding SAS |
| **Client:** | **Client ref.:** |
| JP Morgan Ventures | Mr. Etienne Amic |


Summary:

Bureau Veritas Certification has conducted the 5th periodic verification of Efficient Cooking with Ugastoves project, Gold Standard Registration Reference Number GS447, owned by JP Morgan Ventures, which is located in Plot 3848 Rwakiseta Close, Muyenga, Kampala, Uganda, and applying the methodology Improved Cook Stoves and Kitchen Regimes version 01, on the basis of requirements for Voluntary Offset Projects under the Gold Standard, UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM rules and modalities and the subsequent decisions by the CDM Executive Board, as well as the host country criteria.

The verification scope is defined as an independent and objective review and ex-post determination of the monitored GHG emission reductions, and consisted of the following three phases: i) desk review of the project design, the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification report and opinion. The overall verification, from Contract Review to Verification Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.

In summary, Bureau Veritas Certification confirms that the project is implemented as planned and described in the validated and registered project design documents. Installed equipment being essential for generating emission reduction run reliably and are calibrated appropriately. The monitoring system is in place and the project is generating GHG emission reductions. The GHG emission reductions are calculated without material misstatements, and the emission reductions verified totalize 299,614 tons of CO2e for the monitoring period.

Our opinion relates to the projects' GHG emissions and resulting GHG emission reductions reported and related to the valid and registered project baseline, approved monitoring plan and its associated documents.

| | |
|---|---|
| Reporting period: | 01/04/2012 to 31/12/2012 |
| Baseline emissions: | incorporated in ER calculation equation |
| Project emissions: | incorporated in ER calculation equation |
| Leakage emissions: | 5 t $CO_2$ equivalents. |
| Emission Reductions: | 299,614t $CO_2$ equivalents. |


| Report No.: | Subject Group: |
|---|---|
| BVC-Kenya/VR002/2013 | CDM |
| **Project title:** | |
| Efficient Cooking with Ugastoves | |
| **Work carried out by:** | |
| Mr James Chirchir - Team Leader<br>Mr Samuel Mayieko - Team Member<br>Gertjan Schut - Statician | |
| **Internal Technical Review carried out by:** | |
| Mrs Virginie Vitiello<br>Mr. James Mwaniki – Technical Specialist | |

| Date of this revision: | Rev. No.: | Number of pages: |
|---|---|---|
| 19/04/2013 | 02 | 62 |

**Indexing terms**

Work approved by: Matthieu Martini

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## Abbreviations

| | |
|---|---|
| CAR | Corrective Action Request |
| CDM | Clean Development Mechanism |
| CER | Certified Emission Reductions |
| CR | Clarification Request |
| CO2 | Carbon Dioxide |
| CO2e | Carbon Dioxide Equivalent |
| DOE | Designated Operational Entity |
| DRR | Daily Reading Record |
| ETN | Electricity Transaction Note |
| FAR | Forward Action Request |
| GHG | Green House Gas(es) |
| MoV | Means of Verification |
| MP | Monitoring Plan |
| MR | Monitoring Report |
| MRR | Monthly Reading Record |
| PDD | Project Design Document |
| PLF | Plant Load Factor |
| PP | Project Participant |
| PPA | Power Purchase Agreement |
| UNFCCC | United Nations Framework Convention on Climate Change |
| VVS | Validation and Verification Standard |

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# 1. INTRODUCTION

JP Morgan Ventures has commissioned Bureau Veritas Certification to verify the emissions reductions of its CDM project Efficient Cooking with Ugastoves (hereafter called "**the Project**") at Plot 3848 Rwakiseta Close, Muyenga, Kampala, Uganda managed by ClimateCare and implemented by Impact Carbon.

This report summarizes the findings of the verification of the Project, performed on the basis of requirements for Voluntary Offset Projects under the Gold Standard, UNFCCC criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

## 1.1. Objective

The objective of CDM verification is to conduct a thorough, independent assessment of the registered project activities.

The objective of the Gold Standard verification is to verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the Gold Standard monitoring plan.

In carrying out its verification work, the DOE shall ensure that the project activity complies with the requirements of paragraph 62 of the CDM modalities and procedures, and Gold Standard requirements. In particular, this assessment shall:

(a) Ensure that the project activity has been implemented and operated as per the registered PDD or any approved revised PDD, and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place;

(b) Ensure that the monitoring report and other supporting documents provided are complete in accordance with latest applicable version of the completeness checklist for requests for issuance of CERs, verifiable, and in accordance with applicable CDM requirements;

(c) Ensure that actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan or any revised approved monitoring plan, and the approved methodology including applicable tool(s);

(d) Evaluate the data recorded and stored as per the monitoring methodology including applicable tool(s).

(e) The GS verification is based on the GS Monitoring plan and the additional requirements stated by the Gold Standard

## 1.2. Scope

The verification scope is defined as an independent and objective review and ex-post determination of the monitored GHG emission reductions. The verification is based on the validated and registered project design document, the monitoring report, emission reduction calculation spreadsheet, and supporting documents. The information in these documents is

reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations; and additional requirements stated by the Gold Standard.

The verification is not meant to provide any consulting service towards the PPs. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project monitoring towards reductions in the GHG emissions.

## 1.3. GHG Project Description

The Project consists of production and distribution of efficient cook stoves to users in Uganda. The efficient cook stoves replace baseline inefficient traditional wood and charcoal stoves. The project consists of two main stove clusters (Charcoal stoves and Institutional wood stoves). The annual estimated emission reductions are 85615 tCO2e as indicated in the registered PDD. The project also contributes to Sustainable Development by: improvement of air quality, Lively-hood of the poor, employment, access to Energy Services, Human and Institutional capacity, and Technological self-reliance.

| | |
|---|---|
| Project title: | Efficient Cooking with Ugastoves |
| UNFCCC ref number: | GS447 |
| Monitoring Period: | 01/04/2012 to 31/12/2012 |
| Project Participants: | JP Morgan Ventures |
| Methodologies used | Improved Cook Stoves and Kitchen Regimes version 01 |
| Location of the Project: | Plot 3848 Rwakiseta Close, Muyenga, Kampala, Uganda |
| GS view page: | http://mer.markit.com/br-reg/public/project.jsp?project_id=103000000002469 |

According to GS Requirement V.a.2.1 for VER project activities proceeding under the regular project cycle, the start date of the Gold Standard Crediting Period shall be the date of start of operation or a maximum of two years prior to Gold Standard registration, whichever occurs later. The project has since registration reported emission reduction in the following verification periods:

a) Verification for retroactive monitoring report “Verification Report - Ugastoves - Rev 03.pdf” was performed for the Emissions Reduction crediting period: 01/07/2007 to 31/03/2009
b) Verification for monitoring report “Verification Report - Ugastoves - Rev 06.pdf” was performed for the Emissions Reduction crediting period: 01/04/2009 to 30/06/2010
c) Verification for monitoring report “Verification Report - Ugastoves - Rev 03.pdf” was performed for the Emissions Reduction crediting period: 01/07/2010 to 30/05/2011
d) Verification for monitoring report “Verification Report - Ugastoves - Rev 03.pdf” was performed for the Emissions Reduction crediting period: 01/06/2011 to 31/03/2012
e) The current verification report is for verification period claimed in “Monitoring Report: Efficient Cooking with Ugastoves Q2 2012 – Q4 2012 version 02” from 01/04/2012 through 31/12/2012 and is deemed appropriate

**[Post Registration Changes]**

No post registration changes have been requested.

## 1.4. Verification Team

The assessment team and internal technical reviewer team consist of the following personnel:

| FUNCTION | NAME | TA 3.1 | TA X.X | TASK PERFORMED* |
|---|---|---|---|---|
| **Team Leader** | Mr James Chirchir | ☒ | ☐ | ☒**DR** ☒**SV** ☒**RI** ☐**TR** |
| **Team Member** | Mr Samuel Mayieko | ☒ | ☐ | ☒**DR** ☒**SV** ☐**RI** ☐**TR** |
| **Statistician** | Gertjan Schut | ☐ | ☐ | ☒**DR** ☐**SV** ☐**RI** ☐**TR** |
| **Internal Technical Reviewer (ITR)** | Mrs Virginie Vitiello | ☐ | ☐ | ☒**DR** ☐**SV** ☐**RI** ☒**TR** |
| **Specialist supporting ITR** | Mr. James Mwaniki | ☒ | ☐ | ☒**DR** ☐**SV** ☐**RI** ☒**TR** |

*DR = Document Review; SV = Site Visit; RI = Report issuance; TR = Internal Technical Review

# 2. METHODOLOGY

The overall verification, from Contract Review to Verification Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.

In order to ensure transparency, a verification protocol was customized for the project, according to the version 03.0 of the Clean Development Mechanism Validation and Verification Standard, issued by CDM Executive Board at its 70$^{th}$ meeting on 23/11/2012 /8/ and GS-VER requirements. The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results from verifying the identified criteria. The verification protocol serves the following purposes:

- It organizes, details and clarifies the requirements a CDM and GS-VER project is expected to meet;
- It ensures a transparent verification process where the verifier will document how a particular requirement has been verified and the result of the verification.

The completed verification protocol is enclosed in Appendix A to this report.

## 2.1. Review of Documents

The assessment of the project documentation provided by the project participant is based upon both quantitative and qualitative information on emission reductions. Quantitative information comprises the reported numbers in the monitoring report (MR) version 02 dated 16 April 2013 /5/ and emission reduction calculation spreadsheet version 02 /6/. Qualitative information comprises information on internal management controls, calculation procedures, procedures for transfer of data, frequency of emissions reports, and review and internal audit of calculations.

In addition to the monitoring documentation provided by the project participants, the DOE reviews:

(a) The registered PDD and the monitoring plan, /1/;

(b) The validation report/2/

(c) Previous verification reports /3/;

(d) The applied monitoring methodology /7/;

(e) Other information and references relevant to the project activity's resulting emission reductions (e.g. KPT reports for 2010 and 2012 (Annex 01A, 01B), KS report (Annex 02, 03), Usage Monitoring report (Annex 04, 05))/10/.

## 2.2. Follow-up Interviews

On 28/01/2013 to 29/01/2013, Bureau Veritas Certification performed a site visit and interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of JP Morgan Ventures, Impact Carbon, Centre for Integrated Research Community Development Uganda (CIRCODU), Ugastoves, Energy Uganda Foundation (EUF), Friends of Wealthy Environment (FOWE), Save Energy saving stove for Africa (SESSA) and Africa Energy Environment savings stoves and construction Ltd were interviewed (see References). The main topics of the interviews are summarized in Table 1.

Table 1 Interview topics

| Interviewed organization | Interview topics |
|---|---|
| JP Morgan Ventures (the Project Owner represented by ClimateCare) | ➢ Project Design and implementation |
| Impact Carbon (the Implementer) | ➢ Monitoring Plan and management procedures<br>➢ Monitoring data and Monitoring Report<br>➢ Data uncertainty and residual risks (QA/QC)<br>➢ GHG Calculation<br>➢ Environmental Impacts<br>➢ Compliance with National Laws and Regulations<br>➢ GHG Calculations<br>➢ GS Sustainability |
| Ugastoves, Energy Uganda Foundation Ltd (EUF), FOWE, SESSA, Africa Energy | ➢ Stove manufacturing<br>➢ Sales records<br>➢ Production records<br>➢ Compliance with existing national rules and regulation.<br>➢ Stoves' design changes |
| CIRCODU (Third Party QA/QC) | ➢ Project database quality assurance and control<br>➢ Kitchen surveys<br>➢ Kitchen Performance Tests<br>➢ Technical equipment, calibration and operation |

## 2.3. Resolution of Clarification, Corrective and Forward Action Requests

The objective of this phase of the verification is to resolve issues related to the monitoring, implementation and operations of the registered project activity that could impair the capacity of the registered project activity to achieve emission reductions or influence the monitoring and reporting of emission reductions prior to Bureau Veritas Certification's positive conclusion on the GHG emission reduction calculation.

