

**Gold standard for the global goals**  
**Monitoring report**



June 2017, version 1

Title of the project	GS1247 VPA 86 Southern Ethiopia Community Boreholes (GS5322); GS1247 VPA 87 Southern Ethiopia Community Boreholes (GS5323); GS1247 VPA 88 Southern Ethiopia Community Boreholes (GS5324); GS1247 VPA 127 Southern Ethiopia Community Boreholes (GS6037); GS1247 VPA 128 Southern Ethiopia Community Boreholes (GS6038); GS1247 VPA 165 Southern Ethiopia Community Safe Water (GS7287); GS1247 VPA 166 Southern Ethiopia Community Safe Water (GS7288); GS1247 VPA 168 Southern Ethiopia Community Safe Water (GS7289); GS1247 VPA 169 Southern Ethiopia Community Safe Water (GS7290); GS1247 VPA 170 Southern Ethiopia Community Safe Water (GS7291); GS1247 VPA 171 Southern Ethiopia Community Safe Water (GS7292);
Gold Standard project id	VPA 86 - GS5322 VPA 87 - GS5323 VPA 88 - GS5324 VPA 127 - GS6037 VPA 128 - GS6038 VPA 165 - GS7287 VPA 166 - GS7288 VPA 168 - GS7289 VPA 169 - GS7290 VPA 170 - GS7291 VPA 171 - GS7292
Version number of the monitoring report	Version 5
Completion date of the monitoring report	27/10/2020
Date of project design certification	VPA 86-88 (02/11/2017) VPA 127-8 (28/12/2017) VPA 165-171 (14/01/2020)
Start date of crediting period	GS5322: 07/06/2017 GS5323: 10/06/2017 GS5324: 14/06/2017 GS6037: 22/06/2017 GS6038: 14/06/2017 GS7287: 11/05/2019 GS7288: 11/04/2019 GS7289: 16/03/2019 GS7290: 13/03/2019 GS7291: 28/02/2019 GS7292: 02/03/2019
Duration of this monitoring period	GS5322: (09/05/2019 to 25/03/2020) MP3 GS5323: (09/05/2019 to 25/03/2020) MP3 GS5324: (09/05/2019 to 25/03/2020) MP3 GS6037: (09/05/2019 to 25/03/2020) MP3 GS6038: (09/05/2019 to 25/03/2020) MP3 GS7287: (11/05/2019 to 25/03/2020) MP1

	GS7288: (11/04/2019 to 25/03/2020) MP1 GS7289: (16/03/2019 to 25/03/2020) MP1 GS7290: (13/03/2019 to 25/03/2020) MP1 GS7291: (28/02/2019 to 25/03/2020) MP1 GS7292: (02/03/2019 to 25/03/2020) MP1
Duration of previous monitoring period	GS5322: (09/05/2018 to 08/05/2019) MP2 GS5323: (09/05/2018 to 08/05/2019) MP2 GS5324: (09/05/2018 to 08/05/2019) MP2 GS6037: (09/05/2018 to 08/05/2019) MP2 GS6038: (09/05/2018 to 08/05/2019) MP2 GS7287: N/A GS7288: N/A GS7289: N/A GS7290: N/A GS7291: N/A GS7292: N/A
Project representative(s)	Thomas Devesa, CO2balance UK Ltd
Host Country	Ethiopia, Southern Nations, Nationalities and Peoples Region
Certification pathway (activity certification/impact certification)	Impact Certification
SDG Contributions targeted (as per approved PDD)	SDG 3.9.2: Good Health and Wellbeing – additional people consuming safe water SDG 5.4.1: Gender Equality – time spent collecting firewood SDG 6.1.1: Clean Water and Sanitation – proportion of population using safe water SDG 13.B.1: Climate Action – total project emissions reductions
Gold Standard statement/product certification sought (GSVER/ADALYs/RECs etc.)	GSVER
Selected methodology(ies)	TPDDTEC v.1
Estimated amount of annual average certified SDG impact (as per approved PDD)	1 – SDG 3: additional people consuming safe water GS5322: 1,876 GS5323: 1,876 GS5324: 1,876 GS6037: 1,876 GS6038: 1,876 GS7287: 1,656 GS7288: 1,656 GS7289: 1,656 GS7290: 1,656 GS7291: 1,656 GS7292: 1,656 2 - SDG 5: 0.5 hours per household per day saved on firewood collection time (all VPAs) 3 - SDG 6: additional people gain access to safe water GS5322: 2,309 GS5323: 2,309 GS5324: 2,309 GS6037: 2,309 GS6038: 2,309 GS7287: 2,293 GS7288: 2,293 GS7289: 2,293 GS7290: 2,293 GS7291: 2,293 GS7292: 2,293

	<p>4 – SDG 13: 10,000 tCO2e/y estimated emissions reductions (all VPAs)</p> <p>GS5322: 8,822  GS5323: 8,822  GS5324: 8,822  GS6037: 8,822  GS6038: 8,822  GS7287: 8,768  GS7288: 9,590  GS7289: 10,302  GS7290: 10,385  GS7291: 10,741  GS7292: 10,686</p>
<p>Total amount of certified SDG impact (as per approved methodology) achieved in this monitoring period</p>	<p>1 - SDG 3: additional people consuming safe water</p> <p>GS5322: 1,862  GS5323: 1,852  GS5324: 1,335  GS6037: 1,561  GS6038: 1,688  GS7287: 2,118  GS7288: 2,114  GS7289: 2,290  GS7290: 2,164  GS7291: 2,779  GS7292: 2,133</p> <p>2 - SDG 5: 0.68 hours per household per day saved on firewood collection time (all VPAs)</p> <p>3 - SDG 6: additional people gain access to safe water</p> <p>GS5322: 2,865  GS5323: 2,849  GS5324: 2,054  GS6037: 2,401  GS6038: 2,596  GS7287: 3,258  GS7288: 3,253  GS7289: 3,523  GS7290: 3,329  GS7291: 4,275  GS7292: 3,281</p> <p>4 - SDG 13: Emissions reductions (tCO2e) per VPA per monitoring period</p> <p>GS5322: 8,822  GS5323: 8,822  GS5324: 8,822  GS6037: 8,822  GS6038: 8,822  GS7287: 7,383  GS7288: 8,416  GS7289: 8,556  GS7290: 9,918  GS7291: 8,603  GS7292: 9,202</p>

## SECTION A. Description of project

### A.1. Purpose and general description of project

This Micro-Scale VPA Southern Ethiopia Community Boreholes 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 the Southern Nations, Nationalities and People's Region (SNNPR), Ethiopia. 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.

The SNNPR is a largely rural district 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 are owned by community groups or community-based organizations (CBOs) and have fallen into disrepair because maintenance programmes have been poorly managed or proven too expensive. In this project CO2balance will work with our project partner and community groups in SNNPR, Ethiopia to identify broken down boreholes and renovate them so that they deliver clean, safe water and breakdowns are fixed rapidly. The boreholes included under the project will be entirely human operated and will be fitted with hand pump models that are commonly used in the area, such as India Mark II pumps. The depth of the boreholes will be limited to 100m or less.

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 Southern Nations, Nationalities and People's Region is marked in the red outline in the image below and the specific sub-districts are marked in red on the Google Earth image. 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 red and two smaller red regions on this Google Earth file. 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.



Project Area Coordinates

	Latitude	Longitude
<b>North</b>	6.543464°	37.805167°
<b>East</b>	6.298847°	37.845369°
<b>South</b>	6.125352°	37.471529°
<b>West</b>	6.250965°	37.482652°

The following tables provide details on the villages served by the project, with exact coordinates for the boreholes provided. All villages are within the project boundary shown in figures 1 and 2 above.

