Project Title	**Ecofiltro Guatemala Improved Stove and Water Purification Project**
ERM CVS Reference	**2690.v3**
Gold Standard Project Reference Number	**GS 1321**
Client Name	**Natural Capital Partners**
Client Address	**167 Fleet Street,** **London, EC4A 2EA,** **United Kingdom**

Gold Standard Verification Report

ERM Certification and Verification Services
2nd Floor, Exchequer Court
33 St Mary Axe
London EC3A 8AA

Version Control	Date
Version 01	22 July 2018 (draft verification report)
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Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
EB	Executive Board
CER	Certified Emission Reduction(s)
CL	Clarification Request
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
DOE	Designated Operational Entity
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse Gas
GS	Gold Standard
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
PDD	Project Design Document
PP	Project Participant
QA/QC	Quality Assurance / Quality Control
UNFCCC	United Nations Framework Convention for Climate Change
VVS	CDM Validation and Verification Standard

Project specific abbreviations

BWBT	baseline water boiling test
HH	household
ICS	improved cooking stove
WT	Water Treatment
KPT	kitchen performance test
MKS	monitoring kitchen survey
WCFT	water consumption field test
SM	Socorro Maya
KS	Kitchen Survey

US	Usage Survey
MS	Monitoring Survey
CRW	Carbon Rights Waivers
DCD	Detailed Customer Databases
TSR	Total Sales Record
NGO	Non- Governmental Organisation
CBO	Community Based Organizations
WHO	World Health Organization

1. Project information

Project Title	Ecofiltro Guatemala Improved Stove and Water Purification Project
Gold Standard Project reference	GS 1321
Project Location	Alta Verapaz, Baja Verapaz, San Marcos, Quetzaltenango, Antigua, Guatemala
Host Party	Guatemala
Annex I Party(s)	n/a
Project Participants	Ecofiltro, Natural Capital Partners
Methodology	Gold Standard Methodology "Technologies and practices to displace decentralized thermal energy consumption (version 1 - 11/04/2011)
Methodology version number	11/04/2011

Final monitoring report date	Version 4.0, 02 January 2019
Monitoring Period	April 1st, 2016 – March 31st 2018
Date(s) of Site Visit	9-13 May 2018

Date/version of Registered PDD and monitoring plan	Version 05; dated 20 September 2013
Date/version of revised PDD (if applicable)	N/A
Date of Initial Gold Standard Approval	13 November 2012
Crediting Period	01 January 2013 – 31 December 2019

Number of emission reductions certified	310,056 tCO2e

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 April 1st, 2016 to March 31st, 2018 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 in the project design document (PDD) ▪ the CDM Validation and Verification Standard (VVS) ▪ Gold Standard requirements version 2.2 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, site visit, close out of open issues, preparation of report and technical review.
Responsibilities of Project Participants	The Project Participants (PPs) are responsible for the preparation of the information and GHG emissions data and the reported GHG emissions reductions of the project on the basis set out within the applicable monitoring plan.
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 dated 10 December 2018 were found to be appropriately measured and calculated in accordance with the applied monitoring methodology 'Technologies and Practices to Displace Decentralized Thermal Energy Consumption' (11/04/2011), the monitoring plan set out in the Project Design Document, Version 05 dated 20 September 2013, and Gold Standard Passport version 01.
Total GHG emission reductions certified	**Emission reductions: 310,056 tCO_2 equivalent**

Report approved by	**Signature**
Name: **Melanie Eddis**	
Date: 11 January 2019	

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, and the CDM Executive Board where relevant.

3.1. Verification Objectives

As set out in the Gold Standard Requirements (version 2.2), verification means the periodic independent review and ex post determination by a Designated Operational Entity of monitored reductions in anthropogenic emissions by sources of greenhouse gases (GHG) that have occurred as a result of a registered project activity during the verification 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 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 approved Gold Standard 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 emission reductions as set out in the Monitoring Report have been measured, calculated and reported in accordance with the requirements of the carbon monitoring plan and the sustainability monitoring plan in the Gold Standard Passport.
- 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

The verification is an independent and objective review and ex-post determination of the monitored reductions in GHG emissions by the DOE.

Based on the key project information set out on page 2, the verification addresses the implementation and operation of the project activity as set out in the PDD and the Gold Standard Passport, and the information and reported emissions reductions set out in the monitoring report prepared by the project participant (PP) for this monitoring period.

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

- the approved methodology applied in the PDD the monitoring plan accepted by Gold Standard
- the Gold Standard Passport and its sustainability monitoring plan
- Gold Standard Requirements version 2.2 and Gold Standard Toolkit version 2.2 and its Annexes
- the CDM Validation and Verification Standard (VVS) except where Gold Standard rules or procedures are different
- 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 host country 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	Participated in site visit?
Jonathan Avis	Lead Verifier	Yes	Yes	Yes	Yes
Sushmita Seelam	Support verifier	Yes	Yes	Partial	No

Technical Review	Role	CDM Knowledge	Gold Standard Knowledge	Technical Area	Participated in site visit?
Neringa Pumputyte	Technical Reviewer	Yes	Yes	Yes	No

3.3.1. *Verification Team Member Profiles*

Jonathan Avis is CDM Business Manager for ERM CVS, and a GHG Assessor and Technical Reviewer with over 10 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, technical review of the 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'.

Sushmita Seelam is a validator/verifier based in London and has been with ERM CVS for two years. Sushmita was the support assessor for the validation of the Impact Carbon Global Safe Water Programme of Activities in Uganda and Rwanda, and validation of the Impact Carbon Safe Water and Improved Cookstoves Global Programme of Activities which covers Uganda and Indonesia (which is a retroactive project and uses the TPDDTEC methodology). Prior to ERM CVS, Sushmita had been working in the sustainability consulting service industry for three years. As a CDM consultant, she has been involved in the development of over 25 CDM and VCS projects in various sectors. Her work also involves research and experience in supply chain evaluation, resource footprinting and life cycle assessment of commodities, with a focus on water and GHG footprinting for sectors such as global energy (especially oil & gas), agricultural commodities etc. Sushmita holds a B.E. in Environmental Engineering and an MSc in Environment and Sustainable Development. She has also completed the ERM CVS CDM validation and verification training and the CDM Gold Standard advanced training.

Neringa Pumputyte has over ten years of experience in climate change and GHG emission reductions, having worked as a consultant and project developer prior to joining ERM CVS. Neringa has worked on 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. 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 depicted in the CDM VVS and Gold Standard rules, procedures and guidance where they are different from CDM. 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. *Desk review*

A detailed desk review was undertaken prior to the site visit. This included the PDD and its carbon monitoring plan, the Gold Standard Passport and sustainability monitoring plan, the validation report, the applied monitoring methodology, relevant external data and reports, on-site documents, and relevant decisions, clarifications and guidance from the Gold Standard, and 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.

3.4.2. *Site Visit*

A site visit to the project activity was undertaken to assess implementation and operation of the project activity and to review evidence, and interview key personnel to confirm evidence associated with the data generation, aggregation, calculation and reporting of the monitoring parameters.

