Gold Standard for the Global Goals

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

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	GS1247 IKR Micro PoA-DD CP2 v14
Name and GS ID of fully Validated CPA/VPAs (i.e. non compliance check)	GS1247 VPA 203-12, 231-33 Sierra Leone Safe Water (GS7475 – GS7484, GS10663 – GS10665)

Key Project Information

GS ID (s) of Project (s)	GS7475 – GS7484, GS10663 – GS10665
Title of the project (s) covered by monitoring report	GS1247 VPA 203 Sierra Leone Safe Water (GS7475) GS1247 VPA 204 Sierra Leone Safe Water (GS7476) GS1247 VPA 205 Sierra Leone Safe Water (GS7477) GS1247 VPA 206 Sierra Leone Safe Water (GS7478) GS1247 VPA 207 Sierra Leone Safe Water (GS7479) GS1247 VPA 208 Sierra Leone Safe Water (GS7480) GS1247 VPA 209 Sierra Leone Safe Water (GS7481) GS1247 VPA 210 Sierra Leone Safe Water (GS7482) GS1247 VPA 211 Sierra Leone Safe Water (GS7483) GS1247 VPA 212 Sierra Leone Safe Water (GS7484) GS1247 VPA 231 Sierra Leone Safe Water (GS10663) GS1247 VPA 232 Sierra Leone Safe Water (GS10664)

	GS1247 VPA 233 Sierra Leone Safe Water (GS10665)
Version number of the PDD/VPA-DD (s) applicable to this monitoring report	3
Version number of the monitoring report	6
Completion date of the monitoring report	18/05/2024
Date of project design certification	GS7475-84 - 10/02/2020 GS10663-65 – 24/05/2021
Date of Last Annual Report	N/A
Monitoring period number	4th (GS7475-84) 1st (GS10663-65) (*See Section B.2.5. for details*).
Duration of this monitoring period	19/05/2022-18/05/2023 (GS7475-84) 18/04/2022-18/05/2023 (GS10663-64) 11/04/2022-18/05/2023 (GS10665) (*All dates inclusive; See Section B.2.5. for details*).
Project Representative	George Syder – CO2balance
Host Country	Sierra Leone
Activity Requirements applied	☒ Community Services Activities ☐ Renewable Energy Activities ☐ Land Use and Forestry Activities/Risks & Capacities ☐ N/A
Methodology (ies) applied and version number	Technologies and Practices to Displace Decentralized Thermal Energy Consumption Version 1 (TPPDTEC v1) Technologies and Practices to Displace Decentralized Thermal Energy Consumption Version 3.1 (TPPDTEC v3.1)
Product Requirements applied	☒ GHG Emissions Reduction & Sequestration ☐ Renewable Energy Label ☐ N/A

Table 1 - Sustainable Development Contributions Achieved

Sustainable Development Goals Targeted	SDG Impact	Amount Achieved	Units/ Products
SDG 13 Climate Action	Emissions Reductions	GS7475: 5,767 (17,354) GS7476: 6,428 (18,880) GS7477: 5,507 (16,490) GS7478: 5,639 (18,318) GS7479: 6,484 (18,166) GS7480: 5,904 (16,654) GS7481: 6,031 (18,349) GS7482: 6,822 (19,054) GS7483: 6,983 (22,349) GS7484: 7,105 (21,750) GS10663: 9,498 (21,971) GS10664: 8,233 (18,037) GS10665: 6,532 (15,971) Total: 86,933 (243,343)	tCO_2e
SDG 3 Good Health and Wellbeing	Reduction in incidences of stomach related illnesses or water-borne diseases	89% (all VPAs)	IR_y
SDG 5 Gender Equality	Reduction in time spent collecting water	37.5% (all VPAs)	TR_y
SDG 6 Clean Water and Sanitation	Additional people gaining access to safe water	GS7475: 3,631 GS7476: 3,631 GS7477: 3,631 GS7478: 3,352 GS7479: 3,631 GS7480: 3,631 GS7481: 3,631 GS7482: 3,910 GS7483: 3,910 GS7484: 3,910 GS10663: 5,579 GS10664: 5,571 GS10665: 5,586 Total: 53,603	P_{access}

Table 2 – Product Vintages

	Amount Achieved

Start Dates	End Dates	tCO_2e	IR_y	TR_y	P_{access} (People)
11/04/2022	31/12/2022	GS10665: 2,986	89%	37.5%	GS10665:5,586
18/04/2022	31/12/2022	GS10663: 5,957 GS10664: 4,697	89% (all VPAs)	37.5% (all VPAs)	GS10663:5,579 GS10664:5,571
19/05/2022	31/12/2022	GS7475: 3,589 GS7476: 3,999 GS7477: 3,427 GS7478: 3,509 GS7479: 4,033 GS7480: 3,673 GS7481: 3,753 GS7482: 4,244 GS7483: 4,343 GS7484: 4,343	89% (all VPAs)	37.5% (all VPAs)	GS7475: 3,631 GS7476: 3,631 GS7477: 3,631 GS7478: 3,352 GS7479: 3,631 GS7480: 3,631 GS7481: 3,631 GS7482: 3,910 GS7483: 3,910 GS7484: 3,910
		Total: 52,553 (All VPAs in 2022)			Total: 53,603 (All VPAs in 2022)
01/01/2023	18/05/2023	GS7475: 2,178 GS7476: 2,429 GS7477: 2,080 GS7478: 2,130 GS7479: 2,451 GS7480: 2,231	89% (all VPAs)	37.5% (all VPAs)	GS7475: 3,631 GS7476: 3,631 GS7477: 3,631 GS7478: 3,352 GS7479: 3,631 GS7480: 3,631 GS7481: 3,631 GS7482: 3,910 GS7483: 3,910 GS7484: 3,910 GS10663:5,579 GS10664:5,571 GS10665:5,586

		GS7481: 2,278 GS7482: 2,578 GS7483: 2,640 GS7484: 2,762 GS10663: 3,541 GS10664: 3,536 GS10665: 3,546 Total: 34,380			Total: 53,603

SECTION A. DESCRIPTION OF PROJECT

A.1. General description of project

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CO2balance is implementing 13 micro-scale VPAs in Kono, Kenema, Kailahun and Bo Districts, Sierra Leone, under the Gold Standard methodology *Technologies and Practices to Displace Decentralized Thermal Energy Consumption*. The project activity involves rehabilitating non-functioning boreholes to provide villages with a source of safe water. This displaces the baseline method of water treatment, which involves boiling water using solid fuel. The project activity removes the need of households to rely on firewood and coal to boil water and therefore reduces CO2 emissions.

The 57 boreholes were rehabilitated between the 19th May 2019 to the 1st February 2020; an additional 75 boreholes were rehabilitated between 17th April 2020 and 28th August 2020. A further 60 boreholes were rehabilitated between 10th April 2022 and 8th October 2022. The crediting periods for each VPA are given in section A.4 and have a lifetime of 5 years. This monitoring period covers 19/05/2022 - 18/05/2023 for Phase 1 and Phase 2 boreholes, and 11/04/2022 – 18/05/2023 for Phase 3 boreholes. As part of the requirements, all boreholes were checked on a quarterly basis during the period. All boreholes can be confirmed as operational with only a few minor problems, that needed maintenance and or repairs. Common problems were low water discharge, disconnected rods and broken pump head, all which could be

repaired without detriment to the water supply. An overview of the number of non-functional days is shown below, this value also takes into account days when the boreholes did not provide safe water, as accounted for by quarterly Water Quality Testing.

BH ID	Functional Days (%)	2023 Non-Functional Days	Total Non-Functional Days
BO-32	0%	119	138
KAI-01	75%	57	35
KAI-02	75%	57	35
KAI-03	75%	57	35
KAI-04	75%	57	35
KAI-05	75%	57	35
KAI-06	75%	57	35
KAI-07	75%	57	35
KAI-08	75%	57	35
KAI-13	75%	57	35
KAI-17	0%	227	138
KAI-18	75%	57	35
KAI-19	75%	57	35
KAI-21	75%	57	35
KAI-22	75%	57	35
KAI-23	75%	57	35
KAI-25	75%	57	35
KAI-26	75%	57	35
KAI-29	75%	57	35
KAI-31	75%	57	35
KAI-40	75%	57	35
KAI-41	75%	57	35
KAI-42	75%	57	35
KAI-43	75%	57	35
KAI-44	75%	57	35
KAI-45	75%	57	35
KAI-46	75%	57	35
KAI-53	75%	57	35
KON-05	75%	57	35
KON-06	75%	57	35
KON-07	75%	57	35
KON-08	75%	57	35
KON-09	75%	57	35
KON-10	75%	57	35
KON-16	0%	227	138
KON-21	75%	57	35
KON-30	75%	57	35
KON-31	75%	57	35

KON-35	75%	57	35
KON-41	75%	57	35

A.2. Location of project

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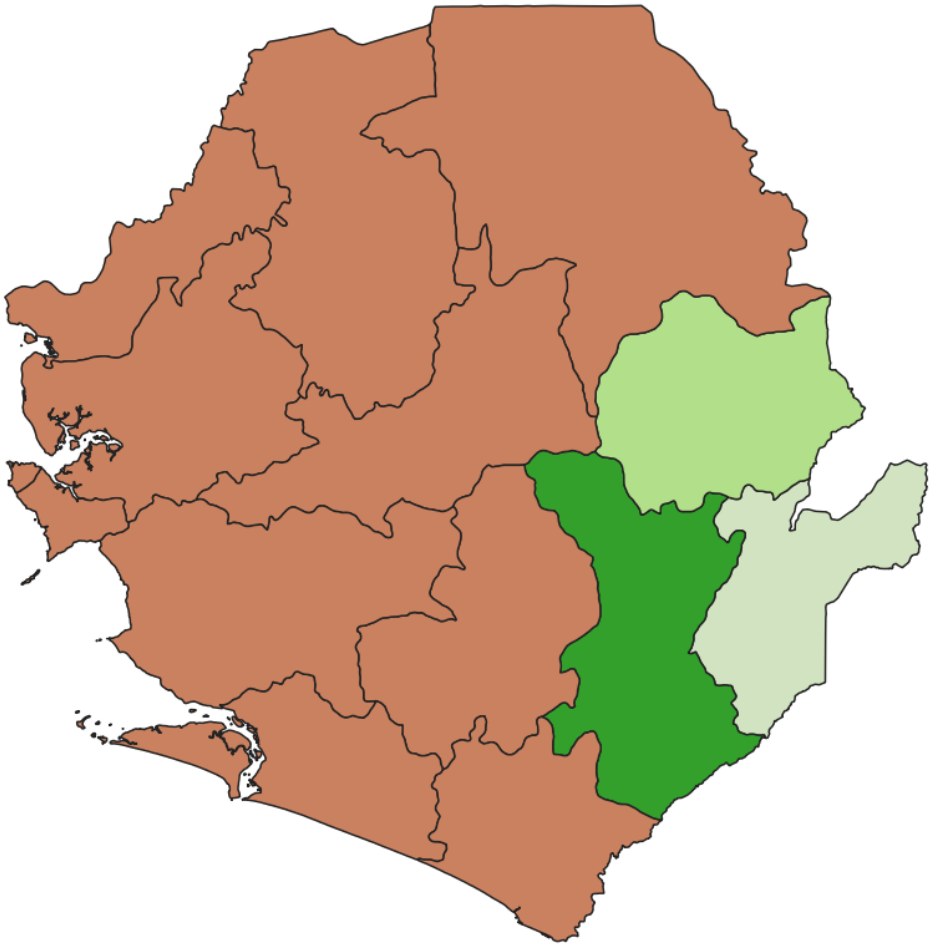
This project is located in Kono, Kenema, Kailahun, and Bo Districts, in the Eastern Provinces of Sierra Leone. Below is the geographic reference to allow unique identification of the project boundary. The target area and the fuel collection area are defined as being contained within project boundary, 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.



