

Project Title	Ecofiltro Guatemala Improved Stoves and Water Purification Project
ERM CVS Reference	2690.v4
Gold Standard Project Reference Number	GS 1321
Client Name	Natural Capital Partners
Client Address	1007 Johnnie Dodds Boulevard, Suite 126 Mount Pleasant, South Carolina 29464 United States of America

Gold Standard Verification Report

ERM Certification and Verification Services

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Version 01	01 May 2020 (draft verification report)
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Version 02.2	19 October 2020 (Final verification report, updated following 2 nd round Gold Standard comments)

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Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CL	Clarification Request
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide Equivalent
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse Gas
GS	Gold Standard
GS4GG	Gold Standard for the Global Goals (latest version of the Gold Standard programme)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
PDD	Project Design Document
QA/QC	Quality Assurance / Quality Control
SDG	Sustainable Development Goal
UNFCCC	United Nations Framework Convention for Climate Change
VVB	Validation and Verification Body
VVS	CDM Validation and Verification Standard

Project specific abbreviations

BWBT	Baseline Water Boiling Test
CBO	Community Based Organizations
CRW	Carbon Rights Waivers
DCD	Detailed Customer Databases
HH	Household
ICS	Improved Cooking Stove
KPT	Kitchen Performance Test
KS	Kitchen Survey

MS	Monitoring Survey
NGO	Non- Governmental Organisation
SM	Socorro Maya
TSR	Total Sales Record
US	Usage Survey
WCFT	Water Consumption Field Test
WQT	Water Quality Test
WT	Water Treatment

1. Project information

Project Title	Ecofiltro Guatemala Improved Stoves and Water Purification Project																		
Gold Standard Project reference	GS 1321																		
Host Country	Guatemala																		
Project Location	The project is located in Guatemala, including all 8 Regions and 22 Departments: <table border="1"> <thead> <tr> <th>Region</th><th>Departments</th></tr> </thead> <tbody> <tr> <td>Metropolitana</td><td>Guatemala</td></tr> <tr> <td>Norte</td><td>Alta Verapaz, Baja Verapaz</td></tr> <tr> <td>Noreste</td><td>Izabal, Chiquimula, Zacapa, El Progreso</td></tr> <tr> <td>Sureste</td><td>Jutiapa, Jalapa, Santa Rosa</td></tr> <tr> <td>Central</td><td>Chimaltenango, Sacatepequez, Escuintla</td></tr> <tr> <td>Suroeste</td><td>San Marcos, Quetzaltenango, Totonicapán, Sololá, Retalhuleu, Suchitepequez</td></tr> <tr> <td>Noroeste</td><td>Huehuetenango, Quiché</td></tr> <tr> <td>Petén</td><td>Petén</td></tr> </tbody> </table>	Region	Departments	Metropolitana	Guatemala	Norte	Alta Verapaz, Baja Verapaz	Noreste	Izabal, Chiquimula, Zacapa, El Progreso	Sureste	Jutiapa, Jalapa, Santa Rosa	Central	Chimaltenango, Sacatepequez, Escuintla	Suroeste	San Marcos, Quetzaltenango, Totonicapán, Sololá, Retalhuleu, Suchitepequez	Noroeste	Huehuetenango, Quiché	Petén	Petén
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Noroeste	Huehuetenango, Quiché																		
Petén	Petén																		
Project Participants	Ecofiltro, S.A. Natural Capital Partners																		
Methodology	Gold Standard Methodology "Technologies and practices to displace decentralized thermal energy consumption" (version 3.1)																		

Final monitoring report date	v1.9 14 October 2020
Monitoring Period	01/04/2018 to 31/12/2019
Date(s) of Site Visit	Due to the ongoing corona virus pandemic, no site visit was conducted. Further details of verification methods are described below.

Date/version of registered PDD and monitoring plan	Version 05; dated 20 September 2013
Date/version of registered Gold Standard Passport	Version 01; dated 10 May 2012
Date of Initial Gold Standard Approval	13 November 2012
Crediting Period	01 January 2013 – 31 December 2019

2. Verification Opinion and Certification Statement

ERM Certification and Verification Services (ERMCVS) was commissioned by Natural Capital Partners to verify and certify the emissions reductions reported for the period 01/04/2018 to 31/12/2019 as set out in the monitoring report of the project activity Ecofiltro Guatemala Improved Stoves and Water Purification Project, Registration Reference GS 1321.

Basis of verification	ERM CVS based its verification work on: ▪ The approved Gold Standard methodology applied; ▪ The project design document (PDD), Gold Standard Passport and Transition Annex to GS4GG, setting out the project description and monitoring & sampling plan; ▪ Gold Standard for the Global Goals requirements and guidance.	
Responsibilities of ERM CVS	ERM CVS is responsible to provide an independent verification conclusion on the reported greenhouse gas (GHG) emission reductions for the project during the relevant monitoring period. The verification activities included desk review, interviews, close out of open issues, preparation of report and technical review.	
Responsibilities of Project Developer	The Project Developer is responsible for the preparation of the information and data and the reported GHG emissions reductions and SDG outcomes of the project on the basis set out within the applicable monitoring plan. The Project Developer is responsible for reporting this in the monitoring report.	
ERM CVS Opinion	Based on the verification activities undertaken, ERM CVS concludes that the project activity is implemented and operated as described in the Project Design Document version 05 and Gold Standard Passport version 01 approved by the Gold Standard. The GHG emissions reductions and sustainability indicators set out in the monitoring report v 1.6 dated 02 July 2020 were found to be appropriately measured and calculated in accordance with the applied monitoring methodology 'Technologies and Practices to Displace Decentralized Thermal Energy Consumption' (v 3.1), the monitoring plan set out in the Project Design Document, Version 05, the Gold Standard Passport version 01 and the accompanying GS4GG Transition Annex (no date or version number stated).	
Total GHG emission reductions certified	Emission reductions achieved in this monitoring period: 322,468 tCO₂ equivalent Emission reductions subtracted to compensate for the deviation at Issuance 4: 19,919 tCO₂e Net emission reductions claimed: <u>302,549 tCO₂e</u>	
Report approved by		Signature: 
Name: Melanie Eddis, Partner		
Date: 19 October 2020		

3. Introduction

This report sets out the methodology and conclusions of the verification process and the ERM CVS Certification Statement. ERM CVS assessed and verified whether the implementation of the project activity and the steps taken to report emission reductions comply with the Gold Standard criteria and relevant guidance provided by the Gold Standard.

3.1. Verification Objectives

As set out in the Gold Standard Requirements, verification means the periodic independent review and ex post determination by a Validation and Verification Body (VVB) of monitored SDG outcomes including GHG emission reductions that have occurred as a result of a registered project activity during the monitoring period.

The objective of the verification is to establish whether sufficient evidence exists to confirm, to reasonable assurance:

- Whether the project activity has been implemented and is being operated as per the PDD and the Gold Standard Passport/GS4GG Transition Annex and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project activity are in place.
- Whether the applied monitoring plan is in compliance with the relevant Gold Standard-approved monitoring methodology.
- Whether the monitoring report and other supporting documents provided are complete and verifiable and in accordance with the monitoring plan and applicable Gold Standard requirements.
- Whether the outcomes related to the Sustainable Development Goals (SDGs), including emission reductions, as set out in the Monitoring Report have been measured, calculated and reported in accordance with the requirements of the monitoring plan in the PDD and Gold Standard Passport/GS4GG Transition Annex.
- Whether the reported data meet the key principles of data quality and are complete, reliable, consistent, accurate, valid, transparent and conservative.

3.2. Scope and basis of verification work

Based on the key project information set out above, the verification addresses the implementation and operation of the project activity as set out in the PDD and the Gold Standard Passport/GS4GG Transition Annex, and the information and reported emissions reductions and SDG outcomes set out in the monitoring report prepared by the project developer for this monitoring period.

The verification tests the data and assertions set out in the monitoring report prepared for this monitoring period and is based on

- the approved methodology applied in the PDD the monitoring plan set out in the PDD and GS Passport/GS4GG Transition Annex approved by Gold Standard
- the Gold Standard Principles and Requirements v1.2 and applicable Gold Standard activity requirements and guidelines
- Other information and references relevant to the project activity's reported emission reductions - refer to Annex 1 for full set of documents

The verification considers both quantitative and qualitative information on emission reductions. The monitoring report is assessed, using a rules-based approach, against the principles of accuracy, relevance, credibility, reliability, completeness, consistency, and transparency. Conservativeness is applied throughout the process to ensure that emission reductions are not overstated.

ERM CVS conducts all its work under strict rules to safeguard impartiality and ensure the independence of the verification team. The verification does not provide any consulting or recommendations for the client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the monitoring activities.

3.3. Appointment of Team Members and Technical Reviewer

Based on ERM CVS's review of the project, a verification team was established that takes into account the coverage of the technical area(s), sectoral scope(s) and relevant geographical experience for verifying the emission reductions achieved by the project activity in the relevant monitoring period for this verification

Personnel who undertook this verification were:

Verification Team	Role	CDM Knowledge	Gold Standard Knowledge	Technical Area
Jonathan Avis	Lead Verifier	Yes	Yes	Yes

Technical Review	Role	CDM Knowledge	Gold Standard Knowledge	Technical Area
Neringa Pumputyte	Technical Reviewer	Yes	Yes	Yes

3.3.1. Verification Team Member Profiles

Jonathan Avis is CDM Business Manager for ERM CVS, and a GHG Assessor and Technical Reviewer with 15 years of experience in the CDM, Gold Standard and VCS. Since joining ERM CVS Jonathan has worked as a Technical Reviewer or GHG Assessor on more than 150 validations and verifications, in sectors including Renewable Energy, Energy Demand, Manufacturing Industries, Mining, and Waste Handling and Disposal. Jonathan's previous work experience involved screening and due diligence of carbon projects, Project Design Document (POA-DD & CPA-DD) development, quality assurance and technical review of CDM and GS project documentation, the development of carbon monitoring plans, and management of carbon projects through the validation, registration and verification stages. Jonathan has completed the ERM CVS CDM training as well as the GHGMI Renewable Energy training and Gold Standard training. Jonathan holds a BA in Geography and an MSc in Environmental Change and Management from the University of Oxford.

Jonathan's Gold Standard experience includes the validation of the Paradigm Sub Saharan Africa Cook Stove Programme, a cooking stove PoA covering Rwanda and Ethiopia, the verification of the Paradigm Healthy Cookstoves and Water Treatment Project, a water purification and cooking stoves GS VER project in Kenya, verification of the Sustainable Deployment of the LifeStraw Family in Kenya, a water purification project in rural areas in Kenya, the technical review of the validation of Hebei Yingxin Glass Group Co. Ltd. Glass Furnace Flue Gas Waste Heat To Energy Project in China, and technical review of the validation of the PoA 'Energy Efficiency Measures in Rural Bangladesh', amongst many other projects.

Neringa Pumputyte has over ten years of experience in climate change and GHG emission reductions,. While at ERM CVS, Neringa has worked on validations and verifications of emission reduction projects and PoAs in renewable energy, energy demand, manufacturing, landfill gas and fugitive emissions (oil and gas), as well as corporate GHG assurance work in a range of sectors. She led development of the Gold Standard programme in ERM CVS. Before joining ERM CVS, Neringa worked on hydro, cook stove and animal waste handling projects as a project developer. Now she works as a contractor. Neringa has completed the ERM CVS CDM training, Gold Standard training, and GHGMI renewable energy training. Neringa also has a BSc and MSc in Geography, and an MSc in Environmental Change and Management from the University of Oxford.

3.4. Verification activities

The verification approach is based on the approach set out in the Gold Standard rules, procedures and guidance where. The verification activities are designed to evaluate:

- Whether sufficient evidence is available, both in terms of frequency (time period between evidence) and in covering the full monitoring period;
- The source and nature of the evidence (external or internal, oral or documented, etc);
- Cross-checks with comparable information available from sources other than that used in the monitoring report, where possible.

3.4.1. Verification methods

The verification was conducted remotely, as a result of the Covid-19 pandemic which has meant that the VVB could not travel to Guatemala, and also within Guatemala travel from one region to another is banned, and household visits could not be conducted anyway because of the risk of spreading the coronavirus. The verification was conducted following the Gold Standard Covid-19 Interim measures. Instead of a site visit, the verification included enhanced desk-based review, interviews, video conferences and follow-ups with project personnel and partners. The verification included the following:

- Interviews with the project participants and project partners to evaluate the latest status of the project, discuss any changes, and cross examine them on the information presented in the monitoring report.
- Review of information flows for generating, aggregating and reporting the monitoring parameters and verification of calculations and assumptions made in determining the SDG data and emission reductions. This was done by review of the documents and excel spreadsheet calculations, survey results database, test reports and sampling spreadsheet and interviews with the project developer and project partners to review the data flows by telephone and video conference.
- Interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the monitoring plan.
- A cross-check between information provided in the monitoring report and data from other sources including the monitoring survey database, KPT results, Water Quality Test reports, purchase/distribution records to establish the existence of a clear audit trail and records that validate or invalidate the stated data. A sample of the paper purchase records and monitoring survey records was selected at random by ERM CVS and scanned and sent by the project developer for review.
- Interviews with the project developer and project partners to discuss the quality control and quality assurance measures taken, and check whether these are in line with the monitoring plan and monitoring methodology and the QA/QC steps followed in the previous monitoring periods.

A detailed document review was undertaken. This included the PDD and its carbon monitoring plan, the sustainability monitoring plan in the Gold Standard Passport and GS4GG Transition Annex, the validation report, the applied monitoring methodology, relevant external data and reports, evidence documents, and relevant decisions, clarifications and guidance from the Gold Standard, and documents from the CDM Executive Board where relevant.

The desk review included

- A review of the data and information presented to verify completeness and consistency in accordance with relevant Gold Standard requirements
- A review of the monitoring plan and monitoring methodology, paying particular attention to the frequency of measurements, quality of metering equipment (including calibration requirements) and the quality assurance and quality control (QA/QC) procedures
- An evaluation of data management and the QA/QC system in the context of their influence on the generation and reporting of emission reductions.

A complete list of all documents reviewed is contained in Annex 1.

During previous verifications, acceptance sampling has been used to validate the results of the project's surveys, visiting a sample of households and conducting surveys and observations in the home. This is not possible during the current pandemic, therefore ERM CVS used alternative methods to check the validity of the monitoring surveys:

- ERM CVS evaluated the sampling plan and sampling implementation, survey design, the wording and order of the questions, selection and training of the surveyors, the working of the smartphone app, data cleaning, removal of outliers, data processing, QA/QC process and data reporting to ensure that the survey results are valid. ERM CVS did this by means of review of documentation, survey forms, dataset and interviews with surveyors.
- ERM CVS determined whether the survey has followed the 'Requirements and Guidelines for carrying out usage surveys for projects implementing improved cooking devices' and the Gold Standard 'Guidelines for carrying out usage survey for projects implementing household water filtration technologies'.
- ERM CVS interviewed surveyors to check their competence and experience for carrying out the surveys. ERM CVS also interviewed those responsible for cleaning and processing the survey data, training surveyors, carrying out QA/QC, and calculating the resulting emission reductions.
- At the previous verification ERM CVS carried out DOE household surveys using the same survey questions as used by

the project, and also asked additional questions related to the level of satisfaction, demographic issues, maintenance process, seasonal cooking differences and daily cooking practices in order to ensure that end users had a good understanding of the project's survey questions and check for any potential survey bias in the way questions are asked. The survey was found to be unbiased, reliable and demonstrating a good level of user understanding. Since the same survey questions and methodology are used in this monitoring period, the risks associated with the survey questions and methodology are considered to be low.

3.4.2. Reporting

Following the desk review and interviews, a draft report was prepared with the preliminary findings of the verification. Where it is not possible to confirm compliance, the verification team raised findings as follows:

- Clarification Request (CL): where information is insufficient or not clear enough to determine whether the applicable requirements have been met.
- Corrective Action Request (CAR): This is issued where:
 - Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;
 - Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impair the estimate of emission reductions;
 - Issues identified in a Forward Action Request (FAR) during validation (or previous verification) to be verified have not been resolved by the project participants.

The verification process may be stopped until this information has been made available to the verifiers' satisfaction. Failure to address a CL may result in a CAR. Information or clarification provided as a result of a CL may also lead to a CAR.

Forward Action Requests (FAR) may also be raised for actions if the monitoring and reporting require attention and/or adjustment for the next verification period. These have no impact upon the completion of the current verification activity.

After satisfactory close out of CARs and CLs, the final report presents the verification activities undertaken; the issues raised, and explains how these issues have been closed out to enable the final verification conclusions to be made.

3.4.3. Independent technical review

The verification activities and content of the report are subject to a review by an independent technical reviewer. The role of the Technical Reviewer is to provide oversight that all procedures have been followed by the verification team and all conclusions justified and supported by evidence. The Technical Reviewer will either accept or reject the recommendations made by the verification team.