The site visit addressed:

- An assessment of the project implementation and operation as per the PDD and the Gold Standard Passport (including visiting households where the project has been implemented);
- Review of information flows for generating, aggregating and reporting the monitoring parameters;
- Interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the monitoring plan. A list of all interviewees is included in Annex 2.
- A cross-check between information provided in the monitoring report and data from other sources such as log books, reports of monitoring surveys, KPTs, Water Quality Tests, purchase records or similar data sources to establish the existence of a clear audit trail and records that validate or invalidate the stated data;
- A review of calculations and assumptions made in determining the GHG data and emission reductions;
- A review of assessment made in determining sustainability indicators;
- Identification of quality control procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters

The site visit included the following:

- Meetings with project's implementation partners, key personnel involved in monitoring and data collection
- Visiting a sample of households where project's units are located and used, and interviews with the end users
- Visiting the project's central warehouse and the office of Socorro Maya in San Pedro Carchá – Altaverapaz and Ecofiltro in Ciudad Vieja - Sacatepequez.
- Reviewing electronic sales, monitoring databases and checking against a sample of paper sales receipts

The verification team aimed to visit a number of units that is square root of the number units surveyed by the PP. As the PP used several surveys for the same clusters, the verification team used monitoring and usage surveys as the guiding surveys for selecting a sample for the site visit. For each scenario the following were the interviews developed during the site visit. The number of households visited was limited by the logistical challenges of reaching remote rural households spread across the whole of Guatemala. In order to ensure representativeness, ERM CVS prioritised reaching a cross section of urban, peri-urban and rural households, rather than trying to interview a higher number of easier-to-reach households (which would bias the sample towards urban and peri-urban households). The following are the households that were surveyed during the verification site visit:

Project Scenarios	Location	End users interviewed
Household Water Treatment – Scenario 1 11 households	Baja Verapaz	Ana Yoj Bol Irma Yolanda Pac Sergio Antonio Cac Irma Yolanda Ramírez José Leal
	Escuintla	Eluvia Martínez Brenda Sánchez Vásquez Marisela donis María Lidia Linares Lucila Esperanza de Quevedo Irma Yolanda Lopez
Improved Cookstove & Water Treatment, Dual Installation – Scenario 2 12 Households	Guatemala City Department	Rosa Barrios Marcela de Sian María filomena del Rosario Romana uyu Rosalina chamale Juana Boch Boch
	Alta Verapaz Department	María Santos Coj Suzy Marisol kip aceituno Claudia Norma Chocorel Marta Pereira María Isabel macal Dominga Ramos

3.4.3. *Reporting*

After the site visit, a draft report is 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.

3.4.4. *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 and the Gold Standard reviews of the project registration. The FARs have been addressed as follows:

Forward Action Request	Date and document (Validation or verification)	Verification activities undertaken to close the FAR	Draft OK/ CAR/CL	Final OK/ Not OK
3rd verification, FAR 1 (raised by ERM CVS) During the site visit, whilst observing the monitoring team carrying out usage and monitoring surveys, ERM CVS observed some questions being asked in a slightly non-neutral manner. Whilst it is unlikely, in the opinion of the verifier, that this would have actually influenced the results of the surveys observed (which were in any case used for the DOE's cross check and where not the source of the results used for crediting), nevertheless it is important that surveyors ask questions in as neutral and unbiased way as possible, whilst still ensuring that the respondent understands the question. FAR 1: Further training, and further elaboration of the 'hints' contained in the survey form should be carried out to ensure that questions are asked in as neutral a manner as possible..	3rd verification, final verification report by ERM CVS. 2nd September 2016	The PP conducted an electronic training session with the monitoring team on Tuesday, May 17th 2016, and has reinforced the importance of asking questions exactly as written within the surveys. The monitoring team were given the opportunity to raise any questions or request clarification or re-wording of any questions that were not clear. ERM CVS confirmed this via interviews with the monitoring staff on site. The attendants to the training session were: 1. Neil Bellefuille The Paradigm Project 2. Eddy Melendez Monitoring Team 3. Gabriel Jerez Monitoring Team All surveys were conducted by Eddy Melendez and/or Gabriel Jerez. On the basis of comments from the monitoring team, some questions were modified for the 4th Monitoring Period /06/. During the site visit ERM CVS observed the monitoring team carrying out usage and monitoring surveys. The surveyors were observed to ask the questions in a neutral and unbiased manner, whilst at the same time ensuring that the respondent understands the question.	OK	OK

4.2. Project Implementation in accordance with the PDD

ERM CVS evaluated the conformity of the project activity and its operation with the PDD and GS Passport. This assessment was undertaken on the basis of the site visit, review of documents and interviews with relevant personnel.

During the site visit, ERM CVS assessed whether all features of the project as described in the PDD and GS Passport are in place and that the PP has operated the project in accordance with operational criteria set out in the PDD and GS Passport.

The project covers distribution and sales of the cooking stoves and water purification devices. The volumes of sales are not projected in the PDD.

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 – but this scenario does not apply for the current monitoring period as confirmed during the site visit and document revision/10/11/12/

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.

The project targets populations within Guatemala – primarily the rural and peri-urban domestic fuel wood users, 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 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') in rural and peri-urban areas. It also provides 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 implemented with the involvement of several different partners:

- Stove Capital LLC is a company established for the purpose of financing the project and bringing local partners together to scale the project through carbon financing.
- CEMEX is an international cement manufacturing company with operations in Guatemala. CEMEX worked with local partner Socorro Maya, with international improved stove design expert - Peter Scott, and with Burn Design Lab to design the Eco-stove (also written as 'Ecostove') and established local manufacturing operations for the Eco-stove from 2013 to 2017. New stoves are now manufactured locally in Guatemala.
- 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 under Project Scenario 1.
- Socorro Maya is a non-profit Guatemalan organization with the goal of serving the humanitarian needs of the poor. It distributes the Eco-stove ('Ecoestufa' in Spanish) and Ecofiltro to Guatemalan communities and provides training and follow-up to ensure technologies are used correctly (i.e. Socorro Maya distributes all technologies under Project Scenario 2).
- The Paradigm Project is an international social enterprise specializing in the development of clean cook stove projects and in carbon finance for scale-up and development of sustainable supply chains. The Paradigm Project partnered with Stove Capital LLC to develop the carbon program and to facilitate processes for tracking and monitoring of the project. In 2017 the Paradigm Project handed over the project to Natural Capital Partners, and is now no longer involved.
- Natural Capital Partners (NCP) is an international carbon project developer. NCP has taken over the management of the Gold Standard carbon emission reduction project, working with Ecofiltro and Scorro Maya.

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

- Eco-Stove ('Ecoestufa' in Spanish): As described above, the Eco-stove was designed by engineers at CEMEX 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. 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, as could be cross-checked with the Registered PDD/02 and with the manufacturing specifications /19. The stove is locally appropriate for Guatemalan cooking needs, providing beneficiaries ample space to cook daily food, local foods and large meals. Socorro Maya is the local Project partner responsible for the sales and installations of Eco-stoves.
- 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. The ceramic element has a pour 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, as could be checked against the manufacturing specifications/19/. Ecofiltro S.A is the local Project partner responsible for the sales and installations of Ecofiltro water filters.

