



IMPROVED COOKSTOVES FOR BURUNDI RESTAURANTS



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Summary:

4K Earth Science Private Limited (4KES) has been contracted by, “AERA Group” to undertake verification and certification for the greenhouse gas (GHG) emission reductions reported from ‘Improved cookstoves for Burundi restaurants’ for the monitoring period 03/02/2020 - 31/12/2021 in the initial monitoring report version 1.1, date 10/03/2022.

OBEN E.A.C (SA) developed an improved cookstoves project for restaurants¹ of Burundi. The proposed VCS project activity aims at:

1. Distributing institutional improved cookstoves (ICS) in restaurants of Burundi to replace currently used traditional open fire three-stone system (and traditional stoves); and
2. Switching from non-renewable wood fuel to a sustainable energy supply: briquettes made of renewable biomass waste. Compared to the currently used three-stone fires or traditional stoves, the advanced technology of ICS allows quicker heating-up, longer cooking and heat retaining with less wood-fuel as well as lower combustion fumes. It results in saving wood-fuel and associated expenses.

Along with the diffusion of such a stove to replace currently inefficient cooking systems, a renewable biomass supply-chain was set up, by sourcing unutilized biomass residues to produce renewable biomass briquettes and market it to the participating restaurants in replacement of their non-renewable wood fuel. OBEN ensure a competitive and attractive price for using briquettes together with improved cook stoves to give incentives to the restaurants to switch 100% from the previous costly non-renewable wood fuel to the innovative briquettes made of renewable biomass wastes.² OBEN ensure through a sale agreement and robust supply strategy that no shortage of briquettes appear as discussed during the interviews.

From 03/02/2020 to 15/05/2020, 5,224 ICS have been installed in 801 restaurants as checked from the distribution database /2.2/. The ICS have been distributed in restaurants located in the province of Bujumbura, Mukaza, Muha and Ntakangwa as checked from the distribution database /2.2/ and during the interviews. 3 types of ICS have been installed as specified in the project description which is further confirmed during the interviews and from the distribution database /2.2/. The stoves are installed by OBEN’s team, and products acquisition agreements /17/ are

¹ One restaurant should be understood as any commercial entities preparing meals. Bars and Hostels are covered under the proposed project and assimilated as restaurants.

² Thanks to ICS cook stoves, OBEN expect to replace 1 stère of wood by in average 20 kg of briquettes (based on experiences done in police camp (an average of 22 kg of briquettes per stère) and schools (an average of 18 kg of briquettes per stère) depending on Lower Heating Value of raw material used for the briquettes (indicative information is 3,300 kcal/kg briquettes for briquettes made of sugar mill wastes against 4,800 kcal/kg briquettes for briquettes made of pine needles). The report of test has been provided to DOE. Actually, one stère of wood is ~~that~~ about 15,000 FBU and one bag of charcoal of 23 kg at 30,000 FBU whereas OBEN E.A.C SA plans to sell 1 kg of briquettes at 378 FBU (indicative price); satisfying the same thermal energy need, will thus cost from two to ten times less than in baseline situation according to one-site visit interviews.

signed by the end-users to confirm the installation of the cookstoves. As per the agreements /17/, the cookstoves will be repaired or retrofitted if any problem occurs to the ICS during their lifetime.

During this monitoring period, 20,093 tonnes of renewable biomass (briquettes) have been delivered to the restaurants, leading to emissions reduction of 575, 239 tCO₂e. The monitoring period subject to this monitoring report is inclusive of first and last day of period.

A risk based approach has been followed to perform the 1st periodic verification of the project activity. In the course of the verification, 03 Corrective Action Requests (CARs) and 01 Clarification (CL) were raised.

The management of the 'OBEN EAC (S.A.)' responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project final monitoring report Version 1.5 dated 19/09/2022. The calculation and determination of GHG emission reductions from the project is the responsibility of the management of the AERA Group. The development and maintenance of records and reporting procedures are in accordance with the Monitoring Report Version 1.5 dated 19/09/2022.

It is our responsibility to express an independent GHG verification opinion on the GHG emissions and on the calculation of GHG emission reductions from the project for the period 03/02/2020 - 31/12/2021 based on the reported emission reductions in the final monitoring report Version 1.5 dated 19/09/2022 for the same period.

Based on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these, 4KES planned and performed our work to obtain the information and explanations that we considered necessary to provide sufficient evidence for us to give reasonable assurance that this reported amount of GHG emission reductions for the period is fairly stated.

4KES confirms the following;

Reporting period: 03/02/2020 to 31/12/2021

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
03 February 2020- 31 December 2020	275,370	563	-	274,807
01 January 2021 - 31 December 2021	301,124	691	-	300,432

Total	576,494	1254	-	575,239
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1 INTRODUCTION

1.1 Objective

4KES has been commissioned by 'AERA Group' to perform verification of its registered VCS project 'Improved cookstoves for Burundi restaurants', for the reported GHG emission reductions for the given monitoring period 03/02/2020 - 31/12/2021 (both dates included). The VCS projects must undergo an independent third party verification and certification of emission reductions as the basis for issuance of Voluntary Emission Reductions (VERs).

The objectives of this verification exercise are, by review of objective evidence, to establish that:

- The project activity has been implemented and operated as per the project description (PD) and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place;
- Monitoring report and other supporting documents are complete;
- The data is recorded and stored as per the monitoring methodology and approved monitoring plan.
- To confirm that the monitoring system is implemented and fully functional to generate Voluntary Emission Reductions (VERs/VCUs) without any double counting, and
- To establish that the data reported are accurate, complete, consistent, transparent and free of material error or omission by checking the monitoring records and the emissions reduction calculation.

1.2 Scope and Criteria

The scope of verification is to assess the claims and assumptions made in the VCS monitoring report (MR) against the VCS criteria, including but not limited to, VCS standard, applied methodology and other relevant rules and requirements established for VCS project activities.

The Verification is not meant to provide any consulting towards the project participants. However, stated requests for clarification and/or correction actions request may have provided inputs for improvement of the project design.

1.3 Level of Assurance

The verification team verified the monitoring data /17/, /18/, /21/, /22/, /30/, /31/ and /32/ for the monitoring parameters of the monitoring plan against the Monitoring report /1.2/ and ER Calculation sheet /2.2/ and confirms that the reported emission reductions are free from any type of material errors. Interviews were also conducted to verify the implementation and monitoring plan of the project activity. The implementation of the project activity was verified during the physical interviews and from the document review and found in accordance with the monitoring report /1.2/ and registered VCS PD /05/. Therefore, 4KES confirms that the verification is conducted with reasonable level of assurance.

1.4 Summary Description of the Project

OBEN E.A.C (SA) developed an improved cookstoves project for restaurants³ of Burundi. The proposed VCS project activity aims at:

1. Distributing institutional improved cookstoves (ICS) in restaurants of Burundi to replace currently used traditional open fire three-stone system (and traditional stoves); and
2. Switching from non-renewable wood fuel to a sustainable energy supply: briquettes made of renewable biomass waste. Compared to the currently used three-stone fires or traditional stoves, the advanced technology of ICS allows quicker heating-up, longer cooking and heat retaining with less wood-fuel as well as lower combustion fumes. It results in saving wood-fuel and associated expenses.

Along with the diffusion of such a stove to replace currently inefficient cooking systems, a renewable biomass supply-chain was set up, by sourcing unutilized biomass residues to produce renewable biomass briquettes and market it to the participating restaurants in replacement of their non-renewable wood fuel. OBEN ensure a competitive and attractive price for using briquettes together with improved cook stoves to give incentives to the restaurants to switch 100% from the previous costly non-renewable wood fuel to the innovative briquettes made of renewable biomass wastes. OBEN ensure through a sale agreement and robust supply strategy that no shortage of briquettes appear as discussed during the interviews.

From 03/02/2020 to 15/05/2020, 5,224 ICS have been installed in 801 restaurants as checked from the distribution database /2.2/ which is also confirmed during the acceptance sampling. The ICS have been distributed in restaurants located in the province of Bujumbura, Mukaza, Muha and Ntahangwa as checked from the distribution database /2.2/ and during the interviews. 3 types of ICS have been installed as specified in the project description which is further confirmed during the interviews and from the distribution database /2.2/. The stoves are installed by OBEN's team, and products acquisition agreements /17/ are signed by the end-users to confirm the installation of the cookstoves. As per the agreements /17/, the cookstoves will be repaired or retrofitted if any problem occurs to the ICS during their lifetime.

During this monitoring period, 20,093 tonnes of renewable biomass (briquettes) have been delivered to the restaurants, leading to emissions reduction of 575, 239 tCO₂e. The monitoring period subject to this monitoring report is inclusive of first and last day of period.

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2 VERIFICATION PROCESS

The registered VCS project is undergoing 1st verification under VCS (1st Crediting period), the approach adopted to ensure the quality of emission reductions is described in the following sections.

2.1 Method and Criteria

4KES assessed and determined whether the proposed implementation and operation of the project activity, and the steps taken to report emission reductions comply with the criteria and relevant guidance provided by the VCS Board. The verification process consist of the following three phases;

- A desk review of the VCS PD and VCS MR
- follow up interviews with project stakeholders
- The resolution of outstanding issues and issuance of final report and opinion.

The prepared verification report and other supporting documents then undergo an internal quality control before being submitted to the VCS executive board for issuance of credits as per VCS standard version 4.2.

Duration of Verification:

Verification Contract	08/12/2021
Remote audit	28/12/2021 and 29/12/2021 (On-site interviews by Local Expert) 30/12/2021 (Zoom interviews by Chetan Swaroop Sharma)
Findings raised	21/03/2022
Draft Verification Report	07/05/2022
Final Verification Report	23/09/2022

2.2 Document Review

The verification is performed primarily as a document review of the approved VCS PD and associated documents as stated in detail in appendix 1 of this document. The assessment is performed by a verification team using a protocol. The cross checks between information provided in the Monitoring report, VCS PD and information from sources other than those used, if available, the team's sectoral or local expertise and, if necessary, independent background investigations.

2.3 Interviews

Due to worldwide COVID-19 spread and air travel restrictions, Team Leader could not conduct the site visit. Since the date of closure of lockdown is uncertain due to the increase spread of COVID-19 and

hence Team Leader did not conduct site visit for this project activity. However, the Verification team performed the Zoom/Email/On-site interview with the PP representatives, site persons, restaurants and stakeholders and reviewed documents to achieve a reasonable level of assurances in the verification. Local expert performed the physical on-site visit. This is in line with Section 4.1.2 of the VCS Standard, v4.2 /03/ which does not explicitly mandate site visits as part of the validation and verification process, only that VVBs must achieve a reasonable level of assurance on all validations and verifications.