Findings established during the verification can either be seen as a non-fulfillment of criteria ensuring the proper implementation of a project or where a risk to deliver high quality emission reductions is identified.

A Corrective Action Request (CAR) is raised, if one of the following situations occurs:

(a) Non-compliance with the monitoring plan or methodology are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;

(b) Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants;

(c) Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions;

(d) Issues identified in a FAR during validation to be verified during verification or previous verification(s) have not been resolved by the project participants.

A Clarification Request (CR) is raised, if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

A Forward Action Request (FAR) is raised, for actions if the monitoring and reporting require attention and/or adjustment for the next verification period.

To guarantee the transparency of the verification process, the concerns raised are documented in more detail in the verification protocol in Appendix A.

## 2.4. Internal Technical Review

The verification report underwent an Internal Technical Review (ITR) before requesting issuance of CERs for the project activity.

The ITR is an independent process performed to examine thoroughly that the process of verification has been carried out in conformance with the requirements of the verification scheme as well as internal Bureau Veritas Certification procedures.

The Team Leader provides a copy of the verification report to the reviewer, including any necessary verification documentation. The reviewer reviews the submitted documentation for

conformance with the verification scheme. This will be a comprehensive review of all documentation generated during the verification process.

When performing an Internal Technical Review, the reviewer ensures that:

- The verification activity has been performed by the team by exercising utmost diligence and complete adherence to the CDM rules and requirements.
- The review encompasses all aspects related to the project which includes project design, baseline, additionality, monitoring plans and emission reduction calculations, internal quality assurance systems of the project participant as well as the project activity, review of the stakeholder comments and responses, closure of CARs, CRs and FARs during the verification exercise, review of sample documents.

The reviewer may raise Clarification Requests to the verification team and discusses these matters with Team Leader.

After the agreement of the responses on the Clarification Requests from the verification team as well as the PP(s), the finalized verification report is accepted for further processing such as uploading via the UNFCCC interface.

# 3. VERIFICATION CONCLUSIONS

In the following sections, the conclusions of the verification are stated.

The findings from the desk review of the original monitoring documents and the findings from interviews during the follow up visit are described in the Verification Protocol in Appendix A.

The Clarification, Corrective and Forward Action Requests are stated, where applicable, in the following sections and are further documented in the Verification Protocol in Appendix A. The verification of the Project resulted in 3 CAR(s), 15 CR(s) and 0 FAR(s).

The CARs, CRs and FARs were closed based on adequate responses from the Project Participant(s) which meet the applicable requirements. They have been reassessed before their formal acceptance and closure.

The number between brackets at the end of each section corresponds to the VVS paragraph.

## 3.1. Remaining issues from validation or previous verification (213)

A FAR1 had been raised during the previous verification /3/ of this project activity regarding missing records on fossil fuel usage for the compressor/sprayer, for one of the new units (that is SESSA). During this verification, the PP produced records for fossil fuel usage for all the manufacturing units including (SESSA). The electronic records were crosschecked with invoices and receipts and were found to be accurate. The verification team confirms that the project participants have addressed the FARs identified during previous verification.

## 3.2. Compliance of the project implementation with the registered project design document (228)

Bureau Veritas Certification has performed a site visit and found that the Project has been put into operation and has continued to produce and distribute efficient wood and charcoal stoves known as Ugastoves. Two main clusters of stoves (Charcoal stove and Institutional wood stoves) have been in operation during the monitoring period.

No changes to the project design have been identified during this verification. The implementation and operation of the project activity have been conducted in accordance with the description contained in the registered PDD.

Information (data and variables) provided in the monitoring report that is different from that stated in the registered PDD, and has caused an increase in estimates of the emission reductions in the current monitoring period is further reported in section 3.6 of this report.

**[Management and Operation]**

The management and operational system for monitoring and reporting of the project activities has been defined in the established Organizational charts and Partner staff list provided (Annex 13 and Annex 14 /10/). These have been verified during the site and interview with relevant persons. The Management System including the organization structure and responsibilities to determine effectiveness of the monitoring process are in line with the registered GS-VER-PDD dated 24 March 2009, the Monitoring plan has clearly prescribed the management and operational procedures for the various steps including the monitoring, recording, data management including backup, audit and training for relevant personnel involved in the Project. BVC has verified the Management and Quality Assurance procedures and found the management and operational system appropriate and effective to ensure accurate reporting samples of data were evaluated through process based audit to cross check accuracy

Corresponding to the paragraph 228 of VVS version 03.0, Bureau Veritas Certification can confirm that:

- The implementation of the Project is consistent with the registered PDD.
- The Project is operated as per the registered PDD by the PP.
- Information (data and variables) provided in the monitoring report that is different from that stated in the registered PDD, and has caused an increase in estimates of the emission reductions in the current monitoring period is reported.

## 3.3. Compliance of the monitoring plan with the monitoring methodology including applicable tool(s) (232)

The verification team has verified the monitoring plan, including the data and parameters required to be monitored, measurement procedures, monitoring frequency and QC/QA procedures as described in the registered PDD.

Corresponding to the paragraph 232 of VVS version 03.0, Bureau Veritas Certification can confirm that the monitoring plan is in accordance with the approved methodology including applicable tool(s) applied by the Project.

## 3.4. Compliance of monitoring activities with the monitoring plan (235-236)

Monitoring has been carried out in accordance with the monitoring plan contained in the registered PDD.

**[Parameters and information flow]**

The parameters required by the monitoring plan and how Bureau Veritas Certification has verified the information flow (from data generation, aggregation, to recording, calculation and reporting) for these parameters including the values in the monitoring report are described below:

***Parameters monitored:***

a) Stove Sales- Ugastove's sales records are kept in QuickBooks and exported to excel sheets, whereas new manufacturing locations/partners making the same stove designs retain hard copies of sales log which are entered into sales excel sheets. The sales records for the verification period 01/04/2012 to 31/12/2012 are as shown in "Annex 06 Complete Sales record project Database.xls"/10/. The records were verified during the site visit by sampling selected dates of the verification period and checking the entries in the excel sheets. The entries checked included date and location of sale, number and type of stoves and customer details, e.g. phone number and address. All the sales figures in the project data base were found to have a corresponding hard copy sales record. Hence the records are considered accurate.

b) Project Fuel Consumption: this parameter is monitored every two years using the Kitchen performance test (KTs) to determine the effect of improved cooking stoves on fuel consumption in households and institutions. The test was performed by Berkeley Air Monitoring Group in 2010 (Refer to Annex 01A) and the results of the KTs had been verified in 2011. As required, another KT was performed in 2012 (Refer to Annex 01B) by CIRCODU (a third party monitoring group – refer to the registered PDD pg 49). This test was used to determine the aging stove fuel performance for Ugastove and EUF stoves and Institutional wood stoves. The report and the results of this KT have been verified and are found acceptable.

c) Clustering definitions - The parameter is monitored through quarterly Kitchen Survey (KS) and Biannual Kitchen Tests (KTs).Clustering definitions have not changed since the last Monitoring Period. The Project continues to measure fuel savings on a per person-meal basis (the cooking of one meal for one person).

d) Usage factor – this parameter is monitored on an annual basis through usage surveys and KT and the values used in the verification period are in "Annex 04 Usage Monitoring Report, Charcoal and Annex 05 Usage Survey Monitoring Report, Institutional Wood." In

the usage survey performed in December 2012, the project participant is using the latest version of the GS Methodology (Technologies and Practices to Displace Decentralized Thermal Energy Consumption - 11/04/2011) to calculate a cumulative usage rate of all household stoves within the project database/sales record. This approach has been approved by the GS and the PP has provided email communication with GS (which indicate approval by GS) as supporting evidence. Through the approach, the cumulative usage rate has been determined to be 86.57% (Refer to Annex 04 and Annex 18). The verification team has reviewed the procedures, data and calculations provided by the PP and conclude that the value determined is correct (refer to 3.6 b ii of this report for additional information).

A sixth year usage survey follow up for institutional wood stoves was done in October 2012 (Refer to Annex 05). The usage rate for stoves aged 5-6 has been conservatively taken as 41.2% *4* (base on a drop off rate of 58.8%) while the usage rate for stoves aged 6-7 years has been determined as 80% (based on a 20% drop off rate). These values have been verified and found acceptable (refer to 3.6 b ii of this report for additional information).

e) Age factor - This parameter is monitored every two years through KTs. The KT's "Annex 01 KPT Berkeley Air 2010 Phases 1-5" recommended that Baseline and Project Fuel consumption values remain the same for the full set of stove vintages for charcoal stoves. Project Fuel savings for institutional wood stoves starting with Age 4-5 is 94% of fuel savings seen in stoves during the first 4 years of lifespan. As required, another KT was performed in 2012 (Refer to Annex 01B) by CIRCODU (a third party monitoring group – refer to the registered PDD pg 49). The test indicates that the performance of institutional wood stove cluster of Ugastoves aged 6 years and above dropped to 90%. The results of the KT did not show any significant change, compared to the result of the 2010 KT, in the performance of charcoal stoves. A factor of 94% has therefore been used. The report and results of this KT have been verified and are found acceptable. The verification team considers the values of 94% and 90% acceptable.

f) New Stove performance - To monitor new stove performance (biannually) 2010 KPT, Berkeley Air recommended using a person-meal metric to more accurately measure fuel use and fuel savings. Data on number of person-meals cooked is derived from the Kitchen Test "Annex 01 KPT Berkeley Air 2010 Phases 1-5". There has been no addition of a new cluster into the project for this verification period.

g) Market development – the parameter is monitored on quarterly basis through company records and marketing reports. Marketing department comprises the head and sales staff who continues to expand the existing market while developing new markets both around Kampala and in rural areas upcountry (refer to Annex 12 Marketing Strategy). The marketing strategies implementation has seen the sales volumes sharply increase in this monitoring period. This was confirmed through sales records reviewed during the site visit.

h) Non-renewable biomass fraction NRB – The parameter is required to be updated every two years. The PP has recalculated this value following the CDM methodology AMS-II.G.

and using the WISDOM approach. A value of 0.936 has been determined using data from FAO; 2010 Global Forests Assessment. This value is 0.0202 point higher than the value used in the previous monitoring period. This difference can be attributed to the approach used to calculate the faction of NRB. The calculations and application of data have been assessed and found to be inline with the methodology and WISDOM approach. The Non-renewable biomass fraction (fNRB) has been verified and found acceptable (refer to section 3.6 of this report for additional information).

i) Baseline fuel consumption – This parameter is monitored through kitchen surveys (KS) and kitchen tests (KTs). The PP has changed the approach since the second monitoring period, and has been monitoring fuel savings through KTs. The new approach was approved in the second monitoring period. The fuel savings per person meal has been verified and reported in section 3.6 of this report.

The verification team has verified the values provided in the monitoring report and ER spreadsheet against the relevant documented evidences i.e. KT reports for 2010 and 2012, KS report, Usage Monitoring reports, Aging monitoring report and Parameters determined ex-ante.

Corresponding to the paragraph 235 and 236 of VVS version 02.0, Bureau Veritas Certification can confirm that:

- The monitoring has been carried out in accordance with the monitoring plan contained in the registered PDD.

- All parameters required by the monitoring plan have been sufficiently monitored and correctly listed. The monitored data for required parameters have been verified by checking the whole information flow.

## 3.5. Compliance with the calibration frequency requirements for measuring instruments (243)

The project activity type does not involve direct measurement of parameters. However in performing Kitchen Performance Tests (KPT), CIRCODU has calibrated the equipment used as required and following the Scale and Weight Calibration Protocol by Berkeley Air Monitoring Group. The main equipment used by CIRCODU are scales used to weigh fuel (Charcoal and wood). Calibration records for the scales (calibration certificates number 01121145 and 01121143) used by CIRCODU were provided and reviewed onsite. The error margin was found to be within the acceptable range.

