



TEMPLATE

Monitoring Report

PUBLICATION DATE 14.10.2020

VERSION v. 1.1

RELATED SUPPORT – TEMPLATE GUIDE Monitoring Report v. 1.1

This document contains the following Sections

Key Project Information

SECTION A - Description of project

SECTION B - Implementation of project

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SECTION D - Data and parameters

SECTION E - Calculation of SDG Impacts

SECTION F - Safeguards Reporting

SECTION G - Stakeholder inputs and legal disputes

KEY PROJECT INFORMATION

Programme of Activity Information – (delete below table if N/A)

GS ID of Programme	GS1247
Title of Programme	GS1247 Improved Kitchen Regimes Multi-Country PoA
Version of POA-DD applicable to this monitoring report	15.3
Name and GS ID of fully Validated CPA/VPAs (i.e. non compliance check)	GS1247 VPA 159 Improved Kitchen Regimes Manica Province Safe Water (Mozambique) (GS7132) GS1247 VPA 160 Improved Kitchen Regimes Manica Province Safe Water (Mozambique) (GS7133) GS1247 VPA 161 Improved Kitchen Regimes Manica Province Safe Water (Mozambique) (GS7134) GS1247 VPA 162 Improved Kitchen Regimes Manica Province Safe Water (Mozambique) (GS7135) GS1247 VPA 163 Improved Kitchen Regimes Manica Province Safe Water (Mozambique) (GS7136) GS1247 VPA 198 Improved Kitchen Regimes Manica Province Safe Water (Mozambique) (GS7470) GS1247 VPA 199 Improved Kitchen Regimes Manica Province Safe Water (Mozambique) (GS7471) GS1247 VPA 200 Improved Kitchen Regimes Manica Province Safe Water (Mozambique) (GS7472) GS1247 VPA 201 Improved Kitchen Regimes Manica Province Safe Water (Mozambique) (GS7473) GS1247 VPA 202 Improved Kitchen Regimes Manica Province Safe Water (Mozambique) (GS7474)

Key Project Information

GS ID (s) of Project (s)	GS 7132 GS 7133 GS 7134 GS 7135 GS 7136 GS 7470 GS 7471 GS 7472
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	GS 7473 GS 7474
Title of the project (s) covered by monitoring report	GS1247 VPA 159 Improved Kitchen Regimes Manica Province Safe Water (Mozambique) (GS7132) GS1247 VPA 160 Improved Kitchen Regimes Manica Province Safe Water (Mozambique) (GS7133) GS1247 VPA 161 Improved Kitchen Regimes Manica Province Safe Water (Mozambique) (GS7134) GS1247 VPA 162 Improved Kitchen Regimes Manica Province Safe Water (Mozambique) (GS7135) GS1247 VPA 163 Improved Kitchen Regimes Manica Province Safe Water (Mozambique) (GS7136) GS1247 VPA 198 Improved Kitchen Regimes Manica Province Safe Water (Mozambique) (GS7470) GS1247 VPA 199 Improved Kitchen Regimes Manica Province Safe Water (Mozambique) (GS7471) GS1247 VPA 200 Improved Kitchen Regimes Manica Province Safe Water (Mozambique) (GS7472) GS1247 VPA 201 Improved Kitchen Regimes Manica Province Safe Water (Mozambique) (GS7473) GS1247 VPA 202 Improved Kitchen Regimes Manica Province Safe Water (Mozambique) (GS7474)
Version number of the PDD/VPA-DD (s) applicable to this monitoring report	GS 7132: Version 5 GS 7133: Version 5 GS 7134: Version 5 GS 7135: Version 5 GS 7136: Version 5 GS 7470: Version 3 GS 7471: Version 3 GS 7472: Version 3 GS 7473: Version 3 GS 7474: Version 3
Version number of the monitoring report	Version 4
Completion date of the monitoring report	15/06/2023
Date of project design certification	04/12/2019
Date of Last Annual Report	20/03/2021

Monitoring period number	MP3
Duration of this monitoring period	All VPAs: 01/07/2021 – 30/06/2022
Project Representative	Serena Coccioli, CO2balance UK Ltd Matthew Pike, CO2balance UK Ltd
Host Country	Republic of Mozambique
Activity Requirements applied	<input checked="" type="checkbox"/> Community Services Activities <input type="checkbox"/> Renewable Energy Activities <input type="checkbox"/> Land Use and Forestry Activities/Risks & Capacities <input type="checkbox"/> N/A
Methodology (ies) applied and version number	TPDDTEC v.1
Product Requirements applied	<input checked="" type="checkbox"/> GHG Emissions Reduction & Sequestration <input type="checkbox"/> Renewable Energy Label <input type="checkbox"/> N/A

Table 1 - Sustainable Development Contributions Achieved

Sustainable Development Goals Targeted	SDG Impact	Amount Achieved		Units/ Products
SDG 3 Good Health and Well-being	Additional people consuming safe water	GS 7132	6063	Number of people
		GS 7133	6353	
		GS 7134	5817	
		GS 7135	6136	
		GS 7136	6574	
		GS 7470	6034	
		GS 7471	6649	
		GS 7472	6408	
		GS 7473	7121	
		GS 7474	6808	
SDG 5 Gender Equality	Variation of time spent on firewood and water collection	GS 7132	1.44	Hours
		GS 7133	1.44	
		GS 7134	1.44	
		GS 7135	1.44	
		GS 7136	1.44	
		GS 7470	1.44	
		GS 7471	1.44	
		GS 7472	1.44	
		GS 7473	1.44	
		GS 7474	1.44	
SDG 6 Clean Water and Sanitation	People gain access to safe water	GS 7132	8861	Number of People
		GS 7133	9285	

	GS 7134	8502	
	GS 7135	8968	
	GS 7136	9609	
	GS 7470	8819	
	GS 7471	9718	
	GS 7472	9366	
	GS 7473	10407	
	GS 7474	9951	
SDG 13 Climate Action Emissions Reduction	GS 7132	7377	tCO2e
	GS 7133	7312	
	GS 7134	8308	
	GS 7135	5423	
	GS 7136	5060	
	GS 7470	4934	
	GS 7471	4786	
	GS 7472	4795	
	GS 7473	4542	
	GS 7474	4801	

Table 2 – Product Vintages

GS7132

		Amount Achieved
Start Dates	End Dates	VERs
01/07/2021	31/12/2021	2522
01/01/2022	30/06/2022	4855

GS7133

		Amount Achieved
Start Dates	End Dates	VERs
01/07/2021	31/12/2021	2363
01/01/2022	30/06/2022	4949

GS7134

		Amount Achieved
Start Dates	End Dates	VERs
01/07/2021	31/12/2021	3774
01/01/2022	30/06/2022	4534

GS7135

		Amount Achieved
Start Dates	End Dates	VERs
01/07/2021	31/12/2021	1665
01/01/2022	30/06/2022	3758

GS7136

		Amount Achieved
Start Dates	End Dates	VERs
01/07/2021	31/12/2021	1489
01/01/2022	30/06/2022	3571

GS7470

		Amount Achieved
Start Dates	End Dates	VERs
01/07/2021	31/12/2021	1539
01/01/2022	30/06/2022	3395

GS7471

		Amount Achieved
Start Dates	End Dates	VERs
01/07/2021	31/12/2021	1574
01/01/2022	30/06/2022	3212

GS7472

		Amount Achieved
Start Dates	End Dates	VERs
01/07/2021	31/12/2021	1520
01/01/2022	30/06/2022	3275

GS7473

		Amount Achieved
Start Dates	End Dates	VERs
01/07/2021	31/12/2021	1398
01/01/2022	30/06/2022	3144

GS7474

		Amount Achieved
Start Dates	End Dates	VERs
01/07/2021	31/12/2021	1645
01/01/2022	30/06/2022	3156

SECTION A. DESCRIPTION OF PROJECT

A.1. General description of project

>> The Micro-Scale VPA Manica Province Safe Water project is eligible under the Gold Standard methodology Technologies and Practices to Displace Decentralized Thermal Energy Consumption Version 1.0. The project will support the provision of safe water using borehole technology to hundreds of households within Manica Province, Mozambique. By providing safe water, the project will ensure that households consume less firewood during the process of water purification and as a result there shall be a reduction of carbon dioxide emissions from the combustion process.

Manica Province is a largely rural province where local people typically use wood fuel on inefficient three stone fires to purify their drinking, cleaning and washing water. This process results in the release of greenhouse gas emissions from the combustion of wood - this can be avoided if a technology that does not require fuel (wood or fossil) supplies clean water desired by households.

Many existing boreholes were established by community groups or community based organizations (CBOs) and have fallen into disrepair because maintenance programmes have been poorly managed, or proven too expensive. CO2balance will be working in partnership with British NGO, Village Water, that operate in Manica Province. CO2balance and Village Water will work with a local NGO and communities in Manica Province to identify communities in need of a safe water source, where boreholes will be installed; and identify broken down boreholes which will be rehabilitated, so that communities have reliable access to clean, safe water. The capacity of communities to maintain their boreholes will also be supported through the project to ensure that the water keeps flowing. The boreholes included under the project will be powered entirely by emission-free technologies such as hand or solar-powered pumps. The depth of the boreholes will be limited to 100m or less.

CO2balance and Village Water rehabilitated the boreholes and deliver the maintenance programme for all the boreholes included in the project activity to ensure that the quality of the water delivered by the boreholes is fit for human consumption for the entire length of the project, which will be a minimum of five years.

This project will be developed under the Gold Standard carbon credit body, which in addition to checking that the carbon credits from this project are real, also measures local social, environmental and economic impact.

The date of rehabilitation was confirmed by a Repair Confirmation Form which was signed by the mechanic carrying out the repair along with a village administrator from the local community. The date of rehabilitation was used as the start date of operation and crediting for each borehole; we have conservatively assumed that the first day of crediting is not counted.

The number of days each borehole credited for in this monitoring period was multiplied by the number of people using the borehole to give the total number of project technology days for that borehole. The individual project technology days for each borehole were totaled to give the total number of project technology days for this monitoring period.