VVB has checked the project Implementation, monitoring, sustainable development, on-going mechanism etc. during the physical site visit by Local Expert from the random check of the restaurants (by verifying the ICS/restaurant details at site with the PP's sampling records /22/, Sample of Briquettes delivery notes /31/ and the signed end user agreements /17/ etc.) selected from the Monitoring survey conducted by PP in 2021 /22/ and forms were filled by VVB. The Number of samples i.e. 15 were selected as per table 2 of the standard "Sampling and surveys for CDM project activities and programmes of activities" 09.0 /12/ on random basis and interviews were conducted which is also as per para 54 of Guidelines for sampling and surveys for CDM project activities and programmes of activities 04.0 /13/. VVB has checked the samples results and found in compliance with the Monitoring survey /22/ conducted by PP and hence accepted. Refer section 2.4 of this report for more details. Kindly find below names of the persons interviewed.

Dates	28/12/2021 and 29/12/2021 (On-site interviews by Prof Dr Pierre-Celestin KARANGWA)		
	30/12/2021 (Zoom interviews by Chetan Swaroop Sharma)		
Key points discussed	Name of person, interviewed	Designation, Organization	Interview conducted by
Project Implementation, Operational data, Data collection, QA/QC, procedures, Calculation of ERs, VCS requirements, on-going mechanism	NDIZEYE CLAVER	Legal Representative	Chetan Swaroop Sharma
	RWEMERA Pascal	Deputy Legal Representative	Prof Dr Pierre-Celestin KARANGWA (Zoom Call)
	NKURUNZIZA Thierry	ENGINEER (Production)	Prof Dr Pierre-Celestin KARANGWA (Physical on-site visit)
	NYABUZANA Christian	WEBMASTER/ LOGISTIC (Distribution)	
	JEREMIE	Trainer of users	
Sustainable development Impact, Complaints, Mode	SUMIYE LOIC ANSELME	World Vision, NGO Operating in Bujumbura and 4 provinces (Muyinga, Ngozi, Bubanza and Rumonge)	Prof Dr Pierre-Celestin KARANGWA (Physical on-site visit)

of communication, Environmental impact, any other concerns			
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Serial Number	Name	Identification number of restaurant sampled	Interview conducted by
1.	Joséphine BUTOYI	BQS0036GIT	Prof Dr Pierre-Celestin KARANGWA (Physical on-site visit)
2.	EAST AFRICA Restaurant	BQS0017NGO	
3.	HOTEL LE PARADIS	BQS0002KAY	
4.	HATUNGIMANA ASHURA	BQS0483BUJ	
5.	NZEYIMANA MARIAM	BQS0054BUJ	
6.	CHEZ MUKITO	BQS0097BUJ	
7.	HATUNGIMANA Marthe	BQS0505BUJ	
8.	RESTAURANT EDEN	BQS0189BUJ	
9.	NSABIMANA Diomède	BQS0214BUJ	
10.	VYIZIGIRO Thimoté	BQS0527BUJ	
11.	RURYORYO Sicaire	BQS0243BUJ	
12.	NTAHIZANIYE Elisabeth	BQS0270BUJ	
13.	BAR CHEZ MASUMBUKO	BQS0287BUJ	
14.	RESTAURANT BARCELONA	BQS0310BUJ	
15.	MANIRAKIZA Vénérand	BQS0338BUJ	

2.4 Site Inspections

Due to worldwide COVID-19 spread and air travel restrictions, Team Leader could not conduct the site visit. Since the date of closure of lockdown is uncertain due to the increase spread of COVID-19 and hence Team Leader did not conduct site visit for this project activity. However, the Verification team performed the Zoom/Email/On-site interview with the PP representatives, site persons, restaurants and stakeholders and reviewed documents to achieve a reasonable level of assurances in the verification. Local expert performed the physical on-site visit. This is in line with Section 4.1.2 of the VCS Standard, v4.2 /03/ which does not explicitly mandate site visits as part of the validation and verification

process, only that VVBs must achieve a reasonable level of assurance on all validations and verifications.

VVB has checked the start date of the project activity i.e. 03/02/2020 (date of distribution of stoves starting on 03 February 2020) from the signed end user agreements /17/ signed on 03/02/2020 as multiple ICS were distributed in this date and photos /21/. The list of ICS distributed on the start date is mentioned under Appendix V of this report. The ICS serial numbers (as mentioned under the ER sheet) corresponding to the start date have been verified from the signed end user agreements /17/. VVB has checked the project Implementation, monitoring, sustainable development, on-going mechanism etc. during the physical site visit by Local Expert from the random check of the restaurants selected from the Monitoring survey conducted by PP in 2021 /22/ and forms were filled by VVB. The Number of samples i.e. 15 were selected as per table 2 of the standard “Sampling and surveys for CDM project activities and programmes of activities” 09.0 /12/ on random basis and interviews were conducted which is also as per para 54 of Guidelines for sampling and surveys for CDM project activities and programmes of activities 04.0 /13/. VVB has checked the samples results and found in compliance with the Monitoring survey /22/ conducted by PP and hence accepted.

Verification team has verified the Monitoring parameters ($N_{distributed_ICS,j,y}$, $N_{IN,y}$, $Pop_{restaurant,y}$, $M_{renewable_biomass,y}$, $N_{p,IN,y}$, $BCPJ,PP$) as per the acceptance sampling by verifying the ICS/restaurant details at site with the PP’s sampling records /22/, Sample of Briquettes delivery notes /31/ and the signed end user agreements /17/ etc.. 4KES verification team carried out the random sampling from the PP’s records and check (using its professional judgment) the acceptability of the data for each record in the PP’s sample records against VVB records i.e. Data collected by the LE during the site visit. The VVB has determined acceptance sample size based on the “Table. Sample size and acceptance number based on AQL, UQL, and producer and consumer risks” of standard “Sampling and surveys for CDM project activities and programmes of activities” version 09.0.

Using acceptance sampling approach, VVB checked the survey records from PP’s survey with the VVB interview records.

For the determination of VVB’s acceptance sample size, verification team has selected the following using its professional judgment:

1. Acceptable quality level (AQL) – 0.5%
2. Unacceptable Quality Level (UQL) – 15%
3. Producer risk -10%
4. Consumer risk -10%

VVB team has determined acceptance sample size based on the “Table. Sample size and acceptance number based on AQL, UQL, and producer and consumer risks” of standard “Sampling and surveys for CDM project activities and programmes of activities” version 09.0. From the above factors, the VVB determined the minimum sample size (n) as 15 and acceptance number (c) as 0. VVB randomly selected the restaurants from the survey. VVB’s LE interviewed the restaurants representative and filled the survey forms to check the acceptability of the data for each PP’s records.

The result of the survey is given below:

VVB Sample size	No of PP's record beyond unacceptable level	Accepted
15	0	15

Verification team has checked the VVB samples results collected at site with the PP's sampling records /22/, Sample of Briquettes delivery notes /31/ and the signed end user agreements /17/ etc. and found in compliance. Hence survey is accepted to the Verification team.

2.5 Resolution of Findings

The objective of this step is to identify, discuss and conclude on the 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. This is done based on the desk review and Zoom/Email/On-site interview. The verification team prepares and/or updates a verification protocol (internal document) that records the conformities and non-conformities, which may be of following types;

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

- Non-compliance with the monitoring plan, the methodology or the standardized baseline 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;
- Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants;
- Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions;
- Issues identified in a FAR during validation to be verified during verification or previous verification(s) have not been resolved by the project participants.

Clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met. All CARs and CLs raised by the 4KES during verification shall be resolved prior to submitting a request for issuance.

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

During the Verification process, total 03 CAR and 01 CL were raised and resolved satisfactorily. No FAR has been raised in the verification. The list of CARs/CLs/FARs raised and the response provided, the mean of validation, reasons for their closure and references to correction in the relevant documents are provided in Appendix II of this report.

2.5.1 Forward Action Requests

No FAR raised during the verification.

2.6 Eligibility for Validation Activities

4KES conducted the 1st verification activity for this project activity under the 1st crediting period. 4KES has a valid UNFCCC accreditation in the sectoral scope from UNFCCC. The accreditation scope can be checked from the below link: <http://cdm.unfccc.int/DOE/list/DOE.html?entityCode=E-0069>.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

Project was originally registered under the CDM by its former developers⁴, it was postponed and re-designed by its new developers, for certification and verification under the VCS only. Project is already deregistered from CDM as verified from CDM website <https://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1394766881.05/view>. VVB confirms that there is no double counting associated with project activity being participation of other GHG programs.

3.2 Methodology Deviations

As per applied methodology (i.e. AMS-I.E. version 12.0) para 29, option c, the quantity of biomass substituted, is calculated using the number of person served per institution. However, for this project the exact number of people could not directly be monitored. Therefore, it is assumed that restaurants distribute 1 meal/persons, and the number of persons is deemed equivalent to the number of meals distributed. VVB has checked the methodology deviation applied to the Project and found OK. Verification team would like to clarify that By “Quantity of woody biomass that is substituted or displaced in year y (tonnes)” is an important parameter for the BEy calculation.

$$By = \sum N_{IN,y} \times N_{p,IN,y} \times (BC_{BL,PP} - BC_{PJ,PP,y})$$

Where:

$N_{p,IN,y}$ = Average number of persons served per institution⁵ in year y (number)

$N_{IN,y}$ = Number of institutions with functional cookstoves distributed under the project activity in year y (number)

$BC_{BL,PP}$ = Average annual consumption of woody biomass per person before the start of the project activity or at the renewal of each crediting period whichever is later (tonnes/person/year)

$BC_{PJ,PP,y}$ = Average annual consumption of woody biomass per person in the pre project devices during the project activity (tonnes/person/year). This parameter shall be considered if it is found that pre-project devices were not completely displaced but continue to be used to some extent.

In this formula, PP has used the terminology of per meal in place of per person for all the three parameters i.e. $N_{p,IN,y}$, $BC_{BL,PP}$ and $BC_{PJ,PP,y}$. Therefore, the deviation does not negatively impact the conservativeness of the quantification of GHG emission reductions or removals.

VVB confirm that applied methodology deviation applied to the project is valid.

⁴ As per CDM Project 9911 : BQS improved cookstoves for Burundi restaurants, undergoing de-registration

⁵ Institutions refers to restaurants in this project

3.3 Project Description Deviations

No deviation is applied during the monitoring period.

