Gold Standard for the Global Goals

TEMPLATE

MONITORING REPORT

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VERSION **v. 1.1**

RELATED SUPPORT **- TEMPLATE GUIDE Monitoring Report v. 1.1**

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KEY PROJECT INFORMATION

Key Project Information

GS ID (s) of Project (s)	GS6598
Title of the project (s) covered by monitoring report	Water for Climate Rwanda Project
Version number of the PDD/VPA-DD (s) applicable to this monitoring report	5.4
Version number of the monitoring report	10.0
Completion date of the monitoring report	02/09/2024
Date of project design certification	29/03/2019
Date of Last Annual Report	N/A
Monitoring period number	4
Duration of this monitoring period	01/01/2022 to 31/12/2022
Project Representative	Herman Noppen (CO2logic)
Host Country	Rwanda
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 (TPDDTEC), version 3.1
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

13 Climate Action (mandatory)	Certified Emissions Reductions/Removals	56,311 30,739 (capped value)[1]	tCO_2e
1 No Poverty	Total quantity of safe water in litres per year supplied by the rehabilitated/newly drilled boreholes of the project to the communities	72,769,585	Litres
3 Good Health and Well-Being	Proportion of households perceiving less often incidence of water borne diseases like cholera, diarrhea, typhoid fewer or Hepatitis A/E since the start of the project	98% reported a decrease 1% reported no change 1% does not know	%
5 Gender	Proportion of women in households perceiving reduced amount of time and effort spent for collecting water since the start of the project	In terms of time and effort spent for collecting water, amongst the households using the project water point: 92% reported a decrease 7% reported no change 1% reported an increase	%
	Proportion of women in households perceiving	In terms of time and effort spent for collecting wood fuel,	

[1] Revised ERs have been calculated based on the capped value of 0.0004 tons/litre for the "Quantity of wood fuel or fossil fuel required to boil 1 litre of water using technologies" resulting in 30,739 tCO2e. The ERs based on the "Quantity of wood fuel or fossil fuel required to boil 1 litre of water using technologies" value of the registered PDD results in 56,311 tCO2e. The PD requests an issuance of the full amount (56,311 tCO2e), however makes sure that 25,572 tCO2e carbon credits from another GS project will be retired prior to issuance to account for the difference.

	reduced amount of time and effort spent for collecting wood fuel since the start of the project	amongst the households using the project water point: 93% reported a decrease 7% reported no change	
6 Clean Water and Sanitation	Number of organized Water Sanitation and Hygiene trainings	4,763 people in 61 Community campaigns have been trained so far as well as 26 trainers.	Number

Table 2 – Product Vintages

		Amount Achieved
Start Dates	**End Dates**	**VERs**
01/01/2022	31/12/2022	56,311 30,739[2]

The project developer confirms that

- project will and has not issued both a CER/other compliance unit under Paris Agreement and a GS VER for the same vintage.

[2] Revised ERs have been calculated based on the capped value of 0.0004 tons/litre for the "Quantity of wood fuel or fossil fuel required to boil 1 litre of water using technologies" resulting in 30,739 tCO2e. The ERs based on the "Quantity of wood fuel or fossil fuel required to boil 1 litre of water using technologies" value of the registered PDD results in 56,311 tCO2e. The PD requests an issuance of the full amount (56,311 tCO2e), however makes sure that 25,572 tCO2e carbon credits from another GS project will be retired prior to issuance to account for the difference.

- Project developer agrees to comply with all future UNFCCC COP/CMP decisions, including adjustment of GWP values.

SECTION A. DESCRIPTION OF PROJECT

A.1. General description of project

Water Access Rwanda (WAR) together with CO2logic and mkaarbon safari has implemented a project to provide safe drinking water to communities in the districts of Rusizi, Ngoma, Rwamagana, Bugesera, Kirehe and Nyagatare. The company SPADEL has provided the funding for the project.