A.2. Location of project

Below are details of the physical location to allow unique identification of the project. The Manica Province is marked in red in Figure 1 below. The target area and the fuel collection area are defined as being contained within the project boundary, with the outer limits of the project boundary being clearly defined below. As the majority of beneficiaries collect their wood fuel locally in close proximity to their homesteads, the wood fuel collection area and target area are considered the same.



Figure 1 Project area - Manica Province, Mozambique (Google Earth image).

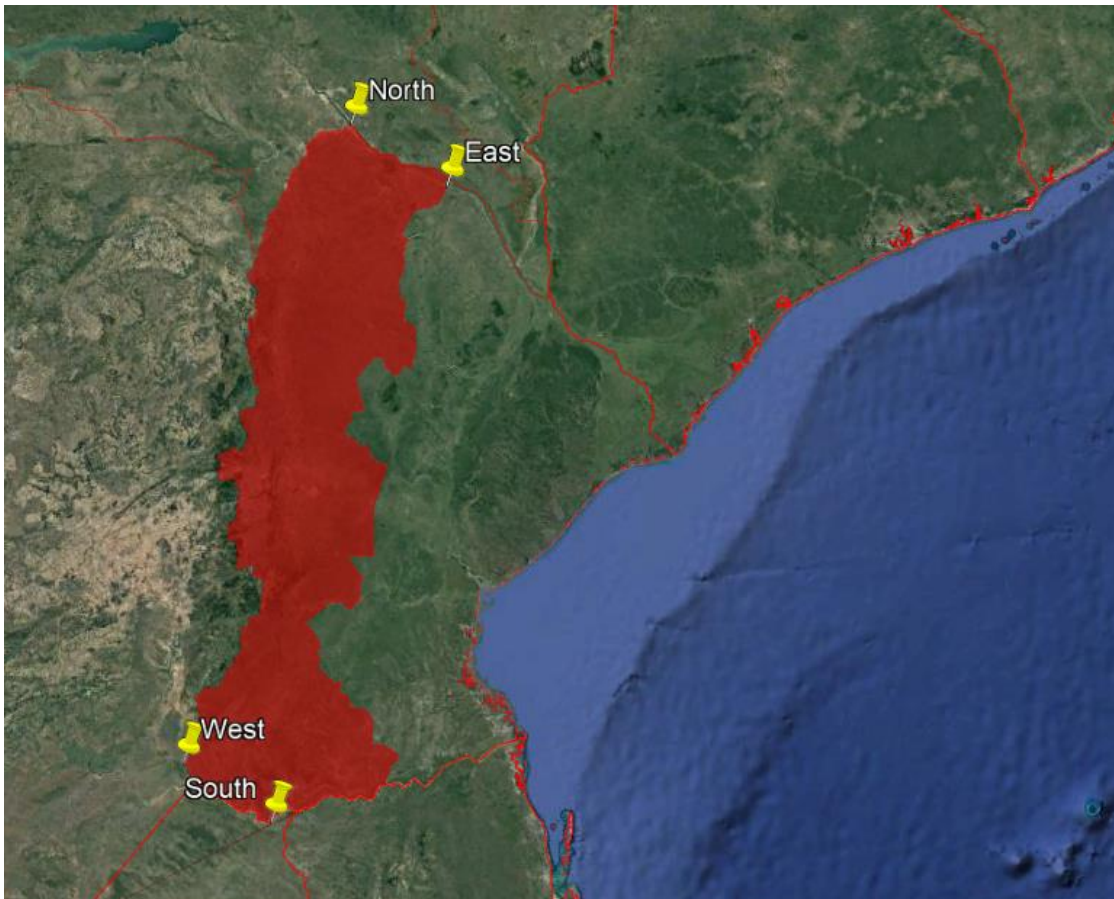


Figure 2 The northern, eastern, southern and western boundaries of the project area pinned in yellow.

All villages are within the project boundary shown in Figures 1 and 2 above. The table below shows the extent with latitude and longitude coordinates.

Project Area Coordinates		
	Latitude	Longitude
North	16°23'7.12"S	33°47'4.90"E
South	21°35'9.51"S	33° 4'3.46"E
East	16°51'59.19"S	34°32'5.72"E
West	21° 8'12.18"S	32°22'0.32"E

In total 240 boreholes were rehabilitated as part of this project between 09/04/2019 and 13/04/2022. The type of pump used for all boreholes rehabilitated is Afridev. The date, location and number of people served by each borehole are included in the project database that is shared during verification.

A.3. Reference of applied methodology

>> This project utilises the Gold Standard Methodology 'Technologies and Practices to Displace Decentralized Thermal Energy Consumption v1'.

A.4. Crediting period of project

>> The date of rehabilitation was used as the start date of operation. It was conservatively assumed that the first day of crediting is not counted and the crediting period begins the following day after the borehole is rehabilitated. The length of the crediting period is 5 years as per the approved PDD.

The start dates for the projects, and crediting periods, are as follows:

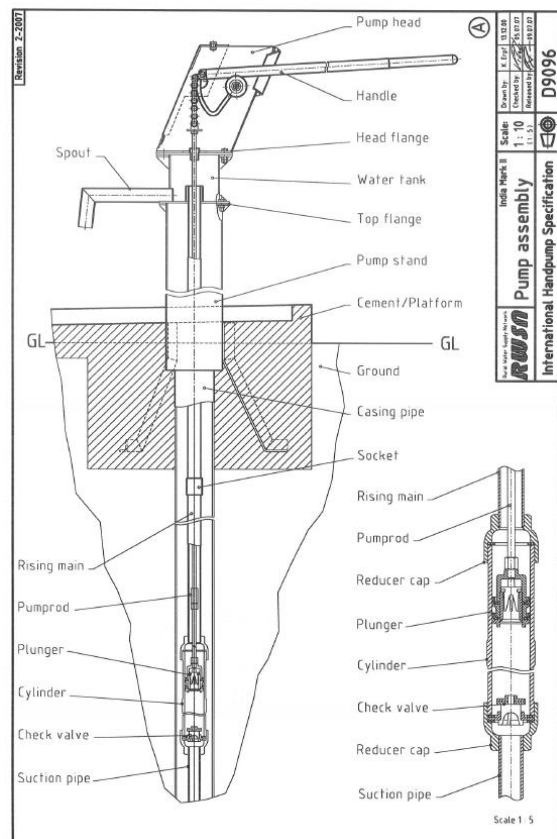
Project ID	Crediting Period Start Date	Crediting Period End Date
7132	19/06/2019	19/06/2024
7133	01/10/2019	01/10/2024
7134	15/05/2019	15/05/2024
7135	10/04/2019	10/04/2024
7136	29/08/2019	29/08/2024
7470	31/05/2019	31/05/2024
7471	31/05/2019	31/05/2024
7472	14/06/2019	14/06/2024
7473	10/09/2019	10/09/2024
7474	18/09/2019	18/09/2024

SECTION B. IMPLEMENTATION OF PROJECT

B.1. Description of implemented project

CO2balance and Village Water have rehabilitated 240 boreholes as part of these VPAs. The boreholes are in working order but a few of them went through some technical problems and didn't produce safe water while they were not functional; the non-functional days have been discounted from the ERs.

Hand pump specifications:



Examples of the Afridev Handpump and India Mark II

Technical Specifications:

	Afridev	India Mark II
Cylinder Diameter (mm)	50	63.5
Maximum Stroke (mm)	225	125

Approx. discharge at about 75 watt input (m³/h)	At 10m head 1.4	at 10 m head 1.8
	At 15 m head 1.1	at 15 m head 1.3
	At 20m head 0.9	at 20 m head 1.0
	At 30m head 0.7	at 30 m head 0.8
Pumping Lift (m)	10-45	10-50
Water Consumption (litres per capita)	15-20	15-20

Borehole Functionality

Village Water (CO2balance in-country project partner) are the main contact for all water point committees which exist for every borehole. If there are any problems with borehole functionality, the water resource committee will contact Village Water to inform them:

For major repairs, Community Water committee reports the problem to the local partner, who contacts the technicians; the technicians visit the site and conduct a technical assessment and repairs if possible, if they need extra materials they arrange for a time to revisit and carry out the maintenance. When the cause of the pump malfunction is a major problem and a technician is needed, the maintenance forms are signed by the technician, by a member of the Water Committee and by a representative of the project.

If the breakdown is minor, the community looks after the repair themselves: a local pump minder will assess the problem and get the parts. The costs are covered with the fees paid by the members of the community. The community informs the local partner stating the problem, the non-functional days and the details of the repairs done, and should report the work and cost In the log-books. When the cause of breakdown is minor and the community enacts the repair, the form is signed by a representative of the project as the community usually informs our local partner of the problem and parts repaired via phone.

Village Water inform CO2balance when the borehole is not functional. The non-functional days are then discounted in the PTDs and the ERs are not accredited for those days.

A full breakdown of all boreholes that underwent any maintenance during this MP has been supplied in the accompanying Emissions Reductions spreadsheet under the specified maintenance section. This details all works required, carried out, date from reported first break down to repair as well as whether the repair was carried out by the community or project partner/technician. An additional down day has been added to all total non-functional days per repair for added conservativeness.

Water Quality Testing

All boreholes undergo annual water quality testing to ensure the water is safe for human consumption as per Mozambique national water standards.

Feedback Mechanisms

Grievance log-books are placed at boreholes and any feedback received during this monitoring period from the borehole users on damage or breaking of boreholes through telephone and verbal reports will be reported. The feedback/grievance mechanisms were discussed during the LSC so that all relevant stakeholders are aware of the processes in place for reporting any issues.

B.1.1. Forward Action Requests

MP3:

No FARs were raised during the last Monitoring Period reviews.

B.2. Post-Design Certification changes

>> N/A

B.2.1. Temporary deviations from the approved Monitoring & Reporting Plan, methodology or standardized baseline

>>

A deviation request was submitted regarding the annual monitoring conducted earlier in the monitoring period for MP3 only.

The PD is requested to:

- a. apply conservative assumptions or discount factors to address the gap (if any) in monitoring to the extent and wherever required, to ensure that GHG emission reductions/SDG impacts will not be overestimated
- b. document the deviation request, its implications, and GS' decision in the appropriate section of the GS Monitoring Report (for the relevant MP)

The approved deviation is temporary in nature and only applies for the monitoring period starting from 01/07/2021 and ending on 30/06/2022.