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	Review of the monitoring report and	During the site visit, ERM CVS confirmed that the project activity implementation for the monitoring period consists of	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
and operation status of the project? Are all physical features of the project activity in place as per the PDD?	registered PDD Review of project sales records (TSR) and Detailed Customer Databases (DCD) Interviews with Project Partners during the site visit listed in A.2. Visits to a sample of households for project scenario 1 and 2	installation of Ecofilters distributed by Ecofiltro S.A through CBOs/NGO or local distributors in Guatemala (Project Scenario 1), and stoves and filters distributed by Socorro Maya (Project Scenario 2). ERM CVS confirmed that the same type of Eco-Stove and model of Ceramic Water Filter are being disseminated during this monitoring period as described in the registered PDD and in the previous verifications. The manufacturing of new stoves is now being done by a Guatemalan company rather than Cemex, although to exactly the same specifications. The assembly and quality control of the stoves is still done by the same team in Socorro Maya and since the stoves are constructed from highly standardised parts, it can be confirmed that the stoves have the same characteristics.		
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 Review of project sales records (TSR) and Detailed Customer Databases (DCD). Interviews with Natural Capital Partners, Ecofiltro and Socorro Maya during the site visit listed in A.2. Visits to a sample of households	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, as confirmed during the site inspection.	OK	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 Interviews with the project partners during the site visit listed in A.2. Visits to a sample of households	ERM CVS has confirmed that provisions have been implemented for the transfer of carbon rights to the project developer. Carbon Rights Waivers: The requirements set out in the methodology and the registered PDD concerning carbon rights waiver information, are as follows: Methodology: 'The project proponents 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. This must be communicated to the technology producers and the retailers of the improved technology or the renewable fuel in use in the project situation by contract or clear written assertions in the transaction paperwork. If the claimants are not the project technology end users, the end users should be 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	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
		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 site of all the EcoFiltra 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. ERM CVS also confirmed through household interviews 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, 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, Socorro Maya communicates 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 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, although not all have done so.However 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

Based on the verifier's site visit, it can be confirmed that all physical features of the project activity have been implemented in

accordance with the PDD and the Gold Standard Passport. No specific monitoring equipment had to be installed according to the monitoring plan /5/. ERM CVS confirmed, through the visual inspection that all physical features of the Gold Standard project activity have been implemented in accordance with the PDD. Only one type of stove and one type of ceramic water filter were disseminated during this monitoring period.

The project activity was also confirmed to be fully operational in accordance with the PDD.

4.3. Compliance of the monitoring plan with the monitoring methodology

ERM CVS evaluated whether the monitoring plan 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 1 - 11 April 2011).	OK	OK

Conclusion

ERMCVS 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 for a period of twelve months, 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.

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 usage surveys and KPTs. Randomized selection of households for surveys and KPTs was done and data was collected in real time via smart phones, allowing for monthly review to address any operating issues. However, as noted in CL 1 below, an insufficient number of monitoring surveys was conducted given the two year length of the monitoring period (monitoring was carried out only during the first year, due to a lack of staff in the second year of the monitoring period after Paradigm withdrew from managing the project – please see CL 1 below.

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 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 is compiled from 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. Not all of the partners are successful at obtaining the 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. Based on the site visit discussions with EcoFiltro, ERM CVS does not consider there to be a significant risk that the customer base of the poorly reporting partner organisations is significantly different to the ones that did report detailed customer data, as all organisations are operating in similar areas and with the same target population.

In order to ensure filters are only credited from the date they are actually delivered to end users, Ecofiltro tracks the date of Delivery Notes (available for all bulk sales), which correspond to sales invoices and indicate the date the filters were delivered to NGOs/CBOs. Individual registrations in the DCD then indicate when the filters were delivered to end users. The data on Delivery

Notes and detailed customater 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.

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.

EcoFiltro communicates carbon rights via a CRW printed clearly on the side of the bucket of the filter itself.

Scenario 2 (stoves and filters): The TSR is collected from sales invoices, and includes each individual unit sold. The database includes the date of installation, end-user's name and contact information (when possible), serial number, and the geographic location (community and department). 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 distributes the technologies directly (indeed, they build the stoves inside the households), they are able to get detailed data for all end users. Hence, for project scenario 2, the TSR = the DCD. The stove TSR/DCD is used for customer follow-up and sampling for project monitoring. All sales data for Socorro Maya is currently collected in paper form then entered manually into the excel database (although the project plans to transition to an electronic data collection system for the next monitoring period).

Socorro Maya communicates 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 informs 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.
>
> **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.
>
> **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.
>
> The KPT is a subsumed KPT and measures 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.
>
> 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. 53 WCFTs were carried out for scenario 1 (51 were used after removal of outliers) and 55 for scenario 2 (49 were used after removal of outliers), all between May 2016 and May 2017.

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.

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 Databases spreadsheets Review of sales invoices records for each project scenario Interviews with project implementation staff and project Partners such as Socorro Maya and Ecofiltro S.A. Interviews with NGO's partners Review of the Operation Manuals for Ecofiltro and Socorro Maya	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. Based on interviews with EcoFiltro monitoring staff and review of the database and paper records on site, ERM CVS was able to confirm that in this monitoring period, EcoFiltro has conducted training with NGO staff, who then train end-users during product distributions, and conducted training with those end users that EcoFiltro sold directly to. ERM CVS reviewed the training material, 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. 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 records against original paper records on site, as well as interviewed the monitoring manager of EcoFiltro. All sales records that were checked were backed up by paper records and hence could be confirmed. **Scenario 2**: The verification team reviewed the database and cross checked a sample of records against original paper records on site, as well as interviewed the monitoring/accounting manager of Socorro Maya. Since Socorro Maya distributes 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. ERM CVS cross checked entries in the database against paper records during the site visit – please see the section on the detailed customer database below for details.	OK	OK
Was detailed customer data	Review of the Total Sales	The detailed customer database is used for the lag analysis for scenario 1 (determining the average length of time between a	CL 2	OK