The project consists of the repair of damaged and defunct boreholes, the drilling of new boreholes and new water points belonging to a stand-pipe system[3]. The rehabilitation of boreholes or provision of new safe water supply points reduces the need for households to boil water as a means of purification or to consume unsafe water being the scenario prior to implementation of the project activity.

Boreholes consists of only one water point (being at the location of the borehole) or several water points if a stand-pipe system is connected to a borehole. In case of a standpipe system water is pumped from the borehole to different water points using solar energy. In case that solar energy is not available, diesel generators are used. No grid electricity has been used during this monitoring period.

The project has implemented 61 water points.

The 61 water points are distributed over 6 districts in the following way:

Rusizi: 16 water points

Rwamagana: 8 water points

Ngoma: 9 water points

Bugesera: 12 water points

Kirehe: 12 water points

[3] A standpipe system is characterized by several water points which receive water from one common borehole. Water is pumped from the borehole to a central Nexus from which Water is purified and distributed to different other points, where there is extra storage.

Nyagatare: 4 water points

A.2. Location of project

The project activity has been implemented in communities in the districts of Rusizi, Ngoma, Rwamagana, Bugesera, Kirehe and Nyagatare all located in the Republic of Rwanda. See in the following a district map with the intervention districts encircled.



GPS COORDINATES OF BUGESERA DISTRICT, RWANDA

DD COORDINATES	DMS COORDINATES	GEOHASH COORDINATES
-2.23456 30.14825	-2°14'4.42" S 30°08'53.70"	kxt7q11q9pu