## 3.6. Assessment of data and calculation of emission reductions (246)

A complete set of data for the specified monitoring period is available. The critical parameters used for the determination of the Emission Reductions are: ER Value, stove usage and leakage. The data and calculations pertaining to these parameters are maintained in the identified records. All the data are in compliance with that stated in the Monitoring Report version 02. The reported calculations and data have been cross-checked by the DOE as follows:

a) The ER value – this is an emission reduction factor that has been developed by the PP to simplify emission reduction calculations. The formula below shows how the ER value is determined and is acceptable, based of previous motoring and verification reports:

ER Value = ((Person-meals/Stove-Year) x (Fuel Savings kg/person-meal) x EFnrb x Age Adjustment (if any))/1000

Where

| | |
|---|---|
| ER Value | This is an emission reduction factor developed by the PP to reduce computational process. The factor is given on tCO2e/stove year. |
| Person-meals/ stove-year | The average number of person-meals that are cooked by each stove within a stove cluster per year. This is determined by The number of Person-Meals prepared by a stove in a day multiplied by the number of Days that the stove is in use, in year. . Table 3.2 of the monitoring report provides a summary of the person-meals/stove-year for each stove cluster (for details, refer to the kitchen surveys Annex 2 and Annex 3). Data and information for determining Person-Meals/Stove-Day is found in the kitchen survey and has been assessed by the verification team and found acceptable (refer to resolution of CR5, CR9 and CR 10 in Table 2: Resolution of Corrective Action and Clarification Requests). The PP has assumed the following Days/ year: household charcoal stove user - 365 days per year, Commercial stove user – 313, school institutions - 270 days per year for boarding schools and 195 day per year for day school, non-school institutions – 313 days per year, 195 day per year for other institution that where the PP is not sure.. The verification team considers that the assumptions are conservative and therefore acceptable. |
| Fuel Savings kg/ person-meal | This parameter refers to the fuel savings. The approach used to determine this parameter was approved by GS in the second monitoring period. Table 3.3 of the monitoring report provides a summary of the fuel savings values used in the calculation of the ER value for each cluster (that is 0.068 for charcoal stoves and 0.072 for institutional stoves). The values in Table 3.3 of the monitoring report have been obtained from KPTs for 2010 and 2012 (that is Annex 01A and Annex 01B).. The verification team has reviewed the KPT for 2012 and finds the values therein acceptable. The KPT for 2010 had been reviewed in previous verifications, thus no further assessment was done. From these analysis, the verification team concludes that Table 3.3 of the monitoring report correctly represents a summary of values determined in the KPTs for 2010 and 2012 |
| EFnrb | This is the emission factor for non renewable biomass (for charcoal and for wood). Table 3.4 of the monitoring report provides a summary of EFnrb values for charcoal and wood (that is 6.017 for charcoal and 2.090 for wood). Except for the fraction of non renewable biomass (NRB fraction), the same values from the previous monitoring reports have been used and therefore no further assessment was done for these values. The verification team only assessed the NRB fraction as follows: |

| | |
|---|---|
| | The verification team has reviewed the PP's calculation of the NRB fraction (fNRB). In this monitoring period the PP has recalculated this value following the CDM methodology AMS-II.G and using the WISDOM approach. Data from FAO, 2010 Global Forests Assessment report has been used. By reviewing the document referenced by the PP (please refer to the following web address: http://cdm.unfccc.int/Panels/ssc_wg/meetings/033/ssc_033_an08.pdf), the verification team confirms that the PP has correctly applied the data, formula and default values provided, in determining the MAI. The verification team has also reviewed the FAO report from which the PP obtained data to determine the NRB, and confirms that the PP has correctly applied the data to determine the NRB (Refer to resolution of CR 3 in Table 2: Resolution of Corrective Action and Clarification Requests). The NRB fraction = 0.936 has been applied during this monitoring period; this is an increase of 0.0202 points compared to the last monitoring period. This change in NRB fraction is attributed to the approach used in calculating this parameter. The verification team has reviewed the data and calculations and finds it acceptable |
| Age Adjustment | This an adjustment factor for the performance of each cluster of stoves, in terms of fuel saving, as they age. The values are obtained from KPTs for 2010 and 2012. The KPTs have been reviewed and the verification team finds the parameter acceptable (refer to section 3.4 e above). |

The Table 3.5 below is a summary of the ER values for the different stove clusters as calculated obtained from FMR Summary sheet of Annex 07. The table is obtained from the evaluation of the formula for determining the ER value above, where values from Table 3.2, Table 3.3.and Table 3.4 have been used. The verification team has reviewed the calculation in FMR Summary sheet of Annex 07 and confirms that the values in Table 3.5 are correct.

**Table 3.5**

Emission Reductions Values

| Cluster | Stove Age | Total Annual Cooking person-meals/stove-year | Fuel Savings kg/person-meal | EF nrb tCO2e/t_fuel | Age Adjustment percentage | Emissions Reduction tCO2e/stove-year |
|---|---|---|---|---|---|---|
| | | Weighted | Mean | | | |
| Charcoal Stoves | 0-6 | 6,539 | 0.068 | 6.017 | 100% | 2.68 |
| | | | 90% CI Adjusted | | 90% CI Adjusted | |
| Institutional Wood | 0-4 | 481,991 | 0.072 | 2.090 | 100% | 72.54 |
| | 4-6 | 481,991 | 0.072 | 2.090 | 94% | 68.18 |
| | 6+ | 481,991 | 0.072 | 2.090 | 90% | 65.28 |

b) Stove usage (stove-years) – This is a simplified parameter developed by the PP that combines the number of stoves (for each cluster) that can claim emissions reduction and the number of days they are in operation taking into account the drop-off rate. The key data sets used to determine this parameter are Stove sales and Usage factor. They have been assessed and described below:

i) Stove sales - Project Database kept electronically (refer to Annex 06) by Impact carbon, was reviewed to determine how many stoves of each type (sorted by cluster) entered into use on each particular day. Protection of the database integrity from inaccuracies was demonstrable as vetting of information is assured by local intervention; Impact Carbon's Uganda Business Development Manager and accounting expert perform cross checks. Additional audits are carried out by CIRCODU (a third party); and finally review and analysis is carried out at Impact Carbon. Ugastoves Manufacturers limited and manufacturing partners have archived sales receipts and production logs that allow cross checks of sales, the sales records have been checked by a third party, CIRCODU. CIRCODU has audited sales entries spreadsheets and financial accounts to confirm that sales records were conservative, as expressed in their report "Annex 11". The records were verified during the site visit by sampling selected dates of the verification period and checking the entries in the excel sheets. The entries checked included date and location of sale, number and type of stoves and customer details, e.g. phone number and address. All the sales figures in the project data base were found to have a corresponding hard copy sales record. Hence the records are considered accurate. There has been a sharp increase in the stove sales of the charcoal cluster of Ugastoves in this monitoring period. This can be attributed to the marketing strategy employed by the PP. This increase has consequently resulted in an increase in the amount of emission reductions. Data form Stove sales constitute the main variable used to determine the number of stove years that is used to calculate emissions reduction.

ii) Usage factor – this is the opposite of drop off rate. The usage factor is determined through usage monitoring surveys. The usage monitoring surveys indicate that the usage rate of stoves declines over time (refer to Usage monitoring reports Annex 04 and Annex 05). In the usage survey performed in December 2012, the project participant is using the latest version of the GS Methodology (Technologies and Practices to Displace Decentralized Thermal Energy Consumption - 11/04/2011) to calculate a cumulative usage rate of all household stoves within the project database/sales record. This has been approved by the GS and an email communication has been provided as supporting document.

The cumulative usage rate has been determined to be 86.57% (Refer Table 3.6 of the monitoring report). Table 3.6 of the monitoring report has been obtained from Annex 04. The calculation and data used (refer to Annex 18) to determine usage factor has been assessed by the verification team and found to be correct and in line with methodology (Refer to resolution of CR 6 in Table 2: Resolution of Corrective Action and Clarification Requests). From this assessment the verification team value considers the value 86.57% acceptable for charcoal stove cluster.

A sixth year usage survey follow up for institutional wood stoves was done in October 2012 (Refer to Annex 05). Table 3.7 of the monitoring report shows a summary of the usage drop off rate for institutional wood stove cluster. The usage drop off rate for stoves of ages 0 to 5 (that is

rows 2 to 6 of the table) have been obtained from previous monitoring report which had been verified, thus no assessment was done for these values. However, the usage rate for stoves aged 5-6 has been conservatively taken as 41.2% (base on a drop off rate of 58.8%) and the usage rate for stoves aged 6-7 years has been determined as 80% (based on a 20% drop off rate) as presented in row 7 and 8 of respectively of Table 3.7 . These have been verified through a review of Annex 5 and data provided by the PP in Annex 20 (Refer to resolution of CR 5 in Table 2: Resolution of Corrective Action and Clarification Requests). From the review, the verification team considers these values acceptable.

The usage factor, as described and verified in ii above, and Stove sales (described and verified in i. above), are used to determine the number of stove usage (in stove years). The stove usage is then used in the calculation of emissions reduction.

The tables below give a summary of Stove usage for the each cluster (charcoal stove and institutional wood stove) cumulated on a quarterly basis. The tables are obtained from 1Apr12-31Dec12 Charcoal Calcs and 1Apr12-31Dec12 Institutional Wood Calcs spread sheets respectively. The calculation and parameters in the spread sheets have been verified and found to be correct (refer to resolution of CAR1, CAR2 and CR 8 in Table 2: Resolution of Corrective Action and Clarification Requests)

**Charcoal Stove Usage (stove-years)**

| Project Year | | 2012 | |
|---|---|---|---|
| Stove Usage Period | Q2 | Q3 | Q4 |
| Age 0-1 | 10,505 | 12,530 | 16,451 |
| Age 1-2 | 5,840 | 6,043 | 7,024 |
| Age 2-3 | 4,817 | 4,910 | 4,726 |
| Age 3-4 | 3,637 | 4,295 | 4,926 |
| Age 4-5 | 4,196 | 4,356 | 3,833 |
| Age 5-6 | 1,531 | 1,835 | 2,913 |
| Age 6-7 | 706 | 1,223 | 1,606 |
| **Total Stove-years** | **31,232** | **35,192** | **41,478** |

**Institutional Stove Usage (stove-years)**

| Project Year | | 2012 | |
|---|---|---|---|
| Stove Usage Period | Q2 | Q3 | Q4 |
| Age 0-1 | 12 | 20 | 15 |
| Age 1-2 | 17 | 17 | 15 |
| Age 2-3 | 3 | 3 | 10 |
| Age 3-4 | 2 | 2 | 2 |
| Age 4-5 | 4 | 4 | 4 |
| Age 5-6 | 5 | 4 | 2.7 |
| Age 6-7 | 2 | 3 | 5 |
| **Total Stove-years** | **45** | **54** | **54** |

**[Baseline emissions] and [Project emissions]**

As per the methodology Improved Cook Stoves and Kitchen Regimes version 01 and the registered PDD, the emission reductions for the Project are calculated as the baseline emissions minus the project emissions and leakage. Given the amount of data to be computed, the PP has developed a spread sheet calculator in which calculation of the baseline emissions and project emissions are integrated into gross emissions reduction and then leakage emissions are subtracted from this value to get the actual emissions reduction.