Compliance question	Verification activities undertaken	Verification findings (including justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
collected appropriately and is it representative of the sales record?	Records & Detailed Customer Databases spreadsheets 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.	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 reviewed the database and cross checked a sample of 10 detailed customer records against original paper records, as well as interviewed the monitoring manager of EcoFiltro. ERM CVS reviewed 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 hence could be confirmed, with the exception of one where the paper record could not be found. Following further investigation, ERM CVS determined that the QA/QC process used by EcoFiltro had been changed in January 2018. ERM CVS then checked an additional 5 records from 2018 and all were correct. As noted above, not all of the 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. Based on the site visit discussions with EcoFiltro, ERM CVS does not consider there to be a significant risk that the customer base of the poorly reporting partner organisations is significantly different to the ones that did report detailed customer data, as all organisations are operating in similar areas and with the same target population. However, in the DCD detailed customer data is only included from 2 NGO partners. Most of the NGOs are not represented. **CL 2 was raised to determine whether the DCD can be considered sufficiently representative**. **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, as well as interviewed the monitoring/accounting manager of Socorro Maya. All detailed sales records that were checked were backed up by paper records and hence could be confirmed, with the exception of one, where the data in the database did not match the date of the paper record. Therefore an additional sample of 37 entries were checked against paper records. Of these, 4 were found to have incorrect dates (incorrect by up to two months). However the rest of the information in these records was correct. Because all four of these stoves were installed before the start of the monitoring period, the installation date had no impact on the emission reductions claimed in this monitoring period. All the stoves installed during this monitoring period were checked, and all had correct installation dates. **However additional QA/QC steps should be put in place before the next verification in order to minimise the recurrence of such errors. Please see FAR 1**.	FAR 1	

Compliance question	Verification activities undertaken	Verification findings (including justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
Were 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 the staff of Natural Capital Partners, implementing partners, and CO2 Management enumerators	During the site visit, ERM CVS confirmed that the Water Quality, KPT, WCFTs, Usage Surveys, and Monitoring Surveys have been conducted in line with the monitoring plan. The Verification team visited a sample of households where the above surveys and tests have be done and confirmed by interviewing the users that Natural Capital Partners' monitoring staff conducted the activities described in the survey and test reports in their kitchens, asked questions and took physical measurements before, during and after activities. <u>Sampling method:</u> The PP used a simple random sampling approach for all monitoring conducted during this monitoring period /09/. 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/. 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 on site 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). 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). <u>Sample size and sampling frame</u>: By review of the sampling frame / sample selection spreadsheet, 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 usage survey contained at least 30 samples of each technology age. 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 for the first year of the monitoring period, even after removing outliers /09/. For stoves, the Total Sales Record was used as the sampling frame and stoves younger than 6 months at the time of monitoring were excluded from consideration, to allow for a sufficiently long (representative) period of use before users	CL 1	OK

Compliance question	Verification activities undertaken	Verification findings (including justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
		were questioned on their usage patterns. For filters, the Detailed Customer Database was used as the sampling frame and filters younger than 6 months and older than 24 months at the time of monitoring were excluded from consideration. Survey/test results from the previous Issuance were used to inform the expected mean and variance for calculating the sample sizes for this monitoring period. The use of means and standard deviation from the previous issuance is acceptable because the areas and households have the same characteristics as under the previous issuance. The sample frames were confirmed to be appropriate. **However, given that this monitoring period is 2 years long, an insufficient number of samples for the monitoring/usage surveys has been taken. During the second year of the monitoring period, monitoring/usage surveys were not conducted due to the withdrawal of Paradigm and the consequent lack of monitoring staff. CL 1 was raised**. In response, the Project Developer requested a deviation from the Gold Standard, who approved a deviation as follows: The Project Developer shall use the measured usage values for the 1st year and an adjusted usage value for the 2nd year for this issuance (MP4). The adjusted usage value can be either: • PD's proposal of a justifiably conservative value; or • the value applied in the PDD (if the 1st year measured usage value matches or is less than the PDD 's value for the same year). The project developer has applied the deviation in the determination of emission reductions. The variables affected by the monitoring/usage surveys are: • Persons per filter • % LPG Users • % Usage The PD has applied the lowest value in every issuance or the proposed in the PDD for the variables: Persons per filter & % Usage, and the highest value for % LPG Users, which is conservative. The specific values chosen, and their origin, is shown in the table for CL 1 below. ERM CVS checked the previous issuances and the PDD and confirmed the values are correct. **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		

Compliance question	Verification activities undertaken	Verification findings (including justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
		appropriate and in line with GS guidance. The monitoring staff are confirmed to be fully trained and experienced on conducting these tests. The equipment was calibrated against a control set of scales to confirm that it was accurate – this was verified by means of interviews with the monitoring staff in the field (since this is not a laboratory calibration where certificates were issued). ERM CVS interviews with end users confirmed that the main benefits of the Eco-stoves are the significant portion of wood savings (i.e. more than 70% of previous practice). 50 KPTs were conducted (for scenario 2 – dual households having both a water filter and a cooking stove), and 1 outlier was removed from the KPT results. No transcription errors were identified in the results. 53 WCFTs were conducted and 2 outliers were removed from the analysis for scenario 1 (water treatment –filter – only households) and 55 WCFTs were conducted and 6 outliers removed 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. The same monitoring staff who conducted the WCFTs and KPTs in the previous monitoring period carried out the data gathering and analysis, and are therefore considered suitably experienced and competent. ERM CVS reviewed the data analysis spreadsheet /06/ and confirmed that the PP removed outliers for the MS/US, WCFT and KPT if the respondent was an institutional or commercial user, or 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. ERM CVS considered that the grounds for removal of outliers were appropriate. **Cookstoves & Water filters US/MS Survey**: ERM CVS conducted household visits to a subset of the end users that were surveyed by the project participants. ERM CVS confirmed that US and MS were appropriately conducted by the project monitoring staff. A total of 120 US&MS for Project Scenario 1 (filter only) (of which 2 were removed as outliers) and 149 US&MS for Project Scenario 2 (dual households – stoves and filters) (7 of which were removed as outliers) were carried out. **Please see CL 1 concerning the sample size**. The surveys were carried out by the project monitoring staff, the same people who carried the previous survey, who have been trained and are experienced in conducting the surveys		

Compliance question	Verification activities undertaken	Verification findings (including justification/substantiation of information, data and evidence)	Draft OK/ CAR/CL	Final OK/ Not OK
		for this project. The results registered in the database /06/ are consistent with the information checked by ERM CVS in the site inspections. The verification used the same survey questions as used by the project, but 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 differences between data collected in the site inspection with the data records were minimal, therefore the survey results are fully consistent with the context of the project activity and ERM CVS's observations. ERM CVS also observed the monitoring staff conducting example surveys during the site visit, enabling ERM CVS to verify that the survey is being delivered appropriately and that end users are able to understand the questions and answer them clearly. <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 findings of the previous verifications and learning from experience of the monitoring staff. The monitoring & usage survey questions /23/ for water technologies were 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/. 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. **Water Quality**: During the site visit, ERM CVS confirmed that Natural Capital Partners 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/. 34 water quality tests were carried out for scenario 1 (water treatment only households) and 41 for scenario 2 (duel households).		