UTM COORDINATES

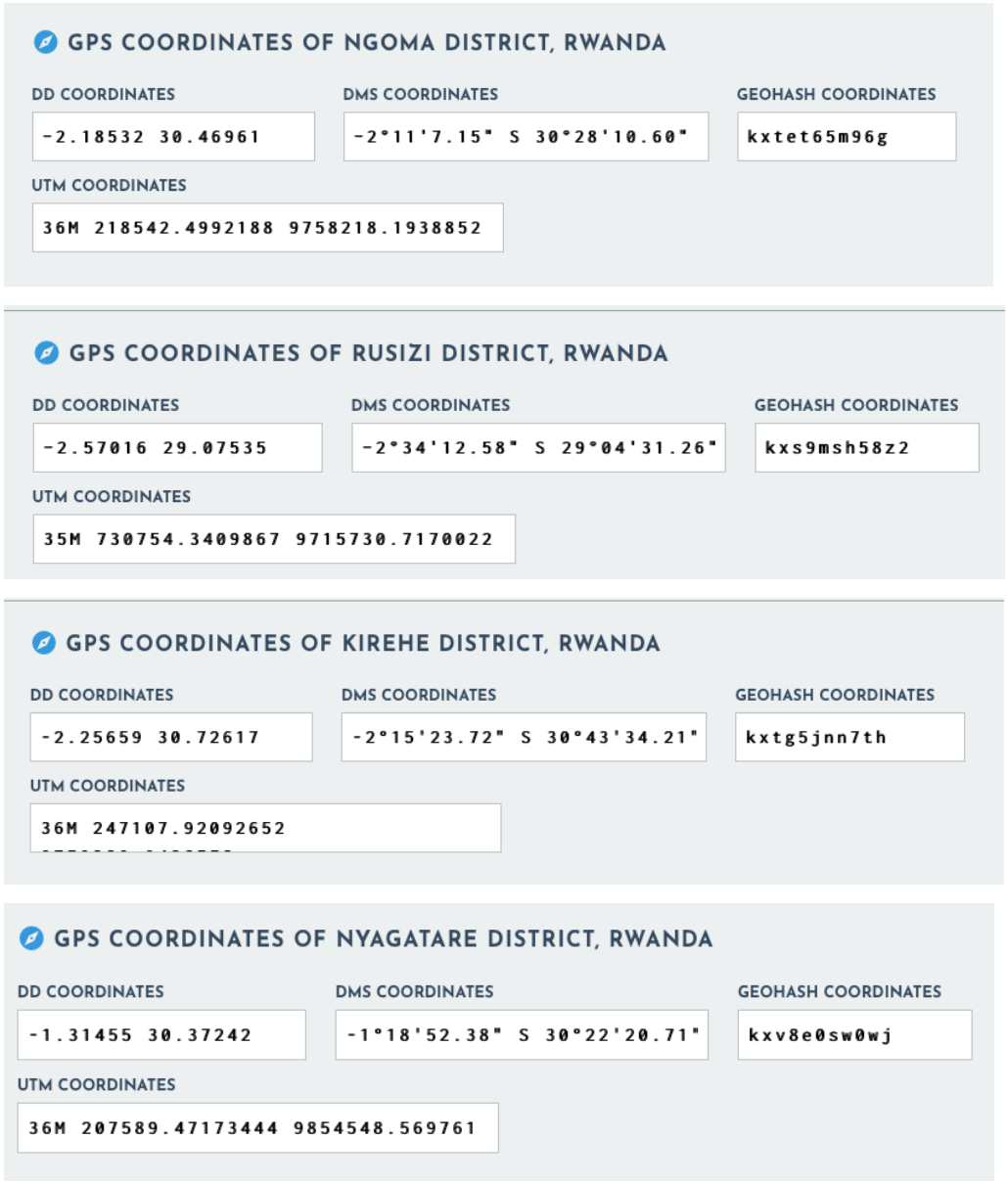
36M 182779.82984615

GPS COORDINATES OF RWAMAGANA DISTRICT, RWANDA

DD COORDINATES	DMS COORDINATES	GEOHASH COORDINATES
-1.97281 30.35428	-1°58'22.12" S 30°21'15.41"	kxtsf8z79cx

UTM COORDINATES

36M 205665.86275231



A.3. Reference of applied methodology

Technologies and practices to displace decentralized thermal energy consumption (TPDDTEC), version 3.1

A.4. Crediting period of project

Start date of crediting period: 01/03/2019

End date of crediting period: 29/02/2024

Length of crediting period: 5 years. The crediting period may be renewed twice in line with the Community Services Activity Requirements.

SECTION B. IMPLEMENTATION OF PROJECT

B.1. Description of implemented project

The project had implemented at the end of this 4rd monitoring period (01/11/2022 to 31/12/2022) 61 water points distributed over 6 districts in the following way:

Rusizi: 16 water points

Rwamagana: 8 water points

Ngoma: 9 water points

Bugesera: 12 water points

Kirehe: 12 water points

Nyagatare: 4 water points

District	Internal N°	Name of Water Point	Type Borehole/Standpipe	mWater ID	Date of rehabilitation/commissioning
Bugesera	BG_01	Gatwe	Borehole	7208609	25.03.2019
	BG_02	Migina	Borehole	6660855	22.02.2019
	BG_03	Cyingaju	Borehole	7208771	03.10.2018
	BG_04	Gisasa Standpipe 1	Standpipe	64315571	01.10.2019
	BG_05	Rugazi stand pipe 1	Standpipe	46078362	01.10.2019
	BG_06	Rugazi standpipe 2	Standpipe	46078355	01.10.2019
	BG_07	Rukoronko Nexus	Borehole	46078348	01.10.2019
	BG_08	Gisasa Standpipe 2	Standpipe	46078386	01.10.2019
	BG_09	Rusagara standpipe	Standpipe	46078379	01.10.2019
	BG_10	Nyarukombe standpipe	Standpipe	46078393	01.10.2019
	BG_11	Sharita	Borehole	159485	30.07.2020
	BG_12	Kivusha	Borehole	6500283	29.07.2020