Project Area Coordinates		
	Latitude	Longitude
North	9°59'59.32"N	11°53'39.77"W
South	6°55'3.04"N	11°27'24.86"W
East	8°28'46.04"N	10°16'31.33"W
West	9° 1'51.84"N	13°18'10.96"W
Kono	8°45’N	11°00’W
Kenema	7°50’N	11°10’W
Kailahun	8°10’N	10°45’W
Bo	8°00’N	11°40’W

A.3. Reference of applied methodology

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The applied methodology is Technologies and Practices to Displace Decentralized Thermal Energy Consumption Version 1.0 (TPDDTEC) (VPAs GS7475-84) and

Technologies and Practices to Displace Decentralized Thermal Energy Consumption Version 3.1 (VPAs GS10663-5).

A.4. Crediting period of project

>>
GS7475: 19/05/2019 – 18/05/2026
GS7476: 20/05/2019 – 19/05/2026
GS7477: 13/06/2019 – 12/06/2026
GS7478: 28/06/2019 – 27/06/2026
GS7479: 29/07/2019 – 28/07/2026
GS7480: 04/08/2019 – 03/08/2026
GS7481: 14/11/2019 – 13/11/2026
GS7482: 14/11/2019 – 13/11/2026
GS7483: 23/01/2020 – 22/01/2027
GS7484: 26/11/2019 – 25/11/2026
GS10663:18/04/2022 – 17/04/2027
GS10664: 18/04/2022 – 17/04/2027
6S10665: 11/04/2022 – 10/04/2027

Each crediting period has a length of 7 years, under the TPDDTEC v1 Methodology. And 5 years under the TPDDTEC v3.1 Methodology

SECTION B. IMPLEMENTATION OF PROJECT

B.1. Description of implemented project

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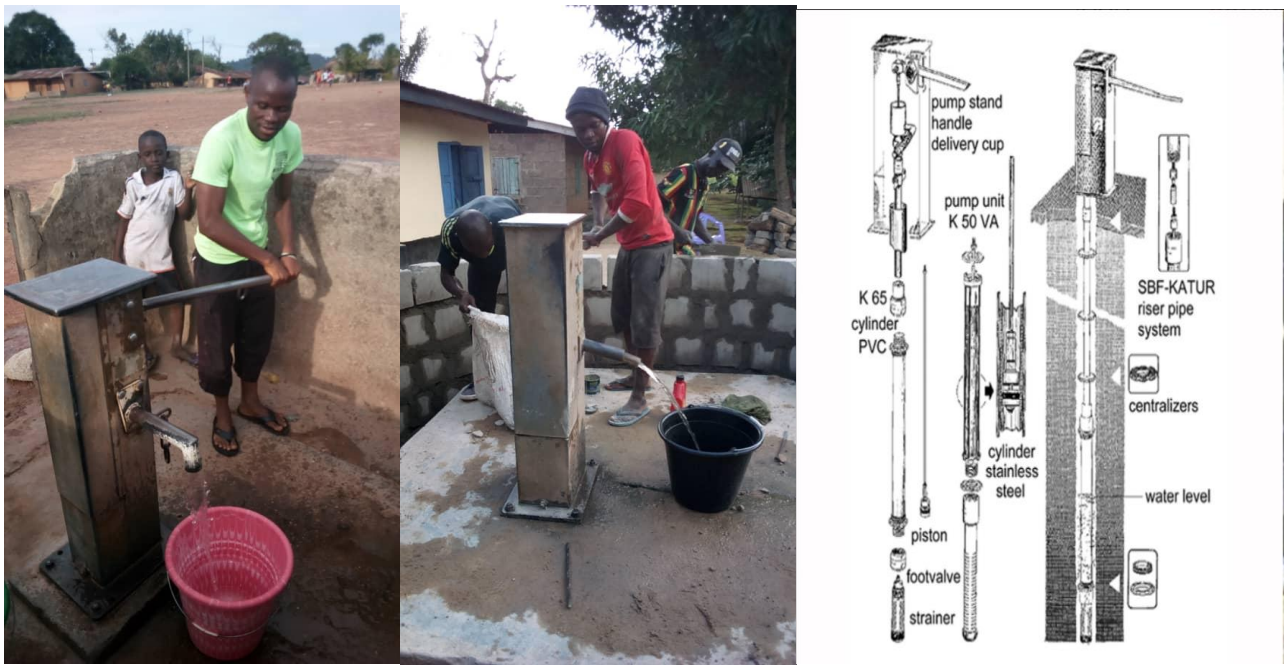
In partnership with Community Organization for Development and Empowerment – Sierra Leone (CODE-SL), CO2balance UK Ltd is implementing a number of Micro-Scale Voluntary Project Activities under PoA 1247 in the districts of Kono, Kenema, Kailahun, and Bo which are eligible under the Gold Standard methodology *Technologies and Practices to Displace Decentralized Thermal Energy Consumption version 1*. Local people typically use wood fuel on inefficient three stone fires for cooking and water purification, which 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.

Kono, Kenema, Kailahun, and Bo are largely rural Districts in which 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 the clean water desired by households. Many existing boreholes are owned by community groups and have fallen into disrepair because maintenance programmes have been poorly managed or proven too expensive. In this project CO2balance UK Ltd, work with community groups and a local NGO partner, CODE-SL in these Districts, to identify broken down boreholes and renovate them so that they deliver clean, safe water and breakdowns are fixed rapidly. To this end, quarterly visits are scheduled to each borehole, whereby the field partner conducts a survey on the functionality of each borehole, and if necessary, service and replaces parts. The majority of maintenance is reactive, however, a programme of proactive flushing of at-risk boreholes was conducted in April prior to the onset of the rainy season.

The date of rehabilitation was confirmed by a Repair Confirmation Form, which was signed by the mechanic employed by the local NGO partner, carrying out the repair along with an elected representative of the community group owners of the borehole. 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.

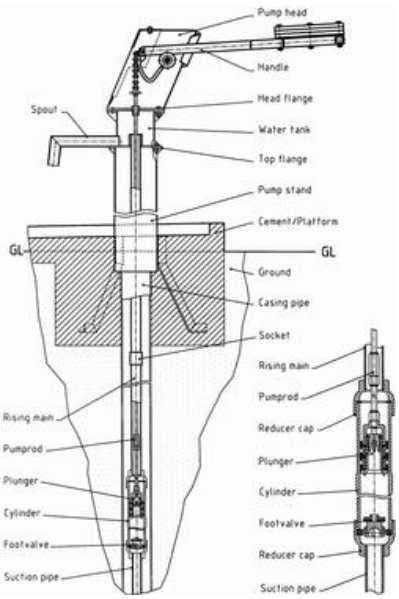
The boreholes included under the project are entirely human operated and fitted with hand pump Kardia-65, Kardia-2000 and India Mark 2 models. The depth of the boreholes are limited to 100m or less. The main differences between 65 and 2000 models are that the piston consists of 4 seals for Kardia 2000 and 5 for Kardia 65, the rubber seating differing between the two and the need for a reducer to tighten the screen pipe on K2000 while it is not necessary on K65.



Left image: Kardia-2000 pump in action from the project in Sierra Leone (Source: CO2balance)
Middle image: Kardia-65 pump in action from the project in Sierra Leone (Source: CO2balance)
Right image: specification of a Kardia pump (Source: Red Cross[1])

	Kardia 65/2000
Cylinder diameter (mm):	62
Maximum Stroke (mm):	125
Approx. discharge (75 watt input):	at 10 m head: 1.4 m^3/hour,
	at 15 m head: 1.1 m^3/hour,
	at 20 m head: 0.9 m^3/hour,
	At 30 m head: 0.7 m^3/hour
Pumping lift (m):	10-50
Water consumption (lpcd):	15-20
Max number of Users	350

[1] https://itemscatalogue.redcross.int/wash--5/water--29/hand-pumps--44/hand-pump-kardia--WPUHSURW03.aspx



Left image: India Mark 2 pump in action from the project in Sierra Leone (Source: CO2balance)

Right image: specification of a India Mark 2 pump (Source: Red Cross[2])

	India Mark 2
Cylinder diameter (mm):	63.5
Maximum Stroke (mm):	125
Approx. discharge (75 watt input):	at 50 m head: 0.55 m³/hour,
	at 60 m head 0.45 m³/hour,
	at 70 m head: 0.4 m³/hour,
Pumping lift (m):	10-50
Water consumption (lpcd):	15-20
Max number of Users	400

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. The 57 boreholes were rehabilitated between the 19th May 2019 to the 1st February 2020, which began crediting for this report on 1st September 2020; an additional 75 boreholes were rehabilitated between 17th April 2020 and 28th August 2020. A further 60 boreholes were rehabilitated between 10th April 2022 and 8th October 2022. The following table details pertinent information for each borehole in the project and groups them by VPA:

[2] https://www.rural-water-supply.net/en/implementation/public-domain-handpumps/india-mark-ii

BH ID	Borehole Name	Date of rehab	Start of MP	Pump Model	Total Users	Mode of use
VPA 203 - GS7475						
KON-01	Chief Compound water point	18/05/2019	19/05/2022	Kardia (K-2000)	548	Domestic
KON-02	Open Eye Water Point	18/05/2019	19/05/2022	Kardia (K-2000)	581	Domestic
KON-03	LCM School Field Borehole	18/05/2019	19/05/2022	Kardia (K-2000)	541	Domestic
KON-04	Yardu Road water point	19/05/2019	19/05/2022	Kardia (K-2000)	749	Domestic
KON-07	Mokoroma Compound water point	07/06/2019	19/05/2022	Kardia (K-2000)	481	Domestic
KON-24	KDEC School water point	27/07/2019	19/05/2022	India Mark 2	599	Domestic
KAI-01	Pa Amara Setiwa Compound Borehole	25/04/2020	19/05/2022	Kardia (K-2000)	473	Domestic
KAI-02	Kissy Kenema Section Borehole	25/04/2020	19/05/2022	Kardia (K-2000)	528	Domestic
KAI-03	Mdm. Moinya Kaikai Compound Borehole	25/04/2020	19/05/2022	Kardia (K-2000)	643	Domestic
KAI-04	Methodist Primary School Compound Borehole	08/05/2020	19/05/2022	Kardia (K-2000)	568	Domestic
KAI-05	Kongonanie Borehole	17/04/2020	19/05/2022	Kardia (K-2000)	454	Domestic
KAI-06	R. C. One School Compound Borehole	05/05/2020	19/05/2022	Kardia (K-2000)	516	Domestic
KAI-07	Paris Section Borehole	06/05/2020	19/05/2022	Kardia (K-2000)	524	Domestic
13					**7,205**	
VPA 204 - GS7476						
KON-10	Tamba Foah Compound water point	19/05/2019	19/05/2022	Kardia (K-2000)	696	Domestic
KON-11	Camp Road Water point	07/06/2019	19/05/2022	Kardia (K-2000)	427	Domestic
KON-12	Masingbe Road Water point	07/06/2019	19/05/2022	Kardia (K-65)	602	Domestic
KON-13	Yormandu Road Water point	08/06/2019	19/05/2022	Kardia (K-2000)	612	Domestic
KON-14	Sedibay Compound Borehole	22/06/2019	19/05/2022	Kardia (K-65)	668	Domestic
KON-15	Benduma Road Borehole	23/06/2019	19/05/2022	Kardia (K-2000)	485	Domestic
KAI-08	Kpanguwama Section Borehole	24/04/2020	19/05/2022	Kardia (K-65)	526	Domestic
KAI-09	Pastor John Charles Compound Borehole	24/04/2020	19/05/2022	Kardia (K-65)	528	Domestic
KAI-10	Nagbena Junction Borehole	22/04/2020	19/05/2022	Kardia (K-2000)	538	Domestic
KAI-11	Bongalo Section Borehole	25/04/2020	19/05/2022	Kardia (K-2000)	538	Domestic
KAI-12	Jewaru Section Borehole	30/04/2020	19/05/2022	Kardia (K-65)	483	Domestic
KAI-13	Pa Brima Salia Compound Borehole	20/04/2020	19/05/2022	Kardia (K-65)	483	Domestic
KAI-14	Sannohla Borehole	20/04/2020	19/05/2022	Kardia (K-65)	534	Domestic
13					**7,120**	
VPA 205 - GS 7477						
KON-30	Kpetema Central Borehole	12/06/2019	19/05/2022	Kardia (K-2000)	753	Domestic
KON-09	Aiah Komba Compound water point	13/06/2019	19/05/2022	Kardia (K-2000)	612	Domestic