4.4.2. *Completeness of monitoring parameters*

The verification team evaluated the monitoring of each parameter stated in the monitoring plan. The parameters included in the monitoring plan 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 parameter in monitoring plan				
Parameter	**Description**	**Included in the Monitoring Report?**	**Draft OK/ CAR/CL**	**Final OK/ Not OK**
Data and parameters to be monitored for the crediting of households improved cookstove over the crediting period (Project Scenario 2):				
Np,y,ics-nb	Cumulative number of project technology-days included in the project database for Project Scenario 2 for technology against baseline scenario in year y	Yes. ERM CVS confirmed that all parameters in the monitoring report /5/, ER calculation /1/ and PDD /2/ are consistent and traceable.	OK	OK
P, p,b,y,ics-nb	Specific fuel savings for an individual technology of Project Scenario 2 against an individual technology of baseline scenario in year y, in tons/technology-day, as derived from the statistical analysis of the data collected from the field tests			
Up,y,ics-nb	Cumulative usage rate in Project Scenario 2, for technology improved cookstove, during year y			
f NRB,y,ics-nb	Fraction of biomass used in year y as non-renewable of woody biomass fuel in scenario 2			
LEp,y,	Leakage in Project Scenario 2 during year y			
Data and parameters to be monitored for the crediting of water treatment technologies (Scenario 1 & 2) over the crediting period:				
Np,y,wt	Number of persons-days of water consumed by project scenario 1 and 2 through year y	Yes. ERM CVS confirmed that all parameters in the monitoring report /5/, ER calculations /1/ and PDD /2/ are consistent and traceable.	OK	OK
Up,y,wt	Cumulative usage rate in project scenario 1 and 2, for technology water filters during year y, based on cumulative installation rate and drop off rate.			
Qp,y	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			
$Q_{p,cleanboil,y}$	Quantity of treated water still boiled in the project scenario 1 and 2, after installation of project technology			
Quality of the treated water	Performance of the treatment technology			

4.4.3. *Data and parameters monitored*

The verification findings for the monitoring of each parameter are set out below

Data / Parameter:	Np,y,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	

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 during the site visit and document cross-checking 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 Socorro Maya TSR data base (as contained in the ER calculation spreadsheet) /03/. Sales from the start of the project to the end of this monitoring period recorded in the TSR are used. The operational time does not include the day of installation. **The inventory lag time calculation was not clearly presented for scenario 1 (filter only households). CL 3 was raised**. ERM CVS conducted cross checks on the sales data as described above. The Verifier selected randomly a considerable number of 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. ERM CVS also confirmed that units are no longer credited after two years (after the end of their expected useful life).	**CL 3**	**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:	P,p,b,y,ics-nb		
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 y		
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**	$P_{p,b,y,ics\text{-}nb}$ is the difference in the specific fuel consumption for an individual technology in baseline scenario b ($P_{,b,y,\ ics\text{-}nb}$) and the specific fuel consumption for an individual technology in project scenario p ($P_{,p,y,\ ics\text{-}nb}$). The Verifier 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 (KPT value was used because it was more conservative than the value from the MS/US) /06/. The calculation is reliable and consistent with the values checked during the site visit and the	**OK**	**OK**

monitoring of parameters during the monitoring period?	results of the KPTs reviewed by ERM CVS /06/. The resultant value is comparable to the previous issuance (0.02068 vs 0.02051 in the last issuance)		
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,y,ics-nb		
Data unit:	Percentage		
Description:	Cumulative, weighted usage rate in project scenario, for technology during year y		
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 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. According to the site inspection, ERM CVS confirmed that the PP conducted combined MS / US surveys on the same samples in the project activity target population. **Sampling methodology & sample size**: the total sample size for usage surveys was 120 for scenario 1 (water treatment only) and 149 for scenario 2 (dual households). The number of monitoring surveys was the same, because all households in the usage survey were found to be using the stoves. For stoves, devices younger than 6 months at the time of monitoring were excluded from consideration. **However the sample size was not sufficiently large given the 2 year length of the monitoring period, and furthermore, the project did not achieve the minimum sample size requirement of at least 30 devices of each age bracket being surveyed /06/. CL 1 was raised**. During the site visit it was also possible to confirm that the target population in different departments where the technology installed is homogeneous. There are no significant differences in terms of cooking practices, domestic customs or wood consumption behavior within the same regions and communities. <u>Cross check of survey results</u>: ERM CVS visited a sample of households previously surveyed by the PP (as listed in section 3.4.2) to cross check the survey results, and found that the data from the DOE surveys was consistent with that from the PP surveys. In terms of <u>QA/QC procedures,</u> all surveys were conducted by the full time monitoring staff and they cleaned the data to ensure consistency. An independent third party QA/QC review was also done on all data & parameters /14/. These procedures could be checked by the verification team during the site visit, document review and interviews with the persons responsible for monitoring. In summary, ERM CVS considered that the sampling process applied are consistent with CDM sampling and GS rules, and is reliable and consistent	**CL 1**	OK

	with the operating manuals /11/15/.		
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		
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?**	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. 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 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, 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	**OK**	**OK**

	• 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 27% of stove users use the EcoEstufa to heat their home. However, the overwhelming majority (90%) 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/ • During the household visits by ERM CVS, 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. • ERM CVS also considered the possibility of seasonal effects. The KPTs for this monitoring period were done during the winter (dry) season, hence stove use for heating could be properly accounted for during the surveys (heating is unlikely to be needed during the hotter summer (wet) season in Guatemala. 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 only a very small percentage of users have switched from using fuels and technologies considered higher efficiency in the baseline to only using firewood after receiving the EcoEstufa – 99% of households used wood in the baseline anyway /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,y,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 ((recorded sale date of each technology – closing date of the monitoring period – 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 project database /03/, ERM CVS confirmed that the water filter databases record the date of water filter supply for bulk water suppliers. **The inventory lag time calculation was not clearly presented for scenario 1 (filter only households). CL 3 was raised**. For filters, devices younger than 6 months and older than 24 months at the time of monitoring were excluded from consideration. The parameter was also adjusted for households that use LPG. ERM CVS confirmed this by review of the data & calculations /03/06/ The number of people using the water filter was measured through the monitoring survey. As noted above, given that this monitoring period is 2 years long, an insufficient number of samples has been taken. During the second year of the monitoring period, monitoring surveys and WCFTs & KPTs were not conducted due to the withdrawal of Paradigm and the consequent lack of monitoring staff. CL 1 was raised. CL 1 was closed following Gold Standard approval of a deviation – please see CL 1 below. In response, conservative values were applied for the second year, in line with the approved deviation: for water treatment households the value for the first year of the current issuance was selected as this was the most conservative, and for dual households, the value from the third issuance was selected as this was the most conservative. <u>Cross check of survey results (for the surveys conducted in the first year of this monitoring period)</u>: ERM CVS visited a sample of households previously surveyed by the PP (as listed in section 3.4.2) to cross check the survey results, and found that the data from the DOE surveys was consistent with that from the PP surveys. In terms of <u>QA/QC procedures,</u> all surveys were conducted by the full time monitoring staff, and the monitoring staff cleaned the data to ensure consistency. An independent third party QA/QC review was also done on all data & parameters /x14. These procedures could be checked by the Verification team during the site visit, document review and interviews with the persons responsible for monitoring. In summary, ERM CVS considered that the sampling process applied are consistent with CDM sampling and GS rules, and is reliable and consistent with the monitoring plan /09/02/.	**CL 3**	**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,y,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?**	Given that this monitoring period is 2 years long, an insufficient number of samples has been taken. During the second year of the monitoring period, monitoring surveys and WCFTs & KPTs were not conducted due to the withdrawal of Paradigm and the consequent lack of monitoring staff. CL 1 was raised. CL 1 was closed following Gold Standard approval of a deviation – please see CL 1 below. In response, conservative values were applied for the second year, in line with the approved deviation: for water treatment households the value for the 2nd issuance was selected as this was the most conservative, and for dual households, the value from the PDD was selected as this was the most conservative. According to the site inspections, ERM CVS confirmed that Water Filter US and MS were conducted in the project activity target population for the two scenarios (for the first year of this monitoring period). Please see section 4.4.1 for details on how the sampling and surveys were validated. 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). <u>Cross check of survey results (applies to the first year of the monitoring period)</u>: ERM CVS visited a sample of households previously surveyed by the PP (as listed in section 3.4.2) to cross check the survey results, and found that the data from the DOE surveys was consistent with that from the PP surveys. In terms of <u>QA/QC procedures,</u> all surveys were conducted by the full time monitoring staff and the monitoring staff cleaned the data to ensure consistency. An independent third party QA/QC review was also done on all data & parameters /14/. These procedures were checked by the Verification team during the site visit, document review and interviews with the persons responsible for monitoring. 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/.	CL 1	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,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		
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. Qp,y is calculated from the average hygienic water consumption per day per hh — average non- hygienic water consumption per day per hh / average persons consuming treated water per day per hh Based on the site inspections, ERM CVS confirmed that WCFTs were conducted in the project activity target population for the two scenarios by Natural Capital Partners. Please refer to section 4.4.1 above for further details of how the WCFTs and MS/US were verified. Please see section 4.4.1 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. The cap of 6L/person/day has been correctly applied in the calculations. Cross check of survey results: ERM CVS visited a sample of households previously surveyed by the PP (as listed in section 3.4.2) to cross check the survey results, and found that the data from the DOE surveys was consistent with that from the PP surveys. In terms of QA/QC procedures, all surveys were conducted by the full time monitoring staff and the monitoring staff cleaned the data to ensure consistency. An independent third party QA/QC review was also done on all data & parameters /14/. These procedures were checked by the verification team during the site visit, 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 valuies are lower (more conservative) than for the 3rd monitoring period.	**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	
Data 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/	Measured	