Rwamagana	RW_01	Nyagakombe	Borehole	42447801	12.12.2018
	RW_03	Kabeza	Borehole	1082528	28.12.2018
	RW_04	Ubwiza	Borehole	5451766	20.12.2018
	RW_05	Nyamabuye	Borehole	43921357	28.04.2019
	RW_06	Karambo	Borehole	16015902	22.02.2019
	RW_07	Ruhunda	Borehole	46117427	02.10.2019
	RW_08	Akamasasa	Borehole	239029102	29.10.2021
	RW_09	Cyaruhogo	Borehole	239029085	29.10.2021
Ngoma	NG_01	Icyakabiri	Borehole	5473834	28.11.2018
	NG_02	Rwakanuma	Borehole	5473872	28.11.2018
	NG_08	Gashanda HP	Borehole	242522791	16.11.2021
	NG_09	Umuyange2 HP	Borehole	242522667	17.11.2021
	NG_10	Amabumba HP	Borehole	242522674	16.11.2021
	NG_11	Akagoma HP	Borehole	242522708	16.11.2021
	NG_12	Kivugiza HP	Borehole	242522681	16.11.2021
	NG_13	Umuyange1-HP	Borehole	242522650	16.11.2021
	NG_14	Agasave HP	Borehole	242522722	16.11.2021
Rusizi	RU_01	Gisunyu	Borehole	13259990	17.10.2018
	RU_02	Muhora	Borehole	13248693	10.10.2018
	RU_03	Nyakabanda	Borehole	5535769	17.10.2018
	RU_04	Rebero	Borehole	13248734	27.11.2018
	RU_05	Busekanka	Borehole	16645743	27.12.2018
	RU_06	Hepfu	Borehole	5495043	27.10.2018
	RU_07	Sumoyamana	Borehole	5494970	07.11.2018
	RU_08	Gihaya	Borehole	58530896	29.03.2020
	RU_09	Mutimasi 1	Borehole	58530906	29/03/2020
	RU_10	Mutimasi 2	Borehole	58530913	20/03/2020

	RU_11	Rutarakiro	Borehole	5503292	26.09.2020
	RU_12	Nyankumbira	Borehole	5494994	26.09.2020
	RU_13	Gahinga HP	Borehole	244548030	06.08.2021
	RU_14	Rurembo HP	Borehole	13248765	05.11.2021
	RU_15	Gaturo HP	Borehole	5503254	03.11.2021
	RU_16	Kanyinya HP	Borehole	7238758	03.11.2021
	RU_17	Kanyombya HP	Borehole	244548047	06.08.2021
Kirehe	KI_01	Rugina	Borehole	247575354	06.08.2021
	KI_02	Munini	Borehole	205837852	16.09.2021
	KI_03	Karehe	Borehole	205837979	15.09.2021
	KI_04	Rurembo2	Borehole	205838042	22.10.2021
	KI_05	Rwabiyombe	Borehole	205837838	22.10.2021
	KI_06	Kivogera	Borehole	205837780	22.10.2021
	KI_07	Bweranka	Borehole	205837962	13.10.2021
	KI_08	Rurama	Borehole	205838035	17.10.2021
	KI_09	Nyacyonga2	Borehole	205837955	28.10.2021
	KI_10	Karembo	Borehole	312082604	28.10.2021
	KI_11	Rugando	Borehole	247575354	02.10.2021
	KI_12	Rwampanga HP	Borehole	306655216	03.12.2021
Nyagatare	NY_01	Nkoma	Borehole	273933597	19.11.2021
	NY_02	Kagarama	Borehole	273933676	19.11.2021
	NY_03	Kayigiro	Borehole	273933669	20.11.2021
	NY_04	Mbare	Borehole	273933463	19.11.2021