In total 25 boreholes were rehabilitated as part of this project between 06/06/2017 and 12/12/2017 with a further 30 boreholes rehabilitated between 01/03/2019 and 13/11/2019. The date, location and number of people served by each borehole are given in the table below, which forms the project database:

GS ID	Borehole ID	Village	Lat	Long	Date	No. HHs	No. People
GS5322	VGIF-01-001	Gera - Wucha	6.33333333	37.81583333	09/06/2017	138	631
	VGIF 01-003	Menhariya (Ezo Ketema)	6.60388889	37.73305556	15/06/2017	135	661
	VGIF 01-004	Yeduro Gebeya 02 (Ezo Ketema)	6.36916667	37.74583333	14/06/2017	147	695
	VGIF 01-006	Hayle	6.48083333	37.815	06/06/2017	125	677
	VGIF-02-014	Kola Mulato - Dentale	6.71694444	37.77111111	30/08/2017	125	709
						<b>Total</b>	<b>3373</b>

GS ID	Borehole ID	Village	Lat	Long	Date	No. HHs	No. People
GS5323	VGIF-01-002	Lechare	6.41111111	37.78666667	10/06/2017	110	598
	VGIF-01-005	Haerba Hollo (Dorze Holo-o)	6.25194444	37.63027778	16/06/2017	66	287
	VGIF-01-008	Meda Sefer (Dorze 01)	6.38444444	37.67305556	09/06/2017	135	587
	VGIF-01-009	Afa Hayzo	6.30138889	37.61222222	16/06/2017	116	483
	VGSF-01-011	Gebeya (Dorze 01)	6.36138889	37.6975	15/09/2017	400	1400
						<b>Total</b>	<b>3355</b>

GS ID	Borehole ID	Village	Lat	Long	Date	No. HHs	No. People
GS5324	VGIF-01-007	Sinsa Gitoia - Kinchaho	6.405	37.59166667	13/06/2017	66	424
	VGIF-01-012	Dorze Holo-o, Dolgalsa.	6.24916667	37.71305556	17/11/2017	120	574
	VGIF-01-014	Dorze Ayira	6.45194444	37.815	12/12/2017	155	541
	VGIF-02-003	Keme	6.59694444	37.99555556	17/06/2017	75	429
	VGIF-02-001	Algea Kebele Tima	6.32694444	37.90444444	16/06/2017	66	450
						<b>Total</b>	<b>2418</b>

GS ID	Borehole ID	Village	Lat	Long	Date	No. HHs	No. People
GS6037	VGIF-02-002	Algea (Kokale)	6.45916667	37.94194444	21/06/2017	62	308
	VGIF-02-004	Shayita	6.53694444	37.81333333	23/06/2017	88	507
	VGIF-02-007	M/eyesus	6.16638889	37.65833333	18/07/2017	130	728
	VGIF-02-015	Dafa ber	6.57777778	37.85583333	31/08/2017	117	617
	VGIF-02-006	Umo Lante (Shola Sir)	6.33166667	37.80611111	20/07/2017	125	667
						<b>Total</b>	<b>2827</b>

GS ID	Borehole ID	Village	Lat	Long	Date	No. HHs	No. People
GS6038	VGIF-02-009	Kelateya	6.49666667	37.94305556	13/06/2017	125	684
	VGIF-02-012	Barber (Kow Ge Gibe)	6.29666667	37.76861111	05/07/2017	110	665
	VGIF-02-016	Hamasha	6.39777778	37.88083333	14/09/2017	64	386
	VGIF-02-017	Fura-budin 7/Uleta village	6.37222222	37.76361111	20/10/2017	73	358
	VGIF-02-011	Delbo (Tunkala ber)	6.29111111	37.76138889	11/07/2017	154	964
						<b>Total</b>	<b>3057</b>

GS ID	Borehole ID	Village/ Borehole	Lat	Long	Date	No. HHs	No. People
GS7287	VGIF-02-026	Ermiyas Ber/Mendeda Mender	6.363611	37.702222	10/05/2019	109	864
	VGIF-02-028	Mohamed Ber	6.515556	37.78278	16/05/2019	109	594
	VGIF-02-029	Alata	6.446944	37.88556	21/05/2019	120	744
	VGIF-03-008	Parko	6.1825	37.70055556	21/05/2019	126	714
	VGIF-03-016	Shanko Ber	6.12722222	37.48111111	13/11/2019	105	920
						<b>Total</b>	<b>3836</b>

GS ID	Borehole ID	Village/ Borehole	Lat	Long	Date	No. HHs	No. People
GS7288	VGIF-01-020	Gemie	6.315278	37.71389	10/04/2019	104	584
	VGIF-02-030	Mehale Qorga	6.61472222	6.61472222	13/09/2019	102	605
	VGIF-03-007	Ancho	37.53388889	37.53388889	05/05/2019	141	773
	VGIF-03-010	Addisu Gebeya	6.05	37.74611111	08/05/2019	250	1127
	VGIF-03-015	Zera	6.16611111	37.56833333	05/05/2019	120	741
						<b>Total</b>	<b>3830</b>

GS ID	Borehole ID	Village/ Borehole	Lat	Long	Date	No. HHs	No. People
GS7289	VGIF-01-018	Dana Zuma	6.29583	37.805	25/03/2019	110	682
	VGIF-01-022	Bolale Galo	6.23722	37.7233	15/03/2019	132	874
	VGIF-01-025	Genka Kasha	6.41778	37.6917	07/10/2019	115	772
	VGIF-03-003	Dubale ber	6.00361	37.6483	23/04/2019	140	684
	VGIF-03-011	Piazza	6.18444	37.5717	16/05/2019	204	1136
						<b>Total</b>	<b>4148</b>

GS ID	Borehole ID	Village/ Borehole	Lat	Long	Date	No. HHs	No. People
GS7290	VGIF-01-017	Zolo	6.581111	37.73056	22/03/2019	132	768
	VGIF-01-019	Hrapha Hillo	6.295556	37.78222	28/03/2019	110	608
	VGIF-01-021	Gede Balie	6.414444	37.66389	12/03/2019	140	941
	VGIF-01-023	ZoZo	6.348611	37.71389	19/03/2019	124	811
	VGIF-03-012	Gebeya sefer	6.1661111	37.56	06/05/2019	149	792
						<b>Total</b>	<b>3920</b>

GS ID	Borehole ID	Village/ Borehole	Lat	Long	Date	No. HHs	No. People
GS7291	VGIF-01-024	Sesqara	6.3888889	37.586111	01/10/2019	119	802
	VGIF-02-027	Shinkoko	6.680833	37.933333	13/05/2019	207	1114
	VGIF-03-002	Kolasa Mender	5.8883333	37.612222	27/02/2019	195	1126
	VGIF-03-005	Luda/Stadium	5.9869444	37.703889	29/04/2019	222	970
	VGIF-03-009	K/M/Ber	5.9880556	37.533889	13/05/2019	200	1022
						<b>Total</b>	<b>5034</b>

GS ID	Borehole ID	Village/ Borehole	Lat	Long	Date	No. HHs	No. People
GS7292	VGIF-03-001	Wonze dar	5.8108333	37.558333	01/03/2019	200	1032
	VGIF-03-004	Fiche dora	5.8652778	37.543333	01/05/2019	120	433
	VGIF-03-006	Mazoria	5.9880556	37.533889	17/05/2019	129	747
	VGIF-03-013	Temirte Bet	6.1327778	37.707222	14/05/2019	112	666
	VGIF-03-014	Belude mender	6.1327778	37.509444	17/05/2019	165	985
						<b>Total</b>	<b>3863</b>

### A.3. Reference of applied methodology

This project utilises the Gold Standard Methodology 'Technologies and Practices to Displace Decentralized Thermal Energy Consumption V.01'.

### 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 7 years, twice renewable as per the approved PDD.

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

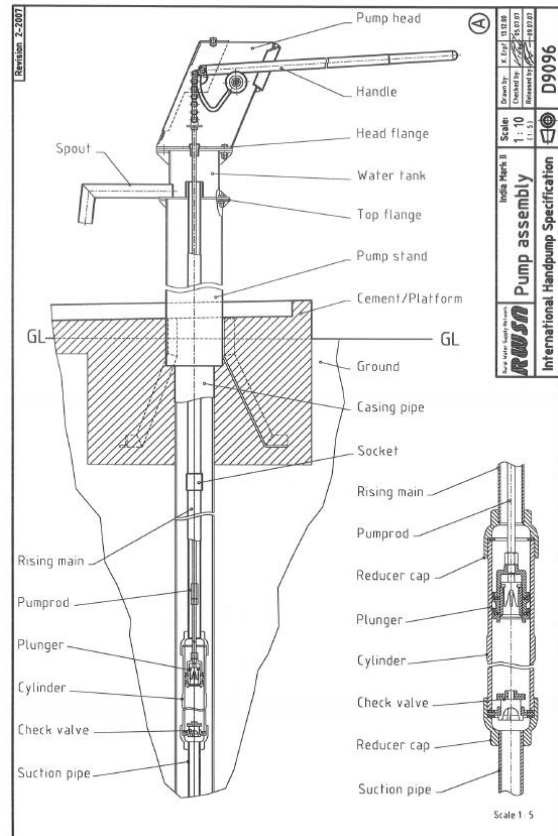
Project ID	Start Date	Crediting Period Start Date	Crediting Period End Date
5322	06/06/2017	07/06/2017	06/06/2024
5323	09/06/2017	10/06/2017	09/06/2024
5324	13/06/2017	14/06/2017	13/06/2024
6037	21/06/2017	22/06/2017	21/06/2024
6038	13/06/2017	14/06/2017	13/06/2024
7287	10/05/2019	11/05/2019	10/05/2026
7288	10/04/2019	11/04/2019	10/04/2026
7289	15/03/2019	16/03/2019	15/03/2026
7290	12/03/2019	13/03/2019	12/03/2026
7291	27/02/2019	28/02/2019	27/02/2026
7292	01/03/2019	02/03/2019	01/03/2026

## SECTION B. Implementation of project

### B.1. Description of implemented project

CO2balance and Vita have rehabilitated 55 boreholes under the VPAs and all water points under the VPAs are in good working order and all, except 7 which have had minor maintenance this monitoring period, have been crediting since the beginning of their crediting period. There has been no deviation or delay to the deliverance of the projects within this monitoring period. Borehole models rehabilitated within the project area are mostly Afridev handpumps, not excluding India Mark II boreholes. The project is not limited to any particular hand pump or water scheme. All boreholes which underwent minor maintenance are detailed in Section B.1.