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 parameter is determined by the Water Consumption Field Tests, 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. Based on the site inspections, ERM CVS confirmed that WCFTs were conducted in the project activity target population for the two scenarios by Natural Capital Partners monitoring staff. Please see section 4.4.1 above for further details of how the WCFTs were verified. Please see section 4.4.1 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. <u>Cross check of survey results</u>: ERM CVS visited a sample of households (as listed in section 3.4.2) to evaluate the WCFT results by using survey questions to ask households to self report the incidence of boiling after the installation of the project technology. The data from the DOE visits was consistent with that from the PP WCFTs. In terms of <u>QA/QC procedures,</u> ERM CVS checked that 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 the PPs cleaned the data to ensure consistency. An independent third party QA/QC review was also done on all data & parameters /14/. These procedures could be checked by the Verification team during the site visit, document review and interviews with the persons responsible for monitoring.	**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:	LEp,i,y		
Data unit:	tCO2e/year		
Description:	Leakage in Project Scenario 2 during year y		
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?	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	**OK**	**OK**

Does the monitoring report correctly state all relevant information and data relating to the monitoring of parameters during the monitoring period?	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 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, 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.		
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:	Water Quality		
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 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. The last 5 to 7 households monitored in each region 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 during the site visit. Based on review of the technology on site, ERM CVS confirms that the monitoring results are credible, given the filters' technical performance in terms of removing bacteria. ERM CVS confirms that the parameter has been correctly determined and applied in the emission reduction calculations. 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, which it was possible to check directly during household inspections by ERM CVS. All interviewed end-users responded consistently to questions about the cleaning and maintenance process.	**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:	$f_{NRB,y,ics\text{-}nb}$	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 Methodology section III.1 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. The PP did not therefore have 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		

4.4.4. *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 the project, implementing partners, and CO2 Management	The project in this monitoring period consists of 2 project scenarios, each of which has differences in the operational and management setup for monitoring as ERM CVS could confirm during the site visit. The Monitoring Report /5/ provides a relevant summary of management and operational system including responsibilities and authorities.	OK	OK

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 appliable, 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_2O 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
EFp,fuel,CH4	CH_4 emission factor arising from use of fuels in project scenario		OK	OK
EFp,fuel,N2O	N_2O emission factor arising from use of fuels in project scenario		OK	OK
NCVb,wood	Net calorific value of the fuel used in the baseline		OK	OK
NCVp,fuel	Net calorific value of the fuel used in the project scenario p		OK	OK
Wb,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
Wp,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		OK	OK

	year y			
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 (see section 5).
- Information provided in the monitoring report has been cross checked with other sources such as log books, inventories, purchase records, laboratory analysis (see section 5)
- 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 conducted in 42 households, 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. 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.	OK	OK
Were data available throughout the monitoring period in accordance with the monitoring plan and methodology?	Only sales data is collected continuously. Other parameters are monitored by surveys and tests conducted once in a certain period of time. There was a gap in continuous monitoring during the second year of the monitoring period – please see CL 1.	CL 1	OK
Has the project participant used appropriate methods and formulae for calculating baseline, project and leakage	ERM CVS checked the methodological options for emission reduction calculation and found methods and formulae are correct and according to Project Scenario 1 & 2, in the MR, and in accordance with the PDD and methodology. The PP included the algorithms and parameter definitions which facilitate the	OK	OK

emissions?	comprehension of the ER calculations. ERM CVS confirmed that the PP used appropriate methods and formulae for baseline and project emissions calculations. Also the leakage assessment is consistent with the monitoring plan and methodology requirements, and the parameters and their description are consistent.		
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 spreadsheet /03/ presents 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. Other observations

No other observations.

4.8. Assessment of sustainability monitoring

4.8.1. *Completeness of sustainability monitoring parameters*

The verification team evaluated the monitoring of each sustainability indicator stated in the Gold Standard passport and compared with the description in the MR how the indicators were monitored, their results, and scoring.

The parameters included in the Gold Standard passport are listed below and a full description of each parameter and the verification activities associated with monitoring of each one is included in Section 4.9.3.

Monitored sustainability indicators				
Number	**Description**	**Included in Monitoring Report?**	**Draft OK/ CAR/CL**	**Final OK/ Not OK**
1	Air quality	Yes	OK	OK
2	Water quality and quantity	Yes	OK	OK

3	Livelihood of the poor	Yes	OK	OK
4	Access to affordable and clean energy services	Yes	OK	OK

4.8.2. *Sustainability indicators monitored*

The verification findings for the monitoring of each sustainability parameter are set out below. Note that only those sustainability parameters monitored for this verification period are presented (see table above).