KEN-25	R.C School Compound Borehole	15/06/2019	19/05/2022	India Mark 2	679	Domestic
KON-31	UMC School Piema Road Water point	17/06/2019	19/05/2022	India Mark 2	495	Domestic
KON-17	Ndomaina Compound Water point	20/06/2019	19/05/2022	India Mark 2	619	Domestic
KON-18	Yawara Compound Borehole	27/06/2019	19/05/2022	Kardia (K-65)	439	Domestic
KAI-15	Nyekehun Section Borehole	20/04/2020	19/05/2022	Kardia (K-65)	479	Domestic
KAI-16	Kalonma Community Borehole	22/04/2020	19/05/2022	India Mark 2	527	Domestic
KAI-17	One Mile Borehole	28/04/2020	19/05/2022	Kardia (K-65)	513	Domestic
KAI-18	James Kabba Compound Borehole	22/04/2020	19/05/2022	Kardia (K-65)	486	Domestic
KAI-19	Guabu Section Borehole	22/04/2020	19/05/2022	Kardia (K-2000)	497	Domestic
KAI-20	Kania Quarter 3 Borehole	20/05/2020	19/05/2022	Kardia (K-2000)	648	Domestic
KAI-21	Golawoma Quarter Borehole	28/04/2020	19/05/2022	Kardia (K-2000)	436	Domestic
13					**7,183**	
VPA 206 - GS 7478						
KON-22	Pa Nyuma Gborie compound Borehole	27/06/2019	19/05/2022	Kardia (K-2000)	700	Domestic
KON-28	Pump Sation Borehole	28/06/2019	19/05/2022	Kardia (K-2000)	765	Domestic
KON-32	Sheku Koroma compound Borehole	24/07/2019	19/05/2022	Kardia (K-65)	683	Domestic
KON-21	Kurankor Compound Borehole	25/07/2019	19/05/2022	Kardia (K-65)	685	Domestic
KEN-14	Abu Marrah Compound Borehole	26/07/2019	19/05/2022	India Mark 2	627	Domestic
KAI-22	Mandingo Quarter Borehole	18/05/2020	19/05/2022	Kardia (K-65)	533	Domestic
KAI-23	Kosiala Borehole	28/04/2020	19/05/2022	Kardia (K-65)	557	Domestic
KAI-24	R.C. Boys School Compound Borehole	20/05/2020	19/05/2022	Kardia (K-2000)	508	Domestic
KAI-25	Barka Section Borehole	28/04/2020	19/05/2022	Kardia (K-2000)	547	Domestic
KAI-26	Golawoma Section Borehole	30/04/2020	19/05/2022	Kardia (K-65)	492	Domestic
KAI-27	Bockarie Pabai's Compound Borehole	30/04/2020	19/05/2022	Kardia (K-65)	556	Domestic
KAI-28	Nixon Hospital Borehole	18/05/2020	19/05/2022	India Mark 2	547	Domestic
12					**7,200**	
VPA 207 - GS7479						
KON-23	KDEC School water point	28/07/2019	19/05/2022	India Mark 2	678	Domestic
KON-26	ABC Store water point	29/07/2019	19/05/2022	India Mark 2	702	Domestic
KON-20	Sahr Bobor Compound Borehole	30/07/2019	19/05/2022	Kardia (K-2000)	455	Domestic
KON-25	KDEC School water point	31/07/2019	19/05/2022	India Mark 2	700	Domestic
KEN-15	Chief Brima Foday Compound Borehole	01/08/2019	19/05/2022	India Mark 2	514	Domestic
KON-19	Sumaila Koroma Compound Borehole	02/08/2019	19/05/2022	Kardia (K-65)	426	Domestic
KEN-26	Mdm. Iye Banya's Compound Borehole	19/06/2020	19/05/2022	India Mark 2	370	Domestic

KEN-27	Koromba Section 2 Borehole	17/06/2020	19/05/2022	India Mark 2	377	Domestic
KEN-28	Silla's Compound Borehole	21/06/2020	19/05/2022	India Mark 2	492	Domestic
KEN-29	Chief Compound Borehole	21/06/2020	19/05/2022	India Mark 2	512	Domestic
KEN-30	O.C Quarter's Borehole	19/06/2020	19/05/2022	India Mark 2	390	Domestic
KEN-31	Pa Kennedy's Compound Borehole	18/06/2020	19/05/2022	India Mark 2	409	Domestic
KEN-32	Mdm. Mamie Daniel Compound Borehole	18/06/2020	19/05/2022	India Mark 2	412	Domestic
13					**6,437**	
VPA 208 - GS7480						
KON-29	Saiama Central Borehole	03/08/2019	19/05/2022	Kardia (K-65)	772	Domestic
KON-05	Mdm Ballay Komba Compound Borehole	04/08/2019	19/05/2022	Kardia (K-2000)	791	Domestic
KON-16	New Sembehun Road Borehole	27/11/2019	19/05/2022	Kardia (K-65)	824	Domestic
KEN-01	Moisala Borehole	22/11/2019	19/05/2022	India Mark 2	533	Domestic
KON-27	Johnny Compound Water Point	21/11/2019	19/05/2022	Kardia (K-2000)	543	Domestic
KEN-33	Serabu CHP Borehole	20/06/2020	19/05/2022	India Mark 2	481	Domestic
KAI-29	Kai Tongie's Compound Borehole	09/06/2020	19/05/2022	Kardia (K-65)	478	Domestic
KAI-30	Sahr Kettor Compound Borehole	08/06/2020	19/05/2022	Kardia (K-2000)	408	Domestic
KAI-31	Sundufula Borehole	09/06/2020	19/05/2022	Kardia (K-65)	439	Domestic
KAI-32	R.C. School Compound Borehole	10/06/2020	19/05/2022	Kardia (K-2000)	414	Domestic
KAI-33	Kongorhun Road Borehole	10/06/2020	19/05/2022	Kardia (K-2000)	498	Domestic
KAI-34	Makor Central Borehole	11/06/2020	19/05/2022	Kardia (K-2000)	428	Domestic
KAI-35	Assembly of God Church Compound Borehole	11/06/2020	19/05/2022	Kardia (K-2000)	547	Domestic
13					**7,156**	
VPA 209 - GS7481						
KEN-10	Central Mosque Borehole	18/11/2019	19/05/2022	India Mark 2	773	Domestic
KON-06	Masundu central Borehole	15/11/2019	19/05/2022	Kardia (K-65)	712	Domestic
KEN-13	One Mile Borehole	19/11/2019	19/05/2022	India Mark 2	703	Domestic
KEN-11	Jimmy section borehole	20/11/2019	19/05/2022	India Mark 2	643	Domestic
KON-08	Saardu Junction water point	13/11/2019	19/05/2022	Kardia (K-2000)	634	Domestic
KAI-36	Njagor Section Borehole	16/06/2020	19/05/2022	Kardia (K-2000)	525	Domestic
KAI-37	Motema Section Borehole	16/06/2020	19/05/2022	Kardia (K-2000)	469	Domestic
KAI-38	Sahr Bockarie Compound	08/06/2020	19/05/2022	Kardia (K-65)	423	Domestic
KAI-39	Foryola Section Borehole	15/06/2020	19/05/2022	Kardia (K-2000)	514	Domestic
KAI-40	Ahmadiyya Primary School Compound Borehole	15/06/2020	19/05/2022	Kardia (K-2000)	492	Domestic
KAI-41	Gietibu Section Borehole	14/06/2020	19/05/2022	Kardia (K-2000)	470	Domestic
KAI-42	Gbonortown Section Borehole	14/06/2020	19/05/2022	Kardia (K-2000)	496	Domestic
KAI-43	Belebu Park Borehole	14/06/2020	19/05/2022	Kardia (K-2000)	474	Domestic
13					**7,328**	
VPA 210 - GS7482						
KEN-12	Karkor Road Borehole	28/11/2019	19/05/2022	India Mark 2	597	Domestic