4. Verification Findings

4.1. Status of open issues from validation and previous verification

ERM CVS reviewed the validation report for this project, the previous verification report and the Gold Standard reviews of the project registration. The FARs have been addressed as follows:

From previous verification:

Forward Action Request	Date and document (Validation or verification)	Verification activities undertaken to close the FAR	Draft OK/ CAR/ CL	Final OK/ Not OK
FAR 1: Of 57 records checked for scenario 2 (dual households), 5 contained incorrect dates. Additional QA/QC steps should be put in place for scenario 2 before the next verification in order to minimise the recurrence of such errors.	Verification report for 4 th monitoring period, version 02.3, dated 5 Feb 2019	The FAR relates to distribution records for project scenario 2 (dual households). No new distributions have been made during this monitoring period for project scenario 2, therefore it is not possible to evaluate the effectiveness of additional QA/QC measures put in place for new sales. However the management of scenario 2 has moved to Ecofiltro, all distributions in future will be managed by the Ecofiltro team and the two employees from Socorro Maya responsible for follow up with households are now employed by Ecofiltro. QA/QC of past Socorro Maya distributions was done in 2018, following the raising of this FAR /30/. QA/QC processes employed by Ecofiltro are not documented in a manual or procedure that can serve as a point of reference. There is an old monitoring manual for the project /11/, but this has not been updated to reflect the changes in the project (e.g. Ecofiltro now manages monitoring of both project scenarios). FAR 1 was therefore raised.	FAR 1	FAR 1

From Gold Standard review of Issuance 4:

Forward Action Request	Date and document (Validation or verification)	Verification activities undertaken to close the FAR	Draft OK/ CAR/CL	Final OK/ Not OK
Forward Action Request # 1: (from Deviation request) PD shall reassess the ERs obtained from the adjusted value using a measured value for the same age-groups at the time of next issuance request (MP5). If the issued ERs for 2nd year (MP4) using the adjusted value are more than those using the reassessed, measured value (MP5), PD will be asked to compensate the emission reductions from MP5. If less, no extra emission reductions can be claimed. PP shall note that the Usage Survey requirements will apply for MP5, however, for the purposes of comparing the adjusted value, the cap will not apply.	GS issuance review for issuance 4, 15 Feb 2019	The project developer has reassessed the emission reductions from year 2 of issuance 4 using the lowest values for each parameter obtained in issuance 5 /14/. The most conservative values for the following parameters were more conservative than the ones applied in issuance 4: Usage Percentage Water Filter Scenario, Usage Percentage Stove, Usage Percentage Filter Dual Scenario, and LPG Users Water Filter Scenario; therefore these values were applied in the calculations. ERM CVS has reviewed the spreadsheet calculations /14/ and confirmed that the calculations are conservative and that the FAR has been implemented. The Gold Standard usage survey requirements for projects implementing household water filtration technologies were applied during issuance 5 (see below) and for the purposes of comparing the adjusted value, the cap was not applied.	OK	OK
Forward Action Request # 2: According to the "Guidelines for carrying out usage surveys for projects implementing household water filtration technologies", the topic on Water storage should be	GS issuance review for issuance 4, 15 Feb 2019	The Gold Standard "Guidelines for carrying out usage surveys for projects implementing household water filtration technologies" require usage surveys to 'ask and observe whether and how the respondent stores the filtered water' to 'inform whether filtered water can be or	OK	OK

Forward Action Request	Date and document (Validation or verification)	Verification activities undertaken to close the FAR	Draft OK/ CAR/CL	Final OK/ Not OK
considered when conducting the usage survey.		is being stored' and to 'rule out users of the project household water treatment unit that do not store filtered water'. The guidelines suggest two example questions that could be used: 'Is there a safe storage container that contains filtered water in it?' and 'If 'no', when was the last time there was filtered water in it?'. In the case of the project survey /23/06/, the survey checks if the Ecofiltro-provided safe storage container (an integral part of the Ecofiltro unit) is present by asking the surveyor to observe and take a photo of the unit, and note down the serial number. The survey also asks the surveyor to check if there is water inside or it is still wet. Ecofiltro water filters have a built-in water storage container (bucket) and so all filtered water must be stored safely by design. ERM CVS confirmed whether the bucket of the Ecofiltro meets the criteria for safe storage containers, and whether survey questions met the requirements of the Guidelines. Please see section 4.4.2 below for details of how this was verified.		
Forward Action Request # 3: The PP is requested to conduct the water quality test quarterly following the "Rule update: Requirements for the quality standards to be met by safe water supply projects submitted prior to 31st January 2014". If the result from MP5 shows that it is more conservative than the applied value for MP4, the ER from MP4 will be adjusted accordingly and be deducted in MP5 issuance.	GS issuance review for issuance 4, 15 Feb 2019	WQTs have been conducted quarterly. The WQT results are combined with the result of the usage parameter of (79%) included in calculations. The usage parameter for the filters is multiplied by the % of WQT that passed the quality needed. The result obtained is more conservative than the conservative approach applied in Year 2 of MP4 and therefore it is included in the calculations of the adjusted (deducted) ERs for MP 5 to compensate. However this FAR has not been mentioned in the monitoring report. CAR 1 was raised. In response, the MR was updated and CAR 1 was closed. Please see section 5 (remediation requests) below for details.	CAR 1	OK
Forward Action Request # 4: PP shall apply the new usage survey guidelines prior to submission for next verification.	GS issuance review for issuance 4, 15 Feb 2019	ERM CVS has reviewed the usage survey /23/ for project scenario 2 (dual households – those households with a stove and a filter) against the Rule Update: Requirements and Guidelines for carrying out usage surveys for projects implementing improved cooking devices, dated 23/08/2017. The project has not applied continuous stove use monitoring, and therefore in accordance with the guidelines usage rates are capped at 90%. ERM CVS reviewed whether the project has implemented the mandatory requirements: define use vs non-use, conduct a household usage survey, and verify accuracy of data. ERM CVS checked whether the project has also applied the 'best practice' practices of field team training and supervision, end-user training and follow-up, and an awareness campaign. FAR 03 was raised in relation to verification checks of the usage survey results for cooking stoves. Please see section 4.4.2 below for further details.	FAR 03	OK

4.2. Project Implementation in accordance with the PDD and GS Passport/GS4GG Transition Annex

ERM CVS evaluated the conformity of the project activity and its operation with the PDD and GS Passport/GS4GG Transition Annex. This assessment was undertaken on the basis of review of documents and interviews with relevant personnel, review of any changes since the last verification, and the in-depth site visit undertaken for the previous verification.

ERM CVS assessed whether all features of the project as described in the PDD and GS Passport/GS4GG Transition Annex are in place and that the PP has operated the project in accordance with operational criteria set out in the PDD and GS Passport/Transition Annex.

The project covers distribution and sales of the cooking stoves and water purification devices. The volumes of sales are not projected in the PDD. No new stoves were disseminated during this crediting period – no new scenario 2 (dual) households were added. Filters continued to be disseminated under scenario 1.

4.2.1. Overview of project design

The current monitoring period details the implementation of 2 project scenarios:

- Project Scenario 1 (hh-wt): Household Water Treatment - consisting of households using project water treatment technologies that displace the use of biomass for water purification.
- Project Scenario 2 (hh-dual): Household Improved Cookstoves + Water Treatment - consisting of dual implementation of project improved cookstoves and water treatment technologies that displace the use of biomass for water purification and allow for the efficient use of biomass for cooking.

The registered PDD includes an additional scenario (Project Scenario 3 (hh-ics): Household Improved Cookstoves (cookstoves only), but this scenario does not apply for the current monitoring period as no households have received just a stove on its own.

EcoFiltro has also distributed a number of the household water filters to schools as part of a philanthropic initiative. Although the technology is the same and emission reductions could be calculated in a similar manner, the schools have not been credited during this monitoring period or any previous monitoring period. Sales by EcoFiltro to urban areas are also not counted under the Gold Standard project: only direct sales and sales through NGOs/CBOs in rural and peri-urban areas are included, as confirmed through interviews with EcoFiltro staff, monitoring staff, review of the total sales record and detailed customer database /03/, and on the basis of the previous site visit performed by ERM CVS for the last verification.

The project targets rural and peri-urban domestic fuel wood using populations within Guatemala, the majority of whom use traditional unimproved stoves. It aims to improve the health and incomes of Guatemalans by reducing time and money spent acquiring fuel for water boiling and cooking, and by providing local populations with improved access to clean water. The project provides affordable improved cook stoves to replace inefficient traditional open fires (i.e. 'polloton'), and high quality, affordable water purification devices that increase access to safe drinking water and reduce the need for boiling water for drinking/sanitation.

The project is currently implemented with the involvement of the following partners:

- Ecofiltro S.A. is a Guatemalan business created to manufacture and market the locally designed Ecofiltro water purification devices, to help address the lack of access to clean drinking water in Guatemala. It manufactures and distributes the Ecofiltro technology as well as now providing overall management of the project under both scenarios, covering project distribution, follow up, training and monitoring.
- Natural Capital Partners (NCP) is an international carbon project developer. NCP works with EcoFiltro to help manage the carbon credit project, develop the Gold Standard documentation & calculation of emission reductions and SDG outcomes, market the credits and work with the VVB.
- Socorro Maya is a non-profit Guatemalan organization with the goal of serving the humanitarian needs of the poor. It distributed the Eco-stove ('Ecoestufa' in Spanish) and Ecofiltro to Guatemalan communities in project scenario 2 but has now handed over responsibility for this to Ecofiltro and is no longer directly involved in the project. No new stoves were distributed during this monitoring period. Two Socorro Maya members of staff have been employed by Ecofiltro to assist with the management and monitoring of the project.
- Ecocomal is a stove manufacturing company with operations in Guatemala, and it is the company in charge of producing the project's stove. However no new stoves were distributed during this monitoring period.

A brief description of the project technologies has been presented below:

- Eco-Stove ('Ecoestufa' in Spanish): The Eco-stove was designed by engineers at CEMEX (a Mexican cement company) with the support of local partner Socorro Maya, an improved stove design expert - Peter Scott, and the Burn Design Lab. The stove is a large metal 'plancha' stove made up of cinder blocks and concrete, as checked during the household inspections on site for the 4th verification. The average thermal efficiency of the stove is 15.4% and the stove has a power output of 8.95 kW, with a lifetime of 10 years, which was cross-checked against the Registered PDD/02/ and with the manufacturer's specifications /19/. The stove is designed to be locally appropriate for Guatemalan cooking needs, providing beneficiaries ample space to cook daily food, local foods and large meals.
- Ecofiltro Water Filter: The Ecofiltro is manufactured locally by Ecofiltro S.A. This water filter purifies water by a gravity fed porous ceramic filtration element inside a bucket container with tap/spigot. The ceramic element has a pore size of 0.6 to 0.3 microns and is lined with colloidal silver which helps to remove impurities and disinfect the filtered water. The

filter has a flow rate of 1-2 liters per an hour and a maximum capacity of 20 liters and has a lifespan of at least 2 years, which was checked against the manufacturing specifications/19/.

Compliance question	Verification activities undertaken	Verification findings (including justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
What is the Implementation and operation status of the project? Are all physical features of the project activity in place as per the PDD?	Review of the monitoring report and registered PDD Review of project sales records (TSR) and Detailed Customer Databases (DCD) Interviews with Project Partners listed in A.2.	ERM CVS confirmed that the project activity implementation for the monitoring period consists of the installation of Ecofilters distributed by Ecofiltro S.A through CBOs/NGOs or local distributors in Guatemala (Project Scenario 1), and stoves and filters previously distributed by Socorro Maya (Project Scenario 2) and now also under the management of Ecofiltro (no new stoves were disseminated in this monitoring period). ERM CVS confirmed through interviews with Ecofiltro and review of a sample of scanned detailed customer records for Ecofiltro (end user receipt/user agreement copies) /25/ and scanned sales records for Ecofiltro sales /26/ that the same model of Ceramic Water Filters has been disseminated during this monitoring period as described in the registered PDD and in the previous verifications.	OK	OK
Does the monitoring report correctly state the implementation and operational status of the project activity?	Review of the monitoring report and the registered PDD. Interviews with project implementation staff and project partners listed in A.2. Review of project sales records (TSR) and Detailed Customer Databases (DCD).	The project description section of the MR does not describe the fact that Socorro Maya is no longer involved in the project, and who is now managing project scenario 2 households. CL 01 raised. In response to CL 01, the MR was updated and an explanation of the withdrawal of Socorro Maya and the enhanced role of Ecofiltro has been provided. ERM CVS confirmed the description against the interviews with Ecofiltro staff. In conclusion, the MR is fully consistent with the PDD/1/ and includes a clear description of the monitoring campaign and surveys and all physical features of the project activity.	CL 01	OK

Compliance question	Verification activities undertaken	Verification findings (including justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
Have provisions been implemented for the transfer of carbon rights to the project developer?	Review of the monitoring report and the registered PDD. Interviews with project implementation staff and project partners	ERM CVS has confirmed that provisions have been implemented for the transfer of carbon rights to the project developer. <u>Carbon Rights Waivers:</u> The requirements set out in the methodology and the registered PDD concerning carbon rights waiver information, are as follows: Methodology: 'The project proponent must clearly communicate to all project participants the entity that is claiming ownership rights of and selling the emission reductions resulting from the project activity. For technology producers and the retailers of the improved technology or the renewable fuel in use, this must be communicated by contract or clear written assertions in the transaction paperwork. If the claimants are not the project technology end users, the end users will need to be informed and notified that they cannot claim for emission reductions from the project'. Footnote 6 of the methodology goes on to say 'For example, leaflets distributed with the products alerting end-users to the waiving of their carbon rights in exchange for pricing of the approved technology which discounts its true cost (waiver forms signed by end users are another example). The PDD implemented these requirements as follows: 'Transfer of carbon rights will be explained at local consultations and end-user technology trainings. Stickers containing an explanation that the rights associated with the environmental benefits of the technology belong to Ecofiltro will be affixed to technologies. Wherever possible credit waiver agreements that stipulate the transfer of carbon rights from the end-user to Ecofiltro will be distributed and agreed upon at the point of distribution. Claimants rights will be explained and agreed upon with the technology producers and retailers of improved technologies through contracts or clear written assertions. Finally, given that the technology end-users are not the claimants they will also be notified through the waivers that they cannot claim for emission reductions from the project'. Validation of CRWs at this verification: For project scenario 1, ERM CVS reviewed the carbon rights waiver information, which is actually printed on the side of all the EcoFiltro buckets themselves, hence is available to all users. ERM CVS confirmed that the wording around carbon rights is appropriate and in line with the PDD/methodology expectations /21/. ERM CVS also confirmed through interviews with Ecofiltro trainers that transfer of carbon rights was explained at local consultations and trainings, albeit in a manner that was understandable to local people (based on ERM CVS's site visit for the previous verification, most households are not familiar with the concept of carbon credits or even greenhouse gas emissions reductions and hence it is explained in terms of environmental benefits that help to support the project). For project scenario 2, no new distributions have been made during this monitoring period, therefore no new carbon rights waivers have been needed. In the 4th verification ERM CVS	OK	OK

Compliance question	Verification activities undertaken	Verification findings (including justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
		confirmed that Socorro Maya communicated the transfer of carbon rights both verbally at the point of sale, and in writing on each sales contract signed by all the end-users at the point of sale. ERM CVS checked a randomly selected sample of these during the 4th verification site visit, and CRWs were found to be in place for all sales checked. Since Socorro Maya assembles and distributes the stoves themselves, no other retailers or distributors are involved. ERM CVS also confirmed that carbon rights ownership has been communicated to the technology producers and the retailers of the improved technology (Socorro Maya and EcoFiltro) by reviewing the Emission reduction Purchase Agreement (ERPA) contract /05/. NGO/CBO partners of EcoFiltro who help distribute water filters are also asked to sign a carbon rights waiver. ERM CVS checked a random sample of CRWs from 5 NGO partners /32/. ERM CVS confirmed through interviews with Ecofiltro that NGOs/CBOs that do not return a signed carbon rights waiver are telephoned to explain that by participating in the programme, they agree to transfer any carbon rights to the project.		

Conclusion

It can be confirmed that all physical features of the project activity have been implemented and operated in accordance with the PDD and the Gold Standard Passport. No specific monitoring equipment had to be installed according to the monitoring plan /5/. Only one type of stove and one type of ceramic water filter have been disseminated under the project. It is further noted that no new distributions were made for project scenario 2 (dual households) during this monitoring period.

4.3. Compliance of the monitoring plan with the monitoring methodology

ERM CVS evaluated whether the monitoring plan (for emission reductions – SDG 13) complies with the requirements of the applied methodology.

Compliance question	Verification activities undertaken	Verification findings (including justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
Is the monitoring plan in compliance with the applied methodology?	Check of the monitoring plan in the PDD against the applied methodology	The application of the monitoring methodology was found to be appropriate and ERM CVS confirms that the monitoring plan is consistent with the requirements of the Gold Standard Methodology “Technologies and practices to displace decentralized thermal energy consumption” (version 3.1).	OK	OK

Conclusion

ERM CVS confirms that the registered monitoring plan is in accordance with the methodology applied for the project activity.

4.4. Compliance of monitoring with the monitoring plan

4.4.1. Overview of monitoring system

During this monitoring period, continuous monitoring was conducted, thereby capturing both dry and wet seasons, as well as harvest and non-harvest seasons. Monitoring was led by two full time monitoring staff in Guatemala, employed by Ecofiltro.

Monitoring employees were employed for the task of conducting monitoring and for cross-training other field staff within the organization to conduct monitoring as part of their overall role. The staff were trained to conduct monitoring and usage surveys, WCFTs and KPTs. Randomized selection of households for surveys, WCFTs and KPTs was done and data was collected in real time via smart phones, allowing for monthly review by Natural Capital Partners to address any operating issues.

The monitoring system, as set out in the registered PDD, includes the monitoring of the following aspects:

Sales and customer data:

Scenario 1 (filters only): The Total Sales Record (TSR) for filters /03/ was recorded from sales invoices from bulk sales. Due to Ecofiltro's distribution model of distributing filters both directly and in batches to NGOs/CBOs and communities, and the difficulties of collecting sales information at the end-user level, the PP elected to track bulk sales as per the methodology. The TSR includes distributors (or end-users' if sold directly) names, number of technology units in the batch, date of sale, and contact information when available. The technology model was not included as all filter technologies distributed were of the same model. The Detailed Customer Database (DCD) for project scenario 1 /03/ is compiled from end user registrations completed by EcoFiltro or by resale partners, and includes individual product serial numbers, end-user information and specific dates of delivery/sale to end users. Detailed customer data has been obtained for more than ten times the minimum sample size for monitoring surveys and field tests. 6596 end users were captured in the DCD for project scenario 1 in year 1, of which 3748 were direct sales by EcoFiltro (57%) and the rest were bulk sales (through NGS/CBO partners). 2274 end users were captured in the DCD for project scenario 1 in year 2, of which 1656 (73%) were direct sales by Ecofiltro and the rest bulk sales. There has been a considerable improvement since issuance 4 in obtaining detailed customer data for project scenario 1 and in getting more end user registrations back from NGO/CBO partners – based on the interviews with the project developer and project partners this is down to investment by Ecofiltro in a network of regional representatives, plus the two field monitoring staff hired from Socorro Maya, who collect detailed data during distributions by NGO/CBO partners, as well as further work with NGO/CBO partners to improve their responsiveness.