3.4 Grouped Project

The project is not a grouped project. Therefore this section is not applicable.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

OBEN E.A.C (SA) developed an improved cookstoves project for restaurants⁶ of Burundi. The proposed VCS project activity aims at:

1. Distributing institutional improved cookstoves (ICS) in restaurants of Burundi to replace currently used traditional open fire three-stone system (and traditional stoves); and
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Along with the diffusion of such a stove to replace currently inefficient cooking systems, a renewable biomass supply-chain was set up, by sourcing unutilized biomass residues to produce renewable biomass briquettes and market it to the participating restaurants in replacement of their non-renewable wood fuel. OBEN ensure a competitive and attractive price for using briquettes together with improved cook stoves to give incentives to the restaurants to switch 100% from the previous costly non-renewable wood fuel to the innovative briquettes made of renewable biomass wastes. OBEN ensure through a sale agreement and robust supply strategy that no shortage of briquettes appear as discussed during the interviews.

From 03/02/2020 to 15/05/2020, 5,224 ICS have been installed in 801 restaurants as checked from the distribution database /2.2/ which is also confirmed during the acceptance sampling. The ICS have been distributed in restaurants located in the province of Bujumbura, Mukaza, Muha and Ntahangwa as checked from the distribution database /2.2/ and during the interviews. 3 types of ICS have been installed as specified in the project description which is further confirmed during the interviews and from the distribution database /2.2/. The stoves are installed by OBEN's team, and products acquisition agreements /17/ are signed by the end-users to confirm the installation of the cookstoves. As per the agreements /17/, the cookstoves will be repaired or retrofitted if any problem occurs to the ICS during their lifetime.

During this monitoring period, 20,093 tonnes of renewable biomass (briquettes) have been delivered to the restaurants, leading to emissions reduction of 575, 239 tCO₂e. The monitoring period subject to this monitoring report is inclusive of first and last day of period.

⁶ One restaurant should be understood as any commercial entities preparing meals. Bars and Hostels are covered under the proposed project and assimilated as restaurants.

Three (03) types of stoves are being distributed: a Turkish-manufactured robust design available in medium (48 cm diameter) and large sizes (78 cm), and a locally manufactured Matawi stove.



Improved Institutional cookstove with briquettes (left: Turc Medium, right: Matawi)

SOBAH's and Matawi institutional improved cookstoves specifications

	Medium Turc ICS	Large Turc ICS	Matawi
Diameter	48 cm	78 cm	20 cm
Weight	46 kg (stove in box)	115 kg (stove in box)	7.5 kg
Cooking power output	2.49 kWth	4.82 kWth	2.074 kWth
Adoption	traditional cooking styles and posture		
Lifetime	5 years warranty		8 years
Age at the time of implementation	new		New

Three production sites (Bujumbura, Rutana and Gitega) are expected to be set up for the supply of all restaurants of Burundi with briquetting machines Jumbo 90. The current supply is ensured by local wood-fuel suppliers.

Verification team has checked the technical specification of the project ICS from Summary description and production process for project cookstoves /15/. PP has an established production process to produce the consistent quality of cookstoves as checked during the interviews and also from the supportive document /15/. Verification team has checked the capacities and lifetime of the project cookstoves from the supportive documents i.e. WBT conducted /33/, /34/.

The selected monitoring period i.e. 03/02/2020 - 31/12/2021 (both days included) is within the 1st crediting period i.e. 03/02/2020 – 02/02/2027 which is accepted to the verification team.

There was no major incident during the monitoring period which might affect the applicability of methodology or might cause material errors in emission reductions.

The assessment team confirmed that there is no proposed or actual change to the project design during this monitoring period. The project design as mentioned in the registered VCS PD & monitoring report submitted is implemented and thus the same is acceptable to the assessment team. All required monitoring equipment's and procedures as mentioned in the registered VCS PD & monitoring report are available and implemented in an appropriate manner.

The organisational role and responsibility as mentioned in the registered VCS PD /05/ & monitoring report /1.2/ is followed onsite as verified during the interview.

The assessment team found that the project is in line with the registered VCS PD, monitoring report, and no deviation on project design or monitoring plan is observed.

There is a methodology deviation which has been assessed under section 3.2 of this report.

Verification team has checked the supportive for the activities that result in the SD contributions from the project activity for each SDG.

SDG Target 13.0: During this monitoring period, 20,093 tonnes of renewable biomass (briquettes) have been delivered to the restaurants, leading to emissions reduction of 575, 239 tCO₂e. Verification team has checked the calculation from the monitoring report /1.2/ and the ER calculation sheet /2.2/ and found correct.

SDG Target 7.1: During this monitoring period, 5,224 IICS have been installed under the project activity. Verification team has verified the same from the distribution database /2.2/ which is also confirmed during the acceptance sampling.

SDG Target 15.2: During this monitoring period 20,093 tonnes of briquettes have been distributed corresponding to 5,168 ha of forest equivalent saved by the project. During the monitoring period 616,945 tonnes of biomass (294,692 in 2020 and 322, 253 in 2021) have been saved by the project.

1) Estimation of wood saved:

- a. In 2020: the quantity of biomass saved per restaurant was 368 and the number of restaurant operational was 801, hence the total biomass saved is: $368 \times 801 = 294,692$.
- b. In 2021: the quantity of biomass saved per restaurant was 403 tonnes and the number of restaurant operational was 799, hence the total biomass saved is: $403 \times 799 = 322,253$.

2) The above ground biomass for forest in Burundi have been estimated to 119.38 tonnes/ha in the latest available Forest resources assessment report of Burundi⁷

Therefore, the total area of forest saved has been estimated to 5,168 ha ($=616,945/119.38$). VVB has checked the calculation for SDG 15 under the ER sheet /2.2/ and found OK.

The project activity contributes positively to sustainable development which has been verified from the interview of the World Vision, NGO (Section 2.3 of this report).

As per the registered VCS PD /05/, ex-ante emission reductions for this monitoring period are 1,255,913 tCO₂e however actual emission reductions corresponding to this monitoring period are 575,239 tCO₂e. As the actual emission reduction are less than the estimated emission reduction, hence no impact on the project activity.

Opinion:

Assessment team concludes the following:

⁷ <https://www.fao.org/3/cb0116fr/cb0116fr.pdf>

- a) There is no material discrepancies between project implementation and the project description provided in the registered PD /05/.
- b) The monitoring plan is implemented completely and monitoring system (i.e., process and schedule for obtaining, recording, compiling and analysing the monitored data and parameters) is appropriate.
- c) There is no material discrepancies between the actual monitoring system, and the monitoring plan set out in the project description and the applied methodology.
- d) The GHG emission reductions or removals generated by the project have not included in an emissions trading program or any other mechanism that includes GHG allowance trading.
- e) The project has not received or sought any other form of environmental credit, or has become eligible to do so since validation or previous verification. Project was originally registered under the CDM by its former developers⁸, it was postponed and re-designed by its new developers, for certification and verification under the VCS only. The project has been successfully deregistered from CDM on 08/03/2022 as per CDM website⁹. The project is not registered (or seeking registration) under any other GHG program or rejected by any other GHG program, verification team reviewed the websites of other GHG schemes to verify the same.
- f) The project is registered under VCS only.

In view of the information's as verified above the assessment team is able to conclude that the project has been implemented as described in the project description.

⁸ As per CDM Project 9911 : BQS improved cookstoves for Burundi restaurants, undergoing de-registration

⁹ Deregistration is confirmed on CDM website : <https://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1394766881.05/view?cp=1>

4.2 Safeguards

4.2.1 No Net Harm

No negative environmental and socio-economic impacts have been identified for the project activity considering the proposed VCS project activity aims at 1. Distributing institutional improved cookstoves (ICS) in restaurants of Burundi to replace currently used traditional open fire three-stone system (and traditional stoves); and 2. Switching from non-renewable wood fuel to a sustainable energy supply: briquettes made of renewable biomass waste. The same was also checked during the interviews with PP and with the NGO i.e. World Vision. Hence no net harm.

4.2.2 Local Stakeholder Consultation

LSC was held in Bujumbura Mairie Province (capital of Burundi) by PP on 2012-01-13.

The process was validated during the registration of project activity in VCS. VCS validation report verified to confirm the same. The PP had invited identified stakeholders well in advance with details of venue and time of meeting.

PP has a mechanism for on-going communication with local stakeholders which has been discussed during the remote interview. During the monitoring period (from 03/02/2020 - 31/12/2021), there are no comments received for the project activity.

4.3 AFOLU-Specific Safeguards

Not Applicable.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

The verification team was able to confirm that the monitoring plan contained in registered VCS-PD /05/ and MR /1.2/ is in accordance with the approved small-scale methodology applied for the project activity i.e. "AMS-I.E. ver. 12.0 – Switch from non-renewable biomass for thermal applications by the user" /07/ and its applicable tools.

The parameter stated in the monitoring plan /05/ and the applied methodology /07/ have been fulfilled in the current monitoring period.

The GHG emission reductions were correctly calculated on the basis of the applied methodology AMS-I.E. ver. 12.0 /07/, VCS-PD /05/ and the formulae given in the monitoring report /1.2/.

Parameter monitored:

Verification team confirms through interviews and from the document review, the actual monitoring system complies with the monitoring plan mentioned in the registered validated VCS-PD /05/. To check the [manual transposition errors between data sets](#), Validation team has checked the monitored data through the sampling conducted (mentioned under section 2.3 of this report), review of ER sheet, supportive documents and VVB remote audit etc. and found the monitoring parameters to be correct. There were no discrepancies found between the PP records and VVB sample records and hence accepted. According to the monitoring plan in the registered VCS-PD, there are 06 monitoring parameters required to be monitored. Acceptance sampling has been conducted to verify the monitoring parameters. Refer section 2.4 of this report for more details.