KEN-03	Ansumana Fofana Compound Borehole	14/11/2019	19/05/2022	India Mark 2	578	Domestic
KEN-04	Madam Cecilia Koroma Compound Borehole	13/11/2019	19/05/2022	India Mark 2	598	Domestic
KEN-07	Chief Compound Water Point	15/11/2019	19/05/2022	India Mark 2	587	Domestic
KEN-02	Samala Compound Borehole	14/11/2019	19/05/2022	India Mark 2	561	Domestic
KEN-08	Koromba 1 Section borehole	15/11/2019	19/05/2022	India Mark 2	558	Domestic
KAI-44	Kissy Town Market Borehole	12/06/2020	19/05/2022	Kardia (K-2000)	415	Domestic
KAI-45	Morpama Section Borehole	12/06/2020	19/05/2022	Kardia (K-2000)	429	Domestic
KAI-46	Tokpombu Borehole	13/06/2020	19/05/2022	Kardia (K-2000)	476	Domestic
KAI-47	Mofindor Road Borehole	13/06/2020	19/05/2022	Kardia (K-65)	382	Domestic
KON-33	Pa Simeon Compound Borehole	13/07/2020	19/05/2022	Kardia (K-2000)	603	Domestic
KON-34	Chief Compound Borehole	18/07/2020	19/05/2022	Kardia (K-65)	504	Domestic
KON-35	Mdm Sia Marie Compound Borehole	16/07/2020	19/05/2022	Kardia (K-65)	518	Domestic
KON-36	Sahr E.Bona Compound Borehole	12/07/2020	19/05/2022	Kardia (K-65)	409	Domestic
14					**7,215**	
VPA 211 - GS7483						
KEN-18	Temne Town Borehole	22/01/2020	19/05/2022	India Mark 2	665	Domestic
KEN-05	Abdul Bangura Compound Borehole	22/01/2020	19/05/2022	India Mark 2	549	Domestic
KEN-17	Koroma sei Compound Borehole	23/01/2020	19/05/2022	India Mark 2	529	Domestic
KEN-09	Kpanguwama Section Borehole	24/01/2020	19/05/2022	India Mark 2	676	Domestic
KEN-21	Kuwahun borehole	24/01/2020	19/05/2022	India Mark 2	856	Domestic
KEN-24	Kamboma section Borehole	27/01/2020	19/05/2022	India Mark 2	662	Domestic
KON-37	Kai Moseray Compound Borehole	14/07/2020	19/05/2022	Kardia (K-2000)	487	Domestic
KON-38	Kongomadu Mosque Borehole	17/07/2020	19/05/2022	Kardia (K-2000)	602	Domestic
KON-39	Tamba Lamin Compound Borehole	16/07/2020	19/05/2022	Kardia (K-2000)	532	Domestic
KON-40	Central Mosque Borehole	17/07/2020	19/05/2022	Kardia (K-2000)	505	Domestic
KON-41	Komba Fomba Compound Borehole	13/07/2020	19/05/2022	Kardia (K-2000)	474	Domestic
KON-42	Old Town Borehole	11/07/2020	19/05/2022	Kardia (K-65)	502	Domestic
KON-43	Seidu MCHP Borehole	18/07/2020	19/05/2022	Kardia (K-65)	526	Domestic
KON-44	Saffea Koroma Compound Borehole	11/07/2020	19/05/2022	Kardia (K-65)	474	Domestic
14					**8,039**	
VPA 212 - GS7484						
KEN-16	Thomas Samai Compound Borehole	28/01/2020	19/05/2022	India Mark 2	528	Domestic
KEN-23	SLMB School Compound Borehole	29/01/2020	19/05/2022	India Mark 2	569	Domestic
KEN-19	Quarter 2 Borehole	30/01/2020	19/05/2022	India Mark 2	665	Domestic

KEN-22	Mayalar Borehole	31/01/2020	19/05/2022	India Mark 2	560	Domestic
KEN-20	Gassimu Harding Compound Borehole	23/01/2020	19/05/2022	India Mark 2	555	Domestic
KEN-06	Nyagbebo Road Borehole	25/11/2019	19/05/2022	India Mark 2	760	Domestic
KON-45	Nanfayie Road Borehole	12/07/2020	19/05/2022	Kardia (K-2000)	463	Domestic
KON-46	Seidu Road Borehole	12/07/2020	19/05/2022	Kardia (K-65)	492	Domestic
KAI-48	Bambawo Section Borehole	21/07/2020	19/05/2022	Kardia (K-2000)	512	Domestic
KAI-49	Chief Amara Compound Borehole/Kulula	21/07/2020	19/05/2022	Kardia (K-2000)	453	Domestic
KAI-50	Pa Ganawa Compound Borehole	22/07/2020	19/05/2022	Kardia (K-2000)	584	Domestic
KAI-51	Gbessay Juana Compound Borehole	20/07/2020	19/05/2022	Kardia (K-2000)	539	Domestic
KAI-52	Belebu Section Borehole	20/07/2020	19/05/2022	Kardia (K-65)	537	Domestic
KAI-53	Blama Quarter One Section Borehole	28/08/2020	19/05/2022	Kardia (K-2000)	494	Domestic
14					**7,711**	
VPA 231 - GS10663						
BO-01	Sillah Kunda Compound Borehole	20/04/2022	21/04/2022	India Mark 2	319	Domestic
BO-02	Fofanahla Borehole	15/05/2022	16/05/2022	Kardia (K-65)	313	Domestic
BO-03	Open Eye secton Borehole	17/04/2022	18/04/2022	India Mark 2	292	Domestic
BO-04	Methodist School compound Borehole	12/05/2022	13/05/2022	Kardia (K-65)	302	Domestic
BO-05	Koromala Borehole	08/10/2022	09/10/2022	Kardia (K-65)	498	Domestic
BO-06	Mamboma central mosque Borehole	15/05/2022	16/05/2022	India Mark 2	362	Domestic
BO-07	Tangehun Section Borehole	11/05/2022	12/05/2022	Kardia (K-65)	468	Domestic
BO-08	Manjehun Road Borehole	11/05/2022	12/05/2022	Kardia (K-65)	374	Domestic
BO-09	Alhaji Pessima Compound borehole	18/04/2022	19/04/2022	India Mark 2	403	Domestic
BO-10	Old Kandor Road Borehole	19/04/2022	20/04/2022	India Mark 2	386	Domestic
BO-11	Sumbuya Road Borehole	20/04/2022	21/04/2022	Kardia (K-65)	357	Domestic
BO-12	Pujehun High Way borehole	20/04/2022	21/04/2022	India Mark 2	345	Domestic
BO-13	Nganyima Section Borehole	08/05/2022	09/05/2022	Kardia (K-65)	435	Domestic
BO-14	Barla Section Borehole	08/05/2022	09/05/2022	Kardia (K-65)	410	Domestic
BO-15	Katawahun Section Borehole	07/05/2022	08/05/2022	Kardia (K-65)	398	Domestic
BO-16	Yambama Section Borehole	09/05/2022	10/05/2022	Kardia (K-65)	406	Domestic
BO-17	Bottom Section Borehole	10/05/2022	11/05/2022	Kardia (K-65)	430	Domestic
BO-18	Koromala Borehole	16/05/2022	17/05/2022	Kardia (K-65)	410	Domestic
BO-19	Kpaveibu Section Borehole	16/05/2022	17/05/2022	Kardia (K-65)	388	Domestic
BO-20	Senehun Court barry Borehole	20/04/2022	21/04/2022	Kardia (K-65)	382	Domestic
20					**7,678**	
VPA 232 - GS10664						
BO-21	Kpandebu Section Borehole	18/04/2022	19/04/2022	Kardia (K-65)	324	Domestic
BO-22	Sefullah One section Borehole	18/04/2022	19/04/2022	Kardia (K-65)	307	Domestic

BO-23	Mattru Bagbo Junction Borehole	06/06/2022	07/06/2022	India Mark 2	441	Domestic
BO-24	Kuwahun Section Borehole	19/04/2022	20/04/2022	Kardia (K-65)	478	Domestic
BO-25	London-guhun Borehole	19/04/2022	20/04/2022	Kardia (K-65)	381	Domestic
BO-26	Fofanahla Borehole	17/04/2022	18/04/2022	Kardia (K-65)	284	Domestic
BO-27	New Apostolic Church Compound Borehole	15/05/2022	16/05/2022	Kardia (K-65)	488	Domestic
BO-28	Mobelewah Borehole	17/04/2022	18/04/2022	Kardia (K-65)	429	Domestic
BO-29	Gbangoya section Borehole	10/05/2022	11/05/2022	Kardia (K-65)	345	Domestic
BO-30	Buima Section Borehole	18/04/2022	19/04/2022	Kardia (K-65)	309	Domestic
BO-31	Manyela section Borehole	04/09/2022	05/09/2022	Kardia (K-65)	402	Domestic
BO-32	Kpendehun Section Borehole	03/09/2022	04/09/2022	Kardia (K-65)	399	Domestic
BO-33	Katawahun Section Borehole	03/09/2022	04/09/2022	Kardia (K-65)	390	Domestic
BO-34	Momohla Borehole	03/09/2022	04/09/2022	Kardia (K-65)	324	Domestic
BO-35	Lower Kargoi section section Borehole	03/09/2022	04/09/2022	India Mark 2	378	Domestic
BO-36	Bevehun Community borehole	18/09/2022	19/09/2022	India Mark 2	475	Domestic
BO-37	Hardingla Borehole	06/09/2022	07/09/2022	Kardia (K-65)	325	Domestic
BO-38	Sakpala Borehole	07/09/2022	08/09/2022	Kardia (K-65)	362	Domestic
BO-39	Gondama Section Borehole	07/09/2022	08/09/2022	Kardia (K-65)	403	Domestic
BO-40	Kpendehun section Borehole	07/09/2022	08/09/2022	Kardia (K-65)	388	Domestic
20					**7,632**	
VPA 233 - GS10665						
BO-41	Brewala Borehole	17/09/2022	18/09/2022	Kardia (K-65)	443	Domestic
BO-42	Konima section Borehole	05/09/2022	06/09/2022	Kardia (K-65)	411	Domestic
BO-43	Baoma road Borehole	05/09/2022	06/09/2022	Kardia (K-65)	383	Domestic
BO-44	Manduguhun borehole	05/09/2022	06/09/2022	Kardia (K-65)	402	Domestic
BO-45	Ansarul Islamic School compound Borehole	16/09/2022	17/09/2022	Kardia (K-65)	379	Domestic
BO-46	Old Bo road Borehole	06/09/2022	07/09/2022	Kardia (K-65)	390	Domestic
BO-47	Junction Road Borehole	06/09/2022	07/09/2022	Kardia (K-65)	408	Domestic
BO-48	Bo-Kenema H/Way Mosque Borehole	16/09/2022	17/09/2022	India Mark 2	429	Domestic
BO-49	UMC School Compound Borehole	04/09/2022	05/09/2022	Kardia (K-65)	387	Domestic
BO-50	Yamandu Old Town Borehole	04/09/2022	05/09/2022	Kardia (K-65)	425	Domestic
BO-51	Garlu CHC Borehole	21/09/2022	22/09/2022	India Mark 2	429	Domestic
BO-52	Madina section Borehole	10/04/2022	11/04/2022	Kardia (K-65)	447	Domestic
BO-53	Talia section Borehole	21/09/2022	22/09/2022	India Mark 2	382	Domestic
BO-54	Ngeeya Section Borehole	10/09/2022	11/09/2022	Kardia (K-65)	364	Domestic
BO-55	Wondewo Section Borehole	10/10/2022	11/10/2022	Kardia (K-65)	407	Domestic
BO-56	Kattala Borehole	09/09/2022	10/09/2022	Kardia (K-65)	410	Domestic
BO-57	Torkpombu Section Borehole	09/09/2022	10/09/2022	Kardia (K-65)	398	Domestic
BO-58	Barla Section Borehole	09/09/2022	10/09/2022	Kardia (K-65)	388	Domestic

BO-59	UMC School Compound Borehole	21/09/2022	22/09/2022	Kardia (K-65)	378	Domestic
BO-60	Kuwahun Borehole	18/09/2022	19/09/2022	India Mark 2	381	Domestic
20					**8,041**	

B.1.1. Forward Action Requests

>> The below table highlights the Forward Action Requests received:

Project Phase	GS Review	Date	FAR
2	Validation	Oct-2020	# 1: Prior to 1st verification, the date of rehabilitation for all boreholes included in a VPA shall be cross-checked along with the GPS co-ordinates of each borehole.
			# 2: PD should note that GS-TAC has determined parameter caps during an ongoing grievance as follows: Firewood consumption to boil 1 litre of water for 10 minutes will be capped at 0.400 kg for three stone firewood baseline stove scenarios. For other baseline fuels, projects will be assessed on case-by-case basis. AND For borehole projects, the number of users per borehole will be capped based on specifications from the borehole technology supplier/manufacturer. Depending on the outcomes of the grievance process, there is a potential for corrective measure, including but not limited to GS rule update and possible remedies for existing GS projects. Please see the grievance ToRs for more detail on how remedies may be proposed and applied.
			#3: CTFs shall be requested during CP renewal of the VPAs.
			#4: VPA-wide borehole grouping shall be checked during verification.
1	Verification 1	Feb-2021	# 1: PD to update their usage survey format to capture seasonality and supply a copy for SustainCERT approval prior to conducting the study.
			# 2: PD to provide full transparency on maintenance programme roles and responsibilities. This should include: the process of recording and reporting all faults/breakdowns and when a borehole starts working again. It should also include a summary of all planned annual maintenance tasks and the downtime expected for these tasks. Future monitoring reports must have % total borehole downtime (and days) recorded transparently in Project Technology Days parameter box.