**[Leakage emissions] and [Emission reductions]**

The emissions reduction for each cluster during the monitoring period from 01/04/2012 to 31/12/2012 are calculated as product of parameter a) and b) above as shown in the tables bellow and leakage is accounted for in the final emission reduction:

**Charcoal stove Emission Reductions (tCO2e)**

| Project Year | 2012 | | |
|---|---|---|---|
| Stove Usage Period | Q2 | Q3 | Q4 |
| Age 0-1 | 28,109 | 33,527 | 44,019 |
| Age 1-2 | 15,626 | 16,170 | 18,794 |
| Age 2-3 | 12,890 | 13,137 | 12,646 |
| Age 3-4 | 9,731 | 11,493 | 13,181 |
| Age 4-5 | 11,228 | 11,655 | 10,255 |
| Age 5-6 | 4,096 | 4,910 | 7,794 |
| Age 6-7 | 1,890 | 3,273 | 4,297 |
| **Total Annual Carbon Volumes (tCO2e)** | **83,568** | **94,165** | **110,985** |

**Institutional Emission Reductions (tCO2e)**

| Project Year | 2012 | | |
|---|---|---|---|
| Stove Usage Period | Q2 | Q3 | Q4 |
| Age 0-1 | 899 | 1,436 | 1,056 |
| Age 1-2 | 1,202 | 1,233 | 1,113 |
| Age 2-3 | 231 | 221 | 746 |
| Age 3-4 | 146 | 152 | 139 |
| Age 4-5 | 263 | 295 | 287 |
| Age 5-6 | 365 | 279 | 184 |
| Age 6-7 | 100 | 213 | 339 |

| | | | |
|---|---|---|---|
| **Total Annual Carbon Volumes (tCO2e)** | **3,206** | **3,829** | **3,866** |

The approach to calculate emissions reduction achieved by the project has been used verified in previous monitoring periods and is therefore acceptable in this monitoring period. From the approach, Baseline emissions and Project emissions are incorporated in the equations for calculating emissions reduction and therefore not calculated separately. The application of data and calculations have been reviewed and found accurate. Emissions reduction has been calculated through an excel calculator by summing up emissions reduction for the two clusters and then subtracting emissions due to leakage as shown in the table below:

**Total Emission Reductions (tCO2e)**

| | Cluster: | Charcoal Stoves | | Institutional Wood Stoves | | Leakage | Total Emission Reductions |
|---|---|---|---|---|---|---|---|
| Year | Quarter | Stove Years | tCO2e | Stove Years | tCO2e | tCO2e | tCO2e |
| 2012 | Q2 | 31,232 | 83,568 | 45 | 3,206 | 1 | 86,773 |
| | Q3 | 35,192 | 94,165 | 54 | 3,829 | 2 | 97,992 |
| | Q4 | 41,478 | 110,985 | 54 | 3,866 | 2 | 114,848 |
| | **Total** | **107,903** | **288,718** | **153** | **10,901** | **5** | **299,614** |

**[Comparison of ERs]**

The estimated emission reductions from the last monitoring period are 202,362 tCO2e as per the last monitoring report. The estimated amount of emissions reduction in this monitoring period is 299,614 tCO2e. This is 48% more that the last monitoring period even though this monitoring period was shorter (covering only three quarters-Q2, Q3 and Q4 of 2012) compared to the last monitoring period that cover four quarters (Q2, Q3 and Q4 of 2011, and Q1 of 2012). The variation is due to changes in two key parameters used to calculate emissions reduction, that is, the number of stove years and the fraction of NRB.

The number of stove years is affected by Stove sales and Usage factor. An increase in the Stoves sales, as was the case in this monitoring period where stoves sales had a sharp increase (refer to Annex 06), will lead to an increase in the number of stove years. The number of stoves years will also be high if the Usage factor is high. The cumulative usage factor for this monitoring period was determined to be 0.8657 (refer to Annex 04), indicating that since the start of the project many stoves are still in operation.

The faction of NRB had a marginal increase of 0.0202 points. This has been attributed to the change in the approach used to calculate fNRB. This approach has been assessed and is deemed to be acceptable.

Corresponding to the paragraph 246 of VVS version 02.0, Bureau Veritas Certification can confirm that:

- Data used for the determination of the emission reductions are available and monitored in accordance with the monitoring plan contained in the registered PDD.
- Information and data provided in the monitoring report have been cross-checked with other sources such as data logs, inventories, purchase records, Kitchen surveys and kitchen performance tests.
- Appropriate methods and formulae for calculating baseline emissions, project emissions and leakage have been followed.
- Assumptions, emission factors and default values that were applied in the calculations have been justified.

## 3.7. Gold Standard Requirements – Sustainable Development Indicators

The Sustainable Development Indicators parameters monitored on an ongoing basis included Air Quality, Livelihood of the Poor, Employment, Access to Energy Services, Human and Institutional Capacity, Technological Self Reliance. These indicators are assessed as follows:

Air Quality and Livelihood of the Poor are monitored using Quarterly Kitchen Surveys. These indicators have a positive score as reported in the 2012 kitchen survey reports (refer to Annex 02 and Annex 03). According to the Kitchen survey, the impact of the Ugastove project on Air Quality is monitored through the proportion of population potentially exposed to indoor air pollution. The survey found that, in this monitoring period, 78% (in dry season) of the population was potentially exposed to hazardous air pollutants during cooking. The proportion is higher during rainy season. As stated in the registered PDD, improved stoves generally reduce indoor air pollution and improve air quality, the project is considered to reduce the negative impact on the population exposed. The impact on of the project on livelihood of the poor was monitored by the amount of money saved by users based on the price of charcoal and the amount of fuel savings recorded in the Kitchen Performance Tests. The score on these indictors has been verified through the document and records provided, and interviews with a few end users during site visit.

Employment is monitored through employment records and retailer records. From the records provided and reviewed, the indication is that Ugastove project continues to provide employment opportunities for the locals in its administrative, sales, production and management positions (Refer to Annex 13 and 14. In this monitoring period the number of employees has increased from a combined total of 156 employees in the last monitoring period to 176 employees. The number of retailers has also increased by more than 200 compared to the last monitoring period. This is a positive score for this indicator.

Access to Energy Services is monitored through sales record and in this monitoring period the indicator has also been monitored through kitchen survey (refer to Annex 02 and Annex 06).The sales records reviewed during site visit, show that there has been a sharp increase in Ugastove sales in this monitoring period, with 80% of the population interviewed in the Kitchen survey indicating that it is easier for them to meet their household energy needs with the Uganda Improved Stove. This is a positive score for this indicator

Human and institutional capacity is monitored through Kitchen surveys and audits carried out by CIRCODU. The indicator assesses skill levels at internal control systems, accounting systems

e.g. in Quickbooks, human resource skills and improved manufacturing systems. Training records for formal and informal trainings were available during site visit assessment (Refer to annex 3, annex 11, Annex 13 and Annex 14), confirmation of trainings was also observed through employee interviews and observation of workshop operations.

Technological self-reliance – this indicator is monitored through estimation and observation. The PP cites the new stove manufacturing companies, started by former Ugastove employees, as examples indicating technological self-reliance. The verification team conducted a tour of the factories during the site visit conducted on 28th to 29th of January 2013. From this assessment the verification team considers that this sustainable development indicator has a positive score.

# 4. VERIFICATION OPINION

Bureau Veritas Certification has performed the 5th periodic verification of Efficient Cooking with Ugastoves, Gold Standard Reference Number GS447, which is located in Plot 3848 Rwakiseta Close, Muyenga, Kampala, Uganda, and applying the methodology Improved Cook Stoves and Kitchen Regimes version 01. The verification was performed based on the requirements set for Voluntary Offset Projects under the Gold Standard, the CDM and relevant guidance provided by CMP and the CDM Executive Board.

The verification consisted of the following three phases: i) desk review of the project design, the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification report and opinion.

The management of JP Morgan Ventures is responsible for the preparation of the GHG emissions data and the reported GHG emission reductions of the project on the basis set out within the monitoring plan contained in the registered PDD. The development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of GHG emission reductions from the project, is the responsibility of the management of the project.

Bureau Veritas Certification has verified the project Monitoring Report version 02 dated 16 April 2013 for the reporting period as indicated below. Bureau Veritas Certification confirms that the project is implemented as described in the validated and registered project design documents. Installed equipment being essential for generating emission reductions run reliably and are calibrated appropriately. The monitoring system is in place and the Project is generating GHG emission reductions as a CDM project.

Bureau Veritas Certification can confirm that the GHG emission reductions are calculated without material misstatements. Our opinion relates to the projects' GHG emissions and resulting GHG emission reductions reported and related to the validated and registered project baseline, monitoring plan and its associated documents. Based on the evidence and information that are considered necessary to guarantee that GHG emission reductions are appropriately calculated, Bureau Veritas Certification confirms the following statement:

| | |
|---|---|
| Reporting period: | 01/04/2012 to 31/12/2012 |
| Baseline emissions: | incorporated in ER calculation equation |
| Project emissions: | incorporated in ER calculation equation |

Leakage emissions: 5 t $CO_2$ equivalents

Emission Reductions: 299,614t $CO_2$ equivalents

Mrs Virginie Vitiello
Internal Technical Reviewer
19/04/2013

Mr. James Chirchir
Team Leader
19/04/2013

# 5. REFERENCES

**Documents reviewed:**

| | |
|---|---|
| /1/ | Registered PDD dated 24 March 2009, ref no.GS447 |
| /2/ | Validation Report rev 4 dated 24/03/2009 |
| /3/ | 4th Assessment verification report dated 10/09/2012 |
| /4/ | Monitoring Report version 01, dated 28 January 2012 |
| /5/ | Monitoring Report version 02, dated 16 April 2013 |
| /6/ | ER Calculation Spreadsheet version 02, dated |
| /7/ | Improved Cook Stoves and Kitchen Regimes version 01 |
| /8/ | Validation and Verification Standard Version 03.0 dated 23/11/2012 |
| /9/ | CDM Monitoring & Management Manual |
| /10/ | Annexes: 01A, 01B, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12a, 12b, 12c, 12d, 12e, 13, 14, 15, 16, 17, 18, 19 and 20 |

**Persons interviewed:**

| | | |
|---|---|---|
| | JP Morgan Ventures | |
| /1/ | Joash Obare (On behalf of JP Morgan) | |
| | Impact Carbon | |
| /2/ | Caitlyn Toombs | Program Manager |
| /3/ | Kai Carter | Program Associate |
| /4/ | Louise Huttinger | Project Coordinator |
| /5/ | John Gwillin | Country Manager |
| /6/ | Micheal Ssemwogerere | Business Dev. Manager Ugastoves |
| | CIRCODU | |
| /7/ | Juliet Kyayesimira | Secretary General |
| /8/ | Alice Kwesiga | Operations Manager |
| /9/ | Fred Isabirye | Field Manager |

## 6. CURRICULA VITAE OF THE DOE'S VERIFICATION TEAM MEMBERS

| | | |
|---|---|---|
| Mr Samuel Mayieko | Bureau Veritas Certification, Kenya | Team Member, Climate Change Verifier.<br>He has a degree in Chemical engineering and has had 4 years experience in manufacturing industry before joining BV. He is an experienced management systems Lead auditor on EMS & QMS and has been trained on CDM Lead verifier course and Energy Management system course. He has conducted validation/verification of more than 5 CDM/GS projects. |

| | | |
|---|---|---|
| Mr James Chirchir | Bureau Veritas Certification, Kenya | Team Leader, Climate Change Lead Verifier,<br>He has a degree in Physics with over 7 years experience in renewable energy and climate change out of which 5 years have been in CDM. He has been trained on CDM verification, QMS and EMS auditing, as Lead auditor. He has been involved as in at least 4 CDM projects as team member. |

| | | |
|---|---|---|
| Mrs Virginie Vitiello | Bureau Veritas Certification, Congo | Technical Reviewer, Climate Change Lead Verifier.<br>MSc. in chemical engineering with more than 8 years of experience in the field of environment and climate change with related expertise in Chemical, Oil & Gas and Energy sector. She is an auditor with Bureau Veritas Certification for Environment Management System, Quality Management System and Corporate Sustainability and a lead auditor for EUETS Verification and carbon accounting. She has done consultancy and training on energy management system, carbon accounting and carbon management. She has undergone intensive training on Clean Development Mechanism and has been involved in the validation and verification processes of CDM projects in Asia, Middle-East and Africa and JI projects in France and Russia. |

| | | |
|---|---|---|
| Mr. James Mwaniki | Technical Specialist, Kenya | Team Member, Technical Review.<br>Graduate in Electrical Engineering with over 25 years of experience power generation and energy demand and distribution as well as in energy management audits. He is the technical expert & supported this Validation |

| | | |
|---|---|---|
| Gertjan Schut | Statistician, | Statistical specialist<br>A PhD graduate in Corporate Finance and strategy, he has been involved in financial reviews of several CDM projects. Graduate in Master of Science in Business Administration. He has 5 years' work experience as a senior consultant with PriceWaterhouse Coopers (PWC), corporate finance, 4 years' experience as a senior manager, Sustainability and Energy in IBM Venture Capital group EMEA/Asia Pacific |