The deviation is described and substantiated below:

MP2 covered the dates between 01/07/2020 and 30/06/2021. During this time, the annual monitoring was carried out by the partner in March, the first day being 04/03/2021. The annual monitoring was, therefore, within the 6 months from end of the monitoring period. However, during MP3, 01/07/2021 to 30/06/2022, the annual monitoring was carried out in September and October. The project and usage surveys were conducted between 16/09/2021 and 05/10/2021 and the WCFT was conducted between 15/09/2021 and 24/09/2021. The project and usage surveys, as well as the WCFT were not within the 6 months to the end of the monitoring period and instead closer to the start of MP3.

We are confident that the earlier annual monitoring in MP3 would not negatively impact the project and may be considered an acceptable deviation considering the steps we are taking, described below. Furthermore, it will allow for capturing of monitoring data during a different season from what had been the norm, allowing us to consider seasonal variation in the project.

- The partner has continued to carry out regular maintenance and WQTs as per the methodology requirements throughout 2022.
- The partner is continually carrying out remote follow-ups across the villages.
- There is a continuous grievance mechanism – the partner ensures that the project is still providing safe water regardless of when the project and usage surveys, and WCFTs were conducted.

B.2.2. All breakdowns are recorded, maintenance and re-repairs are carried out on a regular basis as and when needed, ensuring that communities are able to access safe

water throughout the project even during the rainy season when access to communities for monitoring has been impacted. Corrections

>> N/A

B.2.3. Changes to start date of crediting period

>> N/A

B.2.4. Permanent changes from the Design Certified monitoring plan, applied methodology or applied standardized baseline

>> These VPAs transitioned to GS4GG. The Monitoring Plan was therefore updated from including Sustainable Development Indicators to monitoring impacts and contributions towards the Sustainable Development Goals as per the approved Transition Annex.

The $W_{p,y}$ and $W_{b,y}$ value has changed for this monitoring period and will remain as a permanent change. Previous monitoring periods used a measured baseline value obtained from the Baseline Water Boiling Test. However, the recent update to the parameters means a cap has now been introduced which has been applied to this project for this monitoring period- considering the firewood required to boil 1 litre of water for 10 minutes using a three stone fire (0.4 kg/L).

Updates have been made to parameter EF (Non-CO₂ CH₄ and N₂O emission factor arising from use of wood fuel in baseline scenario), as the new rule update came into force on 01/01/2021, both 2021 and 2022 vintages have been calculated with the updated AR5 value in the corresponding parameter box.

B.2.5. Changes to project design of approved project

>> N/A

SECTION C. DESCRIPTION OF MONITORING SYSTEM APPLIED BY THE PROJECT

All surveys are administered by trained CO2balance staff and in country partner NGO, Village Water, that employs local staff and conversant in the local dialects to ensure that the responses are consistent and not biased by any regional language barriers. Each participant is provided with a briefing on the purpose of the survey and is assured that no individual names are used in the analysis.

The Project and Usage Survey are deployed via mobile devices, where all the answers are securely stored online. The results of the surveys are then downloaded and collated in Excel spreadsheets and stored on a central server in an electronic format.

The Water Consumption Field Test (WCFT) survey is carried out on paper and all the original copies are retained in the office and are scanned upon request of the UK team. The results of the surveys are collated in Excel spreadsheets and stored on a central server in an electronic format. These are then sent to the UK head office for data analysis. The documentation procedure that CO2balance has devised ensures a minimum chance of original data being lost and data entry error.

Below is a summary of the key information that has been collected and monitored as part of this project;

Borehole database

The borehole installation/rehabilitation record includes the following information:

- Date of installation/rehabilitation
- Model of the borehole
- Quantity of boreholes installed
- The total number of people obtaining their water from each borehole
- Mode of use: commercial/domestic

The installation record will be backed up electronically, with original documentation being stored in the appropriate office for the respective VPAs.

The project database will be derived from the Installation Record, with project technologies differentiated by different project scenarios (if required).

All data collected in relation to the project will be held in the local office and/or on the Project Database for the entire life cycle of the project and a period of 2 years afterwards. The data may be archived during the project in order to maintain clarity and security

Ongoing Monitoring Studies

The following ongoing monitoring studies were conducted; the results are given in the parameter boxes tables

- **Water Consumption Field Test (WCFT):** The Water Consumption Field Test was carried out on a randomly selected sample of 40 households from the project database in Manica province. This complies with the recommended minimum sample size of 30 in the Gold Standard requirements.

The test was carried out over a period of four days (1 day preparation and 3 days measurement) following a similar method as the Kitchen Performance Test, and all tests were conducted between 15/09/2021 – 29/09/2021. The total litres of water consumed each day was measured and divided by the number of people consuming water in that day – this measurement was repeated over 3 consecutive days and an overall average per household was calculated. The results showed that on average 8.15 litres of non boiled clean water used only for drinking, hand washing and food preparation (capped at 7.5l) and 0 litres of boiled clean water is consumed per person per day.

The total amount of water credited for in this monitoring period is equal to the average amount of clean non-boiled water consumed per person per day (7.5l), minus the average amount of boiled clean water consumed per person per day (0).

The WCFT is carried out by staff trained by CO2balance to meet the specific requirements of the methodology. All data presented in Excel is subject to checking and cross referencing of a sample of the raw data by CO2balance.

- **Water Quality Test (WQT):** The quality of the treated water will be assessed to ensure that it is fit for human consumption. It is assessed in accordance with Mozambique national standards. The parameters used to assess the water quality will be in line with Mozambique standards for potable water and all parameters will be shown to be within levels considered acceptable for domestic human consumption.
- **Usage Survey:** Usage Survey is used to determine the $U_{p,y}$ (usage rate in the project scenario p through year y) parameter. The annual usage survey is conducted, exceeding the minimum sample size of 100 as 110 surveys were carried out. During this monitoring period the Usage Survey was conducted between 16/09/2021 – 05/10/2021 and found a usage rate of 100%, which has been capped at 95%.

The updated and approved Usage Survey also captures average litres collected from the borehole per household across seasons- used to gain an average litres per user figure.

- **Project Survey** – Conducted annually to survey end users currently using project technologies in order to explore changes in project scenario over time. The annual project survey is conducted, exceeding the minimum sample size of 100 as 110 surveys were carried out. Individual participants were selected from the borehole user data base using the random sampling process outlined in the monitoring plan. Sample sizes are in line with the Gold Standard requirements. During this monitoring period the Project Survey was conducted between 16/09/2021 – 05/10/2021. Data collected during the project surveys explores the following characteristics:
 - General information – Name, address, telephone number etc
 - Household socio-demographic information
 - Water use and purification characteristics
 - Sources and availability of fuel
 - Time use and time saved information
 - Hygiene and Sanitation practices In the Household

- **Project Technology Days (Np,y)**- Number of persons consuming water supplied by project scenario p through year y. Sum of the total number of people using each borehole in the project multiplied by the number of crediting days each borehole earns in this monitoring period. The total number of households using each borehole will be determined through information supplied by our partner. Using this method, the total number of people using each borehole will be known, and hence a figure for person days can be calculated. All monitoring tasks will be selected at random. The following caps are applied:
 - 95% functionality in the monitoring period.
 - Treatment Capacity. Calculations to cap people served, capped at 300 users on this occasion, by each borehole can be found in corresponding emissions reductions calculation spreadsheets.

Individual participants were selected from the borehole user data base using the random sampling process outlined in the monitoring plan. Sample sizes are in line with the Gold Standard requirements.

Double Counting

To avoid double counting during the monitoring period the project has not been included in any other voluntary or compliance standards programmes, and dual certification has not been sought. As the project area contains multiple VPAs double counting has further been avoided through the unique identification of each water point along with GPS coordinates.

fNRB

Below is described the method used to develop the fraction of non-renewable biomass (fNRB) for Mozambique in line with the Annex 1 section A.1.3 of the TPDDTEC v.1. The source of data is the Global Forest Resources Assessment Reports for the years 2015 and 2020 from FAO.

As the Carbon Living biomass related to forest shows a decrease from 2015 to 2020, the following condition is observed: (a) Survey results, national or local statistics, studies, maps or other sources of information such as remote sensing data show that carbon stocks are depleting in the project area thus the approach described in the Annex 1 section A.1.3 of the TPDDTEC v.1 is applicable.

a. $fNRB = NRB / (NRB + DRB)$
 $86\% = 100,152,498 / (100,152,498 + 16,262,285)$

where:

fNRB = Fraction of non-renewable biomass in the country (%)

NRB = Quantity of non-renewable biomass in the country (t/yr)

DRB = Demonstrably Quantity of renewable biomass in the country (t/yr). The approach satisfies the following condition regarding DRB:

Condition 1 - The woody biomass is originating from land areas that are forests

where:

(a) The land area remains a forest; and

(b) Sustainable management practices are undertaken on these land areas to ensure, in particular, that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and

(c) Any national or regional forestry and nature conservation regulations are complied with.

b. $NRB = R - DRB$
 $100,152,498 = 116,414,783 - 16,262,285$

And

c. $R = MAI + \Delta F$
 $116,414,783 = 85,759,936 + 30,654,847$

And

d. $MAI = F * GR$
 $85,759,936 = 36,743,760 * 2.33$

Where:

R = Total annual biomass removals in the country (t/yr)

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MAI = Mean Annual Increment of biomass growth (t/yr)

ΔF = Annual change in living forest biomass (t/yr)

F = Extent of forest (ha)

GR = Annual Growth rate of biomass (t/ha-yr)

e. $DRB = PA * GR$

$16,262,285 = 6,967,560 * 2.33$

Where:

PA = Protected Area Extent of Forest (ha)

SECTION D. DATA AND PARAMETERS

D.1. Data and parameters fixed ex ante or at renewal of crediting period

>>

Relevant SDG Indicator	SDG 13.B.1 (Climate Action)
Data/parameter:	EF _{b,co2}
Unit	tCO ₂ /TJ
Description	CO ₂ emission factor arising from use of fuels in baseline scenario
Source of data	IPCC default value, EFDB Emission Factor Database. Accessible: https://www.ipcc-nggip.iges.or.jp/EFDB/main.php
Value(s) applied)	112
Choice of data or measurement methods and procedures	Deemed valid by Methodology.
Purpose of data	Calculation of baseline emissions.
Additional comments	-

Relevant SDG Indicator	SDG 13.B.1 (Climate Action)
Data/parameter:	EF _{b,non co2}
Unit	tCO _{2e} /TJ
Description	Non-CO ₂ (CH ₄ and N ₂ O) emission factor arising from use of wood fuel in baseline scenario
Source of data	IPCC Default emissions factor, EFDB Emission Factor Database. Accessible: https://www.ipcc-nggip.iges.or.jp/EFDB/main.php
Value(s) applied)	9.460

Choice of data or measurement methods and procedures	Deemed valid by Methodology				
	Gas	Default Emissions factor (kg_gas/TJ _{NCV})	GWP of gas	Default Emissions factor (kg_CO ₂ e/TJ _{NCV})	Default Emissions factor (t_CO ₂ e/TJ _{NCV})
	CH ₄	300	28	8,400	8.4000
	N ₂ O	4	265	1,060	1.060
				Total	9.460
Purpose of data	Calculation of emission reductions.				
Additional comments	AR5 values applied to 2021 and 2022 vintage for this MP.				