Monitoring parameter 1: Ndistributed_ICS,j,y

					VVB Assessment
Data / Parameter	Ndistributed_ICS,j,y				The monitoring parameter, Unit and descriptions are as per the registered VCS-PD /05/.
Data unit	Number				
Description	Total number of distributed ICS (medium and large) or replaced by anequivalent appliance in year y				
Source of data	Project implementer database				The monitoring parameter is recorded for each distribution of the ICS which is in accordance with the PD /05/.
Description of measurement methods and procedures applied	Each participating restaurant who acquires an ICS signs aproduct acquisition agreement with the project implementer. The project implementer keeps a database of all distributed ICS.				
Frequency of monitoring/recording	Continuously				
Value applied:	Turkish medium ICS	Turkish large ICS	Matawi ICS	Total	Verification team has checked the product acquisition agreements /17/ on sample basis during the sampling conducted and found consistent with the database /2.2/. Verification team has checked the scale of the project activity as per the below table and found the project within small-scale limit.
	841	495	3,888	5,224	
Monitoring equipment	Not applicable. The number of ICS distributed is calculated by the addition of all the ICS distributed since the start of the project				

QA/QC procedures applied	The total number of distributed ICS mentioned in the data base will be cross-check by the project implementer with number of contracts (product acquisition agreement) signed with participating restaurants. Databases are periodically checked by the project implementer to count the total number of distributed ICS under the project.				
Purpose of data	Used to record the number/location of each stove distributed and verify the compliance with small scale limit.	Stove type	Thermal output	Ex-ante number of stoves to be distributed	Thermal output per type of stove (kWth)
		Turkish Large	4.82 kWth	495	2,385.9
		Turkish medium	2.49 kWth	841	2,094.1
		Matawi medium	2.074 kWth	3,888	8,063.7
Calculation method	PP has an internal control of the quantity of stoves distributed. The number is rechecked according to sales agreement.	Total			12,544 kWth
Comments	Capped in compliance with the small-scale limit with regard to thermal energy power output of the stoves as detailed in B.2. $N_{distributed_ICS,medium} * P_{medium} + N_{distributed_ICS,large} * P_{large} < 45 \text{ MWth}$	Verification team confirm that the monitoring of this parameter is done as per the VCS-PD /05/.			

Monitoring parameter 2: $N_{IN,y}$

		VB Assessment
Data / Parameter	$N_{IN,y}$	The monitoring parameter, Unit and descriptions are as per the registered VCS-PD /05/.
Data unit	Number	
Description	Total number of participating restaurants in year y	
Source of data	Project implementer database	Each participating restaurant who acquires an ICS signs a product acquisition agreement with the project implementer which is in accordance with the PD /05/.
Description of measurement methods and procedures applied	Each participating restaurant who acquires an ICS signs a product acquisition agreement with the project implementer. The project implementer will keep a	

	database of all distributed ICS and participating restaurant.	The number of participating restaurant are maintained in a database /2.2/ which is checked by the verification team and found OK. Verification team has checked the product acquisition agreements /17/ on sample basis during the sampling conducted and found consistent with the database /2.2/. Verification team confirm that the monitoring of this parameter is done as per the VCS-PD /05/.
Frequency of monitoring/recording	Continuously	
Value applied:	2020	
	801	
	2021	
	799	
Monitoring equipment	The Number of restaurants is extract from the project database maintained by the PP	
QA/QC procedures applied	The total number of restaurants mentioned in the data base is cross-checked by the project implementer with number of contracts signed with participating restaurants. Databases are periodically checked by the project implementer to count the total number of restaurant under the project.	
Purpose of data	Used to record the number/location of each restaurant.	
Calculation method	Not applicable	
Comments	-	

Monitoring parameter 3: Pop restaurant,y

		VVB Assessment
Data / Parameter	Pop restaurant,y	The monitoring parameter, Unit and descriptions are as per the registered VCS-PD /05/.
Data unit	fraction	
Description	Proportion of restaurants still operating ICS or having replaced their ICS by an equivalent in service one under similar conditions under the project activity in year y.	
Source of data	Monitored sample observations.	This monitoring parameter has been monitored by PP based on sampling. 50 restaurants were selected by PP considering the 95/10
Description of measurement methods and procedures applied	Determined using monitoring surveys. OBEN's team conducted monitoring survey on a sample of 50 restaurants. The sample size have been calculated for 95/10 confidence precision, with an oversampling of 20% A total of 50 restaurant have been chosen randomly for this monitoring period.	

Frequency of monitoring/recording	At least once every two years	confidence/precision.																		
Value applied:	0.94	Sampling was done by PP between 03/02/2021 to 04/06/2021 as verified from the sampling records /22/.																		
Monitoring equipment	Not applicable																			
QA/QC procedures applied	$0 \leq \text{Pop restaurant}, y \leq 1$ Database is periodically checked by the project proponent. Each stove is traced from manufacturer to user (restaurant) using its unique ID. The count, prorated from the monitoring sample size, cannot exceed the total distributed number of stoves at any point in time and number of participating restaurants, as recorded in the stove sales register. Any invalid or incomplete entries related to cook stove sales is not taken into consideration in Emissions Reductions calculation.	This was the first sampling since the start date of the project activity (03/02/2020), hence the monitoring frequency has been maintained.																		
Purpose of data	Calculation of baseline emissions	Based on the ER sheet /2.2/, Verification team confirm that sample number i.e. 50 was correctly calculated by the PP and random sampling was done. Further PP has calculated the achieved precision based on the sampling results which is within the limit. Hence the sampling is accepted to the verification team.																		
Calculation method	Parameter estimated ex-post with monitoring surveys. Monitored restaurants have been asked if their ICS was still operating. The total number of restaurants with operating stoves have been divided by the total number of restaurants surveyed. The confidence precision is met <table><tr><td>Global average</td><td>94.00%</td></tr><tr><td>Sample size</td><td>50</td></tr><tr><td>Total population size</td><td>801</td></tr><tr><td>Required precision</td><td>95%</td></tr><tr><td>z-value at 90% confidence</td><td>1.96</td></tr><tr><td>Confidence interval (+/-)</td><td>6.4%</td></tr><tr><td>Lower bound of the interval</td><td>88%</td></tr><tr><td>Higher bound of the interval</td><td>100%</td></tr><tr><td>Maximum error (precision)</td><td>10.00%</td></tr></table>	Global average	94.00%	Sample size	50	Total population size	801	Required precision	95%	z-value at 90% confidence	1.96	Confidence interval (+/-)	6.4%	Lower bound of the interval	88%	Higher bound of the interval	100%	Maximum error (precision)	10.00%	Verification team has further conducted the acceptance sampling and selected 15 random samples out of PP's 50 samples and verified the PP's record with the VVB sample
Global average	94.00%																			
Sample size	50																			
Total population size	801																			
Required precision	95%																			
z-value at 90% confidence	1.96																			
Confidence interval (+/-)	6.4%																			
Lower bound of the interval	88%																			
Higher bound of the interval	100%																			
Maximum error (precision)	10.00%																			

	Sample monitoring precision	6.78%		records. Verification team confirm that both the records were matching, hence PP's sampling is accepted to the verification team.
	Conclusion	Precision OK		
Comments	For subsequent monitoring sessions $p_{op_restaurant,y-1}$ measured during the previous monitoring session shall be used as an estimation of $p_{op_restaurant,y}$ for the new sample size calculation. Guidance for monitoring is provided to field agents in order to determine the operating status of each appliance during monitoring session with specific conditions to comply with.			Verification team confirm that the monitoring of this parameter is done as per the VCS-PD /05/.

Monitoring parameter 4: Mrenewable_biomass,y

		WB Assessment	
Data / Parameter	Mrenewable_biomass,y		The monitoring parameter, Unit and descriptions are as per the registered VCS-PD /05/.
Data unit	tonnes/year		
Description	Quantity of renewable biomass consumed by the participating restaurants in year y		
Source of data	Project distribution database (ER calculation sheet)		The monitoring parameter is monitored each month and reported in the database /2.2/. Verification team has checked the database /2.2/ and found OK. Verification team has verified the Briquettes delivery notes /31/ with the database /2.2/ on sampling basis and found consistent. Verification team confirm that the monitoring of this
Description of measurement methods and procedures applied	The quantity of briquettes distributed is monitored each month and reported in the database. Therefore, Project implementer can assess the total quantity of briquettes distributed within a particular period		
Frequency of monitoring/recording	Every month		
Value applied:	2020	2021	
	9,015 tonnes	11,079 tonnes	
Monitoring equipment	Not applicable		
QA/QC procedures applied	-		
Purpose of data	Project emissions and Methodology requirements		

Calculation method	-	parameter is done as per the VCS-PD /05/.
Comments	-	VVB would like to clarify that for Ex-ante estimation, as the quantity of renewable biomass was not known to assess project emissions from electricity used to produce briquettes, this quantity was assessed ex-ante by taking in consideration that the quantity of briquettes would be 1/10 of the $M_{substituted.biomass,y}$ which relates to the quantity of non-renewable biomass saved. The formula was just used to assess the quantity of briquettes that may have been distributed, in order to be able to assess emissions from electricity. 'Mrenewable_biomass,y' is a monitoring parameter and reported under section 5.2 of the VCS-PD /05/. Verification team confirm that the monitoring of this parameter is done as per the VCS-PD /05/.

Monitoring parameter 5: Np,IN,y

		VVB Assessment
Data / Parameter	Np,IN,y	The monitoring parameter, Unit and descriptions are as per the registered VCS-PD /05/.
Data unit	meals/restaurant/year	
Description	Average number of meals prepared per restaurant in the year y (meals/y)	
Source of data	Derived from monitoring survey conducted,	This monitoring

Description of measurement methods and procedures applied	Number of meals prepared per restaurant sampled is recorded during each monitoring period.	parameter has been monitored by PP based on sampling. 50 restaurants were selected by PP considering the 95/10 confidence/precision. Sampling was done by PP between 03/02/2021 to 04/06/2021 as verified from the sampling records /22/. This was the first sampling since the start date of the project activity
Frequency of monitoring/recording	At least once every years	
Value applied:	2020: 122,348 2021: 111,622	
Monitoring equipment	<i>Not applicable</i>	
QA/QC procedures applied	Sampling standard shall be used for determining the sample size to achieve 90/10 confidence precision (or 95/10 confidence precision) for the sample size calculation (if conducted biennially). 95/10 applicable for this MP	
Purpose of data	Calculation of baseline emissions	