Number:	**1**	Air quality		
Chosen parameter:	Measurement of user perceptions between old stove and new stove: smoke levels, incidence of coughing, incidence of respiratory illness, and incidence of itchy eyes			
Target:	Households will report reduced smoke levels, reduced incidence of coughing, reduced incidence of respiratory illness, reduced incidence of itchy eyes			
Means of monitoring (as per GS Passport):	Baseline and project household surveys regarding sustainability issues will be conducted. Household monitoring surveys will be given to a sample of all purchasers of improved cookstoves.			
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?**	By reviewing the monitoring report, ERM CVS checked that the Sustainable Development Indicators have been correctly developed consistent with the Monitoring Plan in the GS Passport. 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 the vast majority (99%) of stove users feel that there has been a decrease in smoke levels, with none reporting that it had got worse. 99% of users also reported a reduction in eye irritation and 98% reported a reduction in coughing. Please see section 4.4.1 for details of how the sampling and survey was verified. ERM CVS visited a sample of households previously surveyed by the PP (as listed in section 3.4.2) to cross check the survey results, and found that the data from the DOE surveys was consistent with that from the PP surveys.		OK	OK
Conclusion	ERM CVS confirmed that • The indicator has been monitored appropriately in accordance with the monitoring plan • The scoring of the indicator presented in the MR is appropriate			

Number:	**2**	Water quality and quantity
Chosen parameter:	Measurement of user perceptions of filtered water compared to boiled or untreated water and incidence of diarrheal disease	
Target:	Avoidance of boiling water for purification and increased levels of water treatment by filters for drinking and cooking; households will report on reduced incidence of diarrheal disease	
Means of monitoring (as per GS Passport):	Household surveys will be given to beneficiaries of water filter technologies.	

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 surveys for water filters/18/ show that user perceptions of the project are highly positive. This parameter was properly monitored in the Monitoring Survey asking relevant questions about frequency of water-born illnesses, water taste, and perception of water quality. The surveys show that the vast majority (99%) of water filter users feel that the taste of water has improved, and 1% feel it is the same, with none reporting that it had got worse. 94% of users also reported a reduction in stomach illnesses. 100% of surveyed users reported that access to water had improved as a result of the project. Please see section 4.4.1 for details of how the sampling and survey was verified. ERM CVS visited a sample of households previously surveyed by the PP (as listed in section 3.4.2) to cross check the survey results, and found that the data from the DOE surveys was consistent with that from the PP surveys.	OK	OK
Conclusion	ERM CVS confirmed that • The indicator has been monitored appropriately in accordance with the monitoring plan • The scoring of the indicator presented in the MR is appropriate		

Number:	**7**	Livelihood of the poor		
Chosen parameter:	Time and/or money savings due to reduced fuel consumption			
Target:	For families that purchase fuel wood, access to efficient cookstoves will likely reduce fuel expenditures, resulting in more disposable income. For families and institutions that gather biomass, efficient cookstoves will reduce the time spent collecting fuel			
Means of monitoring (as per GS Passport):	Kitchen Performance Tests will be conducted at regular intervals according to the Gold Standard Methodology. This, or related survey method, will provide information on the percentage of fuel saved that will be combined with data regarding the price and time required to collect fuel. Surveys will also assess how time and price savings (if any) are used.			
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 KPTs were conducted to determine the fuel consumption savings associated with the use of the Eco-stove and ERM CVS checked the KPT data /06/ to verify the significant fuel savings on a per meal basis. For the stove users, 79% of users surveyed reported buying fuel in the baseline, and the average money saving reported by users as a result of the project was 72%. 15% collected wood in the baseline, and the average time saving reported by users as a result of the project was 50% (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. Approximately 99% of users also reported satisfaction with the devices disseminated by the project. Please see section 4.4.1 for details of how the sampling and survey was verified.		OK	OK

	ERM CVS visited a sample of households previously surveyed by the PP (as listed in section 3.4.2) to cross check the survey results, and found that the data from the DOE surveys was consistent with that from the PP surveys.		
Conclusion	ERM CVS confirmed that • The indicator has been monitored appropriately in accordance with the monitoring plan • The scoring of the indicator presented in the MR is appropriate		

Number:	8	Access to affordable and clean energy services	
Chosen parameter:	Time and money savings due to reduced fuel consumption.		
Target:	Families will adopt efficient cookstoves and water filters. For families and institutions that purchase fuel wood, access to efficient cookstoves and water filters will reduce fuel expenditures, resulting in more disposable income. For families that gather biomass, efficient cookstoves and water filters will reduce the time spent collecting fuel		
Means of monitoring (as per GS Passport):	Evaluation of household fuel consumption will be evaluated according to Gold Standard methodology. The evaluation will provide information on the percentage or estimated amount of fuel saved that will be combined with data regarding the price and time required to collect fuel. Surveys will assess how time and price savings (if any) are used		
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?**	This indicator is monitored in the same way as the Livelihood of the poor parameter. ERM CVS confirmed that the reporting of this Sustainable Development Indicator in the MR has been corrected and is consistent with the MP.	OK	OK
Conclusion	ERM CVS confirmed that • The indicator has been monitored appropriately in accordance with the monitoring plan • The scoring 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.

<table>
<tr><td>CL 1</td><td></td></tr>
<tr><td>Comment:</td><td>An insufficient number of monitoring surveys was conducted given the two year length of the monitoring period (monitoring was carried out only during the first year, due to a lack of staff in the second year of the monitoring period after Paradigm withdrew from managing the project.</td></tr>
<tr><td>Clarification Request:</td><td>A deviation request shall be made to Gold Standard due to the fact that the sample size requirements were not met for the monitoring period.</td></tr>
<tr><td>PP response:</td><td>The deviation request was made with Gold Standard, it was approved with modifications: Values obtained during the monitoring Period can be used in 1st year calculations. A conservative approach must be used for 2nd year calculations. Three variables were selected as conservative for ERs calculations in 2nd year: Persons per filter, % LPG users & % Usage.

The conservative approach selected was based on the lower values of these three variables from every previous issuance or PDD’s selected values:
<table>
<tr><th>Variable</th><th colspan="3">Scenario</th></tr>
<tr><td rowspan="2">Persons Per filter</td><td colspan="2">Dual</td><td>Water Technologies</td></tr>
<tr><td colspan="2">5.18 (Iss 3)</td><td>5.03 (Iss 4)</td></tr>
<tr><td>% LPG Users</td><td colspan="2">1.00% (Iss 3)</td><td>6.06% (Iss 3)</td></tr>
<tr><td rowspan="2">% Usage</td><td>Stoves</td><td>Filters</td><td rowspan="2">88.42% (Iss 2)</td></tr>
<tr><td>92.39 (Iss 1)</td><td>95 (PDD)</td></tr>
</table></td></tr>
<tr><td>Documentation provided</td><td>GS 1321 Deviation-RequestFINAL.pdf</td></tr>
<tr><td>Verification activity</td><td>The Gold Standard has approved a deviation for the project, whereby the project shall use the measured usage values for the 1st year of the monitoring period (when surveys were carried out), and an adjusted usage value for 2nd year for this issuance.
The adjusted usage value can be either:
• The Project Developer’s proposal of a justifiably conservative value; or
• The value applied in the PDD (if the 1st year measured usage value matches or is less than the PDD’s value for the same year).
Therefore the Project Developer has proposed to use the lowest value in every issuance or the proposed in the PDD for the variables: Persons per filter & % Usage, and the highest value for % LPG Users. This approach is considered conservative and in line with the approved deviation from Gold Standard. ERM CVS has confirmed that the conservative values have been applied in the calculations.