Relevant SDG Indicator	SDG 13.B.1 (Climate Action)
Data/parameter:	EF _{p,co2}
Unit	tCO ₂ /TJ
Description	CO ₂ emission factor arising from use of wood fuel in project scenario
Source of data	Volume 2: 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 2, Table 2.5
Value(s) applied)	112
Choice of data or measurement methods and procedures	Deemed valid by Methodology.
Purpose of data	Calculation of emission reductions.
Additional comments	-

Relevant SDG Indicator	SDG 13.B.1 (Climate Action)
Data/parameter:	EF _{p,non co2}
Unit	tCO ₂ e/TJ
Description	Non-CO ₂ (CH ₄ and N ₂ O) emission factor arising from use of wood fuel in project scenario

Source of data	IPCC Default emissions factor, EFDB Emission Factor Database. Accessible: https://www.ipcc-nggip.iges.or.jp/EFDB/main.php				
Value(s) applied)	9.460				
Choice of data or measurement methods and procedures	Deemed valid by Methodology				
		Default Emissions factor (kg_gas/TJ _{NCV})	GWP of gas	Default Emissions factor (kg_CO ₂ e/TJ _{NCV})	Default Emissions factor (t_CO ₂ e/TJ _{NCV})
	Gas				
	CH ₄	300	28	8,400	8.4000
	N ₂ O	4	265	1,060	1.060
			Total	9.460	
Purpose of data	Calculation of emission reductions.				
Additional comments	-				

Relevant SDG Indicator	SDG 13.B.1 (Climate Action)
Data/parameter:	NCV _b
Unit	TJ/ton
Description	Net calorific value of the wood fuel used in the baseline
Source of data	https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf (Table 1.2)
Value(s) applied)	0.0156
Choice of data or measurement methods and procedures	Deemed valid by Methodology.
Purpose of data	Calculation of emission reductions.
Additional comments	-

Relevant SDG Indicator	SDG 13.B.1 (Climate Action)
Data/parameter:	NCV _p
Unit	TJ/ton
Description	Net calorific value of the wood fuel used in the project
Source of data	https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf (Table 1.2)
Value(s) applied)	0.0156
Choice of data or measurement methods and procedures	Deemed valid by Methodology.
Purpose of data	Calculation of emission reductions.
Additional comments	-

Relevant SDG Indicator	SDG 13.B.1 (Climate Action), SDG 3.9.2 (Good Health and Well-Being)
Data/parameter:	$W_{b,y}$
Unit	T/litre
Description	Quantity of wood fuel that is used to treat 1 litre of water in the baseline scenario b during year y
Source of data	Default Value GS Rule Update: Application of TPDDTEC Methodology to Safe Water Supply Projects (section 2.1.2)
Value(s) applied)	0.0004
Choice of data or measurement methods and procedures	The baseline water boiling test is used to determine the amount of wood used to purify 1 litre of water by boiling. This data is gathered according to: <i>Technologies and Practices to Displace Decentralized Thermal Energy Consumption Version 1, Draft General Guidelines On Sampling And Surveys</i> ; EB37 Annex 27; and <i>Standard For Sampling And Surveys For CDM Project Activities and Programme of Activities (Version 02)</i> ; EB65 Annex 2
Purpose of data	Calculation of emission reductions and impact on SDG 3.
Additional comments	

Relevant SDG Indicator	SDG 13.B.1 (Climate Action), SDG 3.9.2 (Good Health and Well-Being)
Data/parameter:	$W_{p,y}$
Unit	T/litre
Description	Quantity of wood fuel that is used to treat 1 litre of water in the project scenario p during year y
Source of data	Default Value GS Rule Update: Application of TPDDTEC Methodology to Safe Water Supply Projects (section 2.1.2)
Value(s) applied)	0.0004
Choice of data or measurement methods and procedures	The baseline water boiling test is used to determine the amount of wood used to purify 1 litre of water by boiling. This data is gathered according to: <i>Technologies and Practices to Displace Decentralized Thermal Energy Consumption Version 1, Draft General Guidelines On Sampling And Surveys</i> ; EB37 Annex 27; and <i>Standard For Sampling And Surveys For CDM Project Activities and Programme of Activities (Version 02)</i> ; EB65 Annex 2
Purpose of data	Calculation of emission reductions.
Additional comments	

Relevant SDG Indicator	SDG 13.B.1 (Climate Action), SDG 6.1.1 (Clean Water and Sanitation)
Data/parameter:	C _j
Unit	Percentage
Description	Portion of users of project safe water supply who were already in baseline using a non-boiling safe water supply.
Source of data	Baseline study.
Value(s) applied)	0.79%
Choice of data or measurement methods and procedures	The portion of safe water users is determined through the baseline project survey and refers to the number of users that already use safe water from water sources such as boreholes. Deemed valid by Methodology.
Purpose of data	Calculation of emission reductions and SDG 6 impact.
Additional comments	-

Relevant SDG Indicator	SDG 13.B.1 (Climate Action)
Data/parameter:	X _{boil} Non-Suppressed Demand
Unit	Percentage
Description	Percentage of premises that in the absence of the project activity would have used non-GHG emitting technologies like chlorine treatment techniques (if available) in the project boundary.
Source of data	Baseline study. Credible literature, studies, survey, reports, relevant to the project target area
Value(s) applied)	14.29%
Choice of data or measurement methods and procedures	Suppressed demand will be determined through a set of questions in the project survey that establish the method households use to purify their water, if any, and how they would choose to purify if they were not subject to monetary and access barriers. This is in line with the Gold Standard principles of suppressed demand outline in annex 2. A fixed suppressed demand baseline has been opted for, however, in the event the project surveys show a substantial change in fuel use characteristics, a new baseline shall be conducted.
Purpose of data	Calculation of emission reductions.
Additional comments	-

Relevant SDG Indicator	SDG 5.4.1 (Gender Equality)
Data/parameter:	T _{b,y}
Unit	Hours
Description	Time spent collecting firewood per household per day prior to project
Source of data	Baseline survey
Value(s) applied)	3.67

Choice of data or measurement methods and procedures	Measured by question in the baseline survey.
Purpose of data	Calculating time saved collecting water by project.
Additional comments	-

D.2. Data and parameters monitored

>>

Relevant SDG Indicator	SDG 13.B.1 (Climate Action)
Data/parameter:	fNRB,i,y
Unit	Fractional non-renewability
Description	Non-renewability status of woody biomass fuel in scenario i during year y
Measured/calculated/default	N/A
Source of data	The data used for the assessment are obtained from the "Global Forest Resources Assessment Reports" for the years 2015 and 2020 from FAO. http://www.fao.org/forest-resources-assessment/past-assessments/fra-2015/country-reports/en/ http://www.fao.org/forest-resources-assessment/fra-2020/country-reports/en/
Value(s) of monitored parameter	0.86
Monitoring equipment	Desk study
Measuring/reading/recording frequency:	Ongoing
Calculation method (if applicable):	$fNRB = NRB / (NRB + DRB)$ $86\% = 100,152,498 / (100,152,498 + 16,262,285)$ where: fNRB = Fraction of non-renewable biomass in the country (%) NRB = Quantity of non-renewable biomass in the country (t/yr) DRB = Demonstrably Quantity of renewable biomass in the country (t/yr). The approach satisfies the following condition regarding DRB:
QA/QC procedures:	The fNRB assessment has been done in line with Annex 1 section A.1.3 of the TPDDTEC v.1. both condition 1 (p.31) and a (p.31) are satisfied.
Purpose of data:	Calculation of emission reductions.
Additional comments:	-

Relevant SDG Indicator	SDG 13.B.1 (Climate Action)
Data/parameter:	$N_{p,y}$
Unit	Project Technology Days

Description	Number of persons consuming water supplied by project scenario p through year y
Measured/calculated/default	N/A
Source of data	Borehole Project Database
Value(s) of monitored parameter	GS7132 – 1,845,180 Down Days: 33 GS7133 – 1,829,130 Down Days: 90 GS7134 – 2,077,935 Down Days: 12 GS7135 – 1,356,344 Down Days: 61 GS7136 – 1,265,604 Down Days: 32 GS7470 – 1,234,487 Down Days: 44 GS7471 – 1,197,328 Down Days: 5 GS7472 – 1,199,636 Down Days: 8 GS7473 – 1,135,820 Down Days: 9 GS7474 – 1,201,061 Down Days: 40
Monitoring equipment	Project Database
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	Sum of the total number of people using each borehole in the project multiplied by the number of days crediting each borehole earns in a given monitoring period. A 95% functionality cap is implemented on all BHs claiming functionality above this figure to be conservative. Where below 95% functionality is present, the true value is used to calculate the Project Technology Days. PTDs are also further capped as a result of a 300 user cap during this MP.
QA/QC procedures:	N/A
Purpose of data:	Calculation of emission reductions.
Additional comments:	-