## APPENDIX A: CDM PROJECT VERIFICATION PROTOCOL

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| | | | | | |
| ***1 Compliance of the project implementation with the registered project design document a Has the implementation and operation of the*** | | | | | |
| **It is assessed if the GS VER project activity has been implemented and operated as per the registered PDD*** | | **226** | | | |
| a Are all physical features of the proposed GS VER project activity, proposed in the registered PDD, in place? | VVS | 227 | Yes,<br>The physical features of the proposed GS VER project activity were in place as per the site visit, 28/01/13 to 29/01/13 by the verifiers. During the site visit, the verification team made a tour of the production facilities (that is the factories where stoves are produced and assembled) to assess the production process of the stoves and sales process. The verification team also reviewed records (including sales records, employment records and fuel usage records) and had an interview with the management. The team established that in each production facility, there exits a production unit, sales department/unit and administration/management department/unit.<br>CR 1<br>The date of the monitoring report provided is | CR 1 | OK |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| | | | | | |
| | | | indicated as :<br>Last date of edit: 28 January 2012<br>Is this date correct? | | |
| b Have the project participants operated the proposed GS VER project activity as per the registered PDD? | VVS | 227 | Yes.<br>From observations during site visit, review of records and interview with stakeholders, The verification team established that the project has continued to produce and sell energy efficient cook stoves. Additional production units have been added into the project producing similar stoves with comparable efficiency as the original stoves.. During site visit the verification team did not find any deviation in the implementation of the project activity, from the registered PDD. | OK | OK |
| c Was an on-site visit conducted? | VVS | 227 | Yes, a site was conducted on the 28/01/1 to 29/01/13 by the verifiers James Chirchir and Samuel Mayieko | OK | OK |
| d If not, justify the rationale of the decision. | VVS | 227 | N/A | OK | OK |
| ***2 Compliance of the monitoring plan with the monitoring methodology including applicable tool(s)*** | | | | | |
| **It Is assessed if the monitoring plan of the proposed CDM project activity is in accordance with the applied methodology including applicable tool(s)** | **VVS** | **229** | | | |
| a Is the project implementation in accordance with the provisions of the registered PDD and/or an | VVS | 230 | Yes. During site visit the verification team did not find any deviation in the implementation of the project activity, from the registered PDD. | OK | OK |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| | | | | | |
| approved revised PDD? | | | | | |
| b Are there any monitoring aspects of the project activity that are not specified in the methodology, particularly in the case of small-scale methodologies (e.g. additional monitoring parameters, monitoring frequency and calibration frequency)? | VVS | 231 | No. All relevant aspects of the project activity are monitored in accordance to registered GS-VER-PDD | OK | OK |
| ***3 Compliance of monitoring activities with the registered monitoring plan*** | | | | | |
| ***4* It is assessed if monitoring of reductions in GHG emissions to result from the proposed GS - VER project activity is implemented in accordance with the monitoring plan contained in the registered PDD or the accepted revised monitoring plan.** | **VVS** | **233** | | | |
| a Have the monitoring plan and the applied methodology been properly implemented and followed by the project participants? | VVS | 234 | Yes, The PP follows the monitoring plan in the registered PDD which applies the GS monitoring methodology Improved Cook-Stoves and Kitchen Regimes version 01. The PP has, however, adopted the Version 3 (Technologies and Practices to Displace Decentralized Thermal Energy Consumption - 11/04/2011) approach for usage monitoring across the | CR 2 | |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| | | | | | |
| | | | charcoal stove population.<br><br>CR 2<br><br>Under monitoring methodology on page 8 of the monitoring report, it is indicated that:<br>PP now applies a singular usage value across the project population for the charcoal cluster, as approved by the Gold Standard Foundation<br><br>Please provide supporting evidence/reference since the approach seems to differ from the registered PDD and previous monitoring reports | | |
| b Have all parameters stated in the monitoring plan, the applied methodology and relevant GS - VER requirements been sufficiently monitored and updated as applicable, including: | VVS | 234 | | | |
| i Project emission parameters? | VVS | 234 | The Project emission parameters have been incorporated into the emissions reductions equations for all the stoves based on the Kitchen Surveys (KS 2012), Usage Surveys (2012) and Kitchen tests (KPT 2010 and KPT 2012). Reports have been provided and reviewed | OK | OK |
| ii Baseline emission parameters? | VVS | 234 | The baseline emission parameters have been incorporated into the emissions reductions equations for all the stoves based on the Kitchen Surveys and Kitchen tests. Reports have been provided and | OK | OK |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| | | | | | |
| | | | reviewed. | | |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| | | | | | |
| iii Leakage parameters? | VVS | 234 | Qualitative assessment through quarterly Kitchen survey throughout the project period is used to monitor leakage. Leakage due to fossil fuel use production machinery such as an extruder and spraying machine has been accounted for in ER calculations. Electronic records were provided and cross checked with invoices during site visit. | OK | OK |
| iv Management and operational system: the responsibilities and authorities for monitoring and reporting are in accordance with the responsibilities and authorities stated in the monitoring plan? | VVS | 234 | The management and operational system for monitoring and reporting of the project activities has been defined in the established Organizational charts and Partner staff list provided. These have been verified during the site and interview with relevant persons. | **OK** | OK |
| c Is the accuracy of equipment used for monitoring in accordance with the relevant guidance provided by the GS Requirement and are equipment controlled and calibrated in accordance with the monitoring plan? | VVS | 234 | Calibration records for Equipment used by CIRCODU have been provided onsite. They have been reviewed and found acceptable. | OK | OK |
| i Are monitoring results consistently recorded as per approved frequency? | VVS | 234 | Yes, Kitchen Surveys have been conducted quarterly as required, Usage Survey has been done annually as required and KPT has been conducted Biennially as required. | OK | OK |
| ii Have quality assurance and quality control procedures been applied in accordance with the monitoring plan? | VVS | 234 | Yes. Quality checks have been performed periodically by CIRCODU for the project databases | OK | OK |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| | | | | | |
| ***5 Compliance with calibration frequency requirements for measuring instruments*** | | | | | |
| a Is the calibration of those measuring equipment that have an impact on the claimed emission reductions conducted by the project participants at a frequency specified in the applied monitoring methodology and/or the monitoring plan? | VVS | 237 | The project activity type does not involve direct measurement of parameters. However in performing Kitchen Performance Tests (KPT), CIRCODU has calibrated the equipment used. Calibration records for Equipment used by CIRCODU have been provided onsite. They have been reviewed and found acceptable. | OK | OK |
| b During verification of a certain monitoring period, has the calibration been delayed and has the calibration has been implemented after the monitoring period in consideration (i.e. the results of delayed calibration are available)? | VVS | 238 | No | OK | OK |
| c If yes, is the following conservative approach adopted in the calculation of emission reductions? | VVS | 238 | N/A | OK | OK |
| i Applying the maximum permissible error of the instrument to the measured values taken during the period between the scheduled date of calibration and the actual date of calibration, if the results of the delayed calibration do not show any errors in the measuring equipment, or if the error is smaller than the maximum | VVS | 238 | N/A | OK | OK |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| | | | | | |
| permissible error; or | | | | | |
| i Applying the error identified in the delayed calibration test, if the error is beyond the maximum permissible error of the measuring equipment. | | | N/A | OK | OK |
| d. Has the error has been applied: | VVS | 239 | N/A | OK | OK |
| i. In a conservative manner, such that the adjusted measured values of the delayed calibration shall result in fewer claimed emission reductions? | VVS | 239 | N/A | OK | OK |
| ii. Applying the error identified in the delayed calibration test, if the error is beyond the maximum permissible error of the measuring equipment. | VVS | 239 | N/A | OK | OK |
| e. In cases where the results of the delayed calibration are not available, or the calibration has not been conducted at the time of verification, prior to finalizing verification, were the project participants requested to conduct the required calibration have the project participants calculated the emission reductions conservatively using the approach mentioned | VVS | 240 | N/A | OK | OK |

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| in item "c" above | | | | | |
| f. Is it possible for the project participants to conduct the calibration at a frequency specified by either the applied methodology, guidance provided by the Board, and/or the registered monitoring plan? | VVS | 241 | N/A | OK | OK |
| g. If no, were the requirements for post registration changes, in section of E of the VVS, followed? | VVS | 241 | N/A | OK | OK |
| h. Does the monitoring methodology or the monitoring plan specify any requirements for calibration frequency for measuring equipment? | VVS | 242 | N/A | OK | OK |
| i. If no, are the equipment calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer's specification? | VVS | 242 | N/A | OK | OK |
| j. If neither local/national standards nor the manufacturer's specification are available, were international standards used? | VVS | 242 | N/A | OK | OK |
| ***2 Assessment of data and calculation of*** | | | | | |

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| ***greenhouse gas emission reductions*** | | | | | |
| **It is assessed if GHG emission reductions achieved by / resulting from the proposed GS - VER project activity are calculated applying the selected methodology** | VVS | 244 | | | |
| a Is a complete set of data for the specified monitoring period is available? (If no, i.e., only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, the DOE shall opt to either make the most conservative assumption theoretically possible in finalizing the verification report, or raise a request for deviation if appropriate). | VVS | 245 | Yes, Records on daily stove sales is provided as Annex 06, information on usage factor is provided in monitoring reports as Annex 04 and Annex 05, Information on age factor is provided as Annexes 01A and 01B, data to determine leakage emissions also provided in Summary ERs | OK | OK |
| b Has information provided in the monitoring report been cross-checked with other sources such as plant log books, inventories, purchase records, laboratory analysis? | VVS | 245 | Yes, the information provided in the monitoring report has been crosschecked against the factory stove production records, stove inventory books and stove sales reports and receipts. Samples were taken for various dates within the monitoring period and compared with the data in the project database and found OK. | OK | OK |
| c Have calculations of baseline emissions, proposed GS - VER project activity emissions and leakage, | VVS | 245 | CR 3<br>I wish to raise a clarification request on one parameter | CR 3, CR 4, CR 5, CR | OK, All CRs |

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| as appropriate, been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology document? | | | i.e fNRB. A detailed explanation has been provided on how the parameter (fNRB) has been determined (refer to monitoring report pg 12) for this monitoring period, however, it is not clear how it is determined that the portion of accessible area (A) is 76%. According to an example provided in pg 51 of SSC WG33 Annex 8, 100% is recommended if the accessible area is unknown. Kindly provide evidence to support the use of 76%<br>CR 4<br>In cell E16 in parameters sheet of excel book 1Apr12-31Dec12 Institutional Wood Calcs, the value reported is 41.2% how has this value been determined?<br><br>CR 5<br>ISS5 Annex 07 - "FMR Summary"; Calculations for ER for Commercial and Domestic Charcoal ER assume stoves are used on average 365 days per year (cooking frequency). Please provide justification how both groups operate the stoves on average 365 days every year<br><br>CAR 1<br>1Apr12-31Dec12 Charcoal Calcs.xls-"Usage Records" column C: Formula resulting in "569" units sold every day from 3-11-2012 onwards. Formula "=VLOOKUP((A2504-$D$3);'Project | 6, CR 7, CR 8, CR 9, CR 10, CR 11, CR 12, CR 13, CR 14, CAR 1, CAR 2, CAR 3 | and CARs have been closed refer to resolution in Table 2 Below. |