No FARs were received for this monitoring period.

B.2. Post-Design Certification changes

>>

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

>>

No temporary deviations have been made during this monitoring period.

B.2.2. Corrections

>> No corrections to project information or fixed parameters have been applied.

B.2.3. Changes to start date of crediting period

>> No changes have been made to the start date of the crediting period for this monitoring period.

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

>> No permanent changes have been made for this monitoring period.

B.2.5. Changes to project design of approved project

>> As mentioned in the previous MR, a further 135 have been included in these VPAs, on top of the pre-existing 57 boreholes, for a total of 192 boreholes. The newest 90 boreholes are referred to in these documents as Phase 3, the second group of 75 as Phase 2, while the original 57 are referred to as Phase 1. The Phase 3 boreholes were rehabilitated between 10th April 2022 and 10th October 2022, and are all located in Bo District (Southern Province) The Phase 2 boreholes were rehabilitated between 17th April 2020 and 28th August 2020, and are all located in the Eastern Province (districts Kono, Kenema and Kailahun) alongside Phase 1. All phases are have a homogenous baseline, and are registered under the same baseline, hence the decision to include Phase 2 and 3 in this VPAs. Phase 3 boreholes had a second conducted LSC to cover Bo district. Since they are homogenous, Phase 1, 2, and 3 were monitored together, using age-wise sampling (see Section D.4. for more details), and these are the data that are used in this report. Phase 2 and 3 boreholes have been bundled into the VPAs in an even spread, which can be seen in Section B.1. of this document, and in the 'Total PTDs' tab of the ER calculations spreadsheet.

SECTION C. DESCRIPTION OF MONITORING SYSTEM APPLIED BY THE PROJECT

>> The Project monitors the contribution towards 4 SDG indicators:

SDG 3: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.

SDG 5: Recognize and value unpaid care and domestic work through the provision of public services,
infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate.

SDG 6: By 2030, achieve universal and equitable access to safe and affordable drinking water for all.

SDG 13: Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.

All surveys are administered by trained CO2balance staff and partner CODE-SL that are local to the area 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 results of the surveys are collated in excel spreadsheets and stored on a central server in an electronic format then is sent to the UK head office for data analysis. The documentation procedure devised ensures a minimum chance of original data being lost – all original copies of our project documentation are retained by CODE-SL in the Bo City office and are available scanned upon request of the CO2balance team.

In accordance with the Gold Standard methodology Technologies and Practices to Displace Decentralized Thermal Energy Consumption, the survey samples are randomly selected from the borehole user record. Each borehole user is assigned a

unique random number which is then sorted in order from lowest to highest; the first nth HHs are selected for the survey. The size of the RSG is dependent on the methodological requirements and variance of the parameter being monitored to ensure the parameters measured satisfy 90/30 precision (90% confidence interval and 30% margin of error). The RSG is reselected for every monitoring period to ensure the selection remains random.

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
- GPS location of the borehole
- 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 total number of households using each borehole has been determined through the lists supplied by the community group and district officials. CODE-SL further conducts studies to screen and determine the exact number of people the rehabilitated boreholes. Using this method, the total number of people using each borehole has been fixed and hence a figure for person days can be calculated.

Ongoing Monitoring Studies

The following ongoing monitoring studies were conducted; the results are given in the parameter boxes tables in Section 6.

- **Water consumption field test** (Equation parameters Qp,y and Qp,rawboil,y) – The WCFT was conducted during February 2022 and sampled 40 households. The WCFT is conducted biennially and so was not conducted during this monitoring period.

- **Quality of the treated water** - Water quality tests were conducted on all

boreholes in the project area following rehabilitation and all were within levels considered acceptable for domestic human consumption as per the WHO guidelines. Testing took place quarterly for boreholes in the Kono, Kenema, Kailahun and Bo Districts.

- **Usage Survey** – This survey was conducted during May 2023 and sampled 143 households.

- **Project Survey** – This survey was conducted during May 2023 and sampled 143 households.

- **Leakage assessment -** Sources of leakage detailed within the methodology relevant to this project have been reviewed.

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.

Leakage Assessment

In line with the monitoring requirements, a leakage assessment is conducted biennially and has therefore been included in this report. 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. 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 most 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.

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.

SECTION D. DATA AND PARAMETERS

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

>>

Relevant SDG Indicator	**SDG 3 (Good Health and Wellbeing) 3.9:** By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination **3.9.1:** Mortality rate attributed to household and ambient air pollution. **3.9.2:** Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services
Data/parameter:	**$P_{b,boil}$**
Unit	Percentage
Description	Percentage of persons boiling water for purification in the baseline scenario
Source of data	Baseline study
Value(s) applied)	66%
Choice of data or measurement methods and procedures	-
Purpose of data	Calculating SDG 3 impact
Additional comments	

Relevant SDG Indicator	**SDG 3 (Good Health and Wellbeing) 3.9:** By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination **3.9.2:** Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services
Data/parameter:	Ib,y
Unit	Percentage
Description	Percentage of incidences of stomach related illnesses or water-borne diseases prior to project activity
Source of data	Baseline study
Value(s) applied)	88%

Choice of data or measurement methods and procedures	The percentage of incidences of stomach related illnesses or water-borne diseases is determined through the baseline project survey and refers to the number of respondents that suffer from stomach-related illness or water-borne diseases once every few months or more frequently
Purpose of data	Calculating SDG 3 impact
Additional comments	

Relevant SDG Indicator	**SDG 5 (Gender Equality) 5.4:** Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate. **5.4.1:** Proportion of time spent on unpaid domestic and care work, by sex, age and location
Data/parameter:	Tb,y
Unit	Minutes
Description	Time spent collecting water in the baseline scenario
Source of data	Baseline Survey
Value(s) applied)	73.8
Choice of data or measurement methods and procedures	-
Purpose of data	Calculating SDG 5 impact
Additional comments	

Relevant SDG Indicator	**SDG 6 (Clean Water and Sanitation) 6.1** By 2030, achieve universal and equitable access to safe and affordable drinking water for all. **6.1.1:** Proportion of population using safely managed drinking water services **SDG 13 (Climate Action), 13B:** Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.
Data/parameter:	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 study. Credible literature, studies, survey, reports, relevant to the project target area
Value(s) applied)	5%
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.
Purpose of data	Calculate ERs
Additional comments	

Relevant SDG Indicator	**SDG 6 (Clean Water and Sanitation) 6.1** By 2030, achieve universal and equitable access to safe and affordable drinking water for all. **6.1.1:** Proportion of population using safely managed drinking water services **SDG 13 (Climate Action), 13B:** Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.
Data/parameter:	Cj
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. Credible literature, studies, survey, reports, relevant to the project target area
Value(s) applied)	2%
Choice of data or measurement methods and procedures	The portion of safe water users is determined though the baseline project survey and refers to the number of users that already use safe water from water sources such as boreholes.
Purpose of data	Calculate ERs, SDG 3 & 6
Additional comments	

Relevant SDG Indicator	**SDG 13 (Climate Action), 13B:** Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.
Data/parameter:	$EF_{b,co2}$
Unit	tco2/TJ
Description	co2 emission factor arising from use of fuels in baseline scenario
Source of data	IPCC default value
Value(s) applied)	112
Choice of data or measurement methods and procedures	Deemed valid by Methodology
Purpose of data	Calculate ERs
Additional comments	

Relevant SDG Indicator	**SDG 13 (Climate Action), 13B:** Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.
Data/parameter:	$EF_{b,non\ co2}$
Unit	tco_2/TJ
Description	Non-co_2 emission factor arising from use of fuels in baseline scenario
Source of data	IPCC default value
Value(s) applied)	9.46
Choice of data or measurement methods and procedures	Deemed valid by Methodology
Purpose of data	Calculate ERs
Additional comments	

Relevant SDG Indicator	**SDG 13 (Climate Action), 13B:** Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.
Data/parameter:	$EF_{p,co2}$
Unit	tco_2/TJ
Description	co_2 emission factor arising from use of fuels in project scenario
Source of data	IPCC default value (same as baseline)
Value(s) applied)	112
Choice of data or measurement methods and procedures	Deemed valid by Methodology
Purpose of data	Calculate ERs
Additional comments	

Relevant SDG Indicator	**SDG 13 (Climate Action), 13B:** Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.
Data/parameter:	$EF_{p,non\ co2}$
Unit	tco_2/TJ
Description	Non-co_2 emission factor arising from use of fuels in project scenario
Source of data	IPCC default value (same as baseline)
Value(s) applied)	9.46

Choice of data or measurement methods and procedures	Deemed valid by Methodology
Purpose of data	Calculate ERs
Additional comments	

Relevant SDG Indicator	**SDG 13 (Climate Action), 13B:** Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.
Data/parameter:	NCV_b /NCV_p
Unit	TJ/ton
Description	Net calorific value of the fuels used in the project
Source of data	IPCC default value
Value(s) applied)	0.0156
Choice of data or measurement methods and procedures	Deemed valid by Methodology
Purpose of data	Calculate ERs
Additional comments	

Relevant SDG Indicator	**SDG 13 (Climate Action), 13B:** Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.
Data/parameter:	$f_{NRB,i,y}$
Unit	Fractional non-renewability
Description	Non-renewability status of woody biomass fuel in scenario i during year y
Source of data	CDM Default National Figure
Value(s) applied)	0.95
Choice of data or measurement methods and procedures	$f_{NRB,i,y}$
Purpose of data	Calculate ERs
Additional comments	

Relevant SDG Indicator	**SDG 13 (Climate Action), 13B:** Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.
Data/parameter:	$W_{b,y}$
Unit	T/litre
Description	Quantity of fuel that is used to treat 1 litre of water in the baseline scenario p during year y
Source of data	Baseline Water Boiling Test
Value(s) applied)	0.0004 (temporary cap)
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: *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
Purpose of data	Calculate ERs
Additional comments	

Relevant SDG Indicator	**SDG 13 (Climate Action), 13B:** Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.
Data/parameter:	$W_{p,y}$
Unit	T/litre
Description	Quantity of 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)	0.0004 (temporary cap)
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: *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
Purpose of data	Calculate ERs
Additional comments	

D.2. Data and parameters monitored

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Relevant SDG Indicator	**SDG 3 (Good Health and Wellbeing) 3.9:** By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination **3.9.2:** Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services
Data / Parameter	Ip,y
Unit	Percentage
Description	Percentage of incidences of stomach related illnesses or water-borne diseases in project
Measured/calculated/default	Measured
Source of data	Project Survey
Value(s) of monitored parameter	10% (All VPAs)
Monitoring equipment	Project Survey
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	-
QA/QC procedures:	-
Purpose of data	Calculating SDG 3 impact
Additional comments:	