Relevant SDG Indicator	SDG 13.B.1 (Climate Action), SDG 6.1.1 (Clean Water and Sanitation)
Data/parameter:	$U_{p,y}$
Unit	Percentage
Description	Usage rate in project scenario p through year y
Measured/calculated/default	N/A
Source of data	Usage Survey
Value(s) of monitored parameter	100% (capped at 95%)

Monitoring equipment	Usage Survey
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	The usage survey has been carried out by trained local staff to meet the specific requirements of the methodology. All data presented in excel is subject to checking and cross referencing of a sample of the raw data by CO2balance UK Ltd.
QA/QC procedures:	N/A
Purpose of data:	Calculation of usage.
Additional comments:	-

Relevant SDG Indicator	SDG 13.B.1 (Climate Action), SDG 3.9.2 (Good Health and Well-Being)
Data/parameter:	$Q_{p,y}$
Unit	Litres per person per day
Description	Quantity of safe water supplied in the project scenario p during the year y using the zero or low emissions clean water supply technology
Measured/calculated/default	7.5
Source of data	Water Consumption Field Test (WCFT)
Value(s) of monitored parameter	8.15 (capped at 7.5)
Monitoring equipment	WCFT Survey
Measuring/reading/recording frequency:	Biennial
Calculation method (if applicable):	Method used similar to Kitchen Performance Test in which the volume of water consumed in each household is averaged over 3 days. Volume is capped at 7.5 litres per person per day as per the methodology. The WCFT will be carried out by trained local staff to meet the specific requirements of the methodology. All data presented in excel is subject to checking and cross referencing of a sample of the raw data by CO2balance UK Ltd.
QA/QC procedures:	N/A
Purpose of data:	Calculation of emission reductions.
Additional comments:	

Relevant SDG Indicator	SDG 13.B.1 (Climate Action), SDG 3.9.2 (Good Health and Well-Being)
Data/parameter:	$Q_{p,cleanboil,y}$
Unit	Litres per person per day
Description	Quantity of safe water boiled in the project scenario p during the year y using the zero or low emissions clean water supply technology
Measured/calculated/default	N/A
Source of data	Water Consumption Field Test (WCFT)

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Value(s) of monitored parameter	0
Monitoring equipment	WCFT Survey
Measuring/reading/recording frequency:	Biennial
Calculation method (if applicable):	Method used similar to Kitchen Performance Test in which the volume of water consumed in each household is averaged over 3 days. The WCFT has been carried out by trained local staff to meet the specific requirements of the methodology. All data presented in excel is subject to checking and cross referencing of a sample of the raw data by CO2balance UK Ltd.
QA/QC procedures:	N/A
Purpose of data:	Calculation of emission reductions.
Additional comments:	

Relevant SDG Indicator	SDG 13.B.1 (Climate Action)
Data/parameter:	$Q_{p,rawboil, y}$
Unit	Litres per person per day
Description	The raw of unsafe water that is still boiled after installation of the water treatment technology
Measured/calculated/default	N/A
Source of data	Water Consumption Field Test (WCFT)
Value(s) of monitored parameter	0
Monitoring equipment	WCFT Survey
Measuring/reading/recording frequency:	Biennial
Calculation method (if applicable):	Method used similar to Kitchen Performance Test in which the volume of water consumed in each household is averaged over 3 days. The WCFT has been carried out by trained local staff to meet the specific requirements of the methodology. All data presented in excel is subject to checking and cross referencing of a sample of the raw data by CO2balance UK Ltd.
QA/QC procedures:	N/A
Purpose of data:	Calculation of emission reductions.
Additional comments:	

TEMPLATE-

Relevant SDG Indicator	SDG 6.1.1 (Clean Water and Sanitation)
Data/parameter:	Quality of Treated Water
Unit	Parameters as per national standards ¹ :
Description	Performance of the treatment technology
Measured/calculated/default	Measured
Source of data	Laboratory Tests
Value(s) of monitored parameter	Pass
Monitoring equipment	Laboratory equipment
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	The District Service for Planning and Infrastructure/ Serviço Distrital de Planeamento e Infraestrutura (SDPI) has certified each water supply is in line with national standards.
QA/QC procedures:	Laboratory checks by multiple staff
Purpose of data:	To test water quality for safety of human consumption.
Additional comments:	-

Relevant SDG Indicator	SDG 13.B.1 (Climate Action)
Data/parameter:	LE _{p,y}
Unit	tCO ₂ e per year
Description	Leakage in project scenario p during year y
Measured/calculated/default	0
Source of data	Baseline and Monitoring surveys
Value(s) of monitored parameter	0
Monitoring equipment	Desk based research
Measuring/reading/recording frequency:	Completed every two years
Calculation method (if applicable):	Assessed every two years using baseline and monitoring surveys.
QA/QC procedures:	N/A
Purpose of data:	Calculation of leakage.
Additional comments:	-

Relevant SDG Indicator	SDG 5.4.1 (Gender Equality)
Data/parameter:	T _{p,y}
Unit	hours
Description	Project time spent collecting firewood and water per household per day (hours)
Measured/calculated/default	0
Source of data	Project Survey
Value(s) of monitored parameter	2.23 hours
Monitoring equipment	Project Survey
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	Assessed every year using Project Survey
QA/QC procedures:	N/A
Purpose of data:	Calculation of SDG 5.
Additional comments:	-

Relevant SDG Indicator	SDG 6.1.1 (Clean Water and Sanitation), SDG 3.9.2 (Good Health and Well-Being)																				
Data/parameter:	P _y																				
Unit	Number of people																				
Description	Number of persons having access to safe water in the project activity																				
Measured/calculated/default	0																				
Source of data	Usage Survey and Household List																				
Value(s) of monitored parameter	<table border="0"> <tr><td>GS7132:</td><td>9402</td></tr> <tr><td>GS7133:</td><td>9851</td></tr> <tr><td>GS7134:</td><td>9021</td></tr> <tr><td>GS7135:</td><td>9515</td></tr> <tr><td>GS7136:</td><td>10195</td></tr> <tr><td>GS7470:</td><td>9357</td></tr> <tr><td>GS7471:</td><td>10311</td></tr> <tr><td>GS7472:</td><td>9937</td></tr> <tr><td>GS7473:</td><td>11042</td></tr> <tr><td>GS7474:</td><td>10558</td></tr> </table>	GS7132:	9402	GS7133:	9851	GS7134:	9021	GS7135:	9515	GS7136:	10195	GS7470:	9357	GS7471:	10311	GS7472:	9937	GS7473:	11042	GS7474:	10558
GS7132:	9402																				
GS7133:	9851																				
GS7134:	9021																				
GS7135:	9515																				
GS7136:	10195																				
GS7470:	9357																				
GS7471:	10311																				
GS7472:	9937																				
GS7473:	11042																				
GS7474:	10558																				
Monitoring equipment	Project Database/Household List																				
Measuring/reading/recording frequency:	Annual																				
Calculation method (if applicable):	Assessed every year using Project Survey, Usage Survey and Household list																				
QA/QC procedures:	N/A																				

TEMPLATE-

Purpose of data:	Calculation of SDG 6 and SDG 3
Additional comments:	-

Relevant SDG Indicator	SDG 3.9.2 (Good Health and Well-Being)
Data/parameter:	P _{safe}
Unit	Number
Description	Number of additional persons having access to safe water in the project activity compared to the baseline scenario
Measured/calculated/default	Calculated
Source of data	Project Database/Household list; Usage Survey
Value(s) of monitored parameter	GS 7132: 6063 GS 7133: 6353 GS 7134: 5817 GS 7135: 6136 GS 7136: 6574 GS 7470: 6034 GS 7471: 6649 GS 7472: 6408 GS 7473: 7121 GS 7474: 6808
Monitoring equipment	Project Database/Household list; Usage Survey
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	Assessed every year using the Project Database and Usage Survey
QA/QC procedures:	N/A
Purpose of data:	Calculation of SDG 3
Additional comments:	-

Relevant SDG Indicator	SDG 5.4.1 (Gender Equality)
Data/parameter:	Usage of time saved on firewood collection
Unit	%
Description	Uses of time saved which was previously spent on firewood collection
Measured/calculated/default	Measured
Source of data	Project Survey

TEMPLATE-

Value(s) of monitored parameter	Unpaid domestic work – 97% Income generating activities – 97% Religious activities – 90% Social and leisure activities – 70% Voluntary activities – 75% Education and training – 88% Other (Specify) – 0%
Monitoring equipment	Project Survey
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	Percentage of Project Survey respondents
QA/QC procedures:	N/A
Purpose of data:	To quantify how time which was previously spent on firewood collection is now being used
Additional comments:	-

Relevant SDG Indicator	SDG 6.1.1 (Clean Water and Sanitation)
Data/parameter:	P _{access}
Unit	Number of people
Description	Number of additional persons having access to safe water in the project activity compared to the baseline scenario
Measured/calculated/default	Calculated
Source of data	Project Survey and baseline survey
Value(s) of monitored parameter	GS7132: 8861 GS7133: 9285 GS7134: 8502 GS7135: 8968 GS7136: 9609 GS7470: 8819 GS7471: 9718 GS7472: 9366 GS7473: 10407 GS7474: 9951
Monitoring equipment	Project Survey, Usage Survey and Household list
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	Assessed every year using the Project Database and Usage Survey
QA/QC procedures:	N/A
Purpose of data:	Calculation of SDG 6
Additional comments:	-

Relevant SDG Indicator	SDG 5.4.1 (Gender Equality)
Data/parameter:	TR _y
Unit	hours
Description	Total reduction in time spent collecting firewood and water per day for project activity in year y
Measured/calculated/default	Calculated
Source of data	Project Survey and baseline survey.
Value(s) of monitored parameter	1.44 hours (39% reduction in project compared to baseline)
Monitoring equipment	Project Survey
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	Assessed every year using Project Survey. Calculate the average amount of time spent collecting firewood and water in the project scenario and compare to the pre-project scenario
QA/QC procedures:	N/A
Purpose of data:	To quantify whether the project has contributed to a reduction in the amount of time spent collecting firewood compared to the pre-project scenario towards SDG 5 target.
Additional comments:	-