Hand pump specifications:



Examples of the Afridev Handpump and India Mark II

**Technical Specifications:**

	<b>Afridev</b>	<b>India Mark II</b>
<b>Cylinder Diameter (mm)</b>	50	63.5
<b>Maximum Stroke (mm)</b>	225	125
<b>Approx. discharge at about 75 watt input (m3/h)</b>	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
<b>Pumping Lift (m)</b>	10-45	10-50
<b>Water Consumption (litres per capita)</b>	15-20	15-20

**Water Quality Standard**

All boreholes are chlorinated immediately following rehabilitation and then every 3 months thereafter to ensure a safe water supply. All boreholes undergo annual water quality testing to ensure the water is safe for human consumption as per Ethiopian national water standards. The national standards set parameters with upper limits which must be adhered to for drinking water to qualify as potable. In addition, WASH training was conducted with communities at the beginning of the project to ensure safe use of the boreholes and safe transfer of clean water from the point of distribution to consumption

## Project Feedback

Quarterly monitoring checks are conducted across all boreholes and any mechanical issues are identified and repaired, with the technician signing a Repair Confirmation Form detailing the parts replaced and the time the borehole was non-functional. This method of monitoring helps to detect any issues before they result in major breakdown of any boreholes.

Borehole ID	VPA ID	GS ID	Replacement parts	Start Date	End Date	Days Non-Functional
VGIF-01-008	87	5323	Foot valve cylinder and Handle	06/09/2019	09/09/2019	4
VGIF-01-009	87	5323	Chain and Seal	13/07/2019	19/07/2019	7
VGIF-01-005 <sup>1</sup>	87	5323	IM II Chain	07/05/2019	09/05/2019	1
VGIF-01-014	88	5324	PVC #2, Foot valve and Handle	11/07/2019	14/07/2019	3
VGIF-01-012	88	5324	Foot valve and Handle	07/06/2019	11/06/2019	5
VGIF-03-008	165	7287	Rod and Foot valve handle	02/09/2019	04/09/2019	3
VGIF-03-003	168	7289	O-Ring, Centraliser and Foot valve	23/09/2019	24/09/2019	2

Grievance expression process books placed at government county offices have not received any feedback and Vita field staff have not received any feedback during this monitoring period from the borehole users on damage or breaking of boreholes. 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.2. Post-registration changes

#### B.2.1. Temporary deviations from Certified Key Project Information, Project Design Document, Monitoring & Reporting Plan, applied methodology or applied standardized baseline

N/A

#### B.2.2. Corrections

N/A

#### B.2.3. Changes to start date of crediting period

N/A

#### B.2.4. Permanent changes from registered 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.

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<sup>1</sup> VGIF-01-005 was non-functional before the monitoring period start date. Only days within the monitoring period have been included.

## 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, Vita, who are local to the area and conversant in the local dialects to ensure that survey responses are consistent and not biased by any regional language barriers. Training of local staff includes:

- Orientation for data collectors on borehole monitoring surveys
- Ensure all team members have the knowledge and skills to carry out the required work with confidence and to a high standard
- Ensure data collectors understand the guidelines and survey tools for usage, project and WCFT surveys as well as data collection and management processes and protocols
- Familiarise data collectors with carbon finance and Gold Standard principles and requirements during surveying

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 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 – all original copies of our project documentation are retained in the Ethiopian office and are available scanned upon request of the UK team.

In accordance with the Gold Standard methodology “Technologies and Practices to Displace Decentralized Thermal Energy Consumption” (TPDDTEC), survey samples are randomly selected from the user record using a random sample group (RSG). A random number generator ranks the unique serial numbers of the boreholes in the project, generating the RSG which satisfies 90/30 precision. Each user in the RSG is assigned a unique random number from which survey participants are selected in accordance with the minimum sample size and confidence requirement for each survey. The RSG and survey participants are reselected for every monitoring period to ensure the selection remains random.

PP conducted 68 samples from boreholes in their first year of operation and 42 samples from boreholes in their third year of operation, at time of monitoring. There were no boreholes in their second year of operation at time of monitoring.

The surveys were conducted within the end date of the respective monitoring periods for each VPA.

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

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

The project database is 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 in Section D.2.

- **Water Consumption Field Test (WCFT):** The WCFT is used to determine 3 key parameters:  $Q_{p,y}$  – quantity of safe water in litres supplied in the project scenario using the clean water supply technology;  $Q_{p,rawboil,y}$  – quantity of raw or unsafe water that is still boiled after installation of the water supply technology;  $Q_{p,cleanboil,y}$  – quantity of safe water boiled in the project scenario after installation of the water supply technology. WCFT is completed biennially, prior to first verification and then every other year subsequently. The WCFT was conducted, applicable to this monitoring period, between 18/04/2018 – 22/04/2018. The measurement method used is similar to the Kitchen Performance Test in which the volume of water consumed in each household is averaged over 3 days. The WCFT performed found consumption of 9.55L per person per day.

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 UK Ltd.

- **Water Quality Test (WQT):** The quality of the treated water is assessed to ensure that it is fit for human consumption. It is assessed in accordance with Ethiopian national standards. The parameters used to assess the water quality are in line with Ethiopian standards for potable water and all parameters are 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. Boreholes included in this project are installed across a period of 3 year age groups, from the start of the crediting period. Random sampling of different aged technologies ensure that a minimum of 30 samples from each age group are included. The annual usage survey is conducted using a minimum sample size of 100. During this monitoring period the Usage Survey was conducted between 20/02/2020 – 24/02/2020 and found a usage rate of 100%.
- **Project Survey** – Conducted annually to survey end users currently using project technologies to explore changes in project scenario over time. The annual project survey is conducted using a minimum sample size of 100. During this monitoring period the Project Survey was conducted between 20/02/2020 – 24/02/2020. 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

- **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. The Baseline Water Surveys represent the entire project area before any rehabilitations take place. Because lower emitting energy sources were not present in the baseline it can be ruled out that non-project users could have been using cleaner energy sources. As a result, non-project users could not switch from lower emitting energy sources to the non-renewable biomass or fossil fuels saved by the project activity as they are already using fuelwood and charcoal. Therefore, this leakage source can 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. Majority of respondents, as recorded in the project survey, collect fuel from local forests no more than 3 hours walk from their homesteads. Few also collect fuel from close to farm fields keeping within the project boundary.

A marginal number of respondents, 1% buy fuel which may have travelled from outside of the project area which will have very little affect if any on the NRB fraction outside of the project area.

As of this monitoring period, there are currently no other CDM or VER projects in the project area.

In conclusion, impacts on the NRB fraction and leakage are very minimal and can therefore be discounted.

*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.*

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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.

- **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 days crediting each borehole earns in this monitoring period. The total number of households using each borehole will be determined through information supplied by our NGO 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

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.

### Cross Sampling

The project proponent has elected to cross-sample borehole technologies across all its homogenous VPAs located within the project area (VPA 86, 87, 88, 127, 128, 149, 150, 165, 166, 168, 169, 170 and 171). Homogenous VPAs are defined as those that share a common baseline. The samples for the survey listed below are randomly selected from the borehole information databases in line with the minimum sample size requirements as defined by the methodology. Cross sampling will be applied to the following surveys;

- Project Surveys- Completed annually,
- Usage Surveys- Completed annually,
- Water Consumption Field Tests- Completed every two years.

Surveys are conducted through use of a Random Sample Group (RSG). The size of the sample group is selected so the number of boreholes to be sampled satisfies the 90/30 precision rule. A random number generator ranks the unique serial numbers of the boreholes in the project, generating an RSG. The sample group is reselected for every monitoring period to ensure the selection remains random. In this Monitoring Period, the minimum recommended sample size of the RSG to meet 90/30 precision out of 58 boreholes was 7 boreholes. 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, detailed in section D.3. In the table below is information about the random sample.