In order to ensure filters are only credited from the date they are actually delivered to end users, Ecofiltro tracks the date of sales invoices for bulk sales, which indicate the date the filters were delivered to NGOs/CBOs, and the date of individual registrations in the DCD (delivery notes for filters to end user households) which indicate when the filters were delivered to end users. The data on bulk sales and detailed customer registrations are used to conduct a lag analysis by Natural Capital Partners to determine the time differential between the date of sale and the receipt of the filters by end users. ERM CVS reviewed this analysis, contained in the ER calculation spreadsheets /03/. Please see below for further details.

The filters distributed in scenario 2 are also manufactured by EcoFiltro, but all sales of filters by EcoFiltro to Socorro Maya are recorded in the TSR, but removed from crediting under Project Scenario 1 as these filters are credited under Project Scenario 2.

No new distributions were made under project scenario 2 during this monitoring period.

EcoFiltro communicates carbon rights via a CRW printed clearly on the side of the bucket of the filter itself /21/. This was checked during previous verifications in the field, and photos of the buckets were checked during this verification.

Scenario 2 (stoves and filters): The TSR is collected from sales invoices, and includes each individual unit sold. The database /03/ includes the date of installation, end-user's name and contact information (when possible), serial number, and the geographic location (community and department). No new distributions were made under project scenario 2 during this monitoring period. Since all stoves/filters distributed were of the same model, the model was not recorded. An integral part of Socorro Maya's sales and customer care process is the filling out a registration form that serves to collect end user contact information. These records are also used for Socorro Maya's internal follow-up processes for warranties and servicing. Because Socorro Maya distributed the technologies directly (indeed, they build the stoves inside the households), they were able to get detailed data for all end users. Hence, for project scenario 2, the TSR = the DCD. The TSR/DCD is used for customer follow-up and sampling for project monitoring. All sales data for Socorro Maya was currently collected in paper form then entered manually into the excel database (although based on interviews with the project developer, an electronic data collection system is ready for use if and when new distributions are made under project scenario 2).

Socorro Maya communicated the transfer of carbon rights and the need to dismantle traditional stoves on each sales contract signed by the end-users. A component of warranty registration informed the consumer that enrolling in the warranty program also waives rights to carbon credits associated with the use of the devices. Warranties are invalid if the end-user continues to use their baseline stove.

Surveys and tests:

Usage surveys: Usage surveys are designed to estimate the percentage of project technologies still in use within the sales population, i.e. to account for drop off rates as project technologies age and are replaced. The usage survey provides a single usage parameter that is weighted based on drop off rates that are representative of the distribution of stove vintages in the total sales record. All usage surveys are done by means of visual inspection/face-to-face assessments.

Monitoring surveys: The monitoring surveys are combined with the usage surveys, and are used to investigate changes over time in a project scenario, providing information on year-to-year trends in end user characteristics such as technology use, fuel consumption and seasonal variations.

Baseline and project performance field tests: The baseline and project performance field tests (BFT and PFT) measure real, observed technology performance in the field.

Baseline Water Boiling Tests (BWBT): these are conducted for water treatment project scenarios to measure the performance of baseline stoves used for boiling water. The test results are used to determine the quantity of fuel required to purify by boiling one litre of water for 10 minutes using technologies and fuels representative of the baseline scenario. Baseline water boiling tests only need to be updated if the monitoring surveys show that water boiling technologies change over time. They have not been updated during this monitoring period and the results of the monitoring and usage surveys did not suggest that water boiling technologies have changed /06/.

Kitchen Performance Tests (KPTs) and Water Consumption Field Tests (WCFTs): KPTs and WCFTs are undertaken biennially by trained monitoring staff. KPTs and WCFTs require 4 days in a single location to complete the tests. Where possible, US, MS, KPTs, WCFTs and WQTs were conducted in tandem on the same households for consistency and validation of data. Where the questions in the KPT or WCFT overlapped with the MS/US, they were not repeated because the PP used the more comprehensive MS/US survey questions.

KPTs measure wood consumed from all stoves present and in use in the home during the test period. Enumerators measured the quantity of fuel consumed in kilograms (kg) and determined the average fuel consumption per day. Equipment used for the KPTs (i.e. scales, moisture meters) is checked annually for accuracy and calibrated as needed. 60 KPTs were conducted, of which 39 were used after removal of outliers and incomplete tests.

WCFTs are designed to assess filtered water consumption for hygienic purposes (Qp,y), continued boiling of filtered water (Qp, cleanboil) and baseline treatment methods. WCFTs were carried out in line with good practice and hygienic purposes were defined correctly. Households were asked to quantify the number of people using treated water over the previous 24 hours and to list the various uses for treated water. Each respondent was then asked pour the amount of water utilized over the previous 24 hours for drinking, washing hands and washing fruits and vegetables (hygienic purposes) into a measuring container to ascertain the amount of treated water used for hygienic purposes, and the same was done for the amount of treated water used for other (non-hygeinic) purposes. The enumerators could then measure the quantity of water. 50 WCFTs were carried out for scenario 1 (42 were used after removal of outliers and incomplete tests) and 60 for scenario 2 (39 were used after removal of outliers and incomplete tests).

Water Quality Tests: The water quality tests (WQT) were conducted to ensure that the water filters disseminated during the operation of project activity are treating water effectively. Water quality testing was conducted by sending samples taken in the field to third party laboratories. The tests were undertaken by Biomed and Contro-Lab, independent laboratories in Guatemala, based on the number of e-coli present in 100ml of water, following the Standard Methods (SM) for the Examination of Water and Wastewater by the American Public Health Association (APHA) /17/. As per Guatemalan and World Health Organization Standards, and as consistent with the methodology and PDD, any filter samples exceeding 1 CFU of Ecoli per 100 ml were considered to have failed the test. 87 WCTs were conducted, as checked against the lab test reports /17/, and all results could be used.

NRB fraction: The non-renewable biomass fraction is fixed based on the results of the NRB assessment. Over the course of a project activity the PP may at any time choose to re-examine renewability by conducting a new NRB assessment. In case of a renewal of the crediting period the NRB fraction will be reassessed as any other baseline parameters and updated in line with most recent data available. The NRB fraction was not reassessed during this monitoring period.

Leakage: this is assessed biennially based on an assessment of each of the leakage sources identified by the methodology. An assessment of leakage was carried out for this monitoring period.

4.4.2. Compliance of monitoring with monitoring plan and monitoring methodology

Compliance question	Verification activities undertaken	Verification findings (including justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
Was the Total Sales Record collected accurately and in accordance with the methodology and registered monitoring plan?	Review of the Total Sales Records & Detailed Customer Database in the ER spreadsheets /03/ Review of sales invoices Interviews with project implementation staff Review of Ecofiltro monitoring procedures	The total sales record is used to determine the number of units sold, and the length of time they have been in use. Scenario 1: EcoFiltro sells some filter units directly to households, and also sells bulk consignments to preselected NGOs, who sell the filters to households that they work with. Of the total of 69,400 filters that were operating for at least part of this monitoring period, 44% were distributed directly by Ecofiltro, and 56% were sold via NGOs. Based on interviews with EcoFiltro monitoring staff and review of the database and copies of scanned paper records, ERM CVS was able to confirm that in this monitoring period, EcoFiltro has conducted training directly with end-users during product distributions for bulk sales as well as direct sales (in a change to previous practice when NGOs were trained by Ecofiltro and then expected to train households). ERM CVS reviewed the training material /16/, the user manual /20/, and the filter instructions printed on the bucket of the unit /21/. QA/QC on the total sales data is done by the EcoFiltro monitoring staff. ERM CVS reviewed evidence of the QA/QC checks performed by the Ecofiltro monitoring staff /28/. The process is that once an order for filters is placed, an invoice is issued. When the invoice is paid, the filters are shipped and the information is entered into the database. The database is compared with the paper records monthly. The sales records are also used for the company's financial accounting, and therefore there is a high degree of rigour in the data collection and processing. The verification team reviewed the total sales record database and cross checked a sample of 20 bulk sale records against scanned copies of the original paper records /26/, as well as interviewed the monitoring manager of EcoFiltro. All sales records that were checked were backed up by paper records and no errors were found. Scenario 2: Since Socorro Maya distributed directly to households and collected detailed customer data for all of its sales, the total sales record and the detailed customer database are the same. The verification team reviewed the database and cross checked a sample of records against original paper records, as well as interviewed the monitoring/accounting manager of Socorro Maya, during the previous verification. No new distributions have been made during this monitoring period, so there are no new distribution records to check. Please see the section on the detailed customer database below for details.	OK	OK

Compliance question	Verification activities undertaken	Verification findings (including justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
as detailed customer data collected appropriately and is it representative of the sales record?	Review of the Total Sales Records & Detailed Customer Databases in the ER spreadsheets /03/ Review of sales invoices/records for each project scenario Interviews with Natural Capital Partners and project Partners such as Socorro Maya and Ecofiltro S.A.	The detailed customer database /03/ is used for the lag analysis for scenario 1 (determining the average length of time between a filter being shipped to an NGO and the start of use by end users) and forms the basis of the sampling frame for both scenarios /09/. Scenario 1 (water treatment only): the verification team interviewed the monitoring manager of Ecofiltro, reviewed the database /22/ and cross checked a sample of 15 detailed customer records against scanned copies of the original paper records /25/. These paper records consist of the registration slips whereby users register their product, the data from which is used to build up the detailed customer database /22/. All records that were checked were backed up by paper records and no errors were found. Not all of the NGO/CBO partners are successful at obtaining detailed customer data, but as stipulated by the methodology, detailed data has been obtained for more than ten times the minimum sample size for monitoring surveys and field tests. The rate of collection of detailed customer data has also considerably improved since the last monitoring period, attributed to the network of Ecofiltro representatives who now support the NGOs/CBOs by attending the distributions. ERM CVS reviewed whether end users receiving filters via NGOs through the bulk sales could have different characteristics to end users who directly purchase a stove from EcoFiltro. Considering that the target population is the same (rural and peri-urban households without access to clean water) and considering that NGOs are only selected that work with this target population (and urban commercial retail sales are not included in the Gold Standard project), ERM CVS considered that it reasonable to assume that the characteristics of the end users are similar. Scenario 2 (water treatment and cooking stoves): The database for Improved Cookstove & Water Treatment sales through Socorro Maya is appropriate and fully traceable. Since detailed customer data is collected for all sales under scenario 2, the TSR=DCD. The verification team reviewed the database and cross checked a sample of 20 records against original paper records on site during the previous verification, as well as interviewed the monitoring/accounting manager of Socorro Maya. No new distributions have taken place in this monitoring period.	OK	OK

Were monitoring and usage surveys implemented and data collected in a way that minimises errors and bias and ensures conservative estimate of emission reductions?	Review of monitoring and usage survey results and reports, cross checks against filled in paper questionnaires Interviews with Natural Capital Partners and Ecofiltro monitoring staff	ERM CVS confirmed that Monitoring and Usage Surveys have been conducted in line with the monitoring plan. <u>Sampling method:</u> The PP used a simple random sampling approach for all monitoring conducted during this monitoring period /09/. Separate sampling was done for the year 1 and the year 2 monitoring & usage surveys. The surveys were then carried out fairly continually throughout the year, in line with the 'continuous monitoring concept' approved by the Gold Standard /07/08/. All of the records in the DCD were assigned a random number and then sorted numerically which has the effect of randomizing the data /09/. The first 1,000 entries from the randomised list were then selected, sorted by date of sale and reviewed to confirm that it includes at least 60 registrations (double the required number) for each age of the applicable technology /09/. More random households were selected from the Sampling Database until the sample selection includes at least 60 of each age of the monitored technology /09/. The sample selection is then sorted by community, so that the surveyors can visit all of the selected households that are in the same location at the same time – essentially the simple random sample is 'clustered' by community to make visiting the sampled households practically viable. The sampling method of clustering the simple random sample by community was considered appropriate given the dispersed nature of communities across Guatemala and the difficulty of reaching households if they are selected in a totally random order (not sorting and clustering by community). Communities were visited and the randomly selected households within them surveyed, until sufficient households had been surveyed overall. ERM CVS reviewed the sample to confirm that the sampling approach was correctly applied for this monitoring period /09/. ERM CVS interviewed the monitoring team representative to confirm how the sampling was carried out. The sampling approach is consistent with the previous monitoring period. The M&E team travelled to a location and stayed for 4 consecutive days allowing for KPT and WCFT tests to be completed, as well as the monitoring surveys / usage surveys (MS/US). <u>Sample size and sampling frame:</u> For stoves (dual households – project scenario 2), the Total Sales Record was used as the sampling frame. Stoves younger than 6 months at the time of monitoring are excluded from consideration, to allow for a sufficiently long (representative) period of use before users were questioned on their usage patterns (however there were no new stoves distributed during this monitoring period so this has no impact). For filters (project scenario 1), the Detailed Customer Database was used as the sampling frame and filters older than 24 months at the time of monitoring were excluded from consideration. In line with the methodology, the PP ensured that the average age of filters surveyed in the usage survey was greater than six months (the average age of filters surveyed in year 1 was approximately 10 months and in year 2 approximately 9 months). The sample frames were confirmed to be appropriate.	CL 02	OK
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Compliance question	Verification activities undertaken	Verification findings (including justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
		During previous verification site visits visit it was possible to confirm that the target population in different departments where the technology installed is homogeneous. No significant differences in terms of cooking or water treatment practices, domestic customs or wood consumption behavior within the same regions and communities were observed. By review of the sampling frame / sample selection spreadsheet /09/, ERM CVS verified that, since there are more than 1000 technologies in the field the PP thus elected to monitor at the highest minimum sample size requirements outlined by the methodology. The methodology specifies a minimum sample size of 100 for monitoring and usage surveys, with at least 30 samples of each technology age. The total sample size for monitoring and usage surveys in year 1 was 108 for scenario 1 (water treatment only), and 137 for scenario 2 (dual households), and in year 2 the sample size was 114 for scenario 1 and 151 for scenario 2. The project achieved more than 30 surveys of water filters in each age category (0-1 and 1-2 years) for project scenario 1 (water treatment-only households). However in project scenario 2 (dual households), the minimum of 30 samples of each age was not met in several cases: In the Year 1 surveys: - for water filters aged 1-2 years; - for stoves of age categories 0-1 year, 1-2 years and 2-3 years In the year 2 surveys: - for stoves aged 1-2 and 2-3 years /06/. /06/. CL 02 was raised to clarify how methodology requirement for sample size was met. In response the PP presented further explanation and justification of the sample sizes achieved. In the case of stoves, it was not possible to sample 30 devices from the 2017 or 2018 age groups, since less than this number were installed in each of those years. The Project developer managed to survey a relatively high proportion of those stoves despite not reaching 30 devices. For stoves installed in 2016, only 3 less than the minimum were surveyed. Based on interviews with NCP, ERM CVS understands that there were challenges at the moment of performing the surveys due to limited staff resources as a result of Socorro Maya's withdrawal from the project, as it faced financial difficulties. Based on previous verification site visits, ERM CVS confirms that reaching enough households is a very time-intensive and labour-intensive process, and the issues experienced in this monitoring period illustrate the challenges of working in remote rural communities in a developing country. In the case of water filters aged 1-2 years for dual households in the year 1 survey, because the project partner for the dual scenario, Socorro Maya, was in the process of withdrawing from the project in 2017, few water filters were replaced at that time for the dual households. Once EcoFiltro took over management of the households, new replacement filters were disseminated, however that meant that at the time of the survey, most dual households had filters aged less than 1 year and few had filters aged 1-2 years. Because the sample was selected on the basis of the stove ages for this scenario, less than 30 filters age 0-1 years were sampled. However the volume of emission reductions from water filters in the dual scenario is only around 1% of the total ERs from that scenario		

Compliance question	Verification activities undertaken	Verification findings (including justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
		as the stoves make up by far the larger proportion of emission reductions. CL 02 was closed. See more details in the section 5.1 <u>Survey design and survey questions:</u> The survey design was based on the survey that was carried out in the previous monitoring period, with modifications to some questions based on the Gold Standard feedback from the previous verification – to include additional questions about water storage. The surveys were carried out by the project monitoring staff: in year 1 this was Eddy Melendez from NCP, who also carried out the surveys in the previous monitoring period, and who has been trained and experienced in conducting the surveys for this project, as verified in MP4. In year 2 the surveys were conducted by two field monitoring staff hired from Socorro Maya by Ecofiltro. They were trained by Eddy Melendez in March 2019 /22/ and ERM CVS interviewed the surveyors to check their competence and experience for carrying out the surveys. For filters, devices older than 24 months at the time of monitoring were excluded from consideration for the monitoring & usage survey, because their expected lifetime, and limit of crediting, is 2 years. <u>Verification of survey results:</u> Instead of applying acceptance sampling and visiting a sample of surveyed households during the DOE site visit, which was not possible for this verification given the Covid-19 related restrictions, ERM CVS verified the validity of the survey and results by means of review of documentation, survey forms, dataset and interviews with surveyors. - ERM CVS determined whether the survey has followed the 'Requirements and Guidelines for carrying out usage surveys for projects implementing improved cooking devices' and the Gold Standard 'Guidelines for carrying out usage survey for projects implementing household water filtration technologies' (see below). - ERM CVS interviewed those responsible for cleaning and processing the survey data, training surveyors, carrying out QA/QC, and calculating the resulting emission reductions. - ERM CVS checked the survey records, including GPS tags and time stamps of the surveys undertaken, and photographs taken at each survey, as evidence that the surveys were conducted as described. - At the previous verification ERM CVS carried out DOE household surveys using the same survey questions as used by the project, and also asked additional questions related to the level of satisfaction, demographic issues, maintenance process, seasonal cooking differences and daily cooking practices in order to ensure that end users had a good understanding of the project's survey questions and check for any potential survey bias		

Compliance question	Verification activities undertaken	Verification findings (including justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
		in the way questions are asked. The survey was found to be unbiased, reliable and demonstrating a good level of user understanding. Since the same survey questions (except for modifications on water storage questions) and methodology are used in this monitoring period, the risks associated with the survey questions and methodology are considered to be low. • These measures are relevant for the evaluation of GHG emission reductions, and for the results of monitoring of the other sustainable development indicators (air quality, water quality and quantity, livelihood of the poor and access to affordable and clean energy services). • <u>Survey results QA/QC:</u> In terms of QA/QC procedures, all surveys were conducted by the full time monitoring staff and they cleaned the data to ensure consistency. A QA/QC review was done on all data & parameters by Natural Capital Partners. These procedures were checked by the verification team during the document review and interviews with the persons responsible for monitoring. No outliers were removed by the PP.		