Calculation method	Ex-post assessment of the parameter is determined by monitoring surveys. The number of meals cooked by restaurant is assessed on 50 restaurants to obtain 95/10 confidence precision. The confidence precision is met <table><tr><th colspan="2">NplNy</th></tr><tr><td>Global average</td><td>122348</td></tr><tr><td>Sample size</td><td>50</td></tr><tr><td>Total population size</td><td>801</td></tr><tr><td>Required precision</td><td>95%</td></tr><tr><td>z-value at 90% confidence</td><td>1.96</td></tr><tr><td>Confidence interval (+/-)</td><td>10552</td></tr><tr><td>Lower bound of the interval</td><td>111796</td></tr><tr><td>Higher bound of the interval</td><td>132900</td></tr><tr><td>Maximum error (precision)</td><td>10.00%</td></tr><tr><td>Sample monitoring precision</td><td>8.62%</td></tr><tr><td>Conclusion</td><td>Precision OK</td></tr></table>	NplNy		Global average	122348	Sample size	50	Total population size	801	Required precision	95%	z-value at 90% confidence	1.96	Confidence interval (+/-)	10552	Lower bound of the interval	111796	Higher bound of the interval	132900	Maximum error (precision)	10.00%	Sample monitoring precision	8.62%	Conclusion	Precision OK	(03/02/2020), hence the monitoring frequency has been maintained. Based on the ER sheet /2.2/, Verification team confirm that sample number i.e. 50 was correctly calculated by the PP and random sampling was done. Further PP has calculated the achieved precision based on the sampling results which is within the limit. Hence the sampling is accepted to the verification team. Verification team has further conducted the acceptance sampling and selected 15 random samples out of PP's 50 samples and verified the PP's record with the VVB sample records. Verification team confirm that both the records were matching, hence PP's sampling is accepted to the verification team. Verification team confirm that the monitoring of this parameter is done as per the VCS-PD /05/.
NplNy																										
Global average	122348																									
Sample size	50																									
Total population size	801																									
Required precision	95%																									
z-value at 90% confidence	1.96																									
Confidence interval (+/-)	10552																									
Lower bound of the interval	111796																									
Higher bound of the interval	132900																									
Maximum error (precision)	10.00%																									
Sample monitoring precision	8.62%																									
Conclusion	Precision OK																									
Comments	-																									

Monitoring parameter 6: BCPJ,PP

		VVB Assessment
Data / Parameter	BCPJ,PP	The monitoring parameter, Unit and descriptions are as per the registered VCS-PD /05/.
Data unit	Tonnes of wood equivalent / meal	
Description	Average annual consumption of woody biomass per meal in the preproject devices during the project activity during year y	
Source of data	Monitoring surveys	This monitoring parameter has been monitored by PP based on sampling. 50 restaurants were selected by PP considering the 95/10 confidence/precision.
Description of measurement methods and procedures to be applied	The consumption of woody biomass could not be assessed directly. Therefore, is assessed as the proportion of meals cooked with baseline stoves, or project stoves during briquettes delivery shortages	
Frequency of monitoring/recording	At least once every two years	Sampling was done by PP between 03/02/2021 to 04/06/2021 as verified from the sampling records /22/.
Value monitored	0.000043 (1.23% of meals cooked, are cooked with baseline stoves or baseline fuels)	This was the first sampling since the start date of the project activity (03/02/2020), hence the monitoring frequency has been maintained.
Monitoring equipment	-.	
QA/QC procedures to be applied	Sampling standard shall be used for determining the sample size to achieve 90/10 confidence precision (or 95/10 confidence precision) for the sample size calculation (if conducted biennially). 95/10 applicable for this MP	Based on the ER sheet /2.2/, Verification team confirm that sample number i.e. 50 was correctly calculated by the PP and random sampling was done. Further PP has calculated the achieved precision based on the sampling results which is within the limit. Hence the sampling is accepted to the verification team.
Purpose of the data	Calculation of baseline emissions	
Calculation method	The value is derived from the proportion of meals cooked with preproject devices. Monitoring surveys pointed that 1.23% of the meals were cooked with baseline fuels. To assess the quantity in tonnes, this value has been multiplied by BCBL,PP. The parameter 1-% of meals cooked with preproject cookstove have been calculated.	Verification team has further conducted the acceptance sampling and selected 15

	The confidence precision is met.		random samples out of PP's 50 samples and verified the PP's record with the VVB sample records. Verification team confirm that both the records were matching, hence PP's sampling is accepted to the verification team. Verification team confirm that the monitoring of this parameter is done as per the VCS-PD /05/.
	1-% of meals cooked with baseline devices		
	Global average	98.77%	
	Sample size	50	
	Total population size	801	
	Required precision	95%	
	z-value at 90% confidence	1.96	
	Confidence interval (+/-)	3.0%	
	Lower bound of the interval	96%	
	Higher bound of the interval	102%	
	Maximum error (precision)	10.00%	
	Sample monitoring precision	3.00%	
	Conclusion	Precision OK	
Comments	--		

Opinion: The verification team confirms;

- The monitoring plan has been implemented as per the registered PD /05/;
- The monitoring complies with the requirement of the applied methodology /07/ except methodology deviation justified under section 3.2 of this report.;
- The information inflow (from data generation, aggregation, to recording, calculation and reporting) is included above under each parameters and confirms to the requirement of the PD;
- The values included in the monitoring report and corresponding emission reduction sheets are verified and included under each monitoring parameter, wherever appropriate;

Parameters not monitored/ex-ante:

Following ex-ante parameters are reported under section 4.1 of Monitoring report /1.2/.

	VVB assessment
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Data / Parameter	P _j					Verification team has checked the stove capacities from the WBT conducted /28/, /29/ and registered VCS PD /05/ and found consistent. Hence accepted by the verification team.
Data unit	kW _{th}					
Description	Useful thermal output capacity of the ICS type j					
Source of data	Performance test results					
Value applied:		ICS type j	Medium	Large	Matawi	
		Useful thermal output capacity	2.49 kW _{th}	4.82 kW _{th}	2.074 kW _{th}	
Justification of choice of data or description of measurement methods and procedures applied	Useful thermal output of the ICS has been estimated by Water Boiling Test by the Turkish supplier for the Turkish stoves and by the CRUEA laboratory for OBEN Matawi stoves					
Purpose of Data	Small-scale threshold, debundle and automatic additionality compliance					
Comments	-					

		VVB Assessment
Data / Parameter	$f_{\text{NRB},y}$	Verification team has checked the $f_{\text{NRB},y}$ value from the registered VCS PD /05/ and found consistent. Hence accepted by the verification team.
Data unit	Fraction	
Description	Fraction of biomass used in the absence of the CDM project in year y that can be established as non-renewable biomass	
Source of data	Forest resources assessments 2015 (FAO)	
Value applied:	0.8183	
Justification of choice of data or description of measurement methods and	The fraction of non-renewable biomass has been calculated following the CDM tool 30 version 3	

procedures applied		
Purpose of Data	Calculation of baseline emissions	
Comments	-	

		VVB Assessment
Data / Parameter	NCV _{biomass}	The ex-ante parameter is as per the applied methodology AMS-I.E. Version 12.0 /07/. Verification team has checked the NCV_{biomass} value from the registered VCS PD /05/ and found consistent. Hence accepted by the verification team.
Data unit	TJ/tonne	
Description	Net calorific value of the non-renewable woody biomass that is substituted	
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories	
Value applied:	0.0156	
Justification of choice of data or description of measurement methods and procedures applied	According to methodology AMS-I.E, the Net Calorific Value of the non-renewable woody biomass that is substituted has to be taken as IPCC default for wood fuel.	
Purpose of Data	Calculation of baseline emissions	
Comments	-	

		VVB Assessment
Data / Parameter	EF _{projected_fossilfuel}	The ex-ante parameter is as per para 26 of the applied methodology AMS-I.E. Version 12.0 /07/ i.e. value for “Sub-Saharan Africa”. Verification team has checked the NCV_{biomass} value from
Data unit	tCO ₂ /TJ	
Description	Emission factor for the substitution of non-renewable woody biomass by similar consumers	
Source of data	AMS-I.E version 12.0	
Value applied:	73.2	

Justification of choice of data or description of measurement methods and procedures applied	As indicated by the methodology AMS-I.E, this value represents the emission factor of the substitution fuels likely to be used by similar users in Sub-Saharan Africa	the registered VCS PD /05/ and found consistent. Hence accepted by the verification team.
Purpose of Data	Calculation of baseline emissions	
Comments	-	

		VVB Assessment
Data / Parameter	$BC_{BL,PP}$	Verification team has checked the NCV _{biomass} value from the registered VCS PD /05/ and found consistent. Hence accepted by the verification team.
Data unit	Tonnes of wood equivalent / meal	
Description	Average historical consumption of woodfuel equivalent per meal (Tonnes of wood equivalent/meal)	
Source of data	Derived from baseline survey discounted by a factor of 0.89.	
Value applied:	0.00351	
Justification of choice of data or description of measurement methods and procedures applied	As permitted by the methodology AMS-I.E, this was derived from Baseline survey gathering restaurants woodfuel consumption data of two communes of Bujumbura. The historical consumption of restaurants has been divided by the historical number of meals distributed in order to get the historical consumption of woodfuel equivalent per meal. The value obtained has been discounted by a factor of 0.89 to account for model uncertainties.	
Purpose of Data	Calculation of baseline emissions	
Comments	-	

		VVB Assessment
Data / Parameter	Leakage_{adj}	The ex-ante parameter is as per para 39 of the applied methodology AMS-I.E. Version 12 /07/. Verification team has checked the Leakage_{adj} value from the registered VCS PD /05/ and found consistent. Hence accepted by the verification team.
Data unit	fraction	
Description	Net to gross adjustment factor to account for leakages	
Source of data	Methodology AMS-I.E Version 12	
Value applied:	0.95	
Justification of choice of data or description of measurement methods and procedures applied	In case this leakage adjustment factor is applied, it is not required to survey	
Purpose of Data	Calculation of leakage emissions	
Comments	the use/diversion of non-renewable woody biomass saved under the project activity by non-project households/users that previously used renewable energy sources.	

		VVB Assessment
Data / Parameter	EF_{EL,j,y}	Verification team has checked the EF_{EL,j,y} value from the registered VCS PD /05/ and found consistent. Hence accepted by the verification team.
Data unit	tCO ₂ /MWh	
Description	Emission factor for electricity generation for source j in year y	
Source of data	“Tool to calculate baseline, project and/or leakage emissions from electricity consumption” (Version 03)	
Value applied:	1.3	
Justification of choice of data or description of measurement	Option A2: Use a conservative default value of 1.3 tCO ₂ /MWh	

methods and procedures applied		
Purpose of Data	Calculation of leakage emissions	
Comments	-	

		VVB Assessment
Data / Parameter	TDL _{j,y}	Verification team has checked the TDL _{j,y} value from the registered VCS PD /05/ and found consistent. Hence accepted by the verification team.
Data unit	-	
Description	Average technical transmission and distribution losses for providing electricity to the briquetting machine	
Source of data	"Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 03)	
Value applied:	0.20	
Justification of choice of data or description of measurement methods and procedures applied	Use as default values of 20% for option: (a) project or leakage electricity consumption sources;	
Purpose of Data	Calculation of leakage emissions	
Comments	-	

		VVB Assessment
Data / Parameter	SEC _{briq}	Specific consumption provided by the manufacturer /25/ is 35-40 kWh/ Metric tonne of Biomass. To be conservative, a value of 40
Data unit	MWh/tonne	
Description	Default value for the specific quantity of electricity consumed per tonne of briquettes produced	

Source of data	Estimated ex-ante based on historic specific electricity consumption per tonne of briquettes produced.	kWh/tonne is chosen by PP which is found correct. Verification team has checked the SEC _{briq} value from the registered VCS PD /05/ and found consistent. Hence accepted by the verification team.
Value applied:	0.04	
Justification of choice of data or description of measurement methods and procedures applied	The specific electricity consumption is estimated ex-ante based on historic data of electricity consumption per tonne of briquettes produced	
Purpose of Data	Calculation of leakage emissions	
Comments	Specific consumption provided by the constructor is 35-40 kWh/ Metric tonne of Biomass. To be conservative, a value of 40 kWh/tonne is chosen.	