Relevant SDG Indicator	**SDG 5 (Gender Equality) 5.4:** Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate. **5.4.1:** Proportion of time spent on unpaid domestic and care work, by sex, age and location
Data / Parameter	Tp,y
Unit	Minutes
Description	Total time spent collecting water per household per day in project.
Measured/calculated/default	Measured

Source of data	Project Survey
Value(s) of monitored parameter	46.1 (All VPAs)
Monitoring equipment	Project Survey
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	-
QA/QC procedures:	-
Purpose of data	Calculating time saved by project.
Additional comments:	

Relevant SDG Indicator	**SDG 5 (Gender Equality) 5.4:** Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate. **5.4.1:** Proportion of time spent on unpaid domestic and care work, by sex, age and location
Data / Parameter	TRy
Unit	Percentage
Description	Total reduction time spent collecting water for project activity in year y (%)
Measured/calculated/default	Measured
Source of data	Project Survey
Value(s) of monitored parameter	37.5% (All VPAs)
Monitoring equipment	-
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	Calculate the average amount of time spent collecting water in the project scenario and compare to the pre-project scenario
QA/QC procedures:	-
Purpose of data	To quantify whether the project has contributed to a reduction in the amount of time spent collecting water compared to the pre-project scenario
Additional comments:	

Relevant SDG Indicator	**SDG 5 (Gender Equality) 5.4:** Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate. **5.4.1:** Proportion of time spent on unpaid domestic and care work, by sex, age and location
Data / Parameter	Usage of time saved on water collection
Unit	Percentage
Description	Uses of time saved which was previously spent on water collection
Measured/calculated/default	Measured
Source of data	Project Survey
Value(s) of monitored parameter	1. (Unpaid) Domestic work (includes cooking and caring for family members): 94% 2. Income generating activities: 35% 3. Religious activities: 16% 4. Social and leisure activities: 0% 5. Voluntary activities: 0% 6. Education and training: 0% 7. Other (Specify): 0%
Monitoring equipment	-
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	Ask users how time saved on water collection in the project scenario, as opposed to the baseline scenario, is now being used.
QA/QC procedures:	-
Purpose of data	To quantify how time which was previously spent on water collection is now being used
Additional comments:	

Relevant SDG Indicator/Safeguarding Principle	**SDG 6 (Clean Water and Sanitation) 6.1** By 2030, achieve universal and equitable access to safe and affordable drinking water for all.
Data / Parameter	Py
Unit	Number
Description	Number of persons having access to safe water in the project activity
Measured/calculated/default	Calculated

Source of data	User lists, set at the time of the rehabilitation.
Value(s) of monitored parameter	GS 7475: 3,900 (7,205) GS 7476: 3,900 (7,120) GS 7477: 3,900 (7,183) GS 7478: 3,600 (7,200) GS 7479: 3,900 (6,437) GS 7480: 3,900 (7,156) GS 7481: 3,900 (7,328) GS 7482: 4,200 (7,215) GS 7483: 4,200 (8,039) GS 7484: 4,200 (7,711) GS 10663: 5,992 (7,678) GS 10664: 5,984 (7,632) GS 10665: 6,000 (8,041) Total: 57,576 (95,945)
Monitoring equipment	User lists
Measuring/reading/recording frequency:	Recorded Continuously
Calculation method (if applicable):	-
QA/QC procedures:	-
Purpose of data:	Calculating access to safe water
Additional comments:	SDG 3: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination SDG 6: By 2030, achieve universal and equitable access to safe and affordable drinking water for all Temporary cap of 300 Users per borehole

Relevant SDG Indicator/Safeguarding Principle	**SDG 6 (Clean Water and Sanitation) 6.1** By 2030, achieve universal and equitable access to safe and affordable drinking water for all.
Data / Parameter	P_{access}
Unit	Number
Description	Number of additional persons having access to safe water in the project activity compared to the baseline scenario.
Measured/calculated/default	Measured

Source of data	Household lists; Usage Survey
Value(s) of monitored parameter	GS7475: 3,631 GS7476: 3,631 GS7477: 3,631 GS7478: 3,352 GS7479: 3,631 GS7480: 3,631 GS7481: 3,631 GS7482: 3,910 GS7483: 3,910 GS7484: 3,910 GS10663: 5,579 GS10664: 5,571 GS10665: 5,586 Total: 53,603
Monitoring equipment	Household lists; Usage Survey
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	See section E.
QA/QC procedures:	-
Purpose of data:	To calculate the additional number of persons having access to safe water in the project activity compared to the baseline scenario
Additional comments:	

Relevant SDG Indicator	**SDG 6 (Clean Water and Sanitation) 6.1** By 2030, achieve universal and equitable access to safe and affordable drinking water for all. **SDG 13 (Climate Action), 13B:** Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.
Data/parameter:	Quality of Treated Water
Unit	Parameters as per national standards
Description	Laboratory Tests
Measured/calculated/default	Measured
Source of data	Water quality tests
Value(s) of monitored parameter	Pass - The Kenema water quality laboratory, part of the ministry of water resources government department has certified each water supply in line with the WHO guidelines.

Monitoring equipment	-
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	
QA/QC procedures:	
Purpose of data:	Ensure water is safe for human consumption without treatment using the project technology
Additional comments:	

Relevant SDG Indicator	**SDG 13 (Climate Action), 13B:** Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.
Data/parameter:	Np,y
Unit	Project Technology Days
Description	Number of persons consuming water supplied by project scenario p through year y
Measured/calculated/default	Measured
Source of data	Borehole Project Database
Value(s) of monitored parameter	GS7475: 1,202,700 (2,244,621) GS7476: 1,340,700 (2,441,490) GS7477: 1,148,400 (2,132,882) GS7478: 1,176,000 (2,369,112) GS7479: 1,423,500 (2,349,505) GS7480: 1,231,200 (2,154,044) GS7481: 1,257,900 (2,373,144) GS7482: 1,422,600 (2,464,379) GS7483: 1,505,400 (2,890,627) GS7484: 1,532,100 (2,813,033) GS10663: 2,122,227 (2,841,803) GS10664: 1,839,659 (2,332,947) GS10665: 1,459,485 (2,065,636) Total: 18,661,871 (31,473,673)
Monitoring equipment	Borehole Project Database
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	Borehole users * Total crediting days
QA/QC procedures:	-
Purpose of data:	Calculate ERs
Additional comments:	95% cap applied

Relevant SDG Indicator	**SDG 13 (Climate Action), 13B:** Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.
Data/parameter:	Up,y
Unit	Percentage
Description	Usage rate in project scenario p through year y
Measured/calculated/default	Measured
Source of data	Annual Usage Survey
Value(s) of monitored parameter	98.69% capped at 95.00%
Monitoring equipment	The usage survey has been carried out by staff trained by CO2balance and local in- country partner CODE-SL 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 the project developers
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	-
QA/QC procedures:	-
Purpose of data:	Calculate ERs
Additional comments:	

Relevant SDG Indicator	**SDG 13 (Climate Action), 13B:** Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.
Data/parameter:	Qp,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	Measured
Source of data	Water Consumption Field Test (WCFT)
Value(s) of monitored parameter	7.5 (capped; GS7475-84) 7 (capped; GS10663-5) 11.99 (uncapped) – this value has not been used during the calculations
Monitoring equipment	-
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 is carried out by staff trained by CO2balance and local in- country partner CODE-SL 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 the project developers.
QA/QC procedures:	-
Purpose of data:	Calculate ERs
Additional comments:	

Relevant SDG Indicator	**SDG 13 (Climate Action), 13B:** Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.
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	Measured
Source of data	WCFT
Value(s) of monitored parameter	0
Monitoring equipment	-
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 staff trained by CO2balance and local in-country partner FAPDR 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 project developers.
QA/QC procedures:	-
Purpose of data:	Calculate ERs
Additional comments:	

Relevant SDG Indicator	**SDG 13 (Climate Action), 13B:** Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.
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	Measured
Source of data	WCFT
Value(s) of monitored parameter	0
Monitoring equipment	-
Measuring/reading/recording frequency:	Annual
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 staff trained by CO2balance and local in-country partner FAPDR 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 project developers.
QA/QC procedures:	
Purpose of data:	Calculate ERs
Additional comments:	

Relevant SDG Indicator	**SDG 13 (Climate Action), 13B:** Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.
Data/parameter:	LEp,y
Unit	tCO2e per year
Description	Leakage in project scenario p during year y
Measured/calculated/default	Measured
Source of data	Baseline and monitoring surveys
Value(s) of monitored parameter	0
Monitoring equipment	-
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	-
QA/QC procedures:	-

Purpose of data:	Calculate ERs
Additional comments:	

Relevant SDG Indicator	**SDG 13 (Climate Action), 13B:** Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.
Data/parameter:	Failure Days,y
Unit	Number
Description	Number of days a particular borehole was non-functioning during year y
Source of data	Borehole visits, communications from WRC
Value(s) applied	4,193
Measurement methods and procedures	The period in which a particular boreholes is considered to be non-functioning (as determined by maintenance visits) or not providing safe water (as determined by Water Quality Testing)
Monitoring frequency	Ongoing
QA/QC procedures	-
Purpose of data	Calculating ERs
Additional comment	Re-functionality of boreholes will be evidenced by signed RCF

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

Data/Parameter	Value obtained in this monitoring period	Value obtained last monitoring period
Ip,y	10% (all VPAs)	26% (all VPAs)
Tp,y	46.1 (all VPAs)	28.8 (all VPAs)
TRy	37.5% (all VPAs)	61% (all VPAs)
Usage of time saved on water collection	1. (Unpaid) Domestic work (includes cooking and caring for family members): 94% 2. Income generating activities: 35%	1. (Unpaid) Domestic work (includes cooking and caring for family members): 63% 2. Income generating activities: 28%

	3. Religious activities: 16% 4. Social and leisure activities: 0% 5. Voluntary activities: 0% 6. Education and training: 0% 7. Other (Specify): 0% (all VPAs)	3. Religious activities: 15% 4. Social and leisure activities: 2% 5. Voluntary activities: 0% 6. Education and training: 28% 7. Other (Specify): 0% (all VPAs)
Py	GS 7475: 3,900 GS 7476: 3,900 GS 7477: 3,900 GS 7478: 3,600 GS 7479: 3,900 GS 7480: 3,900 GS 7481: 3,900 GS 7482: 4,200 GS 7483: 4,200 GS 7484: 4,200 GS 10663: 5,992 GS 10664: 5,984 GS 10665: 6,000 Total: 57,576	GS 7475: 3,900 GS 7476: 3,900 GS 7477: 3,900 GS 7478: 3,600 GS 7479: 3,900 GS 7480: 3,900 GS 7481: 3,900 GS 7482: 4,200 GS 7483: 4,200 GS 7484: 4,200 Total: 39,600
P_{access}	GS 7475: 3,631 GS 7476: 3,631 GS 7477: 3,631 GS 7478: 3,352 GS 7479: 3,631 GS 7480: 3,631 GS 7481: 3,631 GS 7482: 3,910 GS 7483: 3,910 GS 7484: 3,910 GS 10663: 5,579 GS 10664: 5,571 GS 10665: 5,586 Total: 53,603	GS 7475: 3,631 GS 7476: 3,631 GS 7477: 3,631 GS 7478: 3,352 GS 7479: 3,631 GS 7480: 3,631 GS 7481: 3,631 GS 7482: 3,910 GS 7483: 3,910 GS 7484: 3,910 Total: 36,868
Quality of Treated Water	Pass (all VPAs)	Pass (all VPAs)
Np,y	GS7475: 1,202,700 GS7476: 1,340,700	GS 7475: 1,317,000