Compliance question	Verification activities undertaken	Verification findings (including justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
Were the relevant Gold Standard guidelines relating to usage surveys followed?	Review of monitoring and usage survey results and reports, cross checks against filled in paper questionnaires Interviews with Natural Capital Partners and Ecofiltro monitoring staff	Water filters: The monitoring & usage survey /23/ for water technologies was cross checked against the Gold Standard “Guidelines for carrying out usage survey for projects implementing household water filtration technologies” and align with the guidelines /10/. <u>Introductory questions:</u> The introductory questions were slightly different from the GS guidelines partly because the water questions were asked at the end of the survey, after the stove related questions. Instead of asking if the respondent does anything to treat their water, the surveyor instead asks to be served a glass of water, and then observes whether the water was obtained from the filter or not. This is considered more empirical than relying on self-reported behavior, and is reasonable given that the survey takes place inside the kitchen and hence it can be observed whether a filter is in place or not. The survey also does not specifically ask if the person being interviewed is the primary user of the water treatment unit, although the survey does ask if they are the main cook, which is likely to be the same person. The survey does ask surveyors to observe to see if the filter shows signs of usage, includes demonstration of usage, and functionality. <u>Rate of usage:</u> The survey asked users how often they used the water filter, is there a time when they do not use the filter, and if so why. Surveyors also check to see whether the filter has been used recently by seeing if it shows signs of usage (does the filter have water inside or is wet). <u>Water storage:</u> In the case of the project survey, the survey checks if the Ecofiltro-provided safe storage container (an integral part of the Ecofiltro unit) is present by asking the surveyor to observe and take a photo of the unit, and note down the serial number. The survey also asks the surveyor to check if there is water inside or it is still wet. The answer to this must be yes if the filter is counted as in use (ERM CVS checked the spreadsheet survey results & calculations /06/) ERM CVS can confirm that all Ecofiltro water filters have a built-in water storage container (bucket) that sits underneath and around the ceramic liner – the two things are part and parcel of the same integral unit. The ceramic liner cannot be used without the bucket into which it sits (the bucket supports the ceramic liner, and water seeps out of the base and sides of the ceramic liner so requires a bucket to contain this). Hence the Ecofiltro contains built-in water storage and so all filtered water must be stored safely by design (water cannot overflow from the bucket either, as the level in the bucket	FAR 03	OK

Compliance question	Verification activities undertaken	Verification findings (including justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
		cannot be higher than the level of water in the filter due to gravity). ERM CVS confirmed that the bucket of the Ecofiltro meets the following criteria for safe storage containers: • It is not open – it is entirely covered by the ceramic filter • It is of an appropriate size – the Ecofiltro can store 5 gallons of water, as checked against the manufacturer's product specifications /12/ • It has permanently attached instructions for using the treatment method and cleaning the container • It is never used to collect water from the source, because it forms the base/stand for the ceramic liner, and contains a tap/spigot, so detaching it and using it to collect water is not practical (end users are also trained to use an appropriate container to fetch water, as confirmed by interview with Ecofiltro) • Cleaning: the GS criteria suggest the safe storage container is cleaned once a week with safe water. However due to the ceramic design of the filters, cleaning the inside of the units every week would impair filtration efficacy. Ecofiltro training material guides the users to clean the ceramic filter every 6 months, as cleaning more regularly will erode the filter itself and impair performance (could result in poor water quality). The ceramic filter/liner should only be cleaned every 6 months, along with the inside of the plastic bucket in which the filter liner sits (the outside of the bucket can be cleaned more frequently) – ERM CVS reviewed the end user training material/instructions which state this /16/. The project surveys included questions that check whether the Ecofiltro unit is being correctly used (and hence whether safe water storage is ensured), including asking the surveyor to observe filter use, asking the surveyors to check and confirm whether the filter is being used correctly, check if the unit has water inside, check if the ceramic liner is intact (if not, filtration and safe storage would be compromised), and ask a series of questions to determine whether usage practices are correct: asking the user if they were trained to use the filter, asking if they clean the bucket, asking them to demonstrate cleaning and see if the method is correct. The following additional question was asked in case water is decanted into a second container for any reason: "other storage container to save water?" and if yes, "Do you clean the other bucket?". This was added in response to a FAR raised by Gold Standard during the issuance review process for MP 4. Because the issuance review process finished in February 2019 these questions were not completed in most of the surveys in year 1. For those households where the question was asked towards the end of year 1, most responded 'yes' although this was associated with making 'Fresco', a drink similar to cool-aid or iced tea, not to store water. In year 2, all households were asked this question and most responded 'no' because the surveyors had been trained to clarify that the question is about storing water, not mixing		

Compliance question	Verification activities undertaken	Verification findings (including justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
		up drinks to be consumed straight away. <u>Physical signs of usage:</u> The surveyors are required to check the physical condition of the filter, check if it has been used (wet/contains water), take a photo of the unit, and check the physical condition (is the ceramic element broken or cracked). <u>Demonstration & knowledge:</u> The surveyors ask to be served a glass of water to see if the beneficiary actually uses the filter in practice. If so, they are asked to observe and confirm whether the filter is indeed being used correctly. <u>Functionality:</u> Surveyors are asked to check the physical condition of the filter (is the ceramic element broken or cracked). Surveyors request a cup of water and observe whether the filter is working properly. A device is only confirmed as in use if all of these checks are passed. <u>Other:</u> The surveys were conducted over the course of the whole year (not immediately after capacity building/awareness programmes when the users receive the filters and are shown how to use them). The GS guidelines also specify that logos should not be worn by the surveyors on their clothing, however surveyors wore clothes with the project logo on for the surveys. The reasons for this were discussed during interviews with the project developer. The project is located in rural and peri-urban communities in Guatemala which are often remote or isolated. Based on ERM CVS's experience in previous site visits, the communities are close-knit and people generally know each other, and strangers can be mistrusted. The project has done a lot of work to gain the trust and acceptance of local communities; surveyors try to be accompanied by community leaders, but this is not always possible. These areas have a history of civil war and high crime rates and they are wary of outsiders. The surveys request a lot of very personal information from respondents, and they must be done by consent. Therefore the surveyors wear clothing with the project name on it so that the community can identify and trust the surveyors. Safety concerns were also raised by project staff in relation to entering communities in unmarked clothing and unmarked vehicles, as some people can be hostile to strangers going door-to-door. ERM CVS confirmed that these real safety concerns exist, and indeed for planning previous verification site visits extensive travel risk assessments had to be done as these areas can be dangerous to visit without the guidance and acceptance of the local community. For these reasons it was considered not possible for the surveyors to wear unmarked clothing. FAR 03 was raised in order for the project developer to discuss this with Gold Standard and if necessary obtain an exemption or other way forward for future surveys.		

Compliance question	Verification activities undertaken	Verification findings (including justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
		Cooking stoves: The monitoring and usage survey questions /23/ for cooking stoves were cross checked against the '<i>Gold Standard Rule Update: Requirements and Guidelines for carrying out usage surveys for projects implementing improved cooking devices</i>' (Publication Date: 23/08/2017). The project has not applied continuous stove use monitoring, and therefore in accordance with the guidelines usage rates are capped at 90%. The project has implemented the mandatory requirements: define use vs non-use /06/, conduct a household usage survey /06/, and verify accuracy of data (the NCP monitoring manager verifies the data and conducts outlier removal). It has also applied the 'best practice' practices of field team training and supervision, end-user training and follow-up, and an awareness campaign. <u>Mandatory requirements were addressed as follows:</u> - Defining stove use and non-use: - MS/US checks whether stove is used - Frequency of use is asked - Is a traditional stove still present - Is a traditional stove still used - Which stove is used to cook each meal (breakfast, morning tea/coffee, lunch, afternoon tea/coffee, dinner, any other meal) - Kitchen Performance Tests (KPTs) are also conducted to determine stove and fuel usage - Household usage survey: - In-person usage survey is carried out - Sample size requirements were met - Survey included kitchen observation ('does the stove appear to be in regular use' in the view of the surveyor) - Primary cook is interviewed? The survey asks 'are you the main cook' and surveyors are trained to seek out and speak to the primary cook. In practice this was not always possible and in year 1 six surveys did not interview the main cook, although the surveyor still interviewed an adult with knowledge of cooking in the household. Based on interviewing the project developer during the verification, ERM CVS identified that the main cook was sometimes not available, for example due to being ill, or other unforeseen circumstances. From the site visits for the previous verification, ERM CVS can confirm that it is sometimes challenging to find the main cook at home, even when the visit has been arranged in advance, but often there is more than one person in the household who cooks or who is familiar with cooking practices. Surveyors were trained to stop the survey if the respondent cannot complete the questions and provide all the information requested. An assessment for outliers was also done by the project developer to ensure no outlier values affect the ER claims. Due to the small number of surveys		

Compliance question	Verification activities undertaken	Verification findings (including justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
		involved, the impact on the average usage rate and hence on emission reductions is not significant. All surveys in year 2 interviewed the main cook. • Photos of the cooking area: the surveyors are instructed and required to take a photo of the stove (and any other stove). Surveyors have not been instructed to take a photo of 'the whole kitchen area' (the wording used in the GS guidelines) because houses in the target population typically do not have a separate kitchen (ERM CVS can confirm this based on previous verification site visits). According to interviews with the monitoring manager of the project, privacy concerns and cultural sensitivities prevent surveyors from taking photos of the entire home in which the stove is located; this is considered reasonable given that it would be quite intrusive for households concerned and may make them more hostile to the surveyors. Nevertheless photos of the stoves themselves do serve as positive confirmation that the household was visited, the stove status and the visual condition of the stove. • GPS coordinates: these are recorded in the survey. Each survey is time and date stamped. 3. Verification checks: • After the conclusion of the year 2 survey, the project developer randomly selected and telephoned 16 (10%) of the surveyed dual households to verify that they were visited and the recorded responses are correct. ERM CVS reviewed the records of this /29/. However this was not done after the end of the year 1 surveys. Please see FAR 3. <u>Good practice guidelines were addressed as follows:</u> 1. Field team training and supervision: • The year 1 surveys were done by Eddy Melendez, who is the overall monitoring manager of the project and was previously trained on monitoring and surveys as verified in MP4. In year 2 the surveys were conducted by two field staff, who have been trained by Eddy Melendez as confirmed through interviews with the surveyors themselves. The training workshop was conducted on 29 March 2019, (although please note surveys are done throughout the year as part of the Gold Standard-approved continuous monitoring approach applied to this project). • Based on interviews with the surveyors, and the fact that both have years of experience on the project and have conducted surveys before, ERM CVS is confident that they understand the usage survey objectives, are proficient in recruitment procedures, data collection and management, and troubleshooting. ☐ Separate written guidelines have not been provided for the surveyors but instead have been incorporated into the guidance and hints contained		

Compliance question	Verification activities undertaken	Verification findings (including justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
		in the survey form itself /23/. Also the monitoring manager of NCP mentored the M&E team for the first week of surveying to ensure understanding. - Close supervision of surveyors was undertaken: the project manager Eddy Melendez trained the monitoring staff used for the year 2 surveys and personally oversaw their first week in the field. He also reviewed the data as it came in (as part of the continuous monitoring process). ERM CVS has seen a record of completion of training by both surveyors dated 29 March 2019 /22/. 2. End user training and follow-up visits: - The project conducted end user training to all stove beneficiaries, including demonstration of the stoves, and follow-up visits were done in the communities regularly, initially by Socorro Maya and now by the Ecofiltro staff (transferred over from Socorro Maya). 3. Awareness campaign: - The project conducted an awareness campaign before stove installation and continued to follow up with stove beneficiaries through regular visits to ensure stoves are being used, and no problems have arisen. This was confirmed by interviews with NCP, and with the field monitoring staff who previously worked for Socorro Maya and have now been hired by Ecofiltro.		
Were monitoring tests conducted in line with the requirements of the monitoring plan and methodology?	Review of WQT, WCFT & KPT results. Review of WCFT and KPT protocols and questions. Cross checks against lab test WQT reports Interviews with Natural Capital Partners and Ecofiltro monitoring staff	<u>Sample size and sampling frame:</u> By review of the sampling frame / sample selection spreadsheet /09/, ERM CVS verified that, since there are more than 1000 technologies in the field the PP thus elected to monitor at the highest minimum sample size requirements outlined by the methodology. For water quality tests, the 90/10 confidence/precision rule was followed to determine sample size. For KPTs and WCFTs a minimum sample size of 30 was applied. The actual sample size exceeded the minimum, even after removing outliers /09/. Water Quality Tests: through interviews with monitoring personnel and review of WQT test reports /17/ and the data analysis spreadsheet /04/ ERM CVS confirmed that Ecofiltro monitoring staff collected samples of water from end users to be conducted to the lab for quality testing. The results were provided and explained and ERM CVS has reviewed the 3rd party lab test reports /17/. 87 water quality tests were carried out across both scenarios. The results meet the 90/10 confidence/recision requirements of the methodology.	FAR 02	

		WCFTs & KPTs: ERM CVS interviewed the monitoring staff to confirm whether tests had been carried out appropriately. The monitoring staff conducted the same tests in previous years, using the same test protocols, which are confirmed to be appropriate and in line with GS guidance, therefore ERM CVS is confident that the staff are competent to conduct the tests. The monitoring staff received refresher training for this monitoring period – ERM CVS reviewed training records to confirm that both surveyors had been trained. The equipment does not need annual calibration, according to manufacturer's specifications checked by ERM CVS /27/. In previous years it was checked against a control set of scales to confirm that it was accurate, but this was not done during this monitoring period. FAR 02 raised. 50 WCFTs were conducted and 42 were used after removal of outliers/incomplete for scenario 1 (water treatment – filter – only households) and 60 WCFTs were conducted and 39 were used after removal of outliers and incomplete results for scenario 2 (dual households – water treatment and cooking stoves). The WCFT survey questions were consistent with those verified in the previous monitoring period and ERM CVS confirmed by review of the questions /23/ that they were appropriate. 60 KPTs were conducted, and 39 were used, after the removal of outliers. ERM CVS reviewed the data analysis spreadsheet /06/ and confirmed that the PP removed any outliers for the MS/US, WCFT and KPT if one or more of the following occurred: • Households refused to participate in the survey or were not able to provide access or responses for one or more days in a multi-day test. • Survey was incomplete/missing data for a significant number of questions. • Information was inconsistent or did not make sense (negative data values, for example). • Data value(s) was outside of two standard deviations above or below the mean. • Households reported using the stove or filter for commercial or institutional uses ERM CVS considered that the grounds for removal of outliers were appropriate. During this monitoring period, no outliers were identified or removed for the usage survey / monitoring survey, or from WQTs. A number of outliers were removed from the WCFTs and KPTs as mentioned above. ERM CVS reviewed the data/statistical analysis and results from the tests /04/06/ and the emission reduction calculation spreadsheets /03/ and confirmed that the calculations have been carried out in line with the methodology and the PDD and are traceable. The confidence and precision requirements for the KPT data were met and the average fuel use of the test results was used, because the endpoints of the 90% confidence interval lie within +/- 10% of the estimated mean.	
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4.4.3. Completeness of emission reduction monitoring parameters

The verification team evaluated the monitoring of each parameter stated in the monitoring plan in the PDD. The emission reduction related monitoring parameters included in the monitoring report are listed below and a full description of each parameter and the verification activities associated with monitoring of each one is included in Section 4.4.3. Monitored parameters related to other SDGs are discussed in section 4.7 below.

Parameter (as per monitoring report)	Description	Included in the Monitoring Report?	Draft OK/ CAR/CL	Final OK/ Not OK
Efficient cookstoves				
fNRB,y,ics-nb	Non-renewability status of woody biomass fuel in the scenario i during year y	Yes	OK	OK
Np,1,ics-nb	Cumulative number of days of technology use for project scenario p against baseline scenario b, in year 1	Yes	OK	OK
Np,1,1,dual,ics	Improved cookstoves in the project database for the dual-scenario, through year 1 of the monitoring period	Yes	OK	OK
Np,2,ics-nb	Cumulative number of days of technology use for project scenario p against baseline scenario b, in year 2	Yes	OK	OK
Np,1,2,ics	Improved cookstoves in the project database for the dual-scenario, through year 2 of the monitoring period	Yes	OK	OK
P,p,b,y,ics-nb,1	Specific fuel savings for an individual cookstove in the dual scenario against an individual technology in baseline scenario in year 1	Yes	OK	OK
P,p,b,y,ics-nb,2	Specific fuel savings for an individual cookstove in the dual-scenario against an individual technology in baseline scenario in year 2	Yes	OK	OK
Up,1,ics-nb	Cumulative, weighted usage rate in the project scenario, for technology during year 1	Yes	OK	OK
Up,2,ics-nb	Cumulative, weighted usage rate in the project scenario, for technology during year 2	Yes	OK	OK
LEp,y,ics-nb	Leakage in project scenario for technology in year y	Yes	OK	OK
Water treatment technologies				
Np,1,wt	Cumulative number of person-days of water consumed in project scenario p through year 1.	Yes	OK	OK
Np,1,1,hh-wt	Water filters in the project database for the water technologies scenario, through year 1 of the monitoring period	Yes	OK	OK
Np,2,wt	Cumulative number of person-days of water consumed in project	Yes	OK	OK

	scenario p through year 2.			
Np,l,2,hh-wt	Water filters in the project database for the water technologies scenario, through year 2 of the monitoring period	Yes	OK	OK
Np,1,filter,dual	Cumulative number of person-days of water consumed in the dual scenario for filters through year 1	Yes	OK	OK
Np,l,1,dual,wt	Water filters in the project database for the dual-scenario, through year 1 of the monitoring period	Yes	OK	OK
Np,2,filter,dual	Cumulative number of person-days of water consumed in the dual scenario for filters through year 2	Yes	OK	OK
Np,l,2,dual,wt	Water filters in the project database for the dual-scenario, through year 2 of the monitoring period	Yes	OK	OK
Up,1,wt	Cumulative, weighted usage rate in project scenario for technology during year 1	Yes	OK	OK
Up,2,wt	Cumulative, weighted usage rate in project scenario for technology during year 2	Yes	OK	OK
Qp,y	Quantity of raw water treated with water treatment technology and used for hygienic purposes in the project scenario p and supplied by project technology per person per day	Yes	OK	OK
Qp,cleanboil,y	Quantity of treated water still boiled in project scenario after installation of project technology, per person per day	Yes	OK	OK
LEp,i,y	Leakage in project scenario for technology l in year y	Yes	OK	OK
WQT	Performance of the treatment technology	Yes	OK	OK

4.4.4. Data and parameters monitored

The verification findings for the monitoring of each parameter related to emission reductions are set out below

Data / Parameter:	Np,1,ics-nb and Np,2,ics-nb		
Data unit:	technology-days		
Description:	Cumulative number of days of technology use for project scenario p against baseline scenario b, in year y [cooking stoves]		
Measured/calculated/default	Calculated		
Compliance question	Verification findings (including verification activities undertaken and justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK

Is the parameter monitored in accordance with the monitoring plan and are the QA/QC procedures appropriately applied? Does the monitoring report correctly state all relevant information and data relating to the monitoring of parameters during the monitoring period?	ERM CVS confirmed that the parameter is recorded according to the monitoring plan and the QA/QC procedures. The parameter is calculated based on the sales data recorded in the TSR data base for scenario 2 (as contained in the ER calculation spreadsheet) /03/. All sales from the start of the project are recorded (no new sales took place during this monitoring period). The validated expected lifetime of the stoves in the PDD is 10 years. The oldest stoves in the database were less than 7 years old at the end of the monitoring period. ERM CVS conducted cross checks on the sales data as described above, during the previous verification (no new stove distributions have taken place since then). The verifier randomly selected sales records to check their consistency with the TSR data /03/, and confirmed that the data used as the basis of the total sales record is correct. The Verifier confirms that the spreadsheet does not include technology-days corresponding to the previous monitoring period, through reliable calculation of number of days since the stove installation.	OK	OK
Conclusion	ERM CVS confirmed that - The parameter has been calculated appropriately, in accordance with the monitoring plan and methodology. - The monitoring results have been recorded consistently as per the approved frequency in the monitoring plan.		