		VVB Assessment
Data / Parameter	mbiomass / mcharcoal	The ex-ante parameter is as per para 35 of the applied methodology AMS-I.E. Version 12.0 /07/. Verification team has checked the value from the registered VCS PD /05/ and found consistent. Hence accepted by the verification team.
Data unit	kg biomass/kg charcoal	
Description	Conversion factor wood/charcoal	
Source of data	IPCC 1996- Reference Manual, Chapter 1, Energy, p 1.45 Or national/local values from literature, surveys, or expert judgments if available	
Value applied:	6	
Justification of choice of data or description of measurement methods and procedures applied	The default value should be applied according to recommendations of the IPCC Guidelines if no national/local value is available. However, such default value may be revised ex-post would reliable and country-specific data become available during monitoring.	
Purpose of Data	Calculation of baseline	

Comments	-	
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Opinion:

In the opinion of assessment team, all the ex-ante parameters that were applied in the calculations is consistent with registered PD /05/ and correctly applied in MR /1.2/, emission reductions spreadsheet /2.2/ and justified.

Assessment of Data and Calculation of GHG emission reductions:

The emission reduction (ERy) by the project activity is the difference between baseline emissions (BEy), project emissions (PEy) and emissions due to leakage (Ly). The calculations and formulae as addressed in the approved baseline and monitoring methodology AMS-I.E. Version 12.0 /07/ have been applied by the PP.

Baseline emissions:

As per para 25 of the applied methodology AMS-I.E. Version 12.0 /07/, Baseline emissions are calculated as:

$$BE_y = B_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossil_fuel}$$

Where:

BE_y = Baseline emissions in the year y (tCO₂e)

B_y = Quantity of woody biomass that is substituted or displaced in year y (tonnes)

$f_{NRB,y}$ = Fraction of woody biomass used in the absence of the project activity in year y that can be established as non-renewable biomass (fraction or %)

$NCV_{biomass}$ = Net calorific value of the non-renewable woody biomass that is substituted (TJ/tonne)

$EF_{projected_fossil_fuel}$ = Emission factor of fossil fuels projected to substitute non-renewable woody biomass by similar consumers (tCO₂e/TJ).

Determination of B_y

B_y has been calculated from para 29 option C:

Calculated as the product of the number of persons served per institution multiplied by the number of institutions and the estimate of average annual consumption of woody biomass per person that is displaced by the project activity:

$$B_y = \sum N_{IN,y} \times N_{p,IN,y} \times (BC_{BL,PP} - BC_{PJ,PP,y})$$

Where:

$N_{p,IN,y}$ = Average number of persons served per institution¹⁰ in year y (number)

$N_{IN,y}$ = Number of institutions with functional cookstoves distributed under the project activity in year y (number)

$BC_{BL,PP}$ = Average annual consumption of woody biomass per person before the start of the project activity or at the renewal of each crediting period whichever is later (tonnes/person/year)

$BC_{PJ,PP,y}$ = Average annual consumption of woody biomass per person in the pre project devices during the project activity (tonnes/person/year). This parameter shall be considered if it is found that pre-project devices were not completely displaced but continue to be used to some extent.

The project install energy efficient cookstoves and distribute renewable energy to restaurants in Burundi. The number of persons served by each restaurant is known by the average number of meals cooked and sold by the restaurant. Therefore, it is assumed that one meal is served for one person.

¹⁰ Institutions refers to restaurants in this project

The number of meals served by the restaurant is equal to the number of persons served by the institution. This is already described and justified under the methodology deviation mentioned under section 3.2 of this report.

$f_{NRB,y}$, $NCV_{biomass}$ and $EF_{projected_fossil_fuel}$ are the ex-ante parameters and reported above. Also $N_{IN,y}$, $N_{p,IN,y}$, $BC_{BL,PP}$ and $BC_{PJ,PP,y}$ are the ex-post parameters and reported above.

$$B_y = 122,348 * 801 * (0.00351 - 0.000043) * 0.95 = 323,011 \text{ tonnes}$$

Year	$N_{p,IN,y}$ (units)	$N_{IN,y}$ (units)	$BC_{BL,PP}$ (Tonnes/meal)	$BC_{PJ,PP,y}$ (Tonnes/meal)	B_y (Tonnes)
2020	111,622	801	0.00351	0.000043	294,692
2021	122,348	799	0.00351	0.000043	322,253

$$BE_y = B_y * f_{NRB,y} * NCV_{biomass} * EF_{projected_fossil_fuel}$$

Year	B_y	$f_{NRB,y}$	$NCV_{biomass}$	$EF_{projected_fossil_fuel}$	BE_y
2020	294,692	81.83%	0.0156	73.2	275,370
2021	322,253	81.83%	0.0156	73.2	301,124

Verification team has checked the baseline emission calculation and found correct.

Project Emissions

According to the applied methodology /07/ para 36:

If the project cookstoves use biomass, the following sources of project emissions shall be considered as applicable, bearing in mind that some sources may be only relevant for specific fuels (e.g. production of bioethanol):

(a) Project emissions from cultivation, use and processing of biomass shall be calculated using the latest version of "TOOL16: Project and leakage emissions from biomass" including

(i) CO₂ emissions from on-site consumption of fossil fuels due to the project activity, (e.g. consumption of fossil fuels for any processing of feedstock);

(ii) CO₂ emissions from electricity consumption by the project activity (e.g. the consumption of electricity for any processing of feedstock);

(iii) Project emissions related to cultivation of feedstock.

(iv) Project emissions from transportation of biomass if the transportation distance is more than 200 km; otherwise, they can be neglected.

(b) Methane emission from solid waste disposal or wastewater calculated as per provisions in AMS-III.G. (landfill); AMS-III.F. (composting) and AMS-III.H. (wastewater treatment) in cases where the wastes resulting from production and processing of biomass is disposed in anaerobic conditions.

Project emissions from cultivation of biomass:

As the renewable biomass used is all from residue/waste, this emission source is not applicable to this project. The justification provided by the PP is found acceptable.

Project emissions from utilization of biomass residues that account for:

Emissions resulting from energy consumption are estimated, unless otherwise required in the relevant methodology, by following the provisions in the “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion” and the tool “Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation”. These emissions include emissions due to thermal and mechanical processing of the biomass residue. In the project activity, there is no leakage or project emissions linked to consumption of fuel which is found OK. Therefore, the only emissions come from electricity consumption for transformation of renewable biomass into briquettes. These emissions are calculated as follow:

Emissions related to the transformation of renewable biomass into briquettes

Potential project emissions may arise from the electricity consumption from the machines processing the transformation from renewable biomass into briquettes¹¹. This emissions source is calculated as per the tool ‘Tool to calculate baseline, project and/or leakage emissions from electricity consumption’ version 3. A conservative specific electricity consumption per tonnes of briquettes produced is calculated.

Project emissions from electricity consumption

Project emissions from consumption of electricity are calculated, as follows:

$$PE = PE_{EC,y} = \sum EC_{PJ,j,y} * EF_{EL,j,y} * (1 + TDL_{j,y})$$

Where:

$PE_{EC,y}$ = Project emissions from electricity consumption in year y (tCO₂/yr)

$EC_{PJ,j,y}$ = Quantity of electricity consumed by the project electricity consumption source j in year y (MWh/yr)

$EF_{EL,j,y}$ = Emission factor for electricity generation for source j in year y (tCO₂/MWh)

$TDL_{j,y}$ = Average technical transmission and distribution losses for providing electricity to source j in year y

j = Sources of electricity consumption in the project

¹¹ The briquettes production sites are not included within the boundaries of the project because they will supply different separated projects, different communities and because it is not possible to allocate one production site to one specific city's restaurants as this will depend on the capacity production per site and the regional demand.

Determination of the quantity of electricity consumed by the project ($EC_{PJ,y}$)

The renewable briquettes production sites are likely to provide briquettes to different projects therefore it is not possible to monitor electricity consumption for the project alone. The quantity of electricity consumed by the project $EC_{PJ,y}$ is therefore calculated based on a default value for the specific quantity of electricity consumed per ton of briquettes produced SEC_{briq} (MWh/ton) estimated ex-ante multiplied by the quantity of briquettes supplied to the project activity $M_{renewable.biomass,y}$.

$EF_{EL,j,y}$, $TDL_{j,y}$ and SEC_{briq} are the ex-ante parameters and reported above. Also $M_{renewable.biomass,y}$ is the ex-post parameter and reported above.

Therefore, project emissions are calculated as per the formula and the table below

$$PE_y = M_{renewable_biomass,y} * SEC_{briq,y} * EF_{EL,j,y} * (1 + TDL_{j,y})$$

year	$SEC_{briq,y}$	$EF_{EL,j,y}$	$TDL_{j,y}$	PE_y
2020	0.04	1.3	0.2	563
2021	0.04	1.3	0.2	691

Verification team has checked the calculation and found OK.

Emissions resulting from transport

Emissions resulting from transport of biomass residue to the processing/utilization facility are estimated, unless otherwise required in the relevant methodology, by following the provisions in the methodological tool “Project and leakage emissions from transportation of freight”.

Small scale project activities may, unless otherwise required by the methodology, neglect this source of emissions if the transportation distance is less than 200 km.

Transportation of renewable biomass wastes from collection sites to the briquetting plant is neglected as the briquetting plants operate close to the residues provision sites. For the proposed project, the residues/briquettes will never be transported over a distance more than 200 km (one way), then emissions from transportation can be neglected.

Therefore, no additional leakage emissions from transportation need to be accounted for. The Justification provided by the PP is found OK. Further total area of Burundi is 27,834 km² only and hence it is very unlikely that one way transport will be more than 100 km.