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| | | | Database'!$A$6:$F$2652;3;TRUE)". The use of TRUE parameter in the Vlookup statement which can lead to unforeseen effects as it is approximating similarities and is not exact. Further, It would be better to round the inventory days to an integer.<br><br>CAR 2<br>1Apr12-31Dec12 Charcoal Calcs.xls-"ER Calculations"; The text box containing a description of the calculation used is very confusing.<br>1. It refers to table 3.6 in Annex 07, tab labelled "FMR Summary" to trace the formulas, but table 3.6 can not be found.<br>2. The tab labelled "Person-Meal Analysis, Inst" refers to wood, not charcoal<br>3. The average meals per institutional stove-year (6,781) is false as the institutional stove years is (752,558).<br><br>CR 6<br>Stove technical and economic life has been set to 3 years in the original PDD. This has recently been supported by Adkins et al., "Field testing and survey evaluation of household biomass cookstoves in rural sub-Saharan Africa" (2010), who found an average use of ["The stove with the longest stated lifetime (according to the manufacturer's guarantee) is the Envirofit, with 5 years. The StoveTec is expected to | | |

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| | | | last 2 years, possibly more. The Ugastove and Advent stoves are expected to last between one and two years." The Worldbank states in "Household Cookstoves, Environment, Health, and Climate Change", (2011) a life span of 3 years. In summary, publicly available publications support a life span for the rocket stove between 2.5-4 years (in prisons only 1 year).<br>ISS5 Annex 04 - Usage Monitoring Report; Charcoal shows that after 4 years between 89-69% of stoves is still in use. It does not state what that use is and if it is still the primary cooking stove. Given the high intensity of use implied in the calculations (365 days a year) of the ERs it would be reasonable to expect the stove to be worn-out and not used in the same intensity between 95-60% of cooks use more than 1 stove in cooking meals). Please clarify or further demonstrate the basis for extending the life span of the cook stoves in the calculation of ERs.<br><br>CR 7<br>Within the subsumed approach used in demonstrating emission reductions in the Kitchen test please clarify in what manner the calculations incorporate the purchasing of clients of more than one improved cookstove? Publications show that most cooks use more then 1 stove when cooking. Would the procurement of two or three improved cookstoves from ugastove or a competitor, given the same meals | | |

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| | | | per day, have an impact on the total amount of emission reductions calculated per stove?<br><br>CR 8<br>1Apr12-31Dec12 Institutional Wood Calcs - Text Box states: "2. Berkeley Air's measured fuel-savings per peron meal (.072 kg/person-meal, verified in 2010, 2011 and 2012). Reference could not be found in "ISS5 Annex 01A - KPT Berkeley Air 2010 Phases 1-5". The only reference that reviewer could find which included those digits is an old study into schools: "Annex 5_3 KT07 Stats Instit Ugastoves 7-3-08". Please repair references and clarify in what documents verification in 2010/11/12 is provided.<br><br>CR 9<br>ISS5 Annex 07- Detailed Customer Database-"FMR Summary"; Number of Schooldays is set to 270. Please provide a reference to this number. Given the publicly available terms and agenda's of schools in Uganda and information from the ministery of eduction & sport suggest a substantial lower amount of school days (<~238) for primairy and secundairy schools.<br><br>CR 10<br>ISS5 Annex 07- Detailed Customer Database-"Person-Meal Analysis, Inst" Cell K8; Formula Error : "=COUNTIF(C6:C150;"Non- | | |

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| | | | School")/COUNTA(C6:C150)" does not take into account blank values in column G.<br><br>CR 11<br>ISS5 Annex 07- Detailed Customer Database-"FMR Summary"; Number of days in cell I12 is set to 335 days. Please elaborate on this number and how it has been derived?<br><br>CR 12<br>1Apr12-31Dec12 Institutional Wood Calcs; Please clarify difference in quantities between sheets "Project database" column C and "Usage Records" column C.<br><br>CR 13<br>ISS5 Annex 06 - Complete Sales Record and Project Database, sheet `Total Institutional`; Please clarify why two households have been classified as institutional.<br><br>CR 14<br>Summary ERs - sheet "Institutional Wood" Cells D-F21; Please clarify the following: Stove years are calculated on a per stove basis [n=257; "1Apr12-31Dec12 Institutional Wood Calcs" sheet "Usage Record" and "ISS5 Annex 06 - Complete Sales | | |

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| | | | Record and Project Database" sheet. The ERs are calculated on a per client/site/transaction basis (not clear) [n=143; "ISS5 Annex 07- Detailed Customer Database, sheet "Person-Meal Analysis, Inst" not on a per stove basis as the calculation description suggest. For several clients the number of meals is serviced using more then 1 stove. Please clarify<br><br>CAR 3<br>ISS5 Annex 07- Detailed Customer Databaseplay, "FMR Summary" cell F9: The Daily Individual Meals Served of 41.25 person-meals/stove-day is an arithmetic average of a highly skewed sample (Cell D8 and D9). Median and geometric mean are both around 28 person-meals/stove-day. The non-normality of domestic stoves is also present but acceptable. The commercial sample is too far outside the confidence interval for normality to be used as an estimate for the population mean. Please apply an appropriate mean warranted by the sample provided. | | |
| d Have any assumptions used in emission calculations been justified? | VVS | 245 | Yes | OK | OK |
| e Have appropriate emission factors, IPCC default values and other reference values been correctly applied? | VVS | 245 | Yes, Same values used in the previous monitoring reports | OK | OK |

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| ***3 GS Requirements*** | | | | | |
| a. Have the social and economic impact of the project been investigated biannually and an assessment made of its contribution, positive or otherwise, to sustainable development in the area as per the frequency defined in the PDD? | GS | | CR 15<br>In the monitoring report section 8 sustainable development indicators the information reported in column 4 of the following indicators: Human and Institutional Capacity and Technological Self Reliance, cannot be found in the sources indicated in column 2 of the indicators. Are the sources indicated correct? | CR 15 | OK, CR 15 is closed refer to Table 2 below |
| b. Are there any changes to the key sustainable development indicators? | GS | | Positive changes have been noted on 5 indicators | Pending CR 15 | OK, CR 15 is closed |
| c. Were mitigation/compensation measures achieved and implemented according to the success indicators as established in the monitoring plan(s)? | GS | | Pending | Pending | OK, All indicators scored positively no mitigation action was necessary |

Table 2: Resolution of Corrective Action and Clarification Requests

| **Draft report clarifications and corrective action requests by verification team** | **Ref.** | **Summary of project owner response** | **Verification team conclusion** |
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| The date of the monitoring report provided is indicated as :<br><br>Last date of edit: 28 January 2012<br><br>Is this date correct? | CR 1 | The last revision of the monitoring report was made on 29 January 2013 at 2:32 A.M. The monitoring report will be revised accordingly.<br><br>As the monitoring report has been edited in this round of responses, last date of edit is now listed as 19th March 2013. | Correction accepted CR 1 closed |
| Under monitoring methodology on page 8 of the monitoring report, it is indicated that:<br>PP now applies a singular usage value across the project population for the charcoal cluster, as approved by the Gold Standard Foundation<br><br>Please provide supporting evidence/reference since the approach seems to differ from the registered PDD and previous monitoring reports | CR 2 | The PP submits as evidence, an email from the Gold Standard Foundation confirming the allowance to apply the usage survey monitoring approach described in the monitoring report. | The email communication has been reviewed and confirms that the PP is allowed to use the new approach. CR 2 is closed. |
| I wish to raise a clarification request on one parameter i.e fNRB. A detailed explanation has been provided on how the parameter (fNRB) has been determined (refer to monitoring report pg 12) for this monitoring period, however, it is not clear how it is determined that the portion of accessible area (A) is 76%. According to an example provided in pg 51 of SSC WG33 Annex 8, 100% is recommended if the accessible area is unknown. Kindly provide evidence to support the use of 76% | CR 3 | Regarding your question related to fNRB, I've attached the source used to calculate the accessible area percentage of 76%, the 2010 FAO Forest Resource Assessment for Uganda. The relevant figures are listed in the table below as well as highlighted on pgs. 9 and 16 of the attached document. Please let me know if you need additional information.<br><br>Area (1000 hectares) / Source<br>Forest area: **2,988** — Uganda Forest Resources Assessment, 2010; pg. 9<br>Forest area within protected areas: **731** — Uganda Forest Resources Assessment, 2010; pg. 16 | Response has been reviewed and is acceptable. CR1 is closed |

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| | | % Forest area within protected areas: **24%**<br>% Accessible area (total forest area less protected area): **76%** | |
| In cell E16 in parameters sheet of excel book *1Apr12-31Dec12 Institutional Wood Calcs,* the value reported is 41.2% how has this value been determined? | CR 4 | The value reported in cell E16, cumulative usage rate for stove age 5-6, is calculated by subtracting the usage drop-off rate for that stove age (58.8%) from 100% (100 – 58.8 = 41.2). This is the same approach used for the cumulative usage rate for all stove ages reported in this excel book.<br><br>Verification team response<br>The usage drop-off rate for the stove age is given as 59.8% and not 58.8% refer to Annex 05, Usage Monitoring Report, Institutional Wood<br><br>The figure listed in the usage report in Annex 05 is a typo; it is clear from the submitted data sheet that the usage rate actually results in a 58.8% dropoff rate for age 5-6 institutional stoves. This has been updated in the usage report in Annex 05, resubmitted as "CR5 – ISS5 Annex 05 – Usage Monitoring Report; Institutional Wood_v2". The figures in the repor t match those of the data sheet now. | Response has been reviewed and is acceptable. CR4 is closed |
| **ISS5 Annex 07 - "FMR Summary"**; Calculations for ER for Commercial and Domestic Charcoal ER assume stoves are used on average 365 days per year (cooking frequency). Please provide justification how both groups operate the stoves on average 365 days every year | CR 5 | The project assumes that domestic users cook every day of the year to provide meals for their HH members. In addition, the KS confirms that after purchasing the project stove 90% of HHs used it as their primary stove. The representative KPT uses a subsumed approach, instructing households to cook as they normally would, accounting for infrequent usage. | Response has been reviewed and is acceptable. CR5 is closed |

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| | | As a conservative approach, the average number of days of stove use for commercial uses has been changed to 335 days. This assumes that commercial vendors are not open for business for 30 days out of the year: 365-30 = 335.<br><br>Verification team response<br><br>The subsumed approach is acceptable to provide a solution for several statistical difficulties, including using 365 days used per year. In order to be acceptable the PP needs to make clear or demonstrate that the Kitchen Surveys is representative for all days of the week/year. Practically this would require clarification of the even representation of all days of the week (including Saturday & Sunday). This could not be found in the provided documentation by the reviewer. Please provide reference to where this information can be found or clarify what normalisation method has been used for weekdays as part of the subsumed approach. (Note: closing CR 5 also closes CR 11 below and vice versa)<br><br>PP's Response<br><br>The KS questions that are asked are directed to be representative of the whole week. The survey asks the respondent how many people they cook for on average and how many meals per day they cook on average. Questions are responses are specifically directed toward a specific time of week over another. PP can update the KS questions in next monitoring period to evaluate if there are any significant differences in cooking throughtout the week. | |