Data / Parameter:	Np,l,1,dual,ics and Np,l,2,ics		
Data unit:	technology-days		
Description:	Improved cookstoves in the project database for the dual-scenario, through year 1 of the monitoring period; Improved cookstoves in the project database for the dual-scenario, through year 2 of the monitoring period		
Measured/calculated/default	Measured		
Compliance question	Verification findings (including verification activities undertaken and justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
Is the parameter monitored in accordance with the monitoring plan and are the QA/QC procedures appropriately applied? Does the monitoring report correctly state all relevant information and data relating to the monitoring of parameters during the monitoring period?	ERM CVS confirmed that the parameter is recorded according to the monitoring plan and the QA/QC procedures. The parameter is measured based on the sales data recorded in the TSR data base. All sales from the start of the project are recorded (no new cook stove sales took place during this monitoring period). The validated expected lifetime of the stoves in the PDD is 10 years. The oldest stoves in the database were less than 7 years old at the end of the monitoring period. ERM CVS conducted cross checks on the sales data as described above, during the previous verification (no new stove distributions have taken place since then). The verifier randomly selected sales records to check their consistency with the TSR data /03/, and confirmed that the data used as the basis of the total sales record is correct.	OK	OK

Conclusion	ERM CVS confirmed that - The parameter has been calculated appropriately, in accordance with the monitoring plan and methodology. - The monitoring results have been recorded consistently as per the approved frequency in the monitoring plan.
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Data / Parameter:	P _{p,b,y,ics-nb,1} and P _{p,b,y,ics-nb,2}		
Data unit:	tons/technology-day		
Description:	Specific fuel savings for an individual technology in the Project Scenario against an individual technology in baseline scenario in year 1 or year 2 [cooking stoves]		
Measured/calculated/default	Measured / Calculated (from the statistical analysis of the data collected from the field tests)		
Compliance question	Verification findings (including verification activities undertaken and justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
Is the parameter monitored in accordance with the monitoring plan and are the QA/QC procedures appropriately applied? Does the monitoring report correctly state all relevant information and data relating to the monitoring of parameters during the monitoring period?	P_{p,b,y,ics-nb} is the difference in the specific fuel consumption for an individual technology in baseline scenario b (P_{b,y,ics-nb}) and the specific fuel consumption for an individual technology in project scenario p (P_{p,y,ics-nb}). ERM CVS confirmed that the value of the parameter is the result of the combination of fuel wood saved per meal identified based on KPT tests /06/ and the total number of meals per day per stove unit installed in the project scenario determined from the KPTs /06/. The calculation is reliable and consistent with the results of the KPTs reviewed by ERM CVS /06/. For more details on how the KPTs were verified, please see section 4.4.2 above. The resultant value is comparable to the previous issuance (0.01892 vs 0.02068 in the last issuance)	OK	OK
Conclusion	ERM CVS confirmed that - The parameter has been monitored appropriately, in accordance with the monitoring plan and methodology. - The monitoring results have been recorded consistently as per the approved frequency in the monitoring plan.		

Data / Parameter:	Up _{1,ics-nb} and Up _{2,ics-nb}		
Data unit:	Percentage		
Description:	Cumulative, weighted usage rate in project scenario, for technology during year y [cooking stoves]		
Measured/calculated/default	Calculated (based on usage survey)		
Compliance question	Verification findings (including verification activities undertaken and justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
Is the parameter monitored in accordance with the monitoring plan and are the QA/QC procedures appropriately	ERM CVS confirmed that the parameter is determined according to the monitoring plan and the QA/QC procedures. ERM CVS confirmed that the PP conducted combined monitoring and usage surveys on the same households, sampled from the project beneficiary population. Please section 4.4.2 above for details of how the monitoring & usage surveys were verified.	OK	OK

applied? Does the monitoring report correctly state all relevant information and data relating to the monitoring of parameters during the monitoring period?	The usage rate accounts for non-usage of the Ecostove as well as continued use of baseline stoves, and usage frequency weighted by sales per age of stove. The actual usage rate value obtained in year 1 was higher than 90%, therefore in accordance with the GS <i>“Requirements and Guidelines for carrying out usage surveys for projects implementing improved cooking devices”</i>, the value has been capped at just below 90% (89.99% was applied). The monitored value in year 2 was below 90% anyway. ERM CVS cross checked the values against those from the first year of the previous monitoring period (a complete survey was not carried in year 2 of the previous monitoring period), and the values applied in year 1 and year 2 of this monitoring period are very similar to those monitored in the previous monitoring period, with the value in year 2 being slightly lower. It is reasonable to expect that the values will be similar to the values monitored previously, and any decline might be attributed to the greater age of the stoves. In summary, ERM CVS considered that the sampling and surveying processes applied are consistent with the requirements of the methodology and GS rules, and are reliable and consistent with the monitoring plan. The parameter has been monitored in line with the monitoring plan and methodology.		
Conclusion	ERM CVS confirmed that - The parameter has been monitored appropriately, in accordance with the monitoring plan and methodology. - The monitoring results have been recorded consistently as per the approved frequency in the monitoring plan.		

Data / Parameter:	LEp,y,ics-nb		
Data unit:	tCO2e/year		
Description:	Leakage in Project Scenario for technology in year y [cooking stoves]		
Measured/calculated/default	Calculated / Measured		
Compliance question	Verification findings (including verification activities undertaken and justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
Is the parameter monitored in accordance with the monitoring plan and are the QA/QC procedures appropriately applied? Does the monitoring report correctly state all relevant information and data relating to the monitoring of parameters during the monitoring period?	A leakage assessment, which is to be conducted every 2 years as per the methodology, has not been included in the monitoring report. CL 03 was raised. In response, a leakage assessment has been included in the MR and CL 03 was closed. ERM CVS confirmed that the leakage assessment was included in the MR. Leakage for cookstoves has been validated as follows: LEAKAGE SOURCE 1: The displaced baseline technologies are reused outside the project boundary in place of lower emitting technology or in a manner suggesting more usage than would have occurred in the absence of the project. It is considered reasonable that this is assessed as zero for the following reasons: Households in both scenarios predominantly use three-stone fires in the baseline (in the year 1 surveys, 79% of Ecoestufa users reported having used an open fire in the baseline; in the year 2 surveys, 95% of users reported the same). This technology is unlikely to be transferred to other households as it consists of three rocks which can be obtained anywhere and has no monetary value	CL 03	OK

	LEAKAGE SOURCE 2: The non-renewable biomass or fossil fuels saved under the project activity are used by non-project users who previously used lower emitting energy sources. It is considered reasonable that this is assessed as zero for the following reasons: • The project does not involve a switch from higher emitting to lower emitting fuels, hence is unlikely to lead to a displacement of such use outside the boundary • Wood fuel remains a valuable and declining resource in Guatemala • On the basis of the observations during the site visit for the previous verification, ERM CVS considers it unlikely that the project will have an impact of sufficient scale on aspects like wood prices to influence areas outside the project boundary LEAKAGE SOURCE 3: The project significantly impacts the NRB fraction within an area where other CDM or VER project activities account for NRB fraction in their baseline scenario. It is considered reasonable that this is assessed as zero for the following reasons: • The Project Developer has determined that total number of people reached by all activities of GS1321 is less than 1.4% of the total Guatemalan population, and thus its effects on the national NRB value is likely to be negligible • Even with all gold standard projects in Guatemala, the impact of improved stoves on NRB consumption is likely to be offset by ongoing population growth in Guatemala /18/ • The project will reassess the NRB fraction at the next renewal of crediting period anyway, and if new information is available, the NRB fraction can be updated at any monitoring period. LEAKAGE SOURCE 4: The project population compensates for loss of the space heating effect of inefficient technology by adopting some other form of heating or by retaining some use of inefficient technology. It is considered reasonable that this is assessed as zero for the following reasons: • MS/US monitoring determined that in year 1 15% of stove users reported using the EcoEstufa to heat their home. However, the overwhelming majority (86%) of these households indicated that they achieve heating by letting the fire from cooking die out (i.e. they do not use additional fuel for this purpose) /03/. In the year 2 surveys only 1 user (out of 150 surveyed) reported using the Ekoestufa to heat their home (0.67%), and this user reported that they did not use any additional fuel for this purpose. • During the household visits by ERM CVS during the previous verification, the verification team were able to confirm that almost all households who reported using the stove for heating did so by letting the fire from cooking die out. Furthermore, none of the households visited had retained their old technology, and ERM CVS also did not observe any household that had adopted another technology to heat the home. LEAKAGE SOURCE 5: By virtue of promotion and marketing of a new technology with high efficiency, the project stimulates substitution within households who commonly used a technology with relatively lower emissions, in cases where such a trend is not eligible as an evolving baseline. It is considered reasonable that this is assessed as zero for the following reasons: • MS/US monitoring shows that a small percentage of users have switched from using fuels and technologies considered higher	
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	efficiency in the baseline to only using firewood after receiving the EcoEstufa – 13% of households in year 1 reported using a gas stove in the baseline, and 1% of users in year 2. However there are challenges about asking users to recall which stove(s) they used most in the baseline when they have had the project stove for up to 6 years. /03/.		
Conclusion	ERM CVS confirmed that - The parameter has been monitored appropriately, in accordance with the monitoring plan and methodology. - The monitoring results have been recorded consistently as per the approved frequency in the monitoring plan.		

Data / Parameter:	Np,1,wt and Np,2,wt		
Data unit:	Person-days		
Description:	Cumulative number of person-days of water consumed in project scenario p through year y.		
Measured/calculated/default	Calculated (from Monitoring Survey) [Person-days = sum of ((closing date of the monitoring period - recorded sale date of each technology [or start of monitoring period, whichever is later] – lag adjustment factor), in days * number of persons utilizing the filter per HH).		
Compliance question	Verification findings (including verification activities undertaken and justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
Is the parameter monitored in accordance with the monitoring plan and are the QA/QC procedures appropriately applied? Does the monitoring report correctly state all relevant information and data relating to the monitoring of parameters during the monitoring period?	From the review of the water filter Monitoring Survey data /06/ and emission reduction calculation spreadsheets /03/, ERM CVS confirmed that the TSR for water filters records the date when the bulk sales of filters were made. The Detailed Customer Database then records the date when the filter was actually installed in a home. An average time lag calculation is then made and applied to all filters. ERM CVS reviewed the DCD for filters in the ER calculation spreadsheets for year 1 and year 2 /03/ and the data is conflicting. The 'date of sale' in the DCD for filters is sometimes after the 'date of installation', which is not logical. CL 04 was raised. Sufficient explanation has been provided as to why some filters have a date of sale after the date of installation in the DCD. Emission reductions have been calculated conservatively using only those filters in the DCD that have negative lag times (i.e. the date of sale came before the date of installation). CL 04 was closed. Please see section 5 'Remediation Requests' for details. The number of persons using the filter per household was measured in the monitoring & usage surveys /06/ and the values were correctly applied in the calculations /03/. Please see section 4.4.2 above for details of how the monitoring & usage surveys were verified. The values of persons per filter were cross checked against the last issuance, and are comparable with year 1 of the previous monitoring period. The parameter was adjusted for households that use LPG. The percentage of households that use LPG is determined from the monitoring & usage survey, and this percentage is then removed from the parameter person-days. ERM CVS confirmed this by review of the data & calculations /03/06/ In summary, ERM CVS considered that the sampling and surveying processes applied are consistent with the requirements of the methodology and GS rules, and are reliable and consistent with the monitoring plan. The parameter has been monitored in line with the monitoring plan and methodology.	CL 04	OK

Conclusion	ERM CVS confirmed that - The parameter has been monitored appropriately, in accordance with the monitoring plan and methodology. - The monitoring results have been recorded consistently as per the approved frequency in the monitoring plan.			
Data / Parameter:	Np,l,1,hh-wt and Np,l,2,hh-wt			
Data unit:	Units			
Description:	Water filters in the project database for the water technologies scenario, through year 1 of the monitoring period; Water filters in the project database for the water technologies scenario, through year 2 of the monitoring period			
Measured/calculated/default	Measured			
Compliance question	Verification findings (including verification activities undertaken and justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK	
Is the parameter monitored in accordance with the monitoring plan and are the QA/QC procedures appropriately applied? Does the monitoring report correctly state all relevant information and data relating to the monitoring of parameters during the monitoring period?	The Total Sales Record (TSR) for filters /03/ was recorded from sales invoices from bulk sales. ERM CVS verified this by means of on interviews with EcoFiltro monitoring staff and review of the database and copies of scanned paper records. QA/QC on the total sales data is done by the EcoFiltro monitoring staff. ERM CVS reviewed evidence of the QA/QC checks performed by the Ecofiltro monitoring staff /28/. The process is that once an order for filters is placed, an invoice is issued. When the invoice is paid, the filters are shipped and the information is entered into the database. The database is compared with the paper records monthly. The sales records are also used for the company's financial accounting, and therefore there is a high degree of rigour in the data collection and processing. The verification team reviewed the total sales record database and cross checked a sample of 20 bulk sale records against scanned copies of the original paper records /26/, as well as interviewed the monitoring manager of EcoFiltro. All sales records that were checked were backed up by paper records and no errors were found. Please see section 4.4.2 above for further details of how ERM CVS verified the total sales record for water filters. The parameter has been monitored in line with the monitoring plan and methodology.	OK	OK	
Conclusion	ERM CVS confirmed that - The parameter has been monitored appropriately, in accordance with the monitoring plan and methodology. - The monitoring results have been recorded consistently as per the approved frequency in the monitoring plan.			

Data / Parameter:	Np,1,filter,dual, and Np,2,filter,dual		
Data unit:	Units		
Description:	Cumulative number of person-days of water consumed in the dual scenario for filters through year 1/year 2		
Measured/calculated/default	Calculated		
Compliance question	Verification findings (including verification activities undertaken and justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
Is the parameter monitored in accordance with the monitoring plan and are the QA/QC procedures appropriately applied? Does the monitoring report correctly state all relevant information and data relating to the monitoring of parameters during the monitoring period?	Person-days = sum of (closing date of the monitoring period – lag adjustment factor - (recorded sale date of each technology or start of the MP {if technology was sold prior to that date}), in days * number of persons utilizing the filter per HH). Please see above for verification of the lag factor. The number of persons using the filter per household was measured in the monitoring & usage surveys /06/ and the values were correctly applied in the calculations /03/. Please see section 4.4.2 above for details of how the monitoring & usage surveys were verified. The values of persons per filter were cross checked against the last issuance, and are comparable with year 1 of the previous monitoring period. The parameter was adjusted for households that use LPG and other appropriate water treatment technologies. The percentage of households that use LPG is determined from the monitoring & usage survey, and this percentage is then removed from the parameter person-days. ERM CVS confirmed this by review of the data & calculations /03/06/ The parameter has been monitored in line with the monitoring plan and methodology.	OK	OK
Conclusion	ERM CVS confirmed that - The parameter has been monitored appropriately, in accordance with the monitoring plan and methodology. - The monitoring results have been recorded consistently as per the approved frequency in the monitoring plan.		

Data / Parameter:	Np,l,1,dual,wt, and Np,l,2,dual,wt	
Data unit:	Units	
Description:	Water filters in the project database for the dual-scenario, through year 1/2 of the monitoring period	

Measured/calculated/default	Measured		
Compliance question	Verification findings (including verification activities undertaken and justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
Is the parameter monitored in accordance with the monitoring plan and are the QA/QC procedures appropriately applied? Does the monitoring report correctly state all relevant information and data relating to the monitoring of parameters during the monitoring period?	The TSR for the dual scenario is collected from sales invoices, and includes each individual unit sold. The database /03/ includes the date of installation, end-user's name and contact information (when possible), serial number, and the geographic location (community and department). All sales data for Socorro Maya was currently collected in paper form then entered manually into the excel database (although based on interviews with the project developer, an electronic data collection system is ready for use if and when new distributions are made under project scenario 2). The parameter has been monitored in line with the monitoring plan and methodology.	OK	OK
Conclusion	ERM CVS confirmed that - The parameter has been monitored appropriately, in accordance with the monitoring plan and methodology. - The monitoring results have been recorded consistently as per the approved frequency in the monitoring plan.		