Age Group (years)	0-1	1-2	2-3
Boreholes	30	0	28
Sample Size (BH)	10	0	7
Sample Size (surveys)	68	0	42
Average age (years)	0.7	0	2.6

### 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.

## SECTION D. Data and parameters

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

<b>Relevant SDG Indicator</b>	SDG 13.B.1 (Climate Action)
<b>Data/parameter:</b>	EF <sub>b,co2</sub>
Unit	tco <sub>2</sub> /TJ
Description	co <sub>2</sub> emission factor arising from use of fuels in baseline scenario
Source of data	IPCC default value, EFDB Emission Factor Database. Accessible: <a href="https://www.ipcc-nggip.iges.or.jp/EFDB/main.php">https://www.ipcc-nggip.iges.or.jp/EFDB/main.php</a>
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	-

<b>Relevant SDG Indicator</b>	SDG 13.B.1 (Climate Action)																				
<b>Data/parameter:</b>	EF <sub>b,non co2</sub>																				
Unit	tCO <sub>2</sub> e/TJ																				
Description	Non-CO <sub>2</sub> (CH <sub>4</sub> and N <sub>2</sub> O) emission factor arising from use of wood fuel in baseline scenario																				
Source of data	IPCC Default emissions factor, EFDB Emission Factor Database. Accessible: <a href="https://www.ipcc-nggip.iges.or.jp/EFDB/main.php">https://www.ipcc-nggip.iges.or.jp/EFDB/main.php</a>																				
Value(s) applied)	8.692																				
Choice of data or measurement methods and procedures	Deemed valid by Methodology <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Gas</th> <th>Default Emissions factor (kg_gas/TJ<sub>NCV</sub>)</th> <th>GWP of gas</th> <th>Default Emissions factor (kg_CO<sub>2</sub>e/TJ<sub>NCV</sub>)</th> <th>Default Emissions factor (t_CO<sub>2</sub>e/TJ<sub>NCV</sub>)</th> </tr> </thead> <tbody> <tr> <td>CH<sub>4</sub></td> <td>300</td> <td>25</td> <td>7,500</td> <td>7.5000</td> </tr> <tr> <td>N<sub>2</sub>O</td> <td>4</td> <td>298</td> <td>1,192</td> <td>1.1920</td> </tr> <tr> <td></td> <td></td> <td></td> <td><b>Total</b></td> <td><b>8.692</b></td> </tr> </tbody> </table>	Gas	Default Emissions factor (kg_gas/TJ <sub>NCV</sub> )	GWP of gas	Default Emissions factor (kg_CO <sub>2</sub> e/TJ <sub>NCV</sub> )	Default Emissions factor (t_CO <sub>2</sub> e/TJ <sub>NCV</sub> )	CH <sub>4</sub>	300	25	7,500	7.5000	N <sub>2</sub> O	4	298	1,192	1.1920				<b>Total</b>	<b>8.692</b>
Gas	Default Emissions factor (kg_gas/TJ <sub>NCV</sub> )	GWP of gas	Default Emissions factor (kg_CO <sub>2</sub> e/TJ <sub>NCV</sub> )	Default Emissions factor (t_CO <sub>2</sub> e/TJ <sub>NCV</sub> )																	
CH <sub>4</sub>	300	25	7,500	7.5000																	
N <sub>2</sub> O	4	298	1,192	1.1920																	
			<b>Total</b>	<b>8.692</b>																	
Purpose of data	Calculation of emission reductions.																				
Additional comments	-																				

<b>Relevant SDG Indicator</b>	SDG 13.B.1 (Climate Action)
<b>Data/parameter:</b>	EF <sub>p,co2</sub>
Unit	tCO <sub>2</sub> /TJ

Description	CO <sub>2</sub> emission factor arising from use of wood fuel in project scenario
Source of data	IPCC Default emissions factor, EFDB Emission Factor Database. Accessible: <a href="https://www.ipcc-nggip.iges.or.jp/EFDB/main.php">https://www.ipcc-nggip.iges.or.jp/EFDB/main.php</a>
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	-

<b>Relevant SDG Indicator</b>	SDG 13.B.1 (Climate Action)			
<b>Data/parameter:</b>	EF <sub>p,non co2</sub>			
Unit	tCO <sub>2</sub> e/TJ			
Description	Non-CO <sub>2</sub> (CH <sub>4</sub> and N <sub>2</sub> O) emission factor arising from use of wood fuel in project scenario			
Source of data	IPCC Default emissions factor, EFDB Emission Factor Database. Accessible: <a href="https://www.ipcc-nggip.iges.or.jp/EFDB/main.php">https://www.ipcc-nggip.iges.or.jp/EFDB/main.php</a>			
Value(s) applied)	8.692			
Choice of data or measurement methods and procedures	Deemed valid by Methodology			
	Gas	Default Emissions factor (kg_gas/TJ <sub>NCV</sub> )	GWP of gas	Default Emissions factor (kg_CO <sub>2</sub> e/TJ <sub>NCV</sub> )
	CH <sub>4</sub>	300	25	7,500
	N <sub>2</sub> O	4	298	1,192
			<b>Total</b>	<b>8.692</b>
Purpose of data	Calculation of emission reductions.			
Additional comments	-			

<b>Relevant SDG Indicator</b>	SDG 13.B.1 (Climate Action)			
<b>Data/parameter:</b>	NCV <sub>b</sub>			
Unit	TJ/ton			
Description	Net calorific value of the wood fuel used in the baseline			
Source of data	IPCC Default emissions factor, EFDB Emission Factor Database. Accessible: <a href="https://www.ipcc-nggip.iges.or.jp/EFDB/main.php">https://www.ipcc-nggip.iges.or.jp/EFDB/main.php</a>			
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	-			

<b>Relevant SDG Indicator</b>	SDG 13.B.1 (Climate Action)
<b>Data/parameter:</b>	NCV <sub>p</sub>
Unit	TJ/ton
Description	Net calorific value of the wood fuel used in the project
Source of data	IPCC Default emissions factor, EFDB Emission Factor Database. Accessible: <a href="https://www.ipcc-nggip.iges.or.jp/EFDB/main.php">https://www.ipcc-nggip.iges.or.jp/EFDB/main.php</a>
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	-

<b>Relevant SDG Indicator</b>	SDG 13.B.1 (Climate Action)
<b>Data/parameter:</b>	W <sub>b,y</sub>
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	Baseline Water Boiling Test
Value(s) applied)	0.00127
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; EB37 Annex 27; and Standard For Sampling And Surveys For CDM Project Activities and Programme of Activities (Version 02); EB65 Annex 2</i>
Purpose of data	Calculation of emission reductions.
Additional comments	-

<b>Relevant SDG Indicator</b>	SDG 13.B.1 (Climate Action)
<b>Data/parameter:</b>	W <sub>p,y</sub>
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	Baseline Water Boiling Test
Value(s) applied)	0.00127

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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</i> Version 1, <i>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</i> (Version 02); EB65 Annex 2
Purpose of data	Calculation of emission reductions.
Additional comments	-

<b>Relevant SDG Indicator</b>	SDG 13.B.1 (Climate Action), SDG 6.1.1 (Safe Water and Sanitation), SDG 3.9.2 (Good Health and Well-Being)
<b>Data/parameter:</b>	C <sub>j</sub>
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 Survey
Value(s) applied)	15.07%
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
Additional comments	-

<b>Relevant SDG Indicator</b>	SDG 13.B.1 (Climate Action)
<b>Data/parameter:</b>	Xboil 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 Survey. Credible literature, studies, survey, reports, relevant to the project target area
Value(s) applied)	10.60%
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 outlined 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	-

<b>Relevant SDG Indicator</b>	SDG 5.4.1 (Gender Equality)
<b>Data/parameter:</b>	$T_{b,y}$
Unit	Hours
Description	Time spent collecting firewood per household per day prior to project
Source of data	Baseline survey
Value(s) applied)	3.02
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

<b>Relevant SDG Indicator</b>	SDG 13.B.1 (Climate Action)
<b>Data/parameter:</b>	$f_{NRB,i,y}$
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	CDM Default stated in following document: <a href="https://cdm.unfccc.int/DNA/fNRB/index.html">https://cdm.unfccc.int/DNA/fNRB/index.html</a>
Value(s) of monitored parameter	0.88
Monitoring equipment	Desk study
Measuring/reading/recording frequency:	Ongoing
Calculation method (if applicable):	The UNFCCC CDM default fNRB value for the Federal Democratic Republic of Ethiopia expired in April 2017. In absence of an updated value, the previously approved value shall be used, however this will be updated once a revised figure is put forward for the CDM default value. If the UNFCCC updated value is higher than the previously approved value, then the previously approved value shall be used. In other circumstances, the updated value by the UNFCCC shall be used, maintaining conservativeness.
QA/QC procedures:	N/A
Purpose of data	Calculation of emission reductions.
Additional comments	-

<b>Relevant SDG Indicator</b>	SDG 13.B.1 (Climate Action)
<b>Data/parameter:</b>	$N_{p,y}$
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	GS5322 – 1,086,106 GS5323 – 1,011,826 GS5324 – 774,103 GS6037 – 910,294 GS6038 – 984,354 GS7287 – 1,033,736 GS7288 – 1,176,714 GS7289 – 1,295,320 GS7290 – 1,419,035 GS7291 – 1,580,726 GS7292 – 1,297,509
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.
QA/QC procedures:	N/A
Purpose of data:	Calculation of emission reductions.
Additional comments:	-