D.3. Comparison of monitored parameters with last monitoring period

Data/Parameter	Value obtained in this monitoring period	Value obtained last monitoring period
fNRB _{i,y}	0.86	0.86
	GS7132: 1,845,180	GS7132: 826546
	GS7133: 1,829,130	GS7133: 832200
	GS7134: 2,077,935	GS7134: 832200
	GS7135: 1,356,344	GS7135: 817145
	GS7136: 1,265,604	GS7136: 710582
N _{p,y}	GS7470: 1,234,487	GS7470: 760461
	GS7471: 1,197,328	GS7471: 832200
	GS7472: 1,199,636	GS7472: 755568
	GS7473: 1,135,820	GS7473: 671308
	GS7474: 1,201,061	GS7474: 832200
U _{p,y}	100% (capped at 95%)	100% (capped at 95%)
Q _{p,y}	8.15 (capped at 7.5)	8.53 (capped at 7.5)
Q _{p,cleanboil,y}	0	0
Q _{p,rawboil, y}	0	0

Quality of Treated Water	Pass	Pass
LE _{p,y}	0	0
T _{p,y}	2.23	2.26
P _y	GS7132: 9402	GS7132: 2397
	GS7133: 9851	GS7133: 2400
	GS7134: 9021	GS7134: 2400
	GS7135: 9515	GS7135: 2382
	GS7136: 10195	GS7136: 2131
	GS7470: 9357	GS7470: 2220
	GS7471: 10311	GS7471: 2400
	GS7472: 9937	GS7472: 2179
	GS7473: 11042	GS7473: 1936
P _{safe}	GS 7132: 6063	GS7132: 1546
	GS 7133: 6353	GS7133: 1548
	GS 7134: 5817	GS7134: 1548
	GS 7135: 6136	GS7135: 1536
	GS 7136: 6574	GS7136: 1374
	GS 7470: 6034	GS7470: 1432
	GS 7471: 6649	GS7471: 1548
	GS 7472: 6408	GS7472: 1405
	GS 7473: 7121	GS7473: 1248
Usage of time saved on firewood collection	Unpaid domestic work – 97%	Unpaid domestic work – 99%
	Income generating activities – 97%	Income generating activities – 96%
	Religious activities – 90%	Religious activities – 92%
	Social and leisure activities – 70%	Social and leisure activities – 96%
	Voluntary activities – 75%	Voluntary activities – 78%
	Education and training – 88%	Education and training – 60%
Other (Specify) – 0%	Other (Specify) – 0%	
P _{access}	GS7132: 8861	GS7132: 2259
	GS7133: 9285	GS7133: 2262
	GS7134: 8502	GS7134: 2262
	GS7135: 8968	GS7135: 2245
	GS7136: 9609	GS7136: 2008
	GS7470: 8819	GS7470: 2092

	GS7471: 9718	GS7471: 2262
	GS7472: 9366	GS7472: 2054
	GS7473: 10407	GS7473: 1825
	GS7474: 9951	GS7474: 2262
TR _y	1.44	0.65

D.4. Implementation of sampling plan

>> Surveys were conducted through use of a Random Sample Group (RSG) in accordance with 90/30 precision. The individual participants surveyed from the RSG were selected at random from the project database, in accordance with the methodology’s minimum sample size requirement for each survey, as detailed in Section D.4.1, D.4.2, and D.4.3 below. All surveys complied with the required precision and are therefore representative of the project area. The project area includes neighbouring Woredas which were found to have homogenous characteristics in household characteristics, water sources and purification methods in the initial baseline studies conducted.

Field staff are provided training prior to monitoring surveys taking place.

In this Monitoring Period, the minimum recommended sample size of the RSG to meet 90/30 precision was 7 boreholes (see below). The individual participants surveyed from the RSG are selected at random from the project database using the same random number generator process, in accordance with the minimum sample size requirement for each survey. A snapshot of the random numbers generated for the boreholes is shared below. The same process was carried out to allocate random numbers to the 385 households in the borehole sample. The sampling process has been submitted during the project verification.

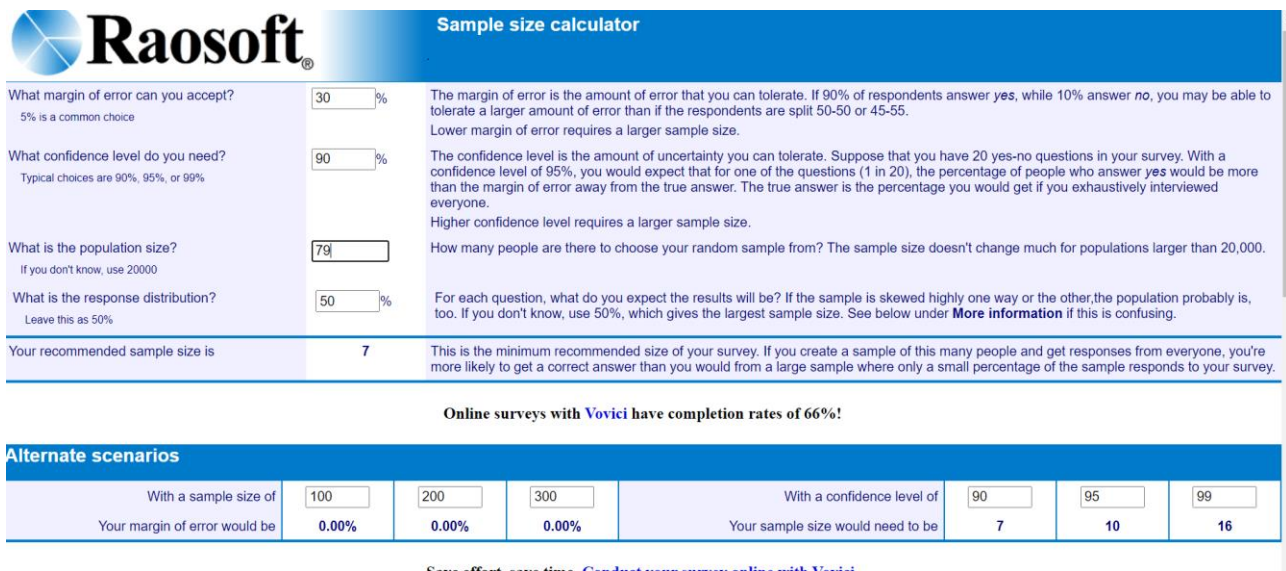


Figure 3 The Raosoft Random Sampling Size Calculator shows that with a 90% confidence and 30% precision, 7 boreholes are required in the sample.

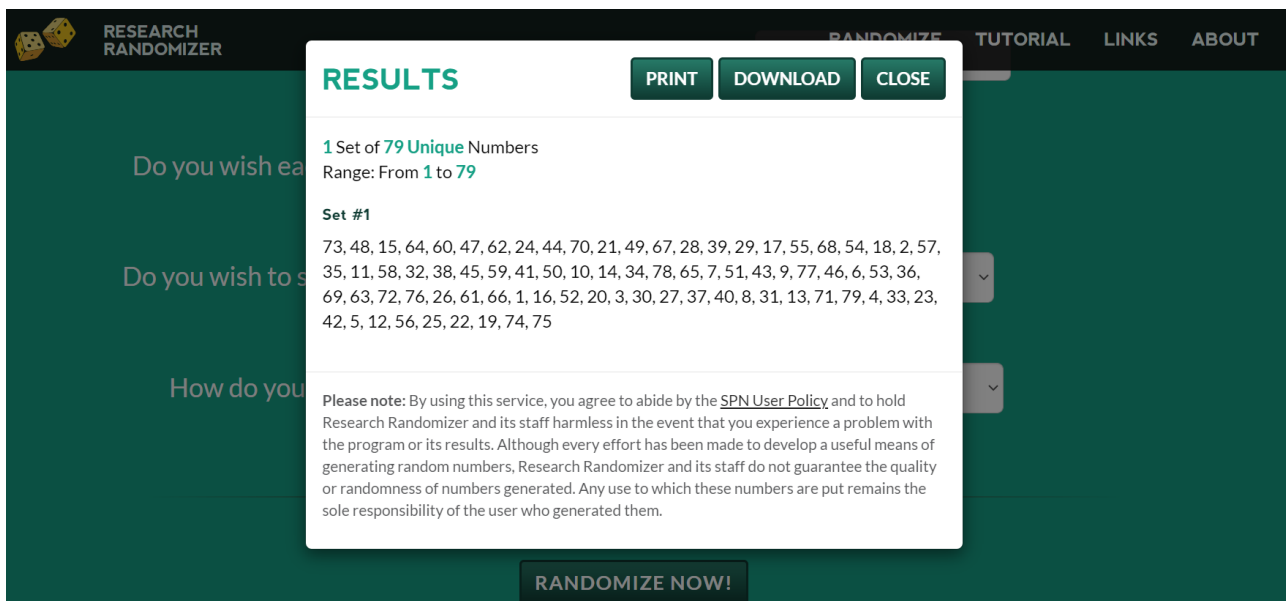


Figure 4 The Random Number Generator provides a list of random numbers that are allocated to the boreholes in the project. These are then ordered and the first 7 are selected for sampling.

Using CDM sampling tool “Guideline: Sampling and surveys for CDM project activities and programmes of activities Version 03.1”, the obtained usage rate of 100% capped at 95% was input to calculate the relative precision of the sampling, achieving 3.6%. This demonstrates 90/30 sampling criteria was met as per the methodological requirements. See below.

Calculator to check if the precision has been met or not after a sampling survey is conducted

Input	Value	Notes
Actual sample size	110	
Sample proportion	0.9500	
Standard error of the proportion	0.0208	
Precision associated with a proportion	0.0342	
Relative precision	3.6%	

Note:
 If the estimates from the actual samples fail to achieve the target minimum levels of precision (e.g. 10%), measures indicated in para. 16 of the sampling standard (ver. 4.1) shall be followed.

Using CDM sampling tool "Guideline: Sampling and surveys for CDM project activities and programmes of activities Version 03.1", the results from the WCFT demonstrate the sample size met the precision requirements of 90/30, with the survey returning a relative precision of 3.9%, shown below.

Calculator to check if the precision has been met or not after a sampling survey is conducted

Input	Value	Notes
Actual sample size	40	
Sample mean	8.1500	
Sample standard deviation	1.1800	
Standard error of the mean	0.1866	
t-value	1.6849	t-value associated with confidence level
Abosolute precision	0.3143	
Relative precision	3.9%	

Note:
 If the estimates from the actual samples fail to achieve the target minimum levels of precision (e.g. 10%), measures indicated in para. 16 of the sampling standard (ver. 4.1) shall be followed.