Data / Parameter:	Up,1,wt and Up,2,wt			
Data unit:	Percentage			
Description:	Cumulative, weighted usage rate in project scenario, for technology during year y (water treatment)			
Measured/calculated/default	Measured based on usage survey			
Compliance question	Verification findings (including verification activities undertaken and justification/substantiation of information, data and evidence)		Draft OK/ CAR/CL	Final OK/ Not OK

Is the parameter monitored in accordance with the monitoring plan and are the QA/QC procedures appropriately applied? Does the monitoring report correctly state all relevant information and data relating to the monitoring of parameters during the monitoring period?	ERM CVS confirmed that the parameter is determined according to the monitoring plan and the QA/QC procedures. ERM CVS confirmed that the PP conducted combined monitoring and usage surveys on the same households, sampled from the project beneficiary population. The usage rate was monitored in line with the GS. Please section 4.4.2 above for details of how the monitoring & usage surveys were verified. ERM CVS cross checked the values against those from the first year of the previous monitoring period (a complete survey was not carried in year 2 of the previous monitoring period), and the values applied in year 1 and year 2 of this monitoring period are lower (more conservative) than those monitored in year 1 of the the previous monitoring period, for both scenarios. In summary, ERM CVS considered that the sampling and surveying processes applied are consistent with the requirements of the methodology and GS rules, and are reliable and consistent with the monitoring plan. The parameter has been monitored in line with the monitoring plan and methodology. The usage rate for filters was discounted to take into account the results of the water quality test (please see verification of water quality parameter below). In summary, ERM CVS considered that the sampling and monitoring process applied is consistent with the CDM sampling and GS rules, and is reliable and consistent with the operation manuals /11/15/.	OK	OK
Conculsino	ERM CVS confirmed that - The parameter has been monitored appropriately, in accordance with the monitoring plan and methodology. - The monitoring results have been recorded consistently as per the approved frequency in the monitoring plan.		

Data / Parameter:	Qp,y			
Data unit:	Litres per person per day (L/p/d)			
Description:	Quantity of raw water treated with water treatment technology and used for hygienic purposes in the project scenario 1 and 2, during year y, capped at 6 L/p/d			
Measured/calculated/default	Measured (biennial) through the WCFT			
Compliance question	Verification findings (including verification activities undertaken and justification/substantiation of information, data and evidence)		Draft OK/ CAR/CL	Final OK/ Not OK

Is the parameter monitored in accordance with the monitoring plan and are the QA/QC procedures appropriately applied? Does the monitoring report correctly state all relevant information and data relating to the monitoring of parameters during the monitoring period?	The parameter is based on data from the WCFTs, conducted every two years. Qp,y is calculated from the average total water consumption per day per hh — average non-hygienic water consumption per day per hh / average persons consuming treated water per day per hh. ERM CVS confirmed that WCFTs were conducted in the project activity target population for the two scenarios separately by the Ecofiltro monitoring staff, with QA/QC done by NCP. Please refer to section 4.4.2 above for further details of how the WCFTs were verified. Please see section 4.4.2 for details on how the sampling and surveys were validated. The verification team checked the data processing and calculations, and confirmed that they are correct. The results met confidence and precision requirements /04/. The cap of 6L/person/day has been correctly applied in the calculations. In terms of QA/QC procedures, the project staff oversee intervention to minimise sampling errors and internally check the consistency of data. All surveys were conducted by full time monitoring staff and NCP conducted a QA/QC check of the data to ensure consistency. This was confirmed through the document review and interviews with the persons responsible for monitoring. The values reported in this monitoring period have been cross checked against the previous monitoring period. The values in both year 1 and year 2 are lower (more conservative) than the monitored values in year 1 of the 4th monitoring period, for both scenarios.	OK	OK
Conclusion	ERM CVS confirmed that • The parameter has been monitored appropriately, in accordance with the monitoring plan and methodology. • The monitoring results have been recorded consistently as per the approved frequency in the monitoring plan.		

Data / Parameter:	Qp,cleanboil,y		
ata unit:	Litres per person per day (L/p/d)		
Description:	Quantity of treated water still boiled in the project scenario 1 and 2, after installation of project technology		
Measured/calculated/default	Measured		
Compliance question	Verification findings (including verification activities undertaken and justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
Is the parameter monitored in accordance with the monitoring plan and are the QA/QC procedures appropriately applied?	The parameter is determined by the Water Consumption Field Tests (WCFTs), where respondents were asked whether (other than for the purposes of cooking already quantified) they had boiled any treated water over the previous 24 hours, and if so, for what purposes. ERM CVS confirmed that WCFTs were conducted in the project activity target population for the two scenarios by Ecofiltro monitoring staff. Please see section 4.4.2 above for further details of how the WCFTs were verified.	OK	OK

Does the monitoring report correctly state all relevant information and data relating to the monitoring of parameters during the monitoring period?	The verification team checked the data processing and calculations, and confirmed that they are correct. The results met confidence and precision requirements /04/. In terms of QA/QC procedures, the project staff oversee intervention to minimise sampling errors and internally check the consistency of data. All surveys were conducted by full time monitoring staff and NCP conducted a QA/QC check of the data to ensure consistency. This was confirmed through the document review and interviews with the persons responsible for monitoring. The values reported in this monitoring period (zero) have been cross checked against the previous monitoring period. The values are the same as in the 4th monitoring period.		
Conclusion	ERM CVS confirmed that - The parameter has been monitored appropriately, in accordance with the monitoring plan and methodology. - The monitoring results have been recorded consistently as per the approved frequency in the monitoring plan.		

Data / Parameter:	LEp,i,y		
Data unit:	tCO2e/year		
Description:	Leakage in Project Scenario 2 during year y [water filters]		
Measured/calculated/default	Calculated / Measured		
Compliance question	Verification findings (including verification activities undertaken and justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
Is the parameter monitored in accordance with the monitoring plan and are the QA/QC procedures appropriately applied? Does the monitoring report correctly state all relevant information and data relating to the monitoring of parameters during the monitoring period?	A leakage assessment, which is to be conducted every 2 years as per the methodology, has not been included in the monitoring report. CL 03 was raised. ERM CVS confirmed that the leakage assessment was included in the MR. Leakage for water filters has been validated as follows: LEAKAGE SOURCE 1: The displaced baseline technologies are reused outside the project boundary in place of lower emitting technology or in a manner suggesting more usage than would have occurred in the absence of the project. It is considered reasonable that this is assessed as zero for the following reasons: - Households in scenario 2 (who receive a stove as well as a filter) are required to remove their old stove under the terms of the sales agreement/warranty, as managed by Socorro Maya. During the site visit all households in scenario 2 visited by ERM CVS had all removed their three stone fires - Households in scenario 1 (households only receiving a water filter): the baseline technology (stove) used for boiling water would still be used for cooking, and hence would not be sold on to a household outside the project boundary. LEAKAGE SOURCE 2: The non-renewable biomass or fossil fuels saved under the project activity are used by non-project users who previously used lower emitting energy sources. It is considered reasonable that this is assessed as zero for the following reasons:	CL 03	OK

	• The project does not involve a switch from higher emitting to lower emitting fuels, hence is unlikely to lead to a displacement of such use outside the boundary • Wood fuel remains a valuable and declining resource in Guatemala • On the basis of the observations during the site visit, ERM CVS considers it unlikely that the project will have an impact of sufficient scale on aspects like wood prices to influence areas outside the project boundary LEAKAGE SOURCE 3: The project significantly impacts the NRB fraction within an area where other CDM or VER project activities account for NRB fraction in their baseline scenario. It is considered reasonable that this is assessed as zero for the following reasons: • The Project Proponent has determined that total number of people reached by all activities of GS1321 is less than 1.4% of the total Guatemalan population, and thus its effects on the national NRB value is likely to be negligible • Even with all gold standard projects in Guatemala, the impact of improved stoves on NRB consumption is likely to be offset by ongoing population growth in Guatemala /18/ • The project will reassess the NRB fraction at the next renewal of crediting period anyway, and if new information is available, the NRB fraction can be updated at any monitoring period. LEAKAGE SOURCE 4: The project population compensates for loss of the space heating effect of inefficient technology by adopting some other form of heating or by retaining some use of inefficient technology. It is considered reasonable that this is assessed as zero for the following reasons: • Households only using a water filter still use their baseline stoves for cooking, and hence there is unlikely to be any adoption of other technologies for heating. LEAKAGE SOURCE 5: By virtue of promotion and marketing of a new technology with high efficiency, the project stimulates substitution within households who commonly used a technology with relatively lower emissions, in cases where such a trend is not eligible as an evolving baseline. It is considered reasonable that this is assessed as zero for the following reasons: • Not applicable, since the households used inefficient stoves in the baseline, as determined through the baseline surveys, assessed by the DOE at validation. For the water filters disseminated by the project, which are zero emissions, this is not applicable since no technologies with lower emissions exist).		
Conclusion	ERM CVS confirmed that • The parameter has been monitored appropriately, in accordance with the monitoring plan and methodology. • The monitoring results have been recorded consistently as per the approved frequency in the monitoring plan.		

Data / Parameter:	WQT (Water Quality Tests)		
Data unit:	Percent		
Description:	Performance of the treatment technology		
Measured/calculated/default	Measured Laboratory testing procedure and the effectiveness through proxies		
Compliance question	Verification findings (including verification activities undertaken and justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
Is the parameter monitored in accordance with the monitoring plan and are the QA/QC procedures appropriately applied? Does the monitoring report correctly state all relevant information and data relating to the monitoring of parameters during the monitoring period?	Water quality tests were carried out to determine the effectiveness of the project technologies as they age. The manufacturer's specifications for Ecofiltro filters state that the filter has a minimum lifespan of 2 years, and the technology has been shown to last for more than 4 years when used and maintained correctly. For the sake of conservatism, the PP has elected to include only filters 2 years of age or younger for crediting, and thus testing. As per Guatemalan and World Health Organisation Standards, and as consistent with the methodology and PDD, any filter samples exceeding 1 CFU of Ecoli per 100 ml were considered to have failed the test. One sample was selected for monitoring of water quality across both scenarios (dual households and water treatment only households). This is considered reasonable given that the technology is the same and the performance of the unit does not vary according to what type of the stove the household uses. This is borne out by the results being consistent across the two groups: 47 tests were done to dual scenario HHs, and 40 to hh-wt, with 81% of tests passing on dual, and 80% on hh-wt /04/. The last 5 to 7 households surveyed in each area from the randomly selected monitoring list were used for water quality testing, ensuring the selection of households was unbiased and representative of the population and ensuring that filters of both ages (0-1 And 1-2 years old) were tested. Samples of water collected from the field were transported to the laboratory and tested there. ERM CVS has reviewed the results of the water quality tests /17/ including the lab test reports, to confirm that the water quality tests were properly carried out by a suitable third party. ERM CVS interviewed the monitoring staff responsible for collecting the water samples. ERM CVS confirms that the parameter has been correctly determined and applied in the emission reduction calculations. The results of the WQTs met the confidence/precision requirements /04/. The Verifier also confirmed that the Water Filter Monitoring Surveys included a relevant question about whether the end-users received training on maintenance and cleaning of the filters.	OK	OK
Conclusion	ERM CVS confirmed that - The parameter has been monitored appropriately, in accordance with the monitoring plan and methodology. - The monitoring results have been recorded consistently as per the approved frequency in the monitoring plan.		

Data / Parameter:	$f_{NRB,y,ics-nb}$	N.B. this parameter is established ex-ante, but reviewed and updated if necessary.		
Data unit:	Fraction			
Description:	Fraction of biomass used in year y as non-renewable of woody biomass fuel in scenario 2			
Measured/calculated/default	Default			
Compliance question	Verification findings (including verification activities undertaken and justification/substantiation of information, data and evidence)		Draft OK/ CAR/CL	Final OK/ Not OK
Is the parameter monitored in accordance with the monitoring plan and are the QA/QC procedures appropriately applied? Does the monitoring report correctly state all relevant information and data relating to the monitoring of parameters during the monitoring period?	The PP used the same value as that set out in the PDD, which was calculated based on NRB assessment and has been validated and approved by Gold Standard. The assumption is valid considering that the PDD states that the value will be fixed based on the baseline study for a given crediting period and updated if necessary as specified in the methodology. ERM CVS confirmed that the parameter value is fixed for the crediting period, consistent with the monitoring plan, and that there is no new relevant data that the PP should take into account to update the value.		OK	OK
Conclusion	ERM CVS confirmed that the parameter did not have to be updated in this monitoring period, in accordance with the monitoring plan			

4.4.5. Management and operational system

ERM CVS evaluated the management systems in place to implement the monitoring of the project activity. This included the organisational structure, roles and responsibilities, data collection, transfer and aggregation procedures, training of personnel, data storage and archiving and emergency procedures for the monitoring system.

Compliance question	Verification activities undertaken	Verification findings (including justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
Has an appropriate management and operational system for monitoring and reporting, including responsibilities and authorities, been established in accordance with the monitoring plan?	Interviews with the monitoring staff of Ecofiltro and NCP	The project in this monitoring period consists of 2 project scenarios, each of which has differences in the operational and management setup for monitoring. The Monitoring Report /5/ provides a relevant summary of management and operational system including responsibilities and authorities. The sampling, carrying out the monitoring & usage surveys, WCFTs, KPTs and taking the water samples for WQTs was carried out by the M&E team of Ecofiltro (Daniel Pop Coronado and Otto Choc). They were previously employed by Socorro Maya and were responsible for surveys in the previous monitoring period also. They also carried out QA/QC on the data, data cleaning, assessment of outliers, etc. Monitoring is not a full time job year-round, so they are also engaged in non-monitoring activities such as end user follow up and maintenance. Design of the monitoring survey, oversight of monitoring	OK	OK

Compliance question	Verification activities undertaken	Verification findings (including justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
		activities, top-level quality control, classroom training of surveyors and in-field training and mentoring of surveyors, as well as preparing the monitoring report, supporting spreadsheets and liaison with the VVB was carried out by Eddie Melendez of Natural Capital Partners, who performed the same role in the previous monitoring period. Data from surveys was collected on mobile devices and synced automatically with the project database. Monitoring of sales/distributions and QA/QC of sales data was managed by Marisol de Leon of Ecofiltro, and NCP provided supervision and oversight. The M&E team (Daniel and Otto) also conducted QA/QC on a random sample of sales against hard copies of sales records. ERM CVS concluded that an appropriate management and operational system for monitoring and reporting, including responsibilities and authorities, has been established, in accordance with the monitoring plan.		

Conclusion

ERM CVS confirmed that the monitoring of all relevant parameters has been carried out in accordance with the monitoring plan. It is confirmed that data acquisition process, data transferring process, archiving process and reporting process occur as required by the monitoring plan. The final monitoring report provides an accurate description of the monitoring for all parameters throughout the monitoring period.

4.5. Data and parameters determined at registration and not monitored

The verification team evaluated the status of data and parameters that were determined at registration and not monitored during the monitoring period, including default values and factors, and confirmed whether they were correctly presented in Section D.2 of the monitoring report and applied correctly in the emission reduction calculations.

Data and parameters that were determined at registration and not monitored during the monitoring period				
Parameter	Description	Presented correctly in section the Monitoring Report and applied correctly in the emission reduction calculations?	Draft OK/ CAR/CL	Final OK/ Not OK
EFb,wood,CO2	CO ₂ emission factor arising from use of fuels in baseline scenario	ERM CVS checked that the ex-ante parameter values are consistent with the values in the registered PDD and, where applicable, previous issuances.	OK	OK
EFb,wood,CH4	CH ₄ emission factor arising from use of fuels in baseline scenario		OK	OK
EFb,wood,N2O	N ₂ O emission factor arising from use of fuels in baseline scenario		OK	OK
EFp,fuel,CO2	CO ₂ emission factor arising from use of fuels in project scenario		OK	OK

EF _{p,fuel,CH4}	CH ₄ emission factor arising from use of fuels in project scenario		OK	OK
EF _{p,fuel,N2O}	N ₂ O emission factor arising from use of fuels in project scenario		OK	OK
NCV _{b,wood}	Net calorific value of the fuel used in the baseline		OK	OK
NCV _{p,fuel}	Net calorific value of the fuel used in the project scenario p		OK	OK
W _{b,y}	Quantity of wood fuel or fossil fuel required to boil 1 litre of water using technologies representative of baseline scenario b during project year y		OK	OK
W _{p,i,y}	Quantity of wood fuel or fossil fuel required to boil 1 litre of water using technology i representative of the project scenario p during project year y		OK	OK
C _j	Portion of users of project safe water supply who were already in baseline using a non-boiling safe water supply		OK	OK

4.6. Assessment of data and calculation of GHG emission reductions

ERM CVS evaluated the calculations applied to determine the emission reductions during the monitoring period resulting from implementation of the project activity. In conducting this evaluation, the verification team evaluated whether:

- A complete set of data for the monitoring period was available, and whether the most conservative assumption has been applied in any case where only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the monitoring plan unless a deviation has been approved.
- Information provided in the monitoring report has been cross checked with other sources such as log books, inventories, purchase records, laboratory analysis
- Calculations of baseline, project and leakage emissions have been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology.
- Any assumptions used in the emission calculations have been justified
- Appropriate emission factors, IPCC default factors and other reference values have been correctly applied.