	GS7477: 1,148,400 GS7478: 1,176,000 GS7479: 1,432,500 GS7480: 1,231,200 GS7481: 1,257,900 GS7482: 1,422,600 GS7483: 1,505,400 GS7484: 1,532,100 GS10663: 2,122,227 GS10664: 1,839,659 GS10665: 1,459,485 TOTAL: 18,661,871	GS 7476: 1,340,100 GS 7477: 1,354,500 GS 7478: 1,258,800 GS 7479: 1,086,600 GS 7480: 1,340,700 GS 7481: 1,218,600 GS 7482: 1,390,200 GS 7483: 1,437,000 GS 7484: 1,389,600 Total: 13,133,100
Up,y	98.69, capped at 95.00% (all VPAs)	81.73% (all VPAs)
Qp,y	7.5 (GS7475-84) 7 (GS10663-5)	7.5 (all VPAs)
Qp,cleanboil,y	0 (all VPAs)	0 (all VPAs)
Qp,rawboil,y	0 (all VPAs)	0 (all VPAs)
LEp,y	0 (all VPAs)	0 (all VPAs)
Failure Days,y	4,193 (all VPAs)	4,403 (all VPAs)

D.4. Implementation of sampling plan

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The project proponent has elected to cross-sample technologies across all its homogenous borehole VPAs located within Kono, Kenema, Kailahun, and Bo districts. The samples for the surveys analysed below are randomly selected from the borehole information databases using the RSG procedure previously explained in line with the minimum sample size requirements as defined by the methodology, and cover VPA, borehole and household levels. The random sampling procedure is as follows. First boreholes across Phase 1 and Phase 2 were assigned to age groups 3 and 4 respectively, with Phase 3 divided across Age Groups 1 and 2, based on the time of rehabilitation. Following 90/30 precision, achieved using Raosoft Sample Size Calculator and the CDM Sample Size Calculator, it was found that 7 of the 44 boreholes in age group 1, 6 of the 16 boreholes in age group 2, 7 of the 71 boreholes in age group 3, and 7 of 61 boreholes in age group 4 would need to be selected for inclusion in the surveys. These 28 boreholes were selected by generating a random list of

numbers on the Research Randomizer online resource, separated by age group. An aggregate list was then generated of the borehole users in the 28 boreholes, and these were ordered according to a new random list of numbers, again generated using Research Randomizer. The aggregate list was then reordered according to random number and the first 30 from Age Group 1 and 2, 44 from Age Group 3 and 38 from Age Group 4 (for a total of 142 users) selected for the Project Survey and Usage Survey (a minimum selection of 30 per Age Group). The usage survey was conducted between 01/05/2023 and 18/05/2023. The project survey was conducted between 01/05/2023 and 18/05/2023. The WCFT was conducted between 16/02/2022 and 22/02/2022 and is conducted biennially.

A total of 143 users were successfully surveyed from random sample generated across the 28 boreholes indicated. The surveys have been conducted to ensure that they are within the end date of the respective monitoring periods for the VPAs.

SECTION E. CALCULATION OF SDG IMPACTS

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

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SDG 3 (Good Health and Wellbeing)

$I_{b,y}$ Percentage of incidences of stomach related illnesses or water-borne diseases prior to project activity (%)

To establish $I_{b,y}$, the Baseline Survey asks the following:

17	Do you or your family ever suffer from stomach related illnesses/water-borne diseases and how often does this occur?	1. Never
		2. Once every few months
		3. Once per month
		4. Several times per month
		5. Weekly
		6. Everyday

$I_{b,y}$ (all VPAs) = 88%

SDG 5 (Gender Equality)

By ensuring that there is a safe water source at the centre of communities, the projects reduce the *time poverty* of women, because the time burden of collecting water, which falls disproportionately on women, is reduced. As the safe water sources are located centrally within communities, closer to public institutions and villages, the distance travelled to collect water is reduced, reducing the time per trip spent collecting water. In addition, as the water sources is maintained, they provide a reliable water supply, ensuring that water needs for cooking, drinking, and food preparation can be met by one central water source, so the time spent collecting water is minimised. The average % decrease per household in time spent collecting water is taken as a proxy contribution towards the SDG target.

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

$T_{b,y}$ (all VPAs) = 73.8

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 (P_{access}). The number of persons using each borehole is determined in the sensitization process during the rehabilitation. The percentage of users who were already consuming safe water in the baseline without boiling it (C_j) is determined through the baseline survey.

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 (all VPAs) = 2%

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.

Baseline Emissions

$$BEb,y = Bb,y * ((fNRB,b, y * EFb,fuel, CO2) + EFb,fuel, nonCO2) * NCVb fuel$$

Where:

$$Bb,y = (1-Cj)*Np,y*Wb,y*(Qp,y+Qp,raw,y)$$

Where:

Cj	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.
Np,y	Project technology-days in the project database for project scenario p through year y
Wb,y	Quantity of fuel that is used to treat 1 litre of water in the baseline scenario b during year y
Qp,y	Quantity of safe water supplied in the project scenario p during the year y using the zero or low emissions clean water supply technology

$Q_{p,raw,y}$ Quantity of raw water boiled in addition to the project technology water in the project scenario p during the year y

Cj (for all VPAs) = 2%
Np,y (for GS7475) = 1,251,150
Wb,y (for all VPAs) = 0.0004
Qp,y (for all VPAs) = 7.5
Qp,raw,y (for all VPAs) = 0

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

>>

SDG 3 (Good Health and Wellbeing)

$I_{p,y}$ Percentage of incidences of stomach related illnesses or water-borne diseases during project activity (%)

The project survey asks the following questions in order to establish $I_{p,y}$:

24	Do you or your family ever suffer from stomach related illnesses/water-borne diseases and how often does this occur?	1. Never
		2. Once every few months
		3. Once per month
		4. Several times per month
		5. Weekly
		6. Everyday

$I_{p,y}$ (all VPAs) = 10%

SDG 5 (Gender Equality)

$T_{p,y}$ Time spent collecting water per household per day in project (minutes)

The project survey asks the following questions in order to establish $T_{p,y}$, $Trips_p$ and to show what use is made of the time used.

37	Who usually goes to this source to collect water for your household?	**1.** Male Adult	**2.** Female Adult
		3. Male Child	**4.** Female Child

38	How much time does a trip to and from the borehole take?	*Please specify*	
39	How many trips are made per day to the borehole?	*Please specify*	
40	Has the borehole project saved you time?	1. Yes	2. No (skip to question 44)
41	In which of these activities has the borehole project saved you the most time?	1. Less distance to walk to the water source	2. Less time waiting at the water source
		3. Less time spent boiling/purifying water	4. Less time spent collecting wood to boil water
		5. Other (Specify)	
42	How much time do you think the borehole project has saved you on average per day?	1. 0-30min	2. 31-60min
		3. 1-2hrs	4. 2-3hrs
		5. 3-4hrs	6. >4hrs
43	What do you do with the time saved from the project? *Select all that apply*	1. (Unpaid) Domestic work (*includes cooking and caring for family members*)	2. Income generating activities
		3. Religious activities	4. Social and leisure activities
		5. Voluntary activities	6. Education and training
		7. Other (Specify)	

$T_{p,y}$ (all VPAs) = 46.1

SDG 6 (Clean Water and Sanitation)

P_y	Number of persons having access to safe water in the project activity.
Xboil	Percentage of premises that would have used other non-GHG emitting technologies like chlorine treatment techniques, if available, in the absence of the project activity.

P_y = 57576

Xboil (all VPAs) = 5%

SDG 13 (Climate Action)

$$PE_{p,y} = B_{p,y} * ((f_{NRB,p,y} * EF_{p,fuel,CO2}) + EF_{p,fuel,nonCO2}) * NCV_{p,fuel}$$

Where:

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

Where:

Np,y	Number of person.days consuming water supplied by project scenario p through year y
Cj	Expressed as a percentage, this is the portion of users of the project technology j or who in the baseline were already consuming safe water without boiling it
Bp,y	Quantity of fuel consumed in project scenario p during the year y in tons
Qp,rawboil,y	Quantity of raw water boiled in the project scenario p per person per day
Qp,cleanboil,y	Quantity of safe water boiled in the project scenario p per person per day
Wp,y	Quantity of wood fuel or fossil fuel in tons required to treat 1 litre of water using technologies representative of the project scenario p during project year y

Np,y (GS7475) = 1,251,150

Cj (all VPAs) = 2%

Bp,y (all VPAs) = 0

Qp,rawboil,y (all VPAs) = 0

Qp,cleanboil,y (all VPAs) = 0

Wp,y (all VPAs) = 0.0004

E.3. Calculation of leakage

>> In line with the monitoring requirements, a leakage assessment is conducted biennially and has therefore been included in this report. 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. 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 most 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 relevant CDM or VER projects in the project area, according to the CDM Project search and Verra Registry.

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.

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

SDG	SDG Impact	Baseline estimate	Project estimate	Net benefit
13	Emissions Reductions	Baseline emission estimate for each VPA (BEb,y): GS 7475: 6,648 tCO_2e GS 7476: 6,765 tCO_2e GS 7477: 6,838 tCO_2e GS 7478: 6,355 tCO_2e	Project emission estimate for each VPA (PEp,y): GS 7475: 0 tCO_2e GS 7476: 0 tCO_2e GS 7477: 0 tCO_2e GS 7478: 0 tCO_2e	Emission reduction (ERy) for each VPA (includes usage rate and leakage reductions): GS 7475: 5,767 tCO_2e GS 7476: 6,428 tCO_2e GS 7477: 5,507 tCO_2e GS 7478: 5,639 tCO_2e

		GS 7479: 5,485 tCO_2e GS 7480: 6,768 tCO_2e GS 7481: 6,152 tCO_2e GS 7482: 7,018 tCO_2e GS 7483: 7,254 tCO_2e GS 7484: 7,150 tCO_2e GS10663: 11,277 tCO_2e GS10663: 9,677 tCO_2e GS10663: 7,755 tCO_2e **Total: 95,142 tCO_2e**	GS 7479: 0 tCO_2e GS 7480: 0 tCO_2e GS 7481: 0 tCO_2e GS 7482: 0 tCO_2e GS 7483: 0 tCO_2e GS 7484: 0 tCO_2e GS10663: 0 tCO_2e GS10663: 0 tCO_2e GS10663: 0 tCO_2e **Total: 0 tCO_2e**	GS 7479: 6,484 tCO_2e GS 7480: 5,904 tCO_2e GS 7481: 6,031 tCO_2e GS 7482: 6,822 tCO_2e GS 7483: 6,983 tCO_2e GS 7484: 7,105 tCO_2e GS10663: 9,498 tCO_2e GS10663: 8,233 tCO_2e GS10663: 6,532 tCO_2e **Total: 86,933 tCO_2e**
3	Reduction in incidences of stomach related illnesses or water-borne diseases	**88%** of households who suffer from stomach related or water-borne illnesses at least once every few months	**10%** of households who suffer from stomach related or water-borne illnesses at least once every few months	**78%** reduction in the percentage of households who suffer from stomach related or water-borne illnesses at least once every few months
5	Reduction in time spent collecting water	**73.8** minutes spent collecting water and fuel per household per day in the baseline for all VPAs	**46.1** minutes spent collecting water and fuel per household per day in the baseline for all VPAs	**37.5%** reduction in time spent collecting water and firewood per household per day for all VPAs
6	Additional people gaining access to safe water	People consuming safe water prior to project: GS 7475: 393 GS 7476: 393 GS 7477: 393 GS 7478: 373 GS 7479: 392 GS 7480: 393 GS 7481: 393 GS 7482: 414 GS 7483: 414 GS 7484: 414 **Total: 3972**	People consuming safe water during project: GS 7475: 5692 GS 7476: 5700 GS 7477: 5700 GS 7478: 5400 GS 7479: 5684 GS 7480: 5700 GS 7481: 5700 GS 7482: 6000 GS 7483: 6000 GS 7484: 6000 **Total: 57,576**	Additional people consuming safe water (P_{access}): GS 7475: 3,631 GS 7476: 3,631 GS 7477: 3,631 GS 7478: 3,352 GS 7479: 3,631 GS 7480: 3,631 GS 7481: 3,631 GS 7482: 3,910 GS 7483: 3,910 GS 7484: 3,910 GS 10663:5,579 GS 10664:5,571 GS 10665:5,586 **Total: 53,603**