Regarding the project surveys, the 110 survey responses exceeds the minimum sample size of 100 that is required in TPDDTEC v1.

D.4.1 Water Consumption Field Test

The Water Consumption Field Test was carried out on a randomly selected sample of 40 households from the project database in Manica province. This complies with the recommended minimum sample size of 30 in the Gold Standard requirements.

The test was carried out over a period of four days (1 day preparation and 3 days measurement) following a similar method as the Kitchen Performance Test, and all tests were conducted between 15/09/2021 – 29/09/2021. The total litres of water consumed each day was measured and divided by the number of people consuming water in that day – this measurement was repeated over 3 consecutive days and an overall average per household was calculated. The results showed that on average 8.15 litres of non-boiled clean water used only for drinking, hand washing and food preparation (capped at 7.5l) and 0 litres of boiled clean water is consumed per person per day.

The total amount of water credited for in this monitoring period is equal to the average amount of clean non-boiled water consumed per person per day (7.5l), minus the average amount of boiled clean water consumed per person per day (0).

D.4.2 Usage Survey

The usage survey establishes the proportion of beneficiaries that use the boreholes, a key parameter in the emission reduction calculations. The annual usage survey has been conducted, exceeding the minimum sample size of 100, as there were 110.

The usage surveys in this monitoring period were carried out by field staff between the 16/09/2021 – 05/10/2021 in Manica province. The households that participated in the survey were randomly selected from the borehole user lists. The results confirmed that 100% of the respondents and their family members use the boreholes that were rehabilitated by the project.

D.4.3 Project Survey

Project surveys were conducted between 16/09/2021 – 05/10/2021 on 110 randomly selected households from across the VPAs in Manica Province, to explore changes in the project scenario demographics, water use and purification practices etc) over time.

Data collected during the project surveys includes the following:

- General information - Name, address, telephone number etc.
- Household socio-demographic information.
- Water use and purification characteristics.

TEMPLATE-

- Sources and availability of fuel.
- Time use and time saved information
- Hygiene and Sanitation practices in the households

SECTION E. CALCULATION OF SDG IMPACTS

E.1. Calculation of baseline value or estimation of baseline situation of each SDG Impact

>> Details of equations and indicators used to estimate baseline values for SDG outcomes are explained below. Calculation is provided in the corresponding Emission Reductions calculations in the 'SDG Calculations' Sheet.

SDG 3 (Good Health and Wellbeing):

The outcome for SDG 3 is quantified as the additional number of persons consuming safe water in the project activity compared to the baseline scenario (P_{safe}). The percentage of users who were already consuming safe water in the baseline without boiling it (C_j) is determined through the baseline survey and deducted. Additionally, the percentage of users who consumed safe water by boiling it in the baseline ($P_{b, boil}$) is deducted. The baseline indicators are detailed in Section D.1 and are as follows:

C_j Expressed as a percentage, the portion of users of the project technology j who in the baseline were already consuming safe water without boiling it.

$P_{b, boil}$ Percentage of persons boiling water for purification in the baseline scenario.

SDG 5 (Gender Equality):

The average decrease in hours per household in time spent gathering firewood ($T_{b,y}$) will be taken as a contribution towards the SDG target. The baseline parameter for time spent collecting firewood per household per day is monitored in the baseline project survey. The baseline indicators are detailed in Section D.1 and are as follows:

$T_{b,y}$ Time spent collecting firewood per household per day prior to project (hours)

$T_{b,y} = 3.67$ hours

SDG 6 (Clean Water and Sanitation):

The outcome for SDG 6 is quantified as the additional number of persons having access to safe water in the project activity compared to the baseline scenario. The percentage of users who were already consuming safe water in the baseline without boiling it (9) was determined through the baseline survey. The baseline indicators are detailed in Section D.1 and are as follows:

C_j Expressed as a percentage, the portion of users of the project technology j who in the baseline were already consuming safe water without boiling it.

$$C_j = 0.79\%$$

SDG 13 (Climate Action)

CO2 emission reductions are the indicator to demonstrate that the project has raised capacity for effective climate change-related planning and management. This outcome is measured using the emission reduction calculations. The baseline indicators are detailed in Section D.1 and are as follows:

Baseline Emissions:

$$BE_{b,y} = B_{b,y} * \left((fNRB_y * EF_{b,fuel,co2}) + EF_{b,fuel,nonco2} \right) * NCV_{b,fuel}^2$$

Example VPA, GS7132: $9,061 = 5,491 * ((0.86 * 112) + 9.46) * 0.0156$

See accompanying Emissions Reductions calculations for all VPAs.

Where:

$$B_{b,y} = (1 - C_j) * N_{j,y} * W_{b,y} * (Q_{p,y} + Q_{p,rawboil,y})$$

Example VPA, GS7132: $5,491 = (1 - 0.0079) * 1,845,180 * 0.0004 * (7.5 + 0)$

See accompanying Emissions Reductions calculations for all VPAs.

Where:

$N_{j,y}$ Number of person days consuming water supplied by project scenario p through year y .

C_j Expressed as a percentage, the portion of users of the project technology j who in the baseline were already consuming safe water without boiling it.

$B_{b,y}$ Quantity of fuel consumed in baseline scenario b during the year y in tons.

$Q_{p,y}$ Quantity of safe water in litres consumed in the project scenario p and supplied by project technology per person per day.

$Q_{p,rawboil,y}$ Quantity of raw water boiled in the project scenario p per person per day.

$W_{b,y}$ Quantity of fuel in tons required to treat 1 litre of water using technologies representative of baseline scenario b during the project year y, as per Baseline Water Boiling Test

E.2. Calculation of project value or estimation of project situation of each SDG Impact

>> Details of equations used to calculate project value for SDG outcomes appear below. Calculation is provided in the corresponding Emission Reductions calculations in the 'SDG Calculations' Sheet.

Outcomes for SDG 3 (Good Health and Wellbeing):

The VPAs are premised on generating Emission Reductions by ensuring that water point users have safe water, thereby removing the need for them to burn non-renewable biomass in order to boil water to purify it. Emission reductions are also claimed through the principle of suppressed demand, meaning that some users lacked the resources, time or information necessary to purify their water prior to the project. Therefore, the users for whom ERs are claimed through suppressed demand were forced to use unsafe water for drinking, food preparation and basic personal hygiene prior to the project.

The outcome for SDG 3 is quantified as the additional number of persons consuming safe water in the project activity compared to the baseline scenario (P_{safe}). The calculation is as follows:

$$P_{safe} = P_y * (1 - C_j) * (1 - P_{b,boil})$$

Example VPA, GS7132: $6,063 = 9,402 * (1 - 0.0079) * (1 - 0.35)$

See accompanying Emissions Reductions calculations for all VPAs.

Where:

P_{safe} Number of additional persons consuming safe water in the project activity compared to the baseline scenario.

P_y Number of persons having access to safe water in the project activity.

C_j Expressed as a percentage, the portion of users of the project technology j who in the baseline were already consuming safe water without boiling it.

$P_{b, boil}$ Percentage of persons boiling water for purification in the baseline scenario.

Outcomes for SDG 5 (Gender Equality):

The overall reduction in time spent collecting firewood by the project activity is calculated as follows:

$$TR_y = T_{b,y} - T_{p,y}$$

All VPAs: $0.39 = 3.67 - (1.79+0.44)$

Where:

TR_y Total reduction time spent collecting firewood per day for project activity in year y (hours)

$T_{b,y}$ Baseline time spent collecting firewood and water per household per day (hours)

$T_{p,y}$ Project time spent collecting firewood and water per household per day (hours)

Outcomes for SDG 6 (Clean Water and Sanitation):

The outcome for SDG 6 is quantified as the additional number of persons having access to safe water in the project activity compared to the baseline scenario.

Calculations are as follows:

$$P_{access} = P_y * (1 - C_j) * U_{p,y}$$

Example VPA, GS7132: $8,861 = 9,402 * (1 - 0.0079) * 0.95$

See accompanying Emissions Reductions calculations for all VPAs.

Where:

P_{access} Number of additional persons having access to safe water in the project activity compared to the baseline scenario.

P_y Number of persons having access to safe water in the project activity.

C_j Expressed as a percentage, the portion of users of the project technology j who in the baseline were already consuming safe water without boiling it.

$U_{p,y}$ Usage rate in project scenario p during year y

Outcomes for SDG 13 (Climate Action):

CO₂e emission reductions are the indicator to demonstrate that the project has raised capacity for effective climate change-related planning and management contributing to SDG 13. The emissions reductions for the current monitoring period can be found in the corresponding Emission reductions excel document and section E.4. below.

E.3. Calculation of leakage

Leakage

The potential sources of leakage listed in the methodology have been investigated, and addressed below:

a) 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.

In all cases the baseline technologies displaced are three stones; these have no market value and are not a product as such. There is nothing limiting the use of three stone cooking across the country (the technology is lowest rung on the energy ladder and the price is zero), which is why this cooking method is so widespread. In any case the primary purpose of these three rocks is for cooking so they will not be replaced/displaced in their entirety as a result of this project - which means they will not be reused outside the project boundary. This leakage source can therefore be discounted.

b) 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.

There is no evidence to suggest significant (if any) use of renewable energy for purifying water in the project region as found in the Baseline Water Surveys. As solar purification devices are not used, renewable energy used for purifying water would likely be animal dung or crop residues which will be used due to ease of availability/proximity to the home rather than due to a shortage of wood fuel, therefore it is an independent factor. This leakage source can therefore be discounted.

c) 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. As the majority of participants collect wood from within the project boundary, it is not expected that the NRB in other areas will be affected. There are currently no other CDM or VER projects in the project area (defined as Manica Province).

d) 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.

The space heating effect of boiling water for purification purposes will be minimal, as the predominant use of baseline technology is for cooking. Therefore it is highly unlikely that another technology will be used for heating when users no longer boil water.

e) By virtue of promotion and marketing of 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.