Compliance question	Verification findings (including justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
Cross effects: because both stove and filter technologies are distributed to households in project scenario 2, have cross effects been considered and emission reductions conservatively calculated?	Cross effects were considered in the monitoring through the KPTs & WCFTs, which include a question about boiling water (besides for making coffee or soup, etc). All 42 responses were negative /06/, therefore confirming that the fuel used in the KPT was used only for meals, not for boiling water, hence it can be concluded that cross effects are not likely to influence the emission reductions. However cross effects were not discussed in the monitoring report – CL 05 raised. In response, cross effects were discussed in the MR and CL 05 was closed. Please refer to section 5 below for details. For the baseline value, this was fixed in Issuance 2 with the Baseline KPTs done in dual scenario Households. It was verified in issuance 2 that all KPT participants were provided an Ecofiltro prior to the KPT to ensure that boiling associated with water treatment was not included in the KPT, so that the Baseline value is also not taking into account boiling associated with water treatment. Since the baseline and the project values do not take into account use of the stoves for boiling water, it is concluded that no cross effects are produced.	CL 05	OK
Were data available throughout the monitoring period in accordance with the monitoring plan and methodology?	Sales data is collected continuously. Other parameters are monitored by surveys and tests conducted over the course of the year (continuous monitoring concept approved by Gold Standard). No gaps in monitoring being carried out were identified.	OK	OK
Has the project participant used appropriate methods and formulae for calculating baseline, project and leakage emissions?	ERM CVS checked the methodological options for emission reduction calculation and found methods and formulae are correct and in accordance with the PDD and methodology. The PP included the algorithms and parameter definitions which facilitate the understanding of the ER calculations. ERM CVS confirmed that the PP used appropriate methods and formulae for baseline and project emissions calculations. However a leakage assessment was missing from the monitoring report. CL 03 was raised. In response a leakage assessment was included in the MR. The leakage assessment is consistent with the monitoring plan and methodology requirements, and the parameters and their description are consistent. Please see above for details of how the leakage assessment was verified.	CL 03	OK
Has the project participant justified all assumptions, emission factors and default values that have been applied?	ERM CVS confirmed that all assumptions are consistent with the PDD and Methodology	OK	OK
Do the monitoring report and associated emission reduction spreadsheet correctly present the data and formulae used to calculate the reported emission reductions?	The ER spreadsheets for years 1 and 2 /03/, the MS/US, WCFT, KPT & WQT analysis/calculation spreadsheets for years 1 and 2 /06 / and the WCFT, KPT and WQT data spreadsheet /04/ collectively present clear, traceable and consistent data, formulae and methods to calculate emission reduction calculations. From the review of the monitoring report and ER spread sheet ERM CVS confirmed that the ER calculations are consistent with the monitoring and usage surveys and other monitored results.	OK	OK

Conclusion

Emission reductions have been calculated in accordance with the monitoring plan and the applied methodology, and it was determined that the data processing and emission reductions calculations resulted in real and measurable emission reductions. Where there was any unavailability of data, conservative assumptions have been made. All assumptions, emission factors and default values have been justified and the information has been cross checked with other sources.

4.7. Assessment of monitoring of other SDGs

4.8.1. Completeness of SDG monitoring parameters

The monitoring plan for sustainable development indicators was contained in the in the Gold Standard passport /02/, however this was updated in the monitoring plan for SDG indicators contained in the Transition Annex for GS4GG /03/.

The SDG monitoring parameters included in the monitoring plan (except for parameters related to SDG 13 discussed above) are listed below, and a full description of each parameter and the verification activities associated with monitoring of each one is then provided.

Gold Standard indicators of sustainable development included in monitoring plan in the GS passport	SDGs impacted by the project according to the Transition Annex	Monitored parameters according to the transition annex	Included in Monitoring Report?	Draft OK/ CAR/C L	Final OK/ Not OK
Air quality	3.9 (air pollution)	Air Quality Indicators (Changes in the amount of smoke, incidence of coughing and respiratory illness, and itchy eyes)	Whilst monitored results and calculation of SDG outcomes are included in the monitoring report, the parameters related to SDG outcomes (apart from SDG 13) were not included in the monitoring tables, section D.2, of the MR. CL 06 was raised.	CL 06	OK
Water quality and quantity	3.3 (water borne diseases) 6.1 (access to safe drinking water)	Quality of treated water; Number of project technologies credited (units); Usage rate.			
Livelihood of the poor	1.1 (eliminate extreme poverty)	Financial savings (\$/year)			
Access to affordable and clean energy services	7.1 (access to affordable, reliable & modern energy services)	Number of project technologies credited (units); i Usage rate.			
n/a	12.2 (sustainable management and efficient use of natural resources)	Kg of Non-renewable biomass saved/year; Quantity of savings in fuel that is reduced.			
n/a	15.1 (conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems)	Non-renewable fraction; Quantity of savings in fuel that is reduced; Number of non-renewable trees saved / year.			
n/a	8.5 (full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value)	Permanent Jobs at Ecofiltro			

4.8.2. SDG indicators monitored

The verification findings for the monitoring of each sustainability parameter are set out below. Note that only those sustainability parameters included in the monitoring plan, as set out in the approved GS passport for this crediting period, are presented (see table above).

SDG	3.9 Air pollution		
Monitored parameters:	Air quality indicators (Improve cookstoves only: project scenario 2: dual households): changes in the amount of smoke, incidence of coughing and respiratory illness, and itchy eyes		
Description:	Percentage of households reporting reduction in smoke levels, incidence of coughing, incidence of respiratory illness, and incidence of itchy eyes.		
Means of monitoring (as per Transition Annex):	Monitoring & usage survey		
Compliance question	Verification findings (including verification activities undertaken and justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
Has the monitoring procedure been followed appropriately? Has the trend of the indicator been appropriately assessed and presented in the MR?	The monitoring survey results for stoves show that user perceptions of the project are highly positive. This parameter was properly monitored in the Monitoring Survey asking relevant questions about perceptions of air quality, and frequency of eye irritation and coughing. The surveys show that in year 1 the majority (88%) of stove users feel that there has been a change in smoke levels, with 99% of those reporting smoke levels were less (1 user reported smoke levels had reported there had been a change in smoke levels but then when questioned about that change, they conversely reported that there had been no change). No users reported smoke levels getting worse. In year 2, 99% of users reported a change in smoke levels, with all of these people saying there was less smoke /06/. Users were asked about any changes in eye irritation, coughing, and respiratory illness. In year 1, 72% of users reported a reduction in eye irritation and 71% reported a reduction in coughing. In year 2 the figures were 97% and 93%, respectively /06/. Meanwhile 100% of users reported they had suffered no respiratory illness in year 1, and 98% in year 2. The results were obtained by means of the monitoring & usage surveys carried out in a representative sample of households. The surveys are considered valid and reliable. Please see section 4.4.2 for details of how the sampling and surveys were verified.	OK	OK
Conclusion	ERM CVS confirmed that - The indicator has been monitored appropriately in accordance with the monitoring plan - The net benefit of the indicator presented in the MR is appropriate		

SDG	3.3 Water borne diseases 6.1 Access to safe drinking water		
Monitored parameters:	Quality of treated water (using water quality tests) Number of project technologies credited (please see section 4.4.2 above regarding verification of the total sales record) Usage rate (please see section 4.4.4 for verification of parameters Up,1,wt and Up,2,wt)		
Description:	Performance of the treatment technology (using water quality tests)		
Means of monitoring (as per Transition Annex):	Please see parameter WQT in section 4.4.4 above		
Compliance question	Verification findings (including verification activities undertaken and justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK

Has the monitoring procedure been followed appropriately? Has the trend of the indicator been appropriately assessed and presented in the MR?	Please refer to section 4.4.4 for verification of Water Quality Tests. Please see section 4.4.2 above regarding verification of the total sales record (number of project technologies credited) Please see section 4.4.4 for verification of parameters Up,1,wt and Up,2,wt (usage rate) In addition to the parameters described in the monitoring plan in the Transition Annex, users were asked about frequency of stomach illness: 'Since purchasing the Ecofiltro, what changes have you noticed in the frequency of diseases of the stomach that you and your family have?' Across both scenarios, in year 1, 38% of households reported 'less' or 'much less' diseases of the stomach /06/. In year 2, 91% of users reported this /06/. The reason for the large difference between the two years is not clear, however both years showed a noticeable positive impact. Furthermore, in year 1, the survey respondents rated with a 99.12% in user satisfaction and happiness with the filter, based on taste of the water and access to safe drinking water. The figure for year 2 was 100%. User perception results were obtained by means of the monitoring & usage surveys carried out in a representative sample of households. The surveys are considered valid and reliable. Please see section 4.4.2 for details of how the sampling and surveys were verified.	OK	OK
Conclusion	ERM CVS confirmed that - The indicator has been monitored appropriately in accordance with the monitoring plan - The net benefit of the indicator presented in the MR is appropriate		

SDG	1.1 Eliminate extreme poverty		
Monitored parameters:	Financial savings (\$/year) [from improved cookstoves]		
Description:	Average amount of savings in project scenario p, for technology i, in year y.		
Means of monitoring (as per Transition Annex):	Annual Monitoring and Usage Surveys		
Compliance question	Verification findings (including verification activities undertaken and justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
Has the monitoring procedure been followed appropriately?	The results were obtained by means of the monitoring & usage surveys carried out in a representative sample of households. The surveys are considered a valid and reliable means of obtaining user-reported savings, although the extent to which users will be able to recall baseline expenditure months or years later is not certain. Nevertheless the monitoring approach is in line with the procedures in the monitoring plan. Please see section 4.4.2 for further details of how the sampling and surveys were verified.	OK	OK
Has the trend of the indicator been appropriately assessed and presented in the MR?	The average money saving reported by dual households in year 1 as a result of the project was \$3.47 a week, and in year 2 \$15.23 a week /06/. The large difference between these two values appears to be the result of some households in year 2 reporting very large baseline fuel consumption (even though the reported amount spent on fuel in the project scenario is actually substantially higher in year 2 than year 1, the reported amount spent on the baseline is even higher, resulting in higher net savings). The MR states that the results from Year 2 are overestimated by the survey respondents in comparison to the results observed from previous issuances, and that Year 1 is conservative. Hence the results from Year 1 are the outcomes that are presented by the project, not year 2. Although it is difficult for households to recall the exact amount of savings (which may be one explanation for why the figures from the year 1 and year 2 surveys were so different), it is clear that users feel that financial savings have	OK	OK

	been made. The average time saving was also reported by dual HHs in year 1: 4.12 hours/week, and in year 2 4.48 hrs/wk /06/ (this is likely to include time savings whilst cooking as well as time savings from fuel collection). These are self-reported estimates by users, but nevertheless give an indication of the positive perception of the impact of the project.		
Conclusion	ERM CVS confirmed that - The indicator has been monitored appropriately in accordance with the monitoring plan - The net benefit of the indicator presented in the MR is appropriate		

SDG	7.1 Access to affordable, reliable & modern energy services		
Monitored parameters:	Number of project technologies credited (units) [stoves]; Usage rate [all technologies].		
Description:	Technologies in the project database for project scenario p, technology i, through year y; Usage rate in project scenario p, for technology i, during year y		
Means of monitoring (as per Transition Annex):	Number of project technologies credited is measured using the Total Sales Record. Usage rate is measured through the usage survey.		
Compliance question	Verification findings (including verification activities undertaken and justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
Has the monitoring procedure been followed appropriately?	Please see section 4.4.2 above regarding verification of the total sales record (number of project technologies credited). Please see section 4.4.4 for verification of the usage rate.	OK	OK
Has the trend of the indicator been appropriately assessed and presented in the MR?	Yes – the number of technologies credited is presented, as well as the usage rate. Please see section 4.4.2 above regarding verification of the total sales record (number of project technologies credited). Please see section 4.4.4 for verification of the usage rate.	OK	OK
Conclusion	ERM CVS confirmed that - The indicator has been monitored appropriately in accordance with the monitoring plan - The net benefit of the indicator presented in the MR is appropriate		

SDG	12.2 Sustainable management and efficient use of natural resources		
Monitored parameters:	Kg of Non-renewable biomass saved/year [all technologies]; Quantity of savings in fuel that is reduced [improved cookstove technologies].		
Description:	For both parameters: Quantity of total savings in non renewable biomass that is reduced, comparing the baseline scenario b, and project scenario p per year;		
Means of monitoring (as per Transition Annex):	Both parameters are measured through Project FT, Project FT updates, KPTs, plus the NRB Assessment.		

Compliance question	Verification findings (including verification activities undertaken and justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
Has the monitoring procedure been followed appropriately?	Yes. Please see section 4.4.2 above regarding verification of the Project FT / Project FT updates and KPTs. The non-renewable biomass fraction is fixed for the crediting period based on the results of the NRB assessment conducted at the start of the crediting period. The NRB fraction was not reassessed during this monitoring period.	OK	OK
Has the trend of the indicator been appropriately assessed and presented in the MR?	Yes – the savings in wood consumption are presented. Please see section 4.4.2 above regarding verification of the Project FT / Project FT updates and KPTs.	OK	OK
Conclusion	ERM CVS confirmed that - The indicator has been monitored appropriately in accordance with the monitoring plan - The net benefit of the indicator presented in the MR is appropriate		

SDG	15.1 Conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems		
Monitored parameters:	Non-renewable fraction; Quantity of savings in fuel that is reduced; Number of non-renewable trees saved / year.		
Description:	Non-renewability status of woody biomass fuel in scenario i during year y; Quantity of savings in fuel that is reduced, comparing the baseline scenario b, and project scenario p, per household-day; Quantity of total non renewable trees saved over the year y.		
Means of monitoring (as per Transition Annex):	The non-renewable fraction is measured based on the NRB assessment. The quantity of savings are measured through Project FT, Project FT updates, KPTs, plus the NRB Assessment. The number of trees saved is based on assumptions about the average size of a tree and factors to convert kg to number of trees		
Compliance question	Verification findings (including verification activities undertaken and justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
Has the monitoring procedure been followed appropriately?	Yes. Please see section 4.4.2 above regarding verification of the Project FT / Project FT updates and KPTs. The non-renewable biomass fraction is fixed for the crediting period based on the results of the NRB assessment conducted at the start of the crediting period. The NRB fraction was not reassessed during this monitoring period. The number of trees saved is calculated based on estimates of firewood yield from commercially-grown trees and default values for density of commercially grown pine wood /33/ and the mean volume of wood per tree /34/. The value for volume of wood per tree for Guatemala was not available, and therefore the project developer has used a value for pine trees in the UK. Therefore the estimate of number of trees should be treated as approximate.	OK	OK
Has the trend of the indicator been appropriately assessed and presented in the MR?	Yes – the savings in wood consumption and estimated equivalent number of trees are presented. Please see section 4.4.2 above regarding verification of the Project FT / Project FT updates and KPTs.	OK	OK
Conclusion	ERM CVS confirmed that - The indicator has been monitored appropriately in accordance with the monitoring plan - The net benefit of the indicator presented in the MR is appropriate		

SDG	8.5 Full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value		
Monitored parameters:	Permanent Jobs at Ecofiltro		
Description:	List of Permanent jobs at Ecofiltro		
Means of monitoring (as per Transition Annex):	Ecofiltro registries		
Compliance question	Verification findings (including verification activities undertaken and justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
Has the monitoring procedure been followed appropriately?	Yes – the Ecofiltro employment registry was used to monitor the number of permanent employees.	OK	OK
Has the trend of the indicator been appropriately assessed and presented in the MR?	Yes – 80 permanent employees were employed by Ecofiltro at the time of the end of the monitoring period. This was checked against the Ecofiltro register of employees /31/. Although it was not possible during verification to determine the number of employees who would be employed by Ecofiltro if the carbon project did not exist (and only commercial retail sales were made, e.g. in urban areas), based on interviews with project staff carbon revenues form a significant proportion of Ecofiltro's revenues and the success of the whole company is underpinned by the carbon project.	OK	OK
Conclusion	ERM CVS confirmed that - The indicator has been monitored appropriately in accordance with the monitoring plan - The net benefit of the indicator presented in the MR is appropriate		

5. Remediation Requests

5.1. Clarification Requests

Where information was insufficient or not clear enough to determine whether the applicable requirements have been met ERM CVS raised a Clarification Request (CL). The CLs raised, and a description of how each was resolved are set out below.

CL 01	
Clarification Request:	The project description section of the MR does not describe the fact that Socorro Maya is no longer involved in the project, and who is now managing project scenario 2 households. Please clarify.
PP response:	In response to CL 01, the MR was updated and an explanation of the withdrawal of Socorro Maya and the enhanced role of Ecofiltro has been provided.
Documentation provided	Updated MR
Verification activity	ERM CVS reviewed the updated MR, and conducted interviews with NCP and Ecofiltro
Conclusion	In conclusion, the updated MR is fully consistent with the PDD/1/ and includes a clear description of the project partners, including explanation of the fact that Socorro Maya is no longer involved. CL closed.

CL 02	
Clarification Request:	Please clarify how the project can meet the sampling requirements of the methodology, given that for project scenario 2 (dual households), the minimum of 30 samples of each age was not met in some cases: In the Year 1 surveys: • for water filters aged 1-2 years; • for stoves of age categories 0-1 year, 1-2 years and 2-3 years In the year 2 surveys: • for stoves aged 1-2 and 2-3 years /06/.
PP response:	The PP has analyzed the usage surveys presented, and categorized the surveys from age comparing the date of the survey and the installation date, and not using calendar years. The PP can confirm that the 30 minimum sample was not met in those cases due to the following reasons: Year 1 • The PP classifies the surveys and organizes monitoring according to stove-ages independently of the filter age, which is changed every two years. In year 1 of monitoring, there was an unusual number of filters that were changed recently in comparison with the survey's date. This was due to Socorro Maya's withdrawal from the project, where the organization replaced the aged-out filter units in 2017 before leaving the project, resulting in a large amount of these filters being selected on the random sample of stoves. The stove represents the vast majority of the Emission Reductions (98.90%) for this scenario, and that is the reason it makes more sense to do the sampling division using stove-ages. In 2016, Socorro Maya whilst still in operation replaced 1,694 of the filters that were aged-out from installations between 2013 and 2014. For 2017 only 238 filters were replaced, whilst 1,625 were aged-out at that time and needed a replacement, accounting only for a replacement rate of 14.6%. Socorro Maya staff continued supporting the project for monitoring in 2018, but due to the withdrawal of the organization, the pattern from 2017 in terms of filter replacement was repeated, and only 188 filters were replaced, focusing on end-users that were selected from the random sample.