SDG 3 (Good Health and Wellbeing)

IR_y (all VPAs) = 89% = (0.88-0.10)/0.88*100

$IR_y = (I_{b,y} - I_{p,y})/ I_{b,y}*100$

Where:

IR_y	Total reduction in incidences of stomach related illnesses or water-borne diseases in the project activity compared to the baseline scenario in year y (%)
$I_{p,y}$	Persons who suffer from stomach related illnesses/water-borne diseases in project (%)
$I_{b,y}$	Persons who suffer from stomach related illnesses/water-borne diseases prior to project (%)

SDG 5 (Gender Equality)

TR_y (all VPAs) = 37.5% = (73.8-46.1)/73.8 * 100

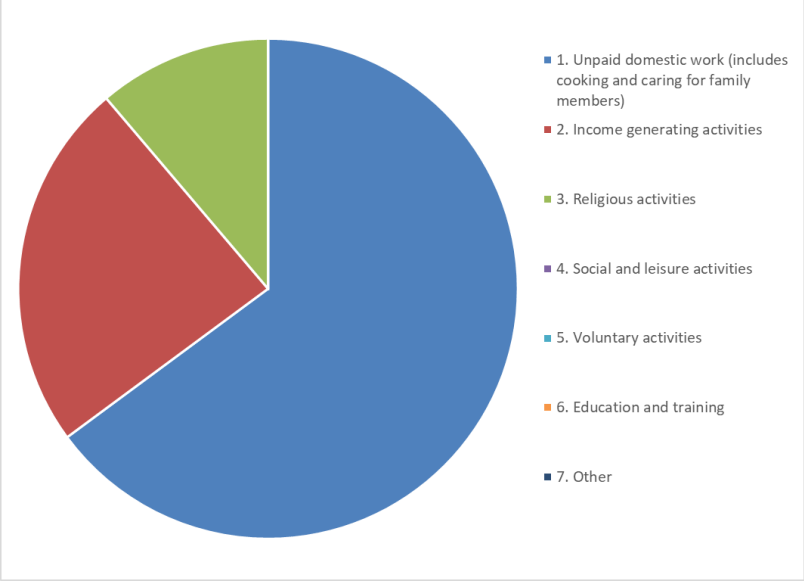
$TR_y = (T_{b,y} - T_{p,y})/ T_{b,y} * 100$

Where:

TR_y	Total reduction time spent collecting water for project activity in year y (%)
$T_{b,y}$	Time spent collecting water per household per day prior to project (minutes)
$T_{p,y}$	Time spent collecting water per household per day in project (minutes)

The project has saved households 27.6 minutes per day and for all households has reduced the distance needed to the water source (100%).

The 37% reduction in time spent collecting and treating water is used in the following ways:



SDG 6 (Clean Water and Sanitation)

P_{access} (for GS7475) = 5299 = 5692 * (1 – 0.02) * (1 – 0.05)

$P_{access} = Py * (1 - Cj) * (1 - Xboil)$

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.

Xboil Percentage of premises that would have used other non-GHG emitting technologies like chlorine treatment techniques, if available, in the absence of the project activity.

GS ID	P,access	P_y
GS 7475	3,631	3,900
GS 7476	3,631	3,900
GS 7477	3,631	3,900
GS 7478	3,352	3,600
GS 7479	3,631	3,900
GS 7480	3,631	3,900
GS 7481	3,631	3,900
GS 7482	3,910	4,200
GS 7483	3,910	4,200
GS 7484	3,910	4,200
GS10663	5,579	5,992
GS10664	5,571	5,984
GS10665	5,586	6,000
Total	53,603	57,576

SDG 13 (Climate Action)

In MP3/2 the project achieved a total capped ERs of 86,933 tCO2e. Below is a summary of the ERs by VPA:

GS ID	Uncapped ERs	Capped ERs Total
GS 7475	5,767	17,354
GS 7476	6,428	18,880
GS 7477	5,507	16,490
GS 7478	5,693	18,318
GS 7479	6,484	18,166
GS 7480	5,904	16,654
GS 7481	6,031	18,349
GS 7482	6,822	19,054
GS 7483	6,983	22,349
GS 7484	7,105	21,750
GS10663	9,498	21,971
GS10664	8,233	18,037
GS10665	6,532	15,971
Total	86,933	243,343

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

13	Ex ante emission reduction (ER_y) for each VPA: GS 7475: 10,000 GS 7476: 10,000 GS 7477: 10,000 GS 7478: 10,000 GS 7479: 10,000 GS 7480: 10,000 GS 7481: 10,000 GS 7482: 10,000 GS 7483: 10,000 GS 7484: 10,000 GS10663:10,000 GS10664:10,000 GS10665:10,000 **Total: 130,00**	Emission reduction (ERy) for each VPA: GS 7475: 5,767 (17,354) GS 7476: 6,428 (18,880) GS 7477: 5,507 (16,490) GS 7478: 5,639 (18,318) GS 7479: 6,484 (18,166) GS 7480: 5,904 (16,654) GS 7481: 6,031 (18,349) GS 7482: 6,822 (19,054) GS 7483: 6,983 (22,349) GS 7484: 7,105 (21,750) GS10663: 9,498 (21,971) GS10664: 8,233 (18,037) GS10665: 6,532 (15,971) **Total: 86,933 (243,343)**
3	From PDD, all VPAs expected to reduce the percentage of households suffering from stomach related or water-borne illness by **66%**	**89%** reduction in the percentage of households suffering from stomach related or water-borne illnesses more frequently than once every few months
5	From PDD, all VPAs expected to reduce the time required to collect water by **40%**	**37.5%** reduction in the time spent collecting water
6	From PDD, the number of people expected to gain access to safe water due to the project is **32,400**. Based on an additional 3,240 per VPA.	Actual additional people with access to safe water (P_{access}): GS 7475: 3631 GS 7476: 3631 GS 7477: 3631 GS 7478: 3352 GS 7479: 3631 GS 7480: 3631 GS 7481: 3631 GS 7482: 3910 GS 7483: 3910 GS 7484: 3910 GS10663:5579 GS10664:5571 GS10665:5586 **Total: 53,603**

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

>> Explanation of estimated ex ante calculations were originally provided in the PDD and are described below:

SDG 3 (Good Health and Wellbeing)

The impacts of the project towards SDG 3 is measured through the project survey. A percentage figure is calculated from the difference between the baseline and the project survey, which asks how often do you or your family suffer from stomach related illnesses, and which illnesses have they suffered from in the last year: Typhoid; Bilharzia; Cholera; or other?

It is estimated that the project will reduce waterborne illness by at least 66% per year.

SDG 5 (Gender Equality)

$$\text{TRy} = \frac{(1.23-0.74)}{1.23} = 40\%$$

$$\text{TRy} = (T_{b,y} - T_{p,y}) / T_{b,y}$$

Where:

TR_y	Total reduction time spent collecting water for project activity in year y (%)
$T_{p,y}$	Time spent collecting water per household per day in project (hours)
$T_{b,y}$	Time spent collecting water per household per day prior to project (hours)

It is estimated that the project will save roughly 0.5 hours per household per day. The project survey will monitor how this time is spent and the impact it has towards Gender Equality.

SDG 6 (Clean Water and Sanitation)

P*access* = 3,240 = 3,480 * (1 – 0.02) * (1 – 0.05)

$$P_{access} = P_y * (1 - C_j) * (1 - X_{boil})$$

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.

X_{boil} Percentage of premises that would have used other non-GHG emitting technologies like chlorine treatment techniques, if available, in the absence of the project activity.

It is estimated that the project will provide access to safe water to an additional 3,240 people.

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. These are calculated according to the description in Section B of the VPA-DD.

Baseline

$BE_{b,y}$ = 6944.16 * ((0.95 * 112) + 8.692) * 0.0156 = 12,468

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

Project emissions

$PE_{p,y}$ = 46.29 * ((0.95 * 112) + 8.692) * 0.0156 = 83.12

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

Where:

$B_{p,y}$ = (1 – 0.02) * 1,270,200 * 0.000743807 * (0 + 0.05) = 46.29

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

ER_y = (((12,468 – 83.12) * 0.855) – 0) * (1 – 0.05) = 10,059

$$ER_y = \left(\left((\Sigma BE_{b,y} - \Sigma PE_{p,y}\right) * Up,y\right) - LEp,y\ ) * (1 - XBoil)$$

As the ERs are over 10,000 tCO2e, the cap of 10,000 tCO2e per year will be applied.

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

>> The following are remarks on the differences achieved for the SDG impacts compared to the estimates provided in the PDD:

SDG 3

The estimated value was close to the actual value achieved during the monitoring period. The greater reduction in stomach related and water-borne illness represent a positive outcome of the project.

SDG 5

The estimated reduction in time spent collecting water for ex-ante calculations was based on similar projects in other countries. The actual figure of 37.5% is slightly lower than expected, however it is within a reasonable margin of expectation.

SDG 6

The number of people accessing safe water shows an increase on the values estimated per VPA in the PDD. As stated in Section B.2.5, the number of boreholes in each VPA has increased, thus increasing the number of people accessing safe water. Despite an increase in the number of boreholes per VPA, the number of people accessing safe water is only slightly higher than the estimated value due to the cap of 300 users per borehole placed by the Gold Standard during a previous SWS grievance review.

SDG 13

Despite an increase in the number of boreholes per VPA (as stated in Section B.2.5), all VPAs have fallen significantly short of the expected 10,000 ERs. This is due to the cap of 0.0004T/L for the Wb,y/Wp,y value placed by the Gold Standard during a previous SWS grievance review.

SECTION F. SAFEGUARDS REPORTING

>> As according to the most recent PDDs for the VPAs under review, no safeguarding principles were identified as relevant to these projects. Nonetheless, the project continues to emphasize during all trainings that project beneficiaries should support vulnerable or less mobile community members to access water, to reduce the risk of marginalization. The project area does not include sites or structures of historic and cultural value, does not negatively impact the physical or economic condition of the beneficiaries, does not impact land tenure arrangements, nor occur on government-owned land, and does not encourage corruption, or break with labour laws.

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.

>>

No inputs or grievances were received during the monitoring period.

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

>>

No inputs or grievances were received during the previous monitoring period.

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

>>

No legal contests or disputes arose during the monitoring period.

Revision History

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