Leakage

According to para. 38 of the applied methodology AMS-I.E. V12.0:

If the cookstoves distributed under the project activity involve the use of biomass, leakage emissions (LEy) shall be calculated using the latest version of “TOOL16: Project and leakage emissions from biomass”, including leakage emissions due to production of processed renewable biomass and bioethanol (e.g. CO2 emissions due to consumption of fossil fuels and electricity).

The following leakage emissions are considered according to the tool 16 version 4.

1) Shifts of pre-project activities

According to tool 16 para 34 “This section is applicable only if the project activity utilizes biomass cultivated in a dedicated plantation. Project proponents are advised to avoid pre-project activities from being shifted outside the project boundary, to avoid indirect land use changes because of the project activity. Rather, project proponents are encouraged to include in the project boundary the land in which the pre-project activities will take place after the project implementation” As the renewable biomass used is all from residue/waste, this emission source is not applicable to this project. The justification provided by the PP is found OK.

2) Leakage due to diversion of biomass residues from other applications

According to tool 16 para 39, “This section is applicable for project activities which utilize biomass residues. It quantifies leakage due to diversion of biomass residues to the project to be used as either fuel or feedstock. These biomass residues could have been used outside the project boundary in competing applications, and due to the implementation of the project activity these competing application might be forced to use inputs which are not carbon neutral.”

The biomass residues, collected in this project would have been burnt in an uncontrolled manner without utilizing it for energy purposes. This situation refers to scenario B3 para 40 of the tool.

As per para 42 of the tool, PP has justified the biomass availability which is found acceptable.

The Project activity's biomass supply involves agro-industrial wastes such as sugar cane wastes, coffee parchments and sawmills residues. These types of wastes are widely available in the region and currently burnt without energy purpose¹². The biomass residue processing is included in the project boundaries and calculated in the project emissions. Therefore, option B3 para 40 of the tool is applicable. The biomass used in the project activity would be burnt in the absence of the project.

The estimation for the quantity of renewable biomass available regarding the types of biomass used for briquettes productions is presented below.

Product	Production in 2019 (tonnes) ¹³	% of agricultural residus ¹⁴	Average estimation of waste available (tonnes)
Coffee	14,059	35.7%	5,019
Rice	241,211	170%	410,058
Palm Oil	17,668	72.5%	12,809
Sorghum	8,851	250%	22,127
Sugar	154,139	30%	46,241
Total	435,928		496,254

¹² Apart from the cogeneration project of SOSUMO where already residues is declared as too many. Indeed, SOSUMO has too much residues and has to burn a great part of it. That's why, OBEN E.A.C SA is signing a partnership with SOSUMO at the sugar cane plant location in order to process the surplus into briquettes

¹³ <https://www.fao.org/faostat/en/#data/QCL>

¹⁴ Percentage of agricultural residues is extracted from the report from Burundi ministry of Energy and mines available at [Ministry of Energy and Mine \(Burundi\)](#)

Moreover, Burundi has a peat reserve of nearly 60,000,000¹⁵ tonnes

Based on production capacity of 3 briquetting machines of 500 tonnes per month the quantity of biomass needed is 18,000 tonnes of dry biomass, thus 36,000 tonnes of wet biomass residues assuming 50% moisture of biomass residues. Therefore, the quantity of available biomass residues in the region is at least 25% larger than the quantity of biomass that is utilized including the project activity. This source of leakage can thus be neglected. Verification team has checked the data from the sources and found correct.

Further as per para 39 of applied methodology AMS-I.E. V12.0, PP has selected the alternative approach i.e. By is multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required which is found OK.

Emission reductions

Emissions reduction calculations are estimated as follow:

$$ER_y = BE_y - PE_y - LE_y$$

Where:

ER_y = Emission reductions in year y (t CO₂e)

BE_y = Baseline emissions in year y (t CO₂e)

PE_y = Project emissions in year y (t CO₂e)

The results of the emission reduction are shown in the table below:

Year	Baseline emissions or (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
03 February 2020- 31 December 2020	275,370	563	-	274,807
01 January 2021 - 31 December 2021	301,124	691	-	300,432

¹⁵ http://obpe.bi/images/pdf/bulletin_numero_4.pdf

Total	576,494	1254	-	575,239
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Opinion:

The verification team confirms that

- The complete data set for the identified and required parameters for the operational days in the current monitoring period was available;
- The reported data has been cross checked with available records, as indicated in the section 4.4 above under each monitored data, wherever appropriate;
- The baseline, project and leakage emissions have been determined in accordance with the requirement of the applied methodologies, as contained in the final monitoring report and corresponding emission reductions spreadsheet;
- The assumptions, emission factors and default values used are justified, as indicated in the section 4.4 above

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

Evidences (Documents/interviews) referred for verification of individual monitoring parameter and fixed parameter are defined under section 4.4. We further confirm that, sufficient evidence covering the entire monitoring period and at the required frequency were available. A list of referred documents for verification is also included in Appendix 1 of this report.

4.6 Non-Permanence Risk Analysis

Not applicable.

5 VERIFICATION CONCLUSION

4K Earth Science Pvt. Ltd. (4KES), contracted by 'AERA Group', has performed the independent verification of the emission reductions for the VCS project activity (VCS ID- 2540) "Improved cookstoves for Burundi restaurants" in Burundi for the monitoring period 03-February-2020 to 31-December-2021 as reported in the Monitoring Report Version 1.5 dated 19/09/2022. AERA Group are responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity. It is our responsibility to express an independent verification statement on the reported GHG emission reductions from the project activity.

4KES commenced the verification on the basis of the baseline and monitoring methodology AMS-I.E. Version 12.0, the monitoring plan contained in the registered VCS PD /05/ and Monitoring Report (Version 1.5 dated 19/09/2022) as per the process described under Section 2 of this report.

4KES verification approach is based on the understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. 4KES planned and performed the verification by obtaining evidence and other information and explanations that 4KES considered necessary to give reasonable assurance that reported GHG emission reductions are fairly stated.

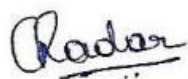
In our opinion the GHG emissions reductions reported for the project activity for the period 03-February-2020 to 31-December-2021 are fairly stated in the Monitoring Report Version 1.5 dated 19/09/2022. The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology AMS-I.E. Version 12.0 and the VCS standard

Verification period: From 03-February-2020 to 31-December-2021

Verified GHG emission reductions and removals in the above verification period:

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
03 February 2020-31 December 2020	275,370	563	-	274,807
01 January 2021 - 31 December 2021	301,124	691	-	300,432
Total	576,494	1254	-	575,239

Approved by



Chandrakala R.

Director

2022

4K Earth Science Private Limited

Date: 23-September -

Place: Bangalore, India

APPENDIX I: LIST OF DOCUMENTS

/1/	/1.1/ Monitoring Report, Version 1.1, dated 10/03/2022 (Initial Version) /1.2/ Monitoring Report, Version 1.5, dated 19/09/2022 (Final Version)	-
/2/	/2.1/ Draft Emission Reduction Calculation sheet (corresponding to initial Version of VCS MR) /2.2/ Final Emission Reduction Calculation Sheet (corresponding to final Version of VCS MR)	-
/3/	VCS Standard Version v4.2 https://verra.org/project/vcs-program/rules-and-requirements/	-
/4/	VCS Program Guide, v4.1 https://verra.org/project/vcs-program/rules-and-requirements/	-
/5/	Registered VCS PD Version 1.2, dated 18/04/2022	-
/6/	Web-Link for the Registered project activity https://registry.verra.org/app/projectDetail/VCS/2540	-
/7/	Approved monitoring methodology: AMS-I.E. ver. 12.0 – “Switch from non-renewable biomass for thermal applications by the user”	-
/8/	Websites referred: http://www.itouchmap.com/latlong.html (Latitude-Longitude location finder)	-
/9/	CDM-EB: Clean Development Mechanism Validation and Verification Standard for project activity	Version 03.0
/10/	VCS Verified Carbon Standard: Registration and Issuance Process Version 4.1	-
/11/	VCS Verified Carbon Standard: Validation and Verification Manual, Version 3.2	-
/12/	Standard “Sampling and surveys for CDM project activities and programmes of activities” 09.0	-
/13/	Guidelines for sampling and surveys for CDM project activities and programmes of activities 04.0	-
/14/	Declaration for double counting, dated 01/03/2021	-
/15/	Summary description and production process for project cookstoves	-

/16/	By decision of its general assembly, BQS transferred the project to OBEN dated 25/06/2021	-
/17/	End user agreement (warranty card and Carbon rights transfer) and sales invoice	-
/18/	Training of staff	-
/19/	Organization structure for the project activity	-
/20/	Company registration certificate, dated 03/12/2020	-
/21/	Photographs of project stove and baseline practice	-
/22/	Monitoring survey conducted in 2021	-
/23/	Physio chemical characterization of briquettes	-
/24/	Supportive for Experiments to estimate the approximate renewable briquettes consumption per cookstove have been conducted and recorded by project proponent over the same model of cookstoves expected to be used by restaurants in two schools and police camp, evidencing savings up to 90%, thus a conversion factor of 0.5 is a conservative assumption.	-
/25/	Technical details of briquette manufacturing machine including 1. Manual instructions for briquette manufacturing 2. Supplied Electrical Motor (HP) 3. Power consumption	-
/26/	ERPA signed between Aera group and PP dated 07/12/2020	-
/27/	2540, Exemption Letter, dated 14 December 2021	-
/28/	WBT conducted for project ICS MATAWI by Centre for research in energy and energy conservation, July 2019	-
/29/	WBT conducted for Turkish ICS	-
/30/	SUSTAINABLE DEVELOPMENT CO-BENEFITS CDM VERIFICATION REPORT, dated 03/06/2020 by LGAI Technological Center, S.A.	-
/31/	Sample of Briquettes delivery notes corresponding to this monitoring period	-
/32/	Stoves Maintenance database	-

APPENDIX II: VERIFICATION FINDINGS

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

This is the 1st periodic verification of the project activity. There is no remaining FAR from Validation.

FAR ID	Xx	Section no.		Date: DD/MM/YYYY
Description of FAR				
Project participant response				Date: DD/MM/YYYY
Documentation provided by project participant				
DOE assessment				Date: DD/MM/YYYY

Table 2. CL from this verification

CL ID	01	Section no.	4.1	Date: 21/03/2022
Description of CL				
As per para 32-34 of the applied methodology, PP need to clarify if in case cookstoves are repaired or retrofitted during this monitoring period.				
Project participant response				Date: 24/03/2022
During this monitoring period, grate of the cookstoves have been replaced, as per the monitoring surveys. The only defect that was signalled by the end-users was relative to broken grates. All the broken grates have been changed as per contract agreement with the end-users. This have been added in section 3.1 of the monitoring report				
Documentation provided by project participant				
Revised MR				
DOE assessment				Date: 07/05/2022
Clarification has been provided by the PP and found OK. The same is also verified from the maintenance database /32/ and during the remote interview. Hence this CL is closed.				