<b>Relevant SDG Indicator</b>	SDG 13.B.1 (Climate Action), SDG 6.1.1 (Safe Water and Sanitation)
<b>Data/parameter:</b>	$U_{p,y}$
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%
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:	-

<b>Relevant SDG Indicator</b>	SDG 13.B.1 (Climate Action)
<b>Data/parameter:</b>	$Q_{p,y}$
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	9.55 (capped at 7.5)
Monitoring equipment	WCFT Survey
Measuring/reading/recording frequency:	Completed every two years
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:	-

<b>Relevant SDG Indicator</b>	SDG 13.B.1 (Climate Action)
<b>Data/parameter:</b>	$Q_{p,cleanboil,y}$
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)
Value(s) of monitored parameter	0
Monitoring equipment	WCFT Survey
Measuring/reading/recording frequency:	Completed every two years
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:	-

<b>Relevant SDG Indicator</b>	SDG 13.B.1 (Climate Action)
<b>Data/parameter:</b>	$Q_{p,rawboil, y}$
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:	Completed every two years
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:	-

<b>Relevant SDG Indicator</b>	SDG 6.1.1 (Safe Water and Sanitation)
<b>Data/parameter:</b>	Quality of Treated Water
Unit	Parameters as per national standards <sup>2</sup> : <ul style="list-style-type: none"> <li>• Turbidity (NTU) (5)</li> <li>• Chlorine (250 mg/l)</li> <li>• Total Coliform per 100ml (undetectable)</li> <li>• Fecal Coliform per 100ml (undetectable)</li> </ul>
Description	Performance of the treatment technology
Measured/calculated/default	Measured
Source of data	Approved Laboratory Tests
Value(s) of monitored parameter	Pass
Monitoring equipment	Laboratory equipment
Measuring/reading/recording frequency:	Annual

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Calculation method (if applicable):	The Water, Mineral and Energy Department 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:	-

<b>Relevant SDG Indicator</b>	SDG 13.B.1 (Climate Action)
<b>Data/parameter:</b>	LE <sub>p,y</sub>
Unit	tCO2e 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:	-

<b>Relevant SDG Indicator</b>	SDG 5.4.1 (Gender Equality)
<b>Data/parameter:</b>	TP <sub>y</sub>
Unit	hours
Description	Project time spent collecting firewood per household per day (hours)
Measured/calculated/default	0
Source of data	Project Survey
Value(s) of monitored parameter	2.34
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:	-

<b>Relevant SDG Indicator</b>	SDG 6.1.1 (Clean Water and Sanitation), SDG 3.9.2 (Good Health and Well-Being)
<b>Data/parameter:</b>	P,y
<b>Unit</b>	Number of people
<b>Description</b>	Number of persons having access to a safe water point in the project activity
<b>Measured/calculated/default</b>	0
<b>Source of data</b>	Project Database
<b>Value(s) of monitored parameter</b>	GS5322 – 3,373 GS5323 – 3,355 GS5324 – 2,418 GS6037 – 2,827 GS6038 – 3,057 GS7287 – 3,836 GS7288 – 3,830 GS7289 – 4,148 GS7290 – 3,920 GS7291 – 5,034 GS7292 – 3,863
<b>Monitoring equipment</b>	Project Database/Household list
<b>Measuring/reading/recording frequency:</b>	Annual
<b>Calculation method (if applicable):</b>	Assessed every year using Project Survey, Usage Survey and Household list
<b>QA/QC procedures:</b>	N/A
<b>Purpose of data:</b>	Calculation of SDG 6 and SDG 3
<b>Additional comments:</b>	-

<b>Relevant SDG Indicator</b>	SDG 3.9.2 (Good Health and Well-Being)
<b>Data/parameter:</b>	P <sub>safe</sub>
<b>Unit</b>	Number
<b>Description</b>	Number of additional persons having access to safe water in the project activity compared to the baseline scenario
<b>Measured/calculated/default</b>	Calculated
<b>Source of data</b>	Project Database/Household list; Usage Survey

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Value(s) of monitored parameter	GS5322 – 1,862 GS5323 – 1,852 GS5324 – 1,335 GS6037 – 1,561 GS6038 – 1,688 GS7287 – 2,118 GS7288 – 2,114 GS7289 – 2,290 GS7290 – 2,164 GS7291 – 2,779 GS7292 – 2,113
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:	-

<b>Relevant SDG Indicator</b>	SDG 5.4.1 (Gender Equality)
<b>Data/parameter:</b>	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
Value(s) of monitored parameter	Unpaid domestic work – 100% Income generating activities – 91% Religious activities – 9% Social and leisure activities – 100% Voluntary activities – 1% Education and training – 2% 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:	-

<b>Relevant SDG Indicator</b>	SDG 6.1.1 (Clean Water and Sanitation)
<b>Data/parameter:</b>	P <sub>access</sub>
<b>Unit</b>	Number
<b>Description</b>	Number of additional persons having access to safe water in the project activity compared to the baseline scenario
<b>Measured/calculated/default</b>	Calculated
<b>Source of data</b>	Project Database/Household List; Usage Survey
<b>Value(s) of monitored parameter</b>	GS5322 – 2,865 GS5323 – 2,846 GS5324 – 2,054 GS6037 – 1,561 GS6038 – 2,596 GS7287 – 3,258 GS7288 – 3,253 GS7289 – 3,523 GS7290 – 3,329 GS7291 – 4,275 GS7292 – 3,281
<b>Monitoring equipment</b>	Project Database/Household List; Usage Survey
<b>Measuring/reading/recording frequency:</b>	Annual
<b>Calculation method (if applicable):</b>	Assess every year using the Project Database and Usage Survey
<b>QA/QC procedures:</b>	N/A
<b>Purpose of data:</b>	Calculation of SDG 6
<b>Additional comments:</b>	-

<b>Relevant SDG Indicator</b>	SDG 5.4.1 (Gender Equality)
<b>Data/parameter:</b>	TR <sub>y</sub>
<b>Unit</b>	Hours
<b>Description</b>	Total reduction time spent collecting firewood per day for project activity in year y
<b>Measured/calculated/default</b>	Calculated
<b>Source of data</b>	Project Survey
<b>Value(s) of monitored parameter</b>	0.68
<b>Monitoring equipment</b>	Project Survey
<b>Measuring/reading/recording frequency:</b>	Annual
<b>Calculation method (if applicable):</b>	Asses every year using the Project Survey
<b>QA/QC procedures:</b>	N/A
<b>Purpose of data:</b>	Calculation of SDG
<b>Additional comments:</b>	-

## **D.3. 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.3.1, D.3.2, and D.3.3 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. This training has the following deliverables:

- Orientation on monitoring surveys
- Ensuring all field staff have the knowledge and skills required to carry out the monitoring surveys with confidence and to a high standard
- Understanding of the monitoring surveys and associated guidelines
- Familiarisation with carbon finance and Gold Standard principles and procedures during surveying

### **D.3.1 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 Mirab Abaya and Chenchaworedas. This complies with the recommended minimum sample size of 30 in the Gold Standard requirements. Furthermore, the sample confidence interval is within 10% of the mean.

Between 2-3 staff carried out the test over a period of four days (1 day for preparation and 3 days measurement) following a similar method as the Kitchen Performance Test, and all tests were conducted between 18/04/2018 – 21/04/2018. 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 9.55 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.3.2 Usage Survey**

The usage survey establishes the proportion of beneficiaries that use the boreholes, a key parameter in the emission reduction calculations. As all the boreholes were installed within 1 year of the start of the crediting period and are expected to last the lifetime of the project, minimum samples of 30 for different aged technologies are not necessary. Therefore, the annual usage survey has been conducted using a sample size of 110 meeting 90/30 precision requirements.

The usage surveys in this monitoring period were carried out by field staff between the 20/02/20 - 24/02/20 in Mirab Abaya, Chenchaworedas and Arbaminch Zuriyaworedas. 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 Vita.

### **D.3.3 Project Survey**

Project surveys were conducted by 2-3 staff between 20/02/20 - 24/02/20 on 110 randomly selected households from across the VPAs in Chenchaworedas, Mirab Abaya and Arbaminch Zuriyaworedas, to explore

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changes in the project scenario demographics, water use and purification practices etc) over time. The number of households surveyed meets 90/30 precision requirements.

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.
- Sources and availability of fuel.
- Time use and time saved information

Data from this Project Survey shows that before the project 100% of households suffered from stomach related illnesses/water-borne diseases at least once every few months. Whereas, after the project, 97% of households report 'never' suffering from stomach related illnesses/water-borne diseases, with 3% only suffering from them 'once every few months'.

## SECTION E. Calculation of SDG outcomes

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

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)
- $T_{b,y} = 3.02$  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 ( $C_j$ ) 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.