The variables affected by the monitoring/usage surveys are:

• Persons per filter

• % LPG Users

• % Usage

The PD has applied the lowest value in every issuance or the proposed in the PDD for the variables: Persons per filter & % Usage, and the highest value for % LPG Users, which is conservative. ERM CVS checked the previous issuances and the PDD and confirmed the values are correct.</td></tr>
</table>

Conclusion	The deviation applied by the PPs has been accepted by Gold Standard. A conservative approach has been applied that will ensure emission reductions are not overstated. The CL can be closed.

CL 2	
Comment:	In the DCD for scenario 1 (water filters), detailed customer data is only included from 2 NGO partners. Most of the NGOs are not represented
Clarification Request:	Please clarify whether the DCD (used as the sampling frame for the survey sample) can be considered sufficiently representative, given that data from only two NGO partners are included.
PP response:	The first random sampling carried out in May 2016 for the purposes of the surveys, which includes the first filters that were monitored, shows representativeness, since 73% of the sales of the database are households who received a filter through an NGO/intermediary. After the pause of the project, the local company did not gather the information of users for the database by NGOs. At the moment of presenting it to the DOE only 27% of the database information was from an NGO source, because of this issue. We conclude that at the time of conducting most of the surveys by the first random sample (2016, early 2017), it was completely representative, because the number of entries of beneficiaries in the database for NGO sales is very similar to the total sales that were made for NGOs. For the next period (MP5), we are already working with a procedure of the local company Ecofiltro to achieve greater representation at the time of monitoring.
Documentation provided	Sampling Ecofiltro Iss4.xlsx
Verification activity	ERM CVS reviewed the sampling frame that was used at the time the sampling was carried out and confirmed that, at the time of conducting most of the surveys by the first random sample (2016, early 2017), it was sufficiently representative, because the percentage of users in the detailed customer database who received a filter from NGOs is similar to the total sales from NGOs (79% in the TSR at that time). Since that point, obtaining detailed customer data on NGO sales has been poor and the PP is taking steps to improve this for the next verification. At the next verification the PP will in any case have to demonstrate that the sampling frame is again representative – this is checked as part of the verification requirements – and therefore it was not considered necessary to raise a FAR for this topic.
Conclusion	The sampling frame can be considered sufficiently representative at the time the sample was selected. The CL can be closed.

CL 3	
Comment:	The inventory lag time calculation was not clearly presented for scenario 1 (filter only households).
Clarification Request:	Please clarify the time lag for scenario 1 and where this is applied in the calculations.
PP response:	The analysis used to determine the number of inventory lag days is found in the Excel file DCD Iss4 Lag Analysis. Where a weighted average was done separating Ecofiltro Sales and NGOs. The procedure was the following:

	1. Obtain the percentage of total sales from NGO and from Ecofiltro in every year. 2. Calculate the inventory lag days for NGO information on the database. 3. Calculate the inventory lag days for Ecofiltro information on the database. 4. Calculate a weighted average to get a representative number of inventory Lag days per year. The result for year 1, was +19 days and it was chosen also for Year 2 in order to get a conservative approach (Real value +1). The number is already used in the newer version of ERs Calculations file shared with the DOE on July 3rd 2018.
Documentation provided	DCD Iss4 Lag Analysis.xlsx
Verification activity	The updated calculations have been reviewed, and the time lag analysis is now included and correctly applied to determine the ER calculations.
Conclusion	The inventory time lag has now been applied correctly, and emission reduction calculations can therefore be considered conservative. The CL can be 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	No CARs raised
Comment:	
Corrective Action Request:	
PP response:	
Documentation provided	
Verification activity	

Conclusion	

5.3. Forward Action Requests

FAR 1	
Comment:	Of 57 records checked for scenario 2 (duel households), 5 contained incorrect dates.
Forward Action Request:	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.
Response by PP	An internal evaluation has been implemented with the two local companies, performing cross checks between the information included in the database and total sales records and the physical records of the companies. The first evaluation was made in February 2018, and is scheduled to be carried out every 5 months,he next one in August 2018 etc. With this practice we seek to minimize errors and increase the quality of the data entered.

FAR 2	
Comment:	The following FAR was raised by Gold Standard as part of their approval of the deviation request
Forward Action 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.
Response by PP	The FAR will be addressed in the next monitoring period.

5.4. Minor Issues

Minor issues were communicated by email and directly during the site visit

Annex A: Reference Documents and Interviews

A.1: Documents

Reference	Title and version	Date
1	Monitoring report v3.0	10 December 2018
2	PDD	Version 05; dated 20 September 2013
3	Emission reduction calculation spreadsheet	21 November 2018
4	Sampling plan	Undated
5	Emission reduction purchase agreement	10 Feb 2012
6	Monitoring / survey results spreadsheet MS_US_WCFT_KPT_WQT Data Spreadsheet	04 April 2018
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	Paradigm: Sampling frame and sample selection spreadsheet	2016
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	Undated
13	Gold Standard: Issuance Review for 3rd issuance	
14	3rd party QA/QC review reports	16 Feb 2018
15	Socorro Maya Operations Manual	18 May 2015
16	Educational flyer distributed with all water filters outlining the health and safety benefits of hygienic practices	Undated
17	Water quality testing lab reports: Biomed Contro-Lab	
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 printed on the bucket of the unit	2018
22	EcoFiltro detailed customer database spreadsheet	May 2018
23	Monitoring & usage survey questions WCFT questions	2016
24	Gold Standard: GS 1321 Deviation Request	27/06/2018

A.2: Persons interviewed

Reference	Name	Title & Organisation	Main Topics Discussed
IV 1	Carlos Barrios	Socorro Maya Manager Guatemala	Organization and Monitoring Process
IV 2	Hugo Daniel Pop	Accounting Manager, Socorro Maya	Database and sales records
IV 3	Otto Choc	Technical staff, Socorro Maya	Eco-stove functioning, use and programme
IV 4	Maynor Reyes	Ecofiltro Field Representative Escuintla	Ecofiltro Programme
IV 5	Eddy Melendez	Natural Capital Partners in-country monitoring staff	Monitoring process Monitoring Training Field work
IV 4	Marisol de Leon	Monitoring manager, EcoFiltro	Monitoring process Monitoring Training
IV 6	Philip Wilson	Founder, EcoFiltro	Programme design Technology specifications

In addition, ERM CVS visited and interviewed 23 household end users – please see section 3.4.2 for details.