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| | | PP's response<br><br>However, it is important to note that KT monitoring is intentionally not conducted on weekends as it is often the case that there are special events/festivities or increases in persons eating at home that increase cooking patterns. The workweek is therefore the best time of week to conduct fuel savings monitoring that is applied to a whole project period, which is how Berkeley Air Monitoring Group and CIRCODU designed the KT in 2010 (as well as Aging KTs). Therefore, any increases in cooking on weekends are not captured in the KT, meaning that these results already lean toward conservative. It is likely that KS would also show answers that demonstrate increases in cooking.<br><br>As is mentioned in CR 11, an adjustment has been made to business-households that now assumes that these users only cook 6 days per week (313 days per year). This is conservative because many households use their stoves for their home (meaning daily) as well as their commercial purposes.<br><br>Updated ER figures and calculations are included in the files along with updated MR. | |
| **1Apr12-31Dec12 Charcoal Calcs.xls-"Usage Records"** column C: Formula resulting in "569" units sold every day from 3-11-2012 onwards. Formula "=VLOOKUP((A2504-$D$3);'Project Database'!$A$6:$F$2652;3;TRUE)". The use of TRUE parameter in the Vlookup statement which can lead to unforeseen effects as it is approximating similarities and is not exact. Further, | CAR 1 | There was a calculation error in the formula referenced, which is now repaired. The results have been reviewed and are deemed accurate.<br><br>There is no need to round the integer referenced because it is used to shift calendar dates and day values are automatically rounded in the calculation. | Values in the spread sheet with the correction made has been randomly sampled and found to be correct. The team concludes that the correction is acceptable. CAR 1 is closed. |

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| It would be better to round the inventory days to an integer. | | | |
| **1Apr12-31Dec12 Charcoal Calcs.xls-"ER Calculations"**; The text box containing a description of the calculation used is very confusing.<br><br>1. It refers to table 3.6 in Annex 07, tab labelled "FMR Summary" to trace the formulas, but table 3.6 can not be found.<br><br>2. The tab labelled "Person-Meal Analysis, Inst" refers to wood, not charcoal<br><br>3. The average meals per institutional stove-year (6,781) is false as the institutional stove years is (752,558). | CAR 2 | 1. The text box should refer to Table 3.5 in Annex 07.<br><br>2. The reference has been changed to "Person-Meal Analysis, Charcoal"<br><br>3. This sentence has been revised to state that the average meals per charcoal stove year is 6,539. Average meals per institutional stove year is listed as 481,991. | The correction has been reviewed and is acceptable. CAR 2 is closed. |
| **Stove technical and economic life** has been set to 3 years in the original PDD. This has recently been supported by Adkins et al., "Field testing and survey evaluation of household biomass cookstoves in rural sub-Saharan Africa" (2010), who found an average use of ["The stove with the longest stated lifetime (according to the manufacturer's guarantee) is the Envirofit, with 5 years. The StoveTec is expected to last 2 years, possibly more. The Ugastove and Advent stoves are expected to last between one and two years." The Worldbank states in "Household Cookstoves, Environment, Health, and Climate Change", (2011) a life span of 3 years. In summary, publicly | CR 6 | The 3 year lifespan stated in the original PDD was a conservative estimate based on manufacturer expectations. The project conducts biennial aging kitchen performance tests (KPTs) and annual usage surveys to assess the actual field performance of the stoves as well as frequency of use.<br><br>Cumulative weighted results from all project usage surveys show that on average across all stove ages 89% of respondents used the project stove as their primary stove and cooked an average of 2.7 meals per day (see updated Annex 18, HH Charcoal Stoves: CR7 Analysis, "HH Usage Analysis" tab). Stoves that are still in use beyond the expected lifespan may be due to high stove quality and durability, as well as user care.<br><br>In addition, every end user is offered a warranty to repair or | The clarification response has been reviewed and the team considers it acceptable after a further interview with PP to get clarification regarding stove age calculations and method of survey. CR 6 is closed. |

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| available publications support a life span for the rocket stove between 2.5-4 years (in prisons only 1 year).<br>ISS5 Annex 04 - Usage Monitoring Report; Charcoal shows that after 4 years between 89-69% of stoves is still in use. It does not state what that use is and if it is still the primary cooking stove. Given the high intensity of use implied in the calculations (365 days a year) of the ERs it would be reasonable to expect the stove to be worn-out and not used in the same intensity between 95-60% of cooks use more than 1 stove in cooking meals). Please clarify or further demonstrate the basis for extending the life span of the cook stoves in the calculation of ERs. | | replace worn-out stoves. When repairs or replacements are carried out on a stove the stove remains in the project database categorized within its original date of sale; the replacement is not counted as a new entry.<br><br>Verification team response:<br><br>1. Error in PP Response: Response from PP states that "... 89% of respondents used the project stove as their primary stove....". This is not supported by evidence provided. Only 75.05% of respondents used an improved cooking stove as their primary stove (as calculated in Annex 18v2). Please use 75.05% as the cumulative weighted results.<br><br>2. Unclear Classification: 89% of respondents answered yes to the question; "Do you still use your improved cooking stove?, which is the basis of calculation for age and other parameters. A positive answer to this question does not always seem to relate to the parameters of the stove in question, or even an Ugastove, as can be deduced from several comments provided by the interviewee (example: Answer on Q9: YES Comment: "The liner broke and she is now using a new improved stove but not Ugastove." [UGA Survey 306]). Additionally the connection to the stove is unclear in several surveys that show 2 stoves purchased of which one has been disgarded/broken/etc.<br><br>3. Quality: The provided surveys provide no support for the argument of high quality or user care, as a high proportion of respondent is dealing with broken stoves in one way or the other. Warranty conditions of Ugastoves are less then some other | |

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| | | improved cookstoves studied in mentioned publications.<br><br>4. Meals per day (Immaterial): Survey comments state in several places that the stove is used minimally, resulting in a use of 1 per day (7 days a week; 52 meals per year), which is not in line with answers from interviewees.<br><br>5. Correcting for missing sales dates: For several entrees the sales date of the stove is not known exactly. The solution used by PP is to choose the first date of the period known (1st day of the month or first day of the year). Please use the middle of the month (15th) for missing day and 1st of July when only a year is known.<br><br>6. Small error: Annex 18v2 CR7 summary show "Age 7-8" and is missing "Age 6-7"<br><br>PP's Response<br><br>1. The proper survey to determine primary stove usage should actually be the Kitchen Survey rather than the usage survey; however, this is immaterial as both surveys provide very similar results to one another: in the KS among recent customers (reference: Detailed Customer Database), 87.74% of respondents say that the project stove is their primary stove. Usage survey data across all ages (reference: Usage Survey data sheet) demonstrates that among those who are still using the stove, 86.14% use it as their primary stove.<br><br>As the KPT already takes a subsumed approach that accounts for fuel and stove mixing and variations of usage based on actual cooking patterns in the homes, fuel savings values are | |

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| | | representative of the project population. No further adjustment is necessary regarding primary vs. secondary stove usage.<br><br>2. It is accurate that question 11 is used for purposes of calculation. A positive answer means that the person answers "yes" to using the stove. In the case of the aforementioned UGA Survey 306, that person actually answered "no" to question 11, and therefore was considered to be a non-user. The users' comments are therefore in line with the results that the user reported and were used in the calculations, given that they are not using the Ugastove. There is no change in the data on that survey.<br><br>PP has, however, re-checked the comments in relation to the answered provided to question 11 and found 4 discrepancies, 3 those who answered yes and then were clearly not actually using per the comments section, and one who was marked as "no" when the rest of the data and the comments indicated that they were actually using the stove and it was fine. This has been updated. These changes modified the total usage rate to 86.57%<br><br>It is important to note that if a person is still using a stove that may be in need of some repair, that person is still counted as a yes as that reflects the condition in the field. The performance of the aging stove is then monitored via the KPT, which measures the performance of stoves as they age. For example, top rings may need repair after many years; however, many people can still cook just fine without a top ring or with a damaged one when the stove is a few years old. There are similar anecdotes of cooking with minor cracks in the liner. The KPT shows that these things do not affect stove performance or fuel savings, though stove degradation does affect usage (for example, people who have a stove they | |

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| | | deem to be damaged will stop using and therefore answer “no” to the question and become “non-users”, counting that stove as having dropped off).<br><br>The fact that the some stoves are lasting more than 6 years and that performance of those stoves still in use remains unchanged is indicative of higher than anticipated quality and durability; however, PP has not undertaken research to determine what habits affect longer stove life in the home so assumptions of user care, etc. are only postulation.<br><br>3. Based on the results of this usage survey, 67% of respondents were aware that the manufacturer will repair the stove, yet only 7% report bringing the stove to the manufacturer for repair. This is useful information to the PP as the project evaluates how to improve after-sales service.<br><br>4. Variations in usage are already captured in the KPT, and average person-meals are monitored via the KS. Usage survey respondents report an average of cooking 2.67 meals per day, which corroborates with KS data.<br><br>5. See below; the change has been made but this has no impact on calculations.<br><br>6. On all data forms Age 6-7 is the maximum age referenced; please provide specific tabs/cells where references to Age 7-8 are seen. PP cannot find any reference to Age 7-8?<br><br>Further verification team comments :<br><br>CAR: Given the stated difficulties with the surveys it is the | |

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| | | reviewers opinion that insufficient hard and reliable evidence has been provided to support an extension of the life span of the stoves in the degree used by PP.<br><br>Relevant corrections can include<br><br>Step 1: Rectify item 5 in the age calculations<br><br>Step 2: Use of Primary used stoves only (Q14 instead of Q9 [HH Usage Data] in constructing tabel "HH Charcoal Stoves: Usage Data Analysis - Aggregated" and Cumulative Usage Rate [HH Usage Analysis] in Annex 18v2.xls or use Existing Usage Rates from Last MR or use 3 years, would be more appropriate<br><br>Step 3: Validation/Recalculation of dependent formula's.<br><br>PP's Response:<br><br>Response to step1: PP has made this update (cells manually changed to fit requested date modifications; modified cells highlighted in orange of v3 of the usage survey data), but it is important to note that this does not have any impact on the calculations whatsoever: given the sales calendar, it is only the year that is used to determine age for the purposes of the calculations (for example, any stove sold between 1st January – 31st December 2006 is clustered in Age 6-7; it does not matter at what point in the year it was sold for the purposes of these usage calculations since the cumulative weighted analysis only looks at age by year. | |

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| | | This is different from the sales record, where actual date of sale is used for ER calculations – in the case that a sale is entered where only the month and year is known, PP conservatively assumes the stove was sold on the last day of the month.<br><br>Response to step2: It is important to note that primary stove usage rate is different from the cumulative usage rate used in emission reduction calculations. The cumulative usage rate refers to stoves that are still in use by the customer, whereas primary stove usage rate refers to the following question: of the stoves that are still in use, what percent of customers use that stove as their primary stove?<br><br>In the case of this project, the numbers are in fact similar to one another (updated cumulative usage rate of 86.57% compared to primary stove usage of 87.74% from the KS and 86.14% from the usage survey), but it is only the cumulative usage rate is used in emission reduction calculations.<br><br>The reason why the cumulative usage rate is used in emission reduction calculations is because the KPTs (new and aging) use a subsumed approach to account for variation in stove usage frequency, mixing of fuels, and mixing of stove types. Therefore, variation of usage is already subsumed in the fuel savings figures. No adjustment for primary versus secondary stove usage is needed, as this has already been accounted for. This is in line with KPT methodology.<br><br>Response to step3: Per the above, recalculation was done with the new slightly modified usage rate. This information has also been | |