## 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:

$$BE_{b,y} = B_{b,y} * \left( (fNRB_y * EF_{b,fuel,co2}) + EF_{b,fuel,nonco2} \right) * NCV_{b,fuel}^3$$

GS5322:	14,681	=	8,775	*	((0.88 * 112) + 8.692)	*	0.0156
GS5323:	13,677	=	8,175	*	((0.88 * 112) + 8.692)	*	0.0156
GS5324:	10,525	=	6,291	*	((0.88 * 112) + 8.692)	*	0.0156
GS6037:	12,305	=	7,355	*	((0.88 * 112) + 8.692)	*	0.0156
GS6038:	13,306	=	7,953	*	((0.88 * 112) + 8.692)	*	0.0156
GS7287:	13,972	=	8,351	*	((0.88 * 112) + 8.692)	*	0.0156
GS7288:	15,906	=	9,507	*	((0.88 * 112) + 8.692)	*	0.0156
GS7289:	17,529	=	10,477	*	((0.88 * 112) + 8.692)	*	0.0156
GS7290:	19,182	=	11,465	*	((0.88 * 112) + 8.692)	*	0.0156
GS7291:	21,369	=	12,772	*	((0.88 * 112) + 8.692)	*	0.0156
GS7292:	17,539	=	10,483	*	((0.88 * 112) + 8.692)	*	0.0156

Where:

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

GS5322:	8,775	=	(1 - 0.1507)	*	1,086,106	*	0.00127	*	(7.5 + 0)
GS5323:	8,175	=	(1 - 0.1507)	*	1,011,826	*	0.00127	*	(7.5 + 0)
GS5324:	6,291	=	(1 - 0.1507)	*	774,103	*	0.00127	*	(7.5 + 0)
GS6037:	7,355	=	(1 - 0.1507)	*	910,294	*	0.00127	*	(7.5 + 0)
GS6038:	7,953	=	(1 - 0.1507)	*	984,354	*	0.00127	*	(7.5 + 0)
GS7287:	8,351	=	(1 - 0.1507)	*	1,033,736	*	0.00127	*	(7.5 + 0)
GS7288:	9,507	=	(1 - 0.1507)	*	1,176,714	*	0.00127	*	(7.5 + 0)
GS7289:	10,477	=	(1 - 0.1507)	*	1,295,320	*	0.00127	*	(7.5 + 0)
GS7290:	11,465	=	(1 - 0.1507)	*	1,419,035	*	0.00127	*	(7.5 + 0)
GS7291:	12,772	=	(1 - 0.1507)	*	1,580,726	*	0.00127	*	(7.5 + 0)
GS7292:	10,483	=	(1 - 0.1507)	*	1,297,509	*	0.00127	*	(7.5 + 0)

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

<sup>3</sup>  $BE_{b,y}$  is rounded down where applicable

$Q_{p,y}$  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 outcome

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 and shown in section E.3.

### 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.

This usage of unsafe water can be taken as a proxy cause of Disability Adjusted Life Years (DALYs) in Ethiopia, as using unsafe water is deemed a significant cause of illness and death in the country.

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 ( $P_{safe}$ ). Calculations are as follows:

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

$$GS5322: 1,862 = 3,373 * (1 - 0.1507) * (1 - 0.35)$$

$$GS5323: 1,852 = 3,355 * (1 - 0.1507) * (1 - 0.35)$$

$$GS5324: 1,335 = 2,418 * (1 - 0.1507) * (1 - 0.35)$$

$$GS6037: 1,561 = 2,827 * (1 - 0.1507) * (1 - 0.35)$$

$$GS6038: 1,688 = 3,057 * (1 - 0.1507) * (1 - 0.35)$$

$$GS7287: 2,118 = 3,836 * (1 - 0.1507) * (1 - 0.35)$$

$$GS7288: 2,114 = 3,830 * (1 - 0.1507) * (1 - 0.35)$$

$$GS7289: 2,290 = 4,148 * (1 - 0.1507) * (1 - 0.35)$$

$$GS7290: 2,164 = 3,920 * (1 - 0.1507) * (1 - 0.35)$$

$$GS7291: 2,779 = 5,034 * (1 - 0.1507) * (1 - 0.35)$$

$$GS7292: 2,133 = 3,863 * (1 - 0.1507) * (1 - 0.35)$$

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:

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

$$0.68 = 3.02 - 2.34$$

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 per household per day (hours)

$T_{p,y}$  Project time spent collecting firewood 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:

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

$$GS5322: 2,865 = 3,373 * (1 - 0.1507) * 1$$

$$GS5323: 2,849 = 3,355 * (1 - 0.1507) * 1$$

$$GS5324: 2,054 = 2,418 * (1 - 0.1507) * 1$$

$$GS6037: 1,561 = 2,827 * (1 - 0.1507) * 1$$

$$GS6038: 2,596 = 3,057 * (1 - 0.1507) * 1$$

$$GS7287: 3,258 = 3,836 * (1 - 0.1507) * 1$$

$$GS7288: 3,253 = 3,830 * (1 - 0.1507) * 1$$

$$GS7289: 3,523 = 4,148 * (1 - 0.1507) * 1$$

$$GS7290: 3,329 = 3,920 * (1 - 0.1507) * 1$$

$$GS7291: 4,275 = 5,034 * (1 - 0.1507) * 1$$

$$GS7292: 3,281 = 3,863 * (1 - 0.1507) * 1$$

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):

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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 overall reduction in CO2 emission reductions is calculated as follows:

$$ER_y = ((BE_{b,y} - PE_{p,y}) * U_{p,y} - LE_{p,y}) * (1 - X_{boil})$$

GS5322: 13,124 = ((14,681 - 0) \* 1 - 0) \* (1 - 0.106)  
 GS5323: 12,227 = ((13,677 - 0) \* 1 - 0) \* (1 - 0.106)  
 GS5324: 9,409 = ((10,525 - 0) \* 1 - 0) \* (1 - 0.106)  
 GS6037: 11,000 = ((12,305 - 0) \* 1 - 0) \* (1 - 0.106)  
 GS6038: 11,895 = ((13,306 - 0) \* 1 - 0) \* (1 - 0.106)  
 GS7287: 12,490 = ((13,972 - 0) \* 1 - 0) \* (1 - 0.106)  
 GS7288: 14,219 = ((15,906 - 0) \* 1 - 0) \* (1 - 0.106)  
 GS7289: 15,670 = ((17,529 - 0) \* 1 - 0) \* (1 - 0.106)  
 GS7290: 17,148 = ((19,182 - 0) \* 1 - 0) \* (1 - 0.106)  
 GS7291: 19,103 = ((21,369 - 0) \* 1 - 0) \* (1 - 0.106)  
 GS7292: 15,679 = ((17,539 - 0) \* 1 - 0) \* (1 - 0.106)

Where:

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

GS5322: 14,681 = 8,775 \* ((0.88 \* 112) + 8.692) \* 0.0156  
 GS5323: 13,677 = 8,175 \* ((0.88 \* 112) + 8.692) \* 0.0156  
 GS5324: 10,525 = 6,291 \* ((0.88 \* 112) + 8.692) \* 0.0156  
 GS6037: 12,305 = 7,355 \* ((0.88 \* 112) + 8.692) \* 0.0156  
 GS6038: 13,306 = 7,953 \* ((0.88 \* 112) + 8.692) \* 0.0156  
 GS7287: 13,972 = 8,351 \* ((0.88 \* 112) + 8.692) \* 0.0156  
 GS7288: 15,906 = 9,507 \* ((0.88 \* 112) + 8.692) \* 0.0156  
 GS7289: 17,529 = 10,477 \* ((0.88 \* 112) + 8.692) \* 0.0156  
 GS7290: 19,182 = 11,465 \* ((0.88 \* 112) + 8.692) \* 0.0156  
 GS7291: 21,369 = 12,772 \* ((0.88 \* 112) + 8.692) \* 0.0156  
 GS7292: 17,539 = 10,483 \* ((0.88 \* 112) + 8.692) \* 0.0156

And:

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

GS5322: 8,775 = (1 - 0.1507) \* 1,086,106 \* 0.00127 \* (7.5 + 0)  
 GS5323: 8,175 = (1 - 0.1507) \* 1,011,826 \* 0.00127 \* (7.5 + 0)  
 GS5324: 6,291 = (1 - 0.1507) \* 774,103 \* 0.00127 \* (7.5 + 0)  
 GS6037: 7,355 = (1 - 0.1507) \* 910,294 \* 0.00127 \* (7.5 + 0)  
 GS6038: 7,953 = (1 - 0.1507) \* 984,354 \* 0.00127 \* (7.5 + 0)  
 GS7287: 8,351 = (1 - 0.1507) \* 1,033,736 \* 0.00127 \* (7.5 + 0)  
 GS7288: 9,507 = (1 - 0.1507) \* 1,176,714 \* 0.00127 \* (7.5 + 0)  
 GS7289: 10,477 = (1 - 0.1507) \* 1,295,320 \* 0.00127 \* (7.5 + 0)  
 GS7290: 11,465 = (1 - 0.1507) \* 1,419,035 \* 0.00127 \* (7.5 + 0)  
 GS7291: 12,772 = (1 - 0.1507) \* 1,580,726 \* 0.00127 \* (7.5 + 0)  
 GS7292: 10,483 = (1 - 0.1507) \* 1,297,509 \* 0.00127 \* (7.5 + 0)