Table 3. CAR from this verification

CAR ID	01	Section no.	4.1	Date: 21/03/2022
Description of CAR				

1. Under section 1.1 of the monitoring report, PP need to provide a summary description of the implementation status of the project, including the following (no more than one page): i. A summary description of the implementation status of the technologies/ measures (e.g., plant, equipment, process, or management or conservation measure) included in the project. ii. The relevant implementation dates (e.g., dates of construction, commissioning, and continued operation periods). iii. The total GHG emission reductions or removals generated in this monitoring period. (As per MR template requirements) 2. Under section 2.2 of the Monitoring report, PP need to mention any comment received during the on-going communication with the stakeholders under this monitoring period and how they were resolved. (As per MR template requirements)	
Project participant response	Date: 24/03/2022
1. section 1.1 have been revised as per template requirements. 2. The section 2.2 have been revised to include information about the comments received during this monitoring period.	
Documentation provided by project participant	
Revised MR	
DOE assessment	Date: 07/05/2022
1. Correction has been done in the revised monitoring report /1.2/ and found OK. Hence this part of CAR is closed. 2. Correction has been done in the revised monitoring report /1.2/ and found OK. Hence this part of CAR is closed.	

CAR ID	02	Section no.	4.4	Date: 21/03/2022
Description of CAR				
Under section 4.1 of the monitoring report, data/parameter P _j is not consistent with the final submitted VCS PD.				
Project participant response				Date: 24/03/2022
The parameter has been corrected				
Documentation provided by project participant				

Revised MR	
DOE assessment	Date: 07/05/2022
Correction has been done in the revised monitoring report /1.2/ and found OK. Now the monitoring parameters are consistent with the VCS PD /05/. Hence this CAR is closed.	

CAR ID	03	Section no.	4.4	Date: 21/03/2022
Description of CAR				
Under section 4.2 of the monitoring report, PP need to mention the sampling details i.e. when the sampling was conducted, frequency of the sampling maintained, samples selected, who conducted the sampling survey, whether the confidence/precision was met etc. for the monitoring parameters $P_{op\ restaurant,y}$, $N_{p,IN,y}$ and $BC_{PJ,PP}$.				
Project participant response				Date: 24/03/2022
The Monitoring report have been corrected. Calculation of the parameters, sample size selection and confidence precision met is added now to the report.				
Documentation provided by project participant				
Revised Monitoring report				
DOE assessment				Date: 07/05/2022
Correction has been done in the revised MR /1.2/ and found OK. Hence this CAR is closed.				

Table 4. FAR from this verification

No FAR raised during this verification.

FAR ID	xx	Section no.		Date: DD/MM/YYYY
Description of CAR				
NA				
Project participant response				Date: DD/MM/YYYY
Documentation provided by project participant				
DOE assessment				Date: DD/MM/YYYY

APPENDIX III: TEAM COMPETENCE

<u>Certificate of Competence</u>						
Name	☒ Mr. ☐ Ms.	Chetan Swaroop Sharma				
Qualification Procedure	Fulfills the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.					
Appointed to work as:						
	CDM Validator/Verifier	Team Leader	Team Member	Technical Expert	Technical Reviewer	Financial Expert
<i>Appointed</i>	Yes	Yes	Yes	Yes	Yes	No
<i>Appointed Date</i>	27-04-2021					
Authorized to work as Technical Expert for:						
<i>Authorized Technical Area</i>	Sectoral Scope	TA Code	Technical Area within the scope			
	Energy industries (renewable - / non-renewable sources)	1.1	Thermal energy generation			
	Energy industries (renewable - / non-renewable sources)	1.2	Renewables			
	Energy distribution	2.1	Energy distribution			
	Energy demand	3.1	Energy demand			
	Waste handling and disposal	13.1	Solid waste and wastewater			
	Waste handling and disposal	13.2	Manure			
Authorized to work as Local Expert for:						
<i>Country/Countries</i>	India					
<u>Compliance check by:</u> Anand S. R.						

<u>Certificate of Competence</u>						
Name	☒ Mr. ☐ Ms.	Ma Paa Puratchikkanal				
Qualification Procedure	Fulfil the requirement as per the appointment of personnel procedure of 4 KES for Validation and Verification of CDM/VCS/GS/GHG Projects.					
Appointed to work as:						
	CDM Validator/Verifier	Team Leader	Team Member	Technical Expert	Technical Reviewer	Financial Expert
Appointed	Yes	Yes	Yes	Yes	Yes	No
Appointed Date	27-04-2021					
Authorized to work as Technical Expert for:						
Authorized Technical Area	Sectoral Scope	TA Code		Technical Area within the scope		
	Energy industries (renewable - / non-renewable sources)	1.1		Thermal energy generation		
	Energy industries (renewable - / non-renewable sources)	1.2		Renewables		
	Energy demand	3.1		Energy demand		
	Construction	6.1		Construction		
	Waste handling and disposal	13.1		Solid waste and wastewater		
	Waste handling and disposal	13.2		Manure		
	Agriculture	15.1		Agriculture		
Authorized to work as Local Expert for:						
Country/Countries	India and Sri Lanka					

<u>Compliance check by:</u> Anand S. R.	
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APPENDIX IV: ABBREVIATIONS

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CL	Clarification Request
EB	Executive Board
ER	Emission Reductions
FAR	Forward Action Request
GHG	Greenhouse Gases
IPCC	Intergovernmental Panel for Climate Change
ISO	International Organization for Standardization
MP	Monitoring Period
MR	Monitoring Report
MW	Mega Watt
MWh	MegaWatt hour
PD	Project Description
PP	Project proponent
QA/QC	Quality Assurance/Quality Control
tCO ₂	Tonnes of Carbon Dioxide
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard
VCSA	Verified Carbon Standard Association
VCU	Verified Carbon Unit

APPENDIX V: STOVES DISTRIBUTED ON THE START DATE

N°	NAME OF THE RESTAURANT	NAME OF THE OWNER	IDENTIFICATION NUMBER	Installation date
1	Bar Restaurant	Lodge URISANZE	BQS0001RUM	03-02-2020
2	Bar Restaurant	TANGANYIKA LODGE	BQS0002RUM	03-02-2020
3	Hotel Restaurant	KARIBU Hotel	BQS0003RUM	03-02-2020

		Restaurant		
4	Bar Restaurant	Kwa MAULIDI	BQS0004RUM	03-02-2020
5	Restaurant	La STAR	BQS0005RUM	03-02-2020
6	Restaurant	Manan SAFI	BQS0006RUM	03-02-2020
7	Hotel Restaurant	KWETU GUEST HOUSE	BQS0023RUM	03-02-2020
8	Hotel Restaurant	BETHEL	BQS0007RUM	03-02-2020
9	Hotel Restaurant	MARIMBU GUEST HOUSE	BQS0008RUM	03-02-2020
10	Hotel Restaurant	Chez DAVID	BQS0009RUM	03-02-2020
11	Restaurant	BA YOUSUFU	BQS0010RUM	03-02-2020
12	Restaurant	Kwa KARIBURYO	BQS0011RUM	03-02-2020
13	Restaurant	MUHAMED SEFU	BQS0024RUM	03-02-2020
14	Restaurant	Maman RUKIYA	BQS0025RUM	03-02-2020
15	Restaurant	Kwa MAHULIDI JUMAINE	BQS0012RUM	03-02-2020
16	Restaurant	KIBURUDISHO	BQS0026RUM	03-02-2020
17	Restaurant	MAHINDU HAWA	BQS0013RUM	03-02-2020
18	Restaurant	Chez MUKAMA Benjamin	BQS0014RUM	03-02-2020
19	HOTEL BISONABISO	BASABOSE Mathias	BQS0283BUJ	03-02-2020
20	BAR KUGICANIRO	MBONIHANKUYE Turdo	BQS0522BUJ	03-02-2020
21	KINYANA HOTEL	HAVYARIMANA Céléstin	BQS0523BUJ	03-02-2020
22	BAR ET MOTEL "La Retrouvaille"	HABONIMANA Pascasie	BQS0524BUJ	03-02-2020
23	BAR (Anonyme)	NIZIGIYIMANA Marie José	BQS0525BUJ	03-02-2020
24	BAR Dineris Paris	BIGIRIMANA	BQS0284BUJ	03-02-2020
25	BAR (Anonyme)	DJUMA	BQS0626BUJ	03-02-2020
26	BAR CHEZ André	BIGIRIMANA André	BQS0540BUJ	03-02-2020
27	BAR "Au Coin des Sages"	BIGIRIMANA Paratine	BQS0285BUJ	03-02-2020
28	BAR NGANDA RELAX	Pontien	BQS0286BUJ	03-02-2020
29	BAR CHEZ MASUMBUKO	MASUMBUKO Joseph	BQS0287BUJ	03-02-2020
30	BAR CHEZ SILAS	Silas	BQS0541BUJ	03-02-2020
31	BAR CHEZ LAURENT	Laurent	BQS0542BUJ	03-02-2020
32	BAR CHEZ DAMIEN	Damien	BQS0288BUJ	03-02-2020
33	BAR "TRIANGLE"	Marie Louise	BQS0543BUJ	03-02-2020
34	BAR KUMWEMBE	NIZIGAMA Ménard	BQS0289BUJ	03-02-2020
35	BAR IMUHIRA	MUKESHIMANA Japhet	BQS0290BUJ	03-02-2020
36	HOTEL AMASHUHA	HABONIMANA Fidèle	BQS0291BUJ	03-02-2020
37	BAR RUGOMBO	NSENGIYUMVA	BQS0544BUJ	03-02-2020

38	HOTEL SHIKA	NDAYISHIMIYE Charlotte	BQS0545BUJ	03-02-2020
39	BAR SIGUGUZE	NYANDWI Luc	BQS0546BUJ	03-02-2020
40	BAR ESHIMA "Etoile du marché"	NIYONZIMA Alice-Paula	BQS0292BUJ	03-02-2020
41	BAR SHAKA ZULU	NDOMO Damien	BQS0627BUJ	03-02-2020
42	BAMBOU CAFETARIAT	NDUWAYO Ramadhani	BQS0601BUJ	03-02-2020
43	BAR KUKIVUMU	NGENDAKURIYO Gervais	BQS0293BUJ	03-02-2020
44	SNACK BAR	HARERIMANA Henri	BQS0294BUJ	03-02-2020