	- For stoves installed in 2016 (age 2-3 in year 1), the PP only surveyed 27 households from this age out of 81 stoves (33%) installed during this period. Even that the PP did not reach the minimum 30 samples for this age, the sample taken is much more representative than the previous years. ~30 samples surveyed out of 705 installed stoves (4.25%), and ~30 from 1538 in 2014 (1.95%). Therefore the PP complied with GS requirements even with lower statistical precision in previous stove-ages and is sure that the three missing surveys will not impact Emission Reductions calculations. - In 2017 (age 1-2 in year 1), Socorro Maya installed only 12 stoves, which the MRV team surveyed 10 in year 1. Therefore the sample studied is representative of that age; visiting the other two would have mean higher costs and inefficient traveling for a small selection. - In 2018 (age 0-1 in year 1), Socorro Maya installed 11 stoves, and the MRV team surveyed 8 of them due to the inefficiency of visiting stoves that were installed in different regions than the other ones. Even not monitoring the rest of the stoves (3), the PP is sure that the sample for that age is representative, with 73% of the population surveyed. Year 2 - In 2017 (age 1-2 in year 1), Socorro Maya installed only 12 stoves, which the MRV team surveyed 2 in year 2. The PP did not find it efficient to visit the same households months after visiting them in year 1. - In 2018 (age 0-1 in year 1), Socorro Maya installed 11 stoves, and the MRV team surveyed 8 of them due to the inefficiency of visiting stoves that were installed in different regions than the other ones. These eight stoves were in the region of other stoves from different ages in the random sampling, so it represented an efficient visit. Even not monitoring the rest of the stoves (3), the PP is sure that the sample for that age is representative, with 73% of the population surveyed.
Documentation provided	Stove age Analysis.xlsx
Verification activity	ERM CVS has reviewed the survey results, comparing the date of the survey and the installation date, and confirms that although the minimum sample size of 30 devices of each age group were not met in some cases, the PP has provided reasonable explanations. The fact that households in the dual scenario have two devices, of different ages, makes it more challenging to select a sample that contains at least 30 of both stoves and filters of every age group. Furthermore, there were a very small number of stoves of some ages in the total population: in 2016 only 81 stoves were installed, in 2017 only 12 and in 2018, only 11. In the year 1 survey the project developer managed to survey 27 of the 81 stoves installed in 2016, 3 short of the 30 minimum. Since only 12 stoves were installed in 2017 and 11 in 2018, it was not possible to survey 30 devices of these ages. The project developer managed to survey 10 out of the 12 stoves installed in 2017 in the year 1 survey, and 2 out of 12 in the year 2 survey. They surveyed 8 out of the 11 stoves installed in 2018 in year 1, and 8 in year 2. As a percentage of the total population of devices sampled, these numbers are quite high (between 16% and 83%). Given the small numbers of stoves in the TSR/DCD for the stove ages concerned (2016, 2017 and 2018), the impact on emission reductions is not significant. In the case of water filters aged 1-2 years for dual households in the year 1 survey, this is attributed to the fact that the project partner for the dual scenario, Socorro Maya, was in the process of withdrawing from the project in 2017, and few water filters were replaced at that time for the dual households (only 14.6% of aged-out filters were replaced in 2017). Once EcoFiltro took over management of the households, new replacement filters were disseminated, however that meant that at the time of the survey, most dual households had filters aged less than 1 year and few had filters aged 1-2 years. Because the sample was selected on the basis of the stove ages for this scenario, less than 30 filters age 0-1 years were sampled. However the volume of emission reductions from water filters in the dual scenario is only around 1% of the total ERs from that scenario as the stoves make up by far the larger proportion of emission reductions. Based on interviews with NCP, ERM CVS understands that there were challenges at the moment of performing the surveys due to limited staff resources as a result of Socorro Maya's withdrawal from the project, as it faced financial difficulties. Based on previous verification site visits, ERM CVS confirms that reaching enough households is a very time-intensive and labour-intensive process, and the issues experienced in this monitoring period illustrate the challenges of working in remote rural communities in a developing country.

Conclusion	In the case of stoves, it was not possible to sample 30 devices from the 2017 or 2018 age groups, since less than this number were installed in each of those years. The Project developer managed to survey a relatively high proportion of those stoves despite not reaching 30 devices. For stoves installed in 2016, 3 less than the minimum were surveyed, but 33% of the total population were surveyed. Based on interviews with NCP, ERM CVS understands that there were challenges at the moment of performing the surveys due to limited staff resources as a result of Socorro Maya's withdrawal from the project, as it faced financial difficulties. ERM CVS considers that reasonable explanation has been given for why the minimum sample size was missed for stoves installed in 2016. In the case of water filters aged 1-2 years for dual households in the year 1 survey, because the sample was selected on the basis of the stove ages for this scenario, and only a small proportion of filters for dual households were replaced in 2017, less than 30 filters age 0-1 years were sampled. However the volume of emission reductions from water filters in the dual scenario is only around 1% of the total ERs from that scenario as the stoves make up by far the larger proportion of emission reductions. CL closed
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CL 03	
Clarification Request:	A leakage assessment, which is to be conducted every 2 years as per the methodology, has not been included in the monitoring report.
PP response:	The project leakage assessment is now presented on Page 33 of the Monitoring Report.
Documentation provided	Updated Monitoring Report.
Verification activity	The leakage assessment has been included in the monitoring report. The assessment is valid, and leakage is verified in detail in section 4.4.4 above.
Conclusion	The leakage assessment is now included in the MR and has been verified. CL closed.

CL 04	
Clarification Request:	ERM CVS reviewed the filter DCD in the ER calculation spreadsheets for year 1 and year 2 /03/ and the data is conflicting. The 'date of sale' in the DCD for filters is sometimes after the 'date of installation'.
PP response:	Ecofiltro had some delays for invoicing in 2016-2017, this means that an end-user would buy the filter and the sales representative would send the information for invoicing after the installation. The administrative personnel was in charge of producing the invoice. Back in 2016-2017, Ecofiltro had a delay due to the lack of employees in charge of doing this process. So some filters have negative lag days because the date the sale was recorded in the database was after the date of installation. Ecofiltro direct sales also has some negative lag days, this is mainly due to the previous procedure that Ecofiltro had with the sales team, where the filters were invoiced and delivered to them in bulk sales, and these filters were stored in warehouses all over the country, taking months to complete its delivery and installation. However the lag day calculation, to determine the average delay between date of sale and date of installation, used in the calculation of emission reductions, has been done conservatively. We are only accounting for the average <i>negative</i> lag days, and the positive ones are not included in the calculation of the average lag time. If we take into account the positives, the lag days would be 4, and we would like to remain conservative with the 37 lag days from the negatives.
Documentation provided	Monitoring Report and Excel ER Calculations Year 1 and 2.

Verification activity	ERM CVS has reviewed the lag time calculations for filters in the ER spreadsheets containing the DCD. ERM CVS interviewed the monitoring manager of Ecofiltro and the person in charge of overall monitoring of the project from NCP. It has been confirmed that invoicing processes in place at the time led to some invoices (date of sale) being processed after the date of installation, leading to a negative lag for some filters. The monitoring procedures now in place with Ecofiltro are designed to prevent this from occurring. FAR 01 was also raised to ensure that monitoring procedures are formally documented in writing to improve quality control. The lag day calculations have been carried out conservatively (only considering the negative lag times) and hence emission reductions are determined conservatively.
Conclusion	Sufficient explanation has been provided as to why some filters have a date of sale after the date of installation in the DCD. Emission reductions have been calculated conservatively using only those filters in the DCD that have negative lag times (i.e. the date of sale came before the date of installation). CL closed.

CL 05	
Clarification Request:	Cross effects were not discussed in the monitoring report.
PP response:	The PP mentions now the cross-effect in the dual scenario on page 15 of the Monitoring Report, with the following paragraph. “The fuel savings obtained in the KPT results are only considering wood consumption used for meals. Every KPT in the dual scenario was done in parallel with a WCFT, where boiled water is analyzed. From the 39 respondents of the survey, 39 stated not boiling water for drinking or other hygienic purposes, clarifying no cross-effects in the project’s fuel savings in the dual scenario”.
Documentation provided	Updated Monitoring Report
Verification activity	ERM CVS reviewed the updated monitoring report. Cross effects have now been discussed in the report. All dual household respondents to the survey reported that they do not boil the treated water from the filter, and hence cross effects can be disregarded.
Conclusion	Cross effects have been discussed in the monitoring report, and are correctly assessed. CL closed.

CL 06	
Clarification Request:	Whilst monitored results and calculation of SDG outcomes are included in the monitoring report, the parameters related to SDG outcomes (apart from SDG 13) were not included in the monitoring tables, section D.2, of the MR.
PP response:	SDG outcomes from the Transition annex approved are now presented on the Monitoring Report, in section D.2.
Documentation provided	Revised MR
Verification activity	ERM CVS reviewed the updated monitoring report. All monitored parameters are now included in the monitoring section.
Conclusion	All monitored parameters are now included in the monitoring section. CL closed.

5.2. Corrective Action Requests

ERM CVS raised a Corrective Action Request (CAR) where:

- Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;
- Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impair the estimate of emission reductions;
- a Forward Action Request (FAR) during validation (or previous verification) to be verified have not been resolved by the project participants

CAR 01	
Corrective Action Request:	The MR does not report on how the project has addressed Forward Action Request # 3 (from GS issuance review for issuance 4, 15 Feb 2019) <i>"The PP is requested to conduct the water quality test quarterly following the "Rule update: Requirements for the quality standards to be met by safe water supply projects submitted prior to 31st January 2014". If the result from MP5 shows that it is more conservative than the applied value for MP4, the ER from MP4 will be adjusted accordingly and be deducted in MP5 issuance."</i>
PP response:	The PP already addressed this FAR. The WQT results are combined with the result of the usage parameter of (79%) included in calculations and the deviation request results. The usage parameter is obtained from an average estimation of the results of the usage surveys in specific questions. Still, for the WT-Scenario, it is always multiplied by the % of WQT that passed the quality needed. The WQT was measured quarterly, and the result obtained is more conservative than the conservative approach. Therefore it is included in the usage parameter used for calculations of this deduction. The MR has now been updated to explain how all FARs were addressed.
Documentation provided	Updated monitoring report
Verification activity	ERM CVS reviewed the updated monitoring report. How FAR 3 was addressed is now explained. WQTs have been conducted quarterly. The WQT results are combined with the result of the usage parameter of (79%) included in calculations. The usage parameter for the filters is multiplied by the % of WQT that passed the quality needed. The result obtained is more conservative than the conservative approach applied in Year 2 of MP4 and therefore it is included in the calculations of the adjusted (deducted) ERs for MP 5 to compensate.
Conclusion	GS FAR 03 has been reported in the MR. CAR closed.

5.3. Forward Action Requests

FAR 01	
Forward Action Request:	QA/QC processes employed by Ecofiltro are not documented in a manual or procedure that can serve as a point of reference. There is an old monitoring manual for the project, but this has not been updated to reflect the changes in the project (e.g. Ecofiltro now manages monitoring of both project scenarios).
Response by PP	Natural Capital Partners will work together with Ecofiltro on updating the procedures for monitoring of sales and the project.

FAR 02	
Forward Action Request:	In previous years the monitoring scales was checked against a control set of scales to confirm that it was accurate, but this was not done during this monitoring period.
Response by PP	The PP will include this process for the next verification. It is essential to mention that the manufacturer of the scales only recommends calibration if some outliers or inadequate measures are seen. In the actual issuance, the results were very similar to the ones obtained in previous verifications. Therefore the PP does not believe that this affected ER calculations but understands the importance of reinstating this process for QAQC.

FAR 03	
Forward Action Request:	(a) Surveyors wore clothes with the project logo on. This is not in line with the GS guidelines for usage surveys for water filtration technologies. This should be discussed with Gold Standard so that an exemption can be discussed if needed. (b) Telephoning a random 10-15% of the surveyed cookstove (dual) households was not done after the year 1 survey. Measures should be put in place to ensure this is done in future in line with the GS guidelines.
Response by PP	(a) Surveyors are required to use clothes with the project logo on due to the cultural context that exists in Rural Guatemala. Rural communities are known to be a place where all of their members know each other and do not act well with outsiders. The PP has used this strategy to gain the confidence to enter to each community and each household because Ecofiltro is a recognized and respected brand in Guatemala. The PP understands that the requirements are stated on the guidelines, and will engage with the GS to request for a deviation. Without the project logo or identification, the safety of the monitoring team is at risk, and the PP values the physical integrity of the field team and does not want to jeopardize their well-being. The project will request to adapt the guidelines to the cultural context of the country. (b) The PP has adapted the telephoning random sample on their monitoring activities and has performed 16 phone calls selected randomly for year 2 (11% of the sample). The telephoning random sample will be added to the project's monitoring procedure and Ecofiltro operations manual.

Annex A: Reference Documents and Interviews

A.1: Documents

Reference	Title and version	Date
1	Monitoring report	Version 1.9 14 October 2020
2	PDD	Version 05 dated 20 September 2013
3	Emission reduction calculation spreadsheets (year 1 and year 2)	
4	WCFT, KPT and WQT data (spreadsheet) (WCFT_KPT_WQT Data GS1321 Iss5)	
5	Emission reduction purchase agreement	10 Feb 2012
6	Monitoring / survey results spreadsheets, year 1 and year 2 MS US WCFT_KPT_WQT Data Spreadsheet	
7	Continuous monitoring concept note	Undated
8	Approval from Gold Standard of continuous monitoring concept: email correspondence between Neil Bellefeuille and Vikash Tayan, Gold Standard	22 March 2016
9	Sampling frame and sample selection spreadsheet	
10	Gold Standard: "Guidelines for carrying out usage survey for projects implementing household water filtration technologies" http://www.goldstandard.org/sites/default/files/documents/rule-update-guidelines-for-carrying-out-water-usage-surveys.pdf	Undated
11	EcoFiltro operations manual	18 May 2015
12	Eco Stove Manual & product specifications	Undated
13	Gold Standard: Issuance Review for 4 th issuance	
14	Emission reduction calculation spreadsheet for year 2 of 4 th issuance (recalculated following GS approved deviation)	
15	Socorro Maya Operations Manual	18 May 2015
16	End user training materials: Educational flyer distributed with all water filters outlining the health and safety benefits of hygienic practices Pictogram guidelines outlining the health and safety benefits of hygienic practices Pictogram guidelines for safe operation of the Ecofiltro	Undated
17	Water quality testing lab reports from Soluciones Analíticas 'Informe de analisis de microbiologia'	2019 (various dates)
18	World Population Data Sheet 2011 – Guatemala http://www.prb.org/Publications/Datasheets/2011/world-population-data-sheet/guatemala.aspx	2011
19	EcoFiltro: Manufacturing specifications of the EcoFiltro device	2016
20	EcoFiltro: User Manual	2018
21	EcoFiltro: filter instructions and CRW printed on the bucket of the unit	2018
22	Record of training completion by surveyors	29 March 2019
23	Monitoring & usage survey questions WCFT questions	2016
24	Gold Standard: GS 1321 Deviation Request	27/06/2018
25	Scanned detailed customer records for Ecofiltro (end user receipt/user agreement copies)	2016-2018
26	Scanned sales records for Ecofiltro sales	2016-2018
27	Weigh Scales manual & specifications, American Weigh Scales Inc.	Undated
28	Ecofiltro 'Verificación documental al azar' (paper records of the QA/QC checks on filter sales data performed by the Ecofiltro monitoring staff)	16 October 2019
29	Spreadsheet containing records of phone surveys used to cross check the results of the Year 2 dual households surveys.	5 May 2020
30	Internal Verification and Validation of Socorro Maya stove distribution records, conducted by Eddy Melendez, NCP	2 August 2018
31	Ecofiltro register of employees	December 2019
32	Scanned copies of carbon rights waivers for the following NGOs: Orphan's Heart, Cambacol, BPD, POP WUJ and FCNACHI	2014-2017 (various dates)
33	The Wood Database: Pine Wood: An Overall Guide http://www.wood-database.com/wood-articles/pine-wood-an-overall-guide/	Accessed May 2020
34	The Forestry Commission: Forest Yield - A handbook on forest growth and yield tables for British forestry	2016

A.2: Persons interviewed

Reference	Name	Title & Organisation	Main Topics Discussed
IV 1	Eddy Melendez	Natural Capital Partners in-country monitoring manager	Monitoring report ER calculations Roles and responsibilities Monitoring processes & procedures Monitoring Training Surveys, WCTFs, KPTs, WQTs Sales monitoring QA/QC of all monitored data
IV 1	Daniel Pop Coronado	Accounting Manager, Socorro Maya	Filter distribution, training and follow-up of end users Monitoring Training received Surveys, WCTFs, KPTs, WQTs QA/QC of survey data and sales data
IV 2	Otto Choc	Technical staff, Socorro Maya	Filter distribution, training and follow-up of end users Monitoring Training received Surveys, WCTFs, KPTs, WQTs QA/QC of survey data and sales data
IV 3	Marisol de Leon	Monitoring manager, EcoFiltro	Monitoring of filter sales and associated QA/QC
IV 4	Mirna Martinez Guerra	Project beneficiary – water treatment only household	SDG contributions & impacts of the project technologies Stakeholder feedback Grievances (if any) Grievance mechanisms and how to report feedback
IV 5	Pedro José Villeda	Project beneficiary – water treatment only household	
IV 6	María Trinidad Culajay López	Project beneficiary – water treatment only household	
IV 7	Juana Ordoñez	Project beneficiary – water treatment only household	
IV 8	Mirtala Quevedo	Project beneficiary – water treatment only household	
IV 9	Sergio Arias	Project beneficiary – water treatment only household	
IV 10	Sandra Beatriz Mann Par	Project beneficiary – water treatment only household	
IV 11	Thelma Guevara	Project beneficiary – water treatment only household	
IV 12	Ledvia Gonzalez	Project beneficiary – water treatment only household	
IV 13	Rosa María Roca Luch	Project beneficiary – water treatment only household	
IV 14	Mónica García	Project beneficiary – water treatment only household	
IV 15	Rosa Caal	Project beneficiary – dual household	SDG contributions & impacts of the project technologies Stakeholder feedback Grievances (if any) Grievance mechanisms and how to report feedback
IV 16	Alicia Cú	Project beneficiary – dual household	
IV 17	Zaira Margarita Gonzales Escalante	Project beneficiary – dual household	
IV 18	Catarlán Ramírez	Project beneficiary – dual household	
IV 19	Maria Patricia Coc	Project beneficiary – dual household	
IV 20	Zoila Chun Caal	Project beneficiary – dual household	
IV 21	María Juárez Reyes	Project beneficiary – dual household	
IV 22	Wendy Liliana Ismalej Raxcaco	Project beneficiary – dual household	

IV 23	Fátima Victoria	Project beneficiary – dual household	
IV 24	Odilia America Tot	Project beneficiary – dual household	