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| | | changed in the MR and calculators attached. | |
| Within the subsumed approach used in demonstrating emission reductions in the Kitchen test please clarify in what manner the calculations incorporate the purchasing of clients of more than one improved cookstove? Publications show that most cooks use more then 1 stove when cooking. Would the procurement of two or three improved cookstoves from ugastove or a competitor, given the same meals per day, have an impact on the total amount of emission reductions calculated per stove? | CR 7 | The representative kitchen tests include households that own more than one improved cookstove. Thus, data collected through these tests and used to calculate emission reductions account for these types of households. | The team has reviewed the response and analysis in the spread sheet ISS5 Annex 18 and considers the clarification adequate. CR 7 is closed. |
| **1Apr12-31Dec12 Institutional Wood Calcs - Text Box** states: "2. Berkeley Air's measured fuel-savings per peron meal (.072 kg/person-meal, verified in 2010, 2011 and 2012). Reference could not be found in "ISS5 Annex 01A - KPT Berkeley Air 2010 Phases 1-5". The only reference that reviewer could find which included those digits is an old study into schools: "Annex 5_3 KT07 Stats Instit Ugastoves 7-3-08". Please repair references and clarify in what documents verification in 2010/11/12 is provided. | CR 8 | The actual reference that should have been provided is the registered PDD (version 090324), which has now been provided. Please see Table E5 on pg. 35. The reference in the text box has also been repaired. | The team has assessed the response and the reference provided and finds the response adequate. CR 8 is closed. |

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| **ISS5 Annex 07- Detailed Customer Database- "FMR Summary"**; Number of Schooldays is set to 270. Please provide a reference to this number. Given the publicly available terms and agenda's of schools in Uganda and information from the ministry of eduction & sport suggest a substantial lower amount of school days (<~238) for primairy and secundairy schools. | CR 9 | The PP has grouped the schools that have purchased institutional wood stoves into the following attendance categories (see "Attendance Type" column in the "Person-meal Analysis, Inst, v2" tab of Annex 07):<br><br>1. Day schools (no boarding students)<br><br>2. Mixed schools (served both day and boarding students and therefore conservatively assumed to be 195)<br><br>3. Boarding school (serves only boarding students)<br><br>4. Unsure (day/boarding status of study body in unknown and therefore assumed to conservatively by 195)<br><br>The Uganda government school schedule includes 195 school days, so this value is applied to "day schools". The value of 195 is also conservatively applied to "mixed schools" since the proportion of day to boarding students is unknown for these types of institutions as well as schools in the "unsure" category. A value of 270 days has been applied to those institutions in the "boarding schools" categories to account for the non-school days that boarding students are served. Changes are highlighted in Table 3.2 of the "FMR Summary v2" tab in Annex 07.<br><br>The weighted average person meals per stove year now accounts for this variation in days per year by type of school institution. | Response has been reviewed together with the correction in the spread sheet and is acceptable. CR9 is closed |
| **ISS5 Annex 07- Detailed Customer Database- "Person-Meal Analysis, Inst"** Cell K8; Formula Error : "=COUNTIF(C6:C150;"Non-School")/COUNTA(C6:C150)" does not take into | CR 10 | The PP has followed up with institutions with blank values in column G to obtain the missing data and has changed Annex 07 accordingly. | The correction has been reviewed and is acceptable. CR 10 is closed |

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| account blank values in column G. | | | |
| **ISS5 Annex 07- Detailed Customer Database- "FMR Summary";** Number of days in cell I12 is set to 335 days. Please elaborate on this number and how it has been derived? | CR 11 | This number is based on the conservative assumption that non-school institutions do not serve meals 30 days out of the year (due to holidays, etc.): 365 – 30 = 335. Non-school institutions include the military, restaurants, and households. This figure of 335 days is conservative, as many of these institutions actually use their stove every day.<br><br>Verification team response:<br><br>The claimed conservative nature of the assumption is unclear, as PP states, not all institutions use their stove each day in the same intensity (especially in the weekends). When PP can confirm that all institutions operate on weekends, this point can be closed.<br><br>PP's Response:<br><br>PP does not assume that all institutions cook on the weekend, given the days adjustment that schools receive (see response to CR 10 regarding schools of various type). PP does know that the military cooks for its soldiers every day, who live in the barracks or out in site. PP also knows that households using institutional wood stoves daily, similar to the charcoal stove users. Conversely, however, PP does not have clear survey data on total restaurant cooking days. Therefore PP has added an additional adjustment to assume that restaurants, now only are in operation 6 days per week (the standard workweek in Uganda), bringing the total to 313 days (365-52 weekend days).<br><br>This value is also applied to households and the military (which as | The response has been reviewed and is acceptable. CR 11 is closed |

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| | | mentioned above cook every day), meaning that this is the new single conservative value for all non-school institutions, including the military and homes which cook 7 days per week. This figure is conservative because it applies this figure to all non-school institutions. Moreover, PP has anecdotal evidence that restaurants actually are often open 7 days per week and on holidays, and in fact similar to other areas see an increase in patronage on weekends due to customers having more time to dine out (however, as described in CR 6, KPTs are deliberately not done on weekends so as not to inflate the figures due to increased cooking from special events, visitors or more customers so these figures are not captured in KPT data either).<br><br>This 313-day value is also applied to all commercial charcoal stoves for the same reason. This is conservative for charcoal stoves as these stoves are actually "business-household" stoves (as referenced in the KPT report), which means that most people not only use the stove for their businesses but are also using it for their homes.<br><br>Updated ER figures and calculations are included in the files along with updated MR. | |
| **1Apr12-31Dec12 Institutional Wood Calcs;** Please clarify difference in quantities between sheets "Project database" column C and "Usage Records" column C. | CR 12 | The quantities should be identical. A pasting error was made and has been revised in the "usage records" sheet. | The correction has been reviewed and is acceptable.<br>CR 12 is closed |
| **ISS5 Annex 06 - Complete Sales Record and Project Database**, sheet `Total Institutional`; Please clarify why two households have been | CR 13 | These households purchased institutional stoves. The person meals per day for these households have been included in the institutional mean calculations, and so the lower values are | The team has reviewed the response and finds it acceptable since it will not |

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| classified as institutional. | | represented. | lead to over estimation of ERs. CR 13 is closed |
| **Summary ERs - sheet "Institutional Wood" Cells D-F21**; Please clarify the following: Stove years are calculated on a **per stove** basis [n=257; "1Apr12-31Dec12 Institutional Wood Calcs" sheet "Usage Record" and "ISS5 Annex 06 - Complete Sales Record and Project Database" sheet. The ERs are calculated on a **per client/site/transaction** basis (not clear) [n=143; "ISS5 Annex 07- Detailed Customer Database, sheet "Person-Meal Analysis, Inst" **not on a per stove** basis as the calculation description suggest. For several clients the number of meals is serviced using more then 1 stove. Please clarify | CR 14 | ERs are calculated on a per stove basis.<br><br>The PP has revised the customer database to clearly show how person-meals are calculated (see "Person-Meal Analysis, Inst v2" tab, columns S and T): "Build capacity" of the intuitional stoves installed (total number of people cooked for, column R) is divided by the number of stoves installed to yield the value for "people cooked for per stove" (column S) which is used to calculated person-meals per day (column T) and used in ER calculations. | The team has reviewed the response and finds it adequate. CR 14 is closed |
| **ISS5 Annex 07- Detailed Customer Databaseplay, "FMR Summary"** cell F9: The Daily Individual Meals Served of 41.25 person-meals/stove-day is an arithmetic average of a highly skewed sample (Cell D8 and D9). Median and geometric mean are both around 28 person-meals/stove-day. The non-normality of domestic stoves is also present but acceptable. The commercial sample is too far outside the confidence interval for normality to be used as an estimate for the population mean. Please apply an appropriate mean warranted by the sample provided. | CAR 3 | The PP has run an analysis of the data points for this parameter (data for both the dry and rainy seasons were analyzed together) and found that outliers contribute to the skewing of the sample. Potential outliers can be identified as those points which are either greater than 3 times the inter-quartile range (IQR) from the third quartile, or less than 3 times the IQR from the first quartile. The dataset in question includes two data points that are three times greater than the IQR from the third quartile and three data points that are three times smaller than the IQR from the first quartile. These extreme outliers were removed from the dataset (see revised analysis in "Person-Meal Analysis, Charc v2 tab at bottom of worksheet) and a new mean estimate of 38.49 was calculated. | The correction has been reviewed and is acceptable. CAR 3 is closed |

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| **In the monitoring report section 8 sustainable development indicators the information reported in column 4 of the following indicators: Human and Institutional Capacity and Technological Self Reliance, cannot be found in the sources indicated in column 2 of the indicators. Are the sources indicated correct?** | CR 15 | The sources listed in the Monitoring Report are correct; the only exception was the reference to Annex 02, as Annex 03 is the only KS report that reports on this indicator.<br><br>Section 3.4 of Annex 03, lists the number of employees: "Locally, the project continues to provide employment for significant numbers of artisans, office staff and field marketers – particularly as production relationships develop and new manufacturing locations are established. The Makindye factory currently has 80 employees—56 artisans and 24 management and administration staff. Other manufacturing locations employ 51 artisans and 29 management and administration staff."<br>The CIRCODU Sales Audit Report Summary shows how the factories improve in their recordkeeping abilities over time as they receive more training. All factories were noted as demonstrating general improvement, with minor recommendations for additional improvements going forward: "There is generally an improvement in the corresponding areas of factory operations such as inventory, materials, labor and production"<br>Additionally, the manufacturer production records, which were checked on site, show when artisans are trained as students, which is describes in the MR. The DOE checked this on site.<br>Lastly, Annex 13 and 14, also included in this response and were submitted originally, also shows the staff lists and organizational charts at all of the factories. These were not referenced in the MR previously, although this has been updated now.<br>Annex 02 did not reference this indicator and so the MR has been updated to delete this reference, as it is only in Annex 03 for the KS reports.<br><br>Verification team response<br><br>According to the registered PDD section D.2.1.2, the parameter Technological self-reliance is monitory through survey. In the | The response has been reviewed and is acceptable. CR 15 is closed |

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| | | monitoring report pg 28, Annex 03 is indicated as the monitoring source (refer to the second column), however, a review of Annex 03 has no mention or indication that the parameter has been monitored in this monitoring period.<br><br>PP's Response:<br><br>The PDD states that Technological Self Reliance shall be monitored through "Estimated though observation and record of Ugastove and spinoff technical innovations and developments." The concept also refers to employment opportunities in manufacturing, distributing, retailing, and maintaining the stoves, as well as in relation to business development and management, and in relation to technological skill. Moreover, the PDD states that the introduction of locally manufactured technology with optimized energy efficiency helps to build technological self-reliance.<br><br>Annex 03, which has been used at the format to report on technological self-reliance for the past few monitoring periods, provides commentary on Technical Self Reliance on pages 6 & 7 via employment figures in the company: "Locally, the project continues to provide employment for significant numbers of artisans, office staff and field marketers – particularly as production relationships develop and new manufacturing locations are established. The Makindye factory currently has 80 employees—56 artisans and 24 management and administration staff. Other manufacturing locations employ 51 artisans and 29 management and administration staff."<br><br>Specifically, stove manufacturers continue to grow each year, adding positions for both stove artisans and | |

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| | | management/administration positions. All employees receive trainings in their positions (i.e. stove manufacturing, software use, accounting, etc.) and gain self-reliance in their respective trades.<br><br>For simplicity, these employment numbers are further detailed in the aforementioned Annexes 13 and 14 rather than adding to an already long KS report. CIRCODU's sales audit report (Annex 11) comments on the progress that has been made by trained employees in maintaining and improving quality at the factories.<br><br>Key examples of the successes of building this technological self-reliance can be seen in the new stove manufacturing companies, all of whom were launched by former Ugastove employees who received training and then ultimately went to start their own factories. This project works with 4 of these factories, but there are many other spin offs with whom the project has not established a partnership to-date but may in the future.<br><br>Additionally, the Monitoring Report provides further information on the number of distribution partners and retailers whose employment is supported by this project (p. 6, reference to 880 retailers). This list was also originally provided as Annex 10.<br><br>All of these Annexes have been resubmitted in the folder. | |