This project is not marketing efficient technology; it is eliminating the need for a fuel based technology to deliver pure water. Lower emission technology substitution within households is therefore not possible and this leakage source can therefore be discounted.

Therefore, a value of 0 is applied for leakage.

E.4. Calculation of net benefits or direct calculation for each SDG Impact

SDG	SDG Impact	Baseline estimate	Project estimate	Net benefit
3	Additional people consuming safe water	GS7132: 2944	GS7132: 9402	GS 7132: 6063
		GS7133: 2752	GS7133: 9851	GS 7133: 6353
		GS7134: 2728	GS7134: 9021	GS 7134: 5817
		GS7135: 2691	GS7135: 9515	GS 7135: 6136
		GS7136: 2911	GS7136: 10195	GS 7136: 6574
		GS7470: 2856	GS7470: 9357	GS 7470: 6034
		GS7471: 2952	GS7471: 10311	GS 7471: 6649
		GS7472: 2904	GS7472: 9937	GS 7472: 6408
5	Variation of time spent on firewood collection	3.67 hours spent collecting firewood and water per household per day	2.23 hours spent collecting firewood and water per household per day	1.44 hours saved collecting firewood and water per household per day
		GS7132: 477	GS7132: 9402	GS 7132: 8861
		GS7133: 446	GS7133: 9851	GS 7133: 9285
		GS7134: 442	GS7134: 9021	GS 7134: 8502
		GS7135: 436	GS7135: 9515	GS 7135: 8968
		GS7136: 471	GS7136: 10195	GS 7136: 9609
		GS7470: 463	GS7470: 9357	GS 7470: 8819
		GS7471: 478	GS7471: 10311	GS 7471: 9718
6	People gain access to safe water	GS7472: 470	GS7472: 9937	GS 7472: 9366
		GS7473: 462	GS7473: 11042	GS 7473: 10407
		GS7474: 467	GS7474: 10558	GS 7474: 9951
		GS7132: 477	GS7132: 9402	GS 7132: 8861
		GS7133: 446	GS7133: 9851	GS 7133: 9285
		GS7134: 442	GS7134: 9021	GS 7134: 8502
		GS7135: 436	GS7135: 9515	GS 7135: 8968
		GS7136: 471	GS7136: 10195	GS 7136: 9609
13	Emissions Reduction tCO2e	Baseline Emission Estimate for	Project Emission Estimate for each VPA (PE _{p,y}):	Emissions Reductions for each VPA (ER _y) – also includes leakage and usage rate:

each VPA		
(BE _{b,y}):		
GS7132: 8026	GS7132: 0	GS7132: 7377
GS7133: 7516	GS7133: 0	GS7133: 7312
GS7134: 7709	GS7134: 0	GS7134: 8308
GS7135: 6797	GS7135: 0	GS7135: 5423
GS7136: 5612	GS7136: 0	GS7136: 5060
GS7470: 5810	GS7470: 0	GS7470: 4934
GS7471: 5729	GS7471: 0	GS7471: 4786
GS7472: 5443	GS7472: 0	GS7472: 4795
GS7473: 4927	GS7473: 0	GS7473: 4542
GS7474: 5673	GS7474: 0	GS7474: 4801

E.5. Comparison of actual SDG Impacts with estimates in approved PDD

SDG	Values estimated in ex ante calculation of approved PDD for this monitoring period	Actual values ³ achieved during this monitoring period
3	GS 7132: 2260	GS 7132: 6063
	GS 7133: 2260	GS 7133: 6353
	GS 7134: 2260	GS 7134: 5817
	GS 7135: 2260	GS 7135: 6136
	GS 7136: 2260	GS 7136: 6574
	GS 7470: 2260	GS 7470: 6034
	GS 7471: 2260	GS 7471: 6649
	GS 7472: 2260	GS 7472: 6408
	GS 7473: 2260	GS 7473: 7121
	GS 7474: 2260	GS 7474: 6808
	Total: 22,600	Total: 63,964 people

³ Whenever emission reductions are capped, both the original and capped values used for calculations must be transparently reported. Use brackets to denote original values.

5 At least 0.5 hours per trip per household time saved 1.44 hours per trip per household saved

6	GS 7132: 3125	GS 7132: 8861
	GS 7133: 3125	GS 7133: 9285
	GS 7134: 3125	GS 7134: 8502
	GS 7135: 3125	GS 7135: 8968
	GS 7136: 3125	GS 7136: 9609
	GS 7470: 3125	GS 7470: 8819
	GS 7471: 3125	GS 7471: 9718
	GS 7472: 3125	GS 7472: 9366
	GS 7473: 3125	GS 7473: 10407
	GS 7474: 3125	GS 7474: 9951
	Total: 31,250	Total: 93,485 people

13		GS 7132: 7377 tCO2e
		GS 7133: 7312 tCO2e
		GS 7134: 8308 tCO2e
		GS 7135: 5423 tCO2e
		GS 7136: 5060 tCO2e
	All VPAs: 10,000 tCO2e/y	GS 7470: 4934 tCO2e
	Total: 100,000 tCO2e/y	GS 7471: 4786 tCO2e
		GS 7472: 4795 tCO2e
		GS 7473: 4542 tCO2e
		GS 7474: 4801 tCO2e
		Total: 57,338 tCO2e

E.5.1. Explanation of calculation of value estimated ex ante calculation of approved PDD for this monitoring period

Ex-ante estimations are derived from ex ante calculations supplied at Internal Validation and Design Review of the Projects. These calculations use a mix of baseline project survey data and assumptions ahead of annual monitoring data collection to estimate SDG impacts for each VPA.

SDG 3: Good Health and Well-Being

In ex ante calculations, 500 users per borehole are assumed. The remaining parameters, C_j and $P_{b,boil}$, in the calculation use baseline project survey data and are fixed ex ante, as found in Section D.1. of the MR.

SDG 5: Gender Equality

The parameter $T_{b,y}$ is estimated using the baseline project survey and is fixed ex ante (Section D.1. of the MR). In order to estimate the reduction in time spent collection firewood (TR_y), the ex ante calculations assumed a 0.5 hour reduction for $T_{p,y}$. This parameter is monitored annually in the project survey.

SDG 6: Clean Water and Sanitation

In ex ante calculations, 500 users per borehole are assumed as well as a 90% usage rate. The remaining parameter, C_j , is fixed ex ante, as found in Section D.1. of the MR.

SDG 13: Climate Action

The ex ante calculations for SDG 13 use a mix of baseline monitored parameters, methodology caps and figures assumed ahead of data collection. The major difference between ex ante estimates and figures reported in the MR is the reported baseline water boiling test value (used for parameters $W_{b,y}$ and $W_{p,y}$ in section D.1. of the MR). In ex ante calculations this was set at 0.00097 tonnes per litre, however this value has subsequently been capped at 0.0004 tonnes per litre in this monitoring period.

E.6. Remarks on increase in achieved SDG Impacts from estimated value in approved PDD

>> SDG 3: Actual values are above estimates. There has been bundling of boreholes during this monitoring period into all VPAs. This means an increase in the number of people having access to safe water for MP3 even though there is still a max 300 user cap. All project participants now consume safe water without the need to boil. Even those above the cap. Participants are now experiencing fewer illnesses associated with consuming unsafe water.

SDG 5: Actual value exceeds estimate. Time spent collecting firewood and water reduced by 1.44 hours in the project. This presents a reduction in time spent

collecting firewood and water compared to the baseline and exceeds the ex-ante estimate of 0.5 (30 minutes) hours saved.

SDG 6: Actual values are above estimates. There has been bundling of boreholes during this monitoring period into all VPAs. This means an increase in the number of people having access to safe water.

SDG 13: No increase in actual values compared to PDD estimates.

SECTION F. SAFEGUARDS REPORTING

>> The Stakeholder Consultation process identified four individual safeguarding principles as relevant to the project, to be included in the monitoring report.

1. Gender Equality and Women's Rights

Two parameters to be monitored annually were identified. Firstly, the time saved through the collection of firewood, $T_{p,y}$, is monitored and presented in Section D.2. of the MR. Secondly, how time saved is used is also monitored annually and this parameter is presented in Section D.2. of the MR. No issues were raised in the monitoring of these two parameters.

2. Corruption

Communities involved in the projects are able to communicate any cases of corruption through the continuous input mechanism established for the projects. No instances of corruption have been reported in the monitoring period.

3. Negative Economic Consequences

Community-orientated trainings on conducting minor maintenance were established at the beginning of the project. All breakdowns are recorded in the monitoring report and average functionality is well above 75%, shows that this initiative has been highly successful. All down days are recorded in Section D.2. of the monitoring report.

4. Community Health, Safety, and Working Conditions

Incidences of water borne illnesses are monitored annually in the monitoring project survey and compared with baseline results. A rate of 0%, as compared to 93% in the baseline shows successful establishment of a clean water supply in the communities.

SECTION G. STAKEHOLDER INPUTS AND LEGAL DISPUTES

G.1. List all Inputs and Grievances which have been received via the Continuous Input and Grievance Mechanism together with their respective responses/mitigations.

>> There are multiple methods for stakeholders to give feedback. Continuous input/Grievance Expression Process log books are held at a water point level on which users can comment on.

In addition, a telephone number for the WATSAN in-country office was provided as well as email addresses for the relevant Village Water UK and CO2balance staff and the Gold Standard were provided. All methods of communication were shared with stakeholders during the LSC.

No Stakeholder feedback or comments have been received during this monitoring period.

G.2. Report on any stakeholder mitigations that were agreed to be monitored.

N/A

G.3. Provide details of any legal contest that has arisen with the project during the monitoring period

N/A

Revision History

Version	Date	Remarks
1.1	14 October 2020	<p>Hyperlinked section summary to enable quick access to key sections</p> <p>Improved clarity on Key Project Information</p> <p>Section for POA monitoring</p> <p>Forward action request section</p> <p>Improved Clarity on SDG contribution/SDG Impact term used throughout</p> <p>Clarity on safeguard reporting</p> <p>Clarity on design changes</p> <p>Leakage section added for VER/CER projects</p> <p>Addition of Comparison of monitored parameters with last monitoring period</p> <p>Provision of an accompanying Guide to help the user understand detailed rules and requirements</p>
1.0	10 July 2017	Initial adoption