Where

$$PE_{p,y} = B_{p,y} * \left( (fNRB_y * EF_{p,fuel,co2}) + EF_{p,fuel,nonco2} \right) * NCV_{p,fuel}$$

GS5322: 0 = 0 \* ((0.88 \* 112) + 8.692) \* 0.0156  
 GS5323: 0 = 0 \* ((0.88 \* 112) + 8.692) \* 0.0156  
 GS5324: 0 = 0 \* ((0.88 \* 112) + 8.692) \* 0.0156

GS6037:  $0 = 0 * ((0.88 * 112) + 8.692) * 0.0156$   
 GS6038:  $0 = 0 * ((0.88 * 112) + 8.692) * 0.0156$   
 GS7287:  $0 = 0 * ((0.88 * 112) + 8.692) * 0.0156$   
 GS7288:  $0 = 0 * ((0.88 * 112) + 8.692) * 0.0156$   
 GS7289:  $0 = 0 * ((0.88 * 112) + 8.692) * 0.0156$   
 GS7290:  $0 = 0 * ((0.88 * 112) + 8.692) * 0.0156$   
 GS7291:  $0 = 0 * ((0.88 * 112) + 8.692) * 0.0156$   
 GS7292:  $0 = 0 * ((0.88 * 112) + 8.692) * 0.0156$

And:

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

GS5322:  $0 = (1 - 0.1507) * 1,086,106 * 0.0012685 * (0 + 0)$   
 GS5323:  $0 = (1 - 0.1507) * 1,011,826 * 0.0012685 * (0 + 0)$   
 GS5324:  $0 = (1 - 0.1507) * 774,103 * 0.0012685 * (0 + 0)$   
 GS6037:  $0 = (1 - 0.1507) * 910,294 * 0.0012685 * (0 + 0)$   
 GS6038:  $0 = (1 - 0.1507) * 984,354 * 0.0012685 * (0 + 0)$   
 GS7287:  $0 = (1 - 0.1507) * 1,033,736 * 0.0012685 * (0 + 0)$   
 GS7288:  $0 = (1 - 0.1507) * 1,176,714 * 0.0012685 * (0 + 0)$   
 GS7289:  $0 = (1 - 0.1507) * 1,295,320 * 0.0012685 * (0 + 0)$   
 GS7290:  $0 = (1 - 0.1507) * 1,419,035 * 0.0012685 * (0 + 0)$   
 GS7291:  $0 = (1 - 0.1507) * 1,580,726 * 0.0012685 * (0 + 0)$   
 GS7292:  $0 = (1 - 0.1507) * 1,297,509 * 0.0012685 * (0 + 0)$

Where:

- BE<sub>b,y</sub> Baseline emissions in baseline scenario b per year y
- PE<sub>p,y</sub> Project emissions in project scenario p per year y
- U<sub>p,y</sub> Usage rate in project scenario p during year y
- LE<sub>p,y</sub> Leakage in project scenario p during year y
- X<sub>boil</sub> Expressed as a percentage, the portion of premises that in the absence of the project activity would have used non-GHG emitting technologies if they were available in the project boundary

The emissions reductions for the current monitoring period can be found in the corresponding Emission Reductions Calculations spreadsheet.

### E.3. Calculation of net benefits as difference of baseline and project values or direct calculation for each SDG outcome.

#### SDG 3 (Good Health and Wellbeing):

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

GS5322:  $1,862 = 3,373 * (1 - 0.1507) * (1 - 0.35)$   
 GS5323:  $1,852 = 3,355 * (1 - 0.1507) * (1 - 0.35)$   
 GS5324:  $1,335 = 2,418 * (1 - 0.1507) * (1 - 0.35)$   
 GS6037:  $1,561 = 2,827 * (1 - 0.1507) * (1 - 0.35)$   
 GS6038:  $1,688 = 3,057 * (1 - 0.1507) * (1 - 0.35)$

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GS7287:  $2,118 = 3,836 * (1 - 0.1507) * (1 - 0.35)$

GS7288:  $2,114 = 3,830 * (1 - 0.1507) * (1 - 0.35)$

GS7289:  $2,290 = 4,148 * (1 - 0.1507) * (1 - 0.35)$

GS7290:  $2,164 = 3,920 * (1 - 0.1507) * (1 - 0.35)$

GS7291:  $2,779 = 5,034 * (1 - 0.1507) * (1 - 0.35)$

GS7292:  $2,133 = 3,863 * (1 - 0.1507) * (1 - 0.35)$

## SDG 5 (Gender Equality):

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

All VPAs:  $0.68 = 3.02 - 2.34$

## SDG 6 (Clean Water and Sanitation):

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

GS5322:  $2,865 = 3,373 * (1 - 0.1507) * 1$

GS5323:  $2,849 = 3,355 * (1 - 0.1507) * 1$

GS5324:  $2,054 = 2,418 * (1 - 0.1507) * 1$

GS6037:  $1,561 = 2,827 * (1 - 0.1507) * 1$

GS6038:  $2,596 = 3,057 * (1 - 0.1507) * 1$

GS7287:  $3,258 = 3,836 * (1 - 0.1507) * 1$

GS7288:  $3,253 = 3,830 * (1 - 0.1507) * 1$

GS7289:  $3,523 = 4,148 * (1 - 0.1507) * 1$

GS7290:  $3,329 = 3,920 * (1 - 0.1507) * 1$

GS7291:  $4,275 = 5,034 * (1 - 0.1507) * 1$

GS7292:  $3,281 = 3,863 * (1 - 0.1507) * 1$

## SDG 13 (Climate Action):

Emission Reductions per VPA:

### GS 5322:

Total Capped ERs for MP3		
Emissions Reductions		
2019		6,493
2020		2,329
<b>Total ERs for MP3</b>		<b>8,822</b>

### GS 5323:

Total Capped ERs for MP3		
Emissions Reductions		
2019		6,493
2020		2,329
<b>Total ERs for MP3</b>		<b>8,822</b>

GS 5324:

Total Capped ERs for MP3		
Emissions Reductions		
2019		6,493
2020		2,329
<b>Total ERs for MP3</b>		<b>8,822</b>

GS 6037:

Total Capped ERs for MP3		
Emissions Reductions		
2019		6,493
2020		2,329
<b>Total ERs for MP3</b>		<b>8,822</b>

GS 6038:

Total Capped ERs for MP3		
Emissions Reductions		
2019		6,493
2020		2,329
<b>Total ERs for MP3</b>		<b>8,822</b>

GS 7287:

Total Capped ERs for MP1		
Emissions Reductions		
2019		5,054
2020		2,329
<b>Total ERs for MP1</b>		<b>7,383</b>

GS 7288:

Total Capped ERs for MP1		
Emissions Reductions		
2019		6,088
2020		2,328
<b>Total ERs for MP1</b>		<b>8,416</b>

GS 7289:

Total Capped ERs for MP1		
Emissions Reductions		
2019		6,227
2020		2,329
<b>Total ERs for MP1</b>		<b>8,556</b>

GS 7290:

Total Capped ERs for MP1		
Emissions Reductions		
2019		7,589
2020		2,329
<b>Total ERs for MP1</b>		<b>9,918</b>

GS 7291:

Total Capped ERs for MP1		
Emissions Reductions		
2019		6,274
2020		2,329
<b>Total ERs for MP1</b>		<b>8,603</b>

GS 7292:

Total Capped ERs for MP1		
Emissions Reductions		
2019		6,873
2020		2,329
<b>Total ERs for MP1</b>		<b>9,202</b>

## E.4. Summary of ex-post values of each SDG outcome for the current monitoring period

Item	Baseline estimate	Project estimate	Net benefit
<b>SDG 3</b>	People consuming safe water: GS5322: 1,511 GS5323: 1,503 GS5324: 1,083 GS6037: 1,266 GS6038: 1,369 GS7287: 1,718 GS7288: 1,716 GS7289: 1,858 GS7290: 1,756 GS7291: 2,255 GS7292: 1,730	People consuming safe water: GS5322: 3,373 GS5323: 3,355 GS5324: 2,418 GS6037: 2,827 GS6038: 3,057 GS7287: 3,836 GS7288: 3,830 GS7289: 4,148 GS7290: 3,920 GS7291: 5,034 GS7292: 3,863	Additional people consuming safe water: GS5322: 1,862 GS5323: 1,852 GS5324: 1,335 GS6037: 1,561 GS6038: 1,688 GS7287: 2,118 GS7288: 2,114 GS7289: 2,290 GS7290: 2,164 GS7291: 2,779 GS7292: 2,133
<b>SDG 5</b>	3.02 hours spent collecting firewood per household per day	2.34 hours spent collecting firewood per household per day	0.68 hours decrease in time spent collecting firewood per day
<b>SDG 6</b>	People with access to safe water: GS5322: 508 GS5323: 506 GS5324: 360 GS6037: 426 GS6038: 462 GS7287: 583 GS7288: 577 GS7289: 625 GS7290: 591 GS7291: 759 GS7292: 582	People with access to safe water: GS5322: 3,373 GS5323: 3,355 GS5324: 2,418 GS6037: 2,827 GS6038: 3,057 GS7287: 3,836 GS7288: 3,830 GS7289: 4,148 GS7290: 3,920 GS7291: 5,034 GS7292: 3,863	Additional people with access to safe water: GS5322: 2,865 GS5323: 2,849 GS5324: 2,054 GS6037: 2,401 GS6038: 2,596 GS7287: 3,258 GS7288: 3,253 GS7289: 3,523 GS7290: 3,329 GS7291: 4,275 GS7292: 3,281
<b>SDG 13</b>	Baseline emission estimate: GS5322: 8,822 tCO <sub>2</sub> e GS5323: 8,822 tCO <sub>2</sub> e GS5324: 8,822 tCO <sub>2</sub> e GS6037: 8,822 tCO <sub>2</sub> e GS6038: 8,822 tCO <sub>2</sub> e GS7287: 8,768 tCO <sub>2</sub> e GS7288: 9,590 tCO <sub>2</sub> e GS7289: 10,302 tCO <sub>2</sub> e GS7290: 10,385 tCO <sub>2</sub> e GS7291: 10,741 tCO <sub>2</sub> e GS7292: 10,686 tCO <sub>2</sub> e	Project emission estimate: GS5322: 0 tCO <sub>2</sub> e GS5323: 0 tCO <sub>2</sub> e GS5324: 0 tCO <sub>2</sub> e GS6037: 0 tCO <sub>2</sub> e GS6038: 0 tCO <sub>2</sub> e GS7287: 0 tCO <sub>2</sub> e GS7288: 0 tCO <sub>2</sub> e GS7289: 0 tCO <sub>2</sub> e GS7290: 0 tCO <sub>2</sub> e GS7291: 0 tCO <sub>2</sub> e GS7292: 0 tCO <sub>2</sub> e	Emission Reductions: GS5322: 8,822 tCO <sub>2</sub> e GS5323: 8,822 tCO <sub>2</sub> e GS5324: 8,822 tCO <sub>2</sub> e GS6037: 8,822 tCO <sub>2</sub> e GS6038: 8,822 tCO <sub>2</sub> e GS7287: 7,383 tCO <sub>2</sub> e GS7288: 8,416 tCO <sub>2</sub> e GS7289: 8,556 tCO <sub>2</sub> e GS7290: 9,918 tCO <sub>2</sub> e GS7291: 8,603 tCO <sub>2</sub> e GS7292: 9,202 tCO <sub>2</sub> e

E.5. Comparison of actual value of outcomes with estimates in approved PDD

Item	Values estimated in ex ante calculation of approved PDD	Actual values achieved during this monitoring period
SDG 3	GS5322: 1,876 GS5323: 1,876 GS5324: 1,876 GS6037: 1,876 GS6038: 1,876 GS7287: 1,656 GS7288: 1,656 GS7289: 1,656 GS7290: 1,656 GS7291: 1,656 GS7292: 1,656 <b>Total: 19,316</b>	GS5322: 1,862 GS5323: 1,852 GS5324: 1,335 GS6037: 1,561 GS6038: 1,688 GS7287: 2,118 GS7288: 2,114 GS7289: 2,290 GS7290: 2,164 GS7291: 2,779 GS7292: 2,133 <b>Total: 21,896</b>
SDG 5	At least 0.5 hours per trip per household time saved	Time spent collecting firewood has decreased during this monitoring period by 0.68 hours (41 minutes)
SDG 6	GS5322: 2,309 GS5323: 2,309 GS5324: 2,309 GS6037: 2,309 GS6038: 2,309 GS7287: 2,293 GS7288: 2,293 GS7289: 2,293 GS7290: 2,293 GS7291: 2,293 GS7292: 2,293 <b>Total: 25,303</b>	GS5322: 2,865 GS5323: 2,849 GS5324: 2,054 GS6037: 2,401 GS6038: 2,596 GS7287: 3,258 GS7288: 3,253 GS7289: 3,523 GS7290: 3,329 GS7291: 4,275 GS7292: 3,281 <b>Total: 33,684</b>
SDG 13	GS5322: 8,822 tCO <sub>2</sub> e (322-day period) GS5323: 8,822 tCO <sub>2</sub> e (322-day period) GS5324: 8,822 tCO <sub>2</sub> e (322-day period) GS6037: 8,822 tCO <sub>2</sub> e (322-day period) GS6038: 8,822 tCO <sub>2</sub> e (322-day period) GS7287: 8,768 tCO <sub>2</sub> e (320-day period) GS7288: 9,590 tCO <sub>2</sub> e (350-day period) GS7289: 10,302 tCO <sub>2</sub> e (376-day period) GS7290: 10,385 tCO <sub>2</sub> e (379-day period) GS7291: 10,741 tCO <sub>2</sub> e (392-day period) GS7292: 10,686 tCO <sub>2</sub> e (390-day period) <b>Total: 104,582 tCO<sub>2</sub>e</b>	GS5322: 8,822 tCO <sub>2</sub> e (322-day period) GS5323: 8,822 tCO <sub>2</sub> e (322-day period) GS5324: 8,822 tCO <sub>2</sub> e (322-day period) GS6037: 8,822 tCO <sub>2</sub> e (322-day period) GS6038: 8,822 tCO <sub>2</sub> e (322-day period) GS7287: 7,383 tCO <sub>2</sub> e (320-day period) GS7288: 8,416 tCO <sub>2</sub> e (350-day period) GS7289: 8,556 tCO <sub>2</sub> e (376-day period) GS7290: 9,918 tCO <sub>2</sub> e (379-day period) GS7291: 8,603 tCO <sub>2</sub> e (392-day period) GS7292: 9,202 tCO <sub>2</sub> e (390-day period) <b>Total: 96,199 tCO<sub>2</sub>e</b>

## **E.6. Remarks on difference from estimated value in approved PDD**

Projects GS5322-24, 6037-38 were design certified prior to transition to Gold Standard for the Global Goals, hence all ex-ante estimates of SDG outcomes for these projects are derived from the relevant Transition Annex.

SDG 3: Actual values are below estimates. Estimates were calculated before the VPAs had been bundled, so user numbers for some VPAs were lower than estimated. All project participants now consume safe water without the need to boil. Participants are now experiencing less illnesses associated with consuming unsafe water.

SDG 5: Actual value slightly exceeds estimate. Time spent collecting firewood reduced by 0.68 hours in the project. This presents a 41-minute reduction in time spent collecting firewood compared to the baseline and exceeds the ex-ante estimate of 0.5 (30 minutes) hours saved.

SDG 6: Actual value exceeds estimate. Estimates were conservatively based upon an 80% usage rate in the project scenario. However, in the current monitoring period, 100% of households collect their water from the boreholes rehabilitated as part of the project. As such, all project participants now have access to a reliable safe water source in the project.

SDG 13: Estimates meet or exceed actual value. ERs have been capped at a daily rate, as monitoring periods are variable in this MR. For current monitoring periods in MP3 the cap is based on 322 days and the ERs claimed are capped at 8,822. For VPAs in their first monitoring period, the ERs claimed are below the daily cap as not all water points included in each VPA were crediting from the start date. Positive contributions to SDG13 have been achieved.

## **SECTION F. Stakeholder inputs and legal disputes**

### **F.1. List all inputs/grievances which have been received for the project during the monitoring period together with their respective answers/actions**

There are multiple methods for stakeholders to give feedback. Continuous input/Grievance Expression Process books are held at a water point level on which users can comment on. Comments from the logbooks are collected once a week.

In addition, a telephone number for the Vita in-country office was provided as well as email addresses for the relevant 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.

### **F.2. List all inputs/grievances from previous monitoring period where follow up action is to be verified in this monitoring period**

No Stakeholder feedback or comments were received during previous monitoring period hence no follow up action has been taken during this monitoring period.

### **F.3. Provide details of any legal contest or dispute that has arisen with the project during the monitoring period**

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There was no legal contest or dispute of any kind during the monitoring period. CO2balance and their project partner and implementer, Vita, have not had any legal contest brought forward to them in regards to the project since its inception.