Image 1: Google Earth screenshot of Rukoronko stand-pipe system in Bugesera



Image 2: Google Earth screenshot of Mugesera stand-pipe system in Ngoma



B.1.1 Forward Action Requests

Not applicable

B.2. Post-Design Certification changes

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

Some of the water points were tested for E.coli with delays, i.e. some of them exceeded the 6 months for the 1st test after rehabilitation/drilling or start of commissioning (in case of standpipe water points) or the 3 months for subsequent E.coli tests. In such cases the project technology days have been only considered in the ER calculation, if the 2 consecutive tests were E.coli negative. No project technology days and hence no emission reductions would have been accounted for in the period between a negative and a subsequent positive test or a positive and a subsequent negative test. The worksheet tab 'E.coli delays' in the Project Water Point Database provides an overview of when E.coli tests would have been due and when they have been finally conducted. However, since there were no positive E.coli tests during this monitoring period, it was not needed to discount any project technology days due the delay of E.coli tests.

B.2.2. Corrections

Not applicable

B.2.3. Changes to start date of crediting period

Not applicable

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

It is not doable and practical to record diesel consumption using rulers or weighing scales as stated in the monitoring plan. Instead, the hours and minutes are continuously recorded the diesel generators are active. Diesel fuel consumption is then calculated by multiplying the time (HH:MM) the diesel generators are switched on by the calculated hourly consumption, the latter one based on manufacturer's specifications and load factor. The calculated diesel fuel consumption is compared with the purchase receipts and in case that the value based on the purchase receipts is higher, the latter one is used for conservativeness.

B.2.5. Changes to project design of approved project

Diesel generators have been added as additional back-up option besides grid electricity. Any emissions from diesel consumption would be taken into account in the ER calculation as soon as they are material, i.e. consist of more than 5% of the overall project emissions. The use of diesel

generators as back-up and the relevant parameters had been included in the last version of the PDD, which has been submitted to SustainCert after the 1st Performance Certification.

The project has had the following changes

1. The fNRB value was updated from from 89.68% to 98.00%.This design change was approved on 17/03/2022.
2. The geographical boundary of the project in four districts Rusizi, Ngoma, Rwamagana and Bugesera was extended to include an additional districts namely Kirehe and Nyagatare. This design change was approved on 18/10/2021.

SECTION C. DESCRIPTION OF MONITORING SYSTEM APPLIED BY THE PROJECT

The project proponent maintains an accurate and complete electronic database using mWater data management platform[4] for enabling the unique identification of the project water points. The database contains amongst the following information:

- Unique mWater identification number of each project water point;
- Date of rehabilitation/drilling of each borehole or commissioning in case of standpipe water points;
- GPS location of each project water point;
- Model of the pump used for each borehole;

The number of households including number of household members have been collected by the WASH committees[5] for each water point. End-user lists (paper records) have been provided to WAR which then have been transferred to an excel spreadsheet. In line with the methodology, only households living within 1 km from the project water point have been taken into account.

Water quality testing (E.coli water quality tests)

The quality of the treated water has been assessed to ensure that it is fit for human consumption. In line with the national standard, no E.coli is permitted in drinking water, hence must be nil Colony Forming Unit (CFU) of E.Coli / 100 ml of safe water. As per the registered monitoring plan, the water quality must be tested every quarter, with the first test within 6 months of the stated project start date[6]. In addition project participants shall ensure that water quality is tested at least once during season where there is a high chance of contamination, for example the rainy season

[4] https://www.mwater.co

[5] The WASH committees amongst others help to ensure that surroundings of the boreholes are kept clean and protected against animals or vandalism and notify the hand-pump mechanic immediately in case any problem with the borehole occurs. Additionally, they are community mobilizers who remind their peers of good practices to keep water safe and sensitize them on handwash practices to further reduce instances of waterborne diseases.

[6] The project start date has been defined for each water point as the date of rehabilitation/drilling (for boreholes) or commissioning (for standpipe water points). Details on the project start date for each water point are provided in the excel file "W4C MP3 Project Water Point Database_.xlsx".

in the presence of the local health authorities. At least once every two years, accredited laboratories must perform the water quality testing. If accredited laboratory results differ materially from non-accredited laboratory results, testing with the aberrant non-accredited laboratory must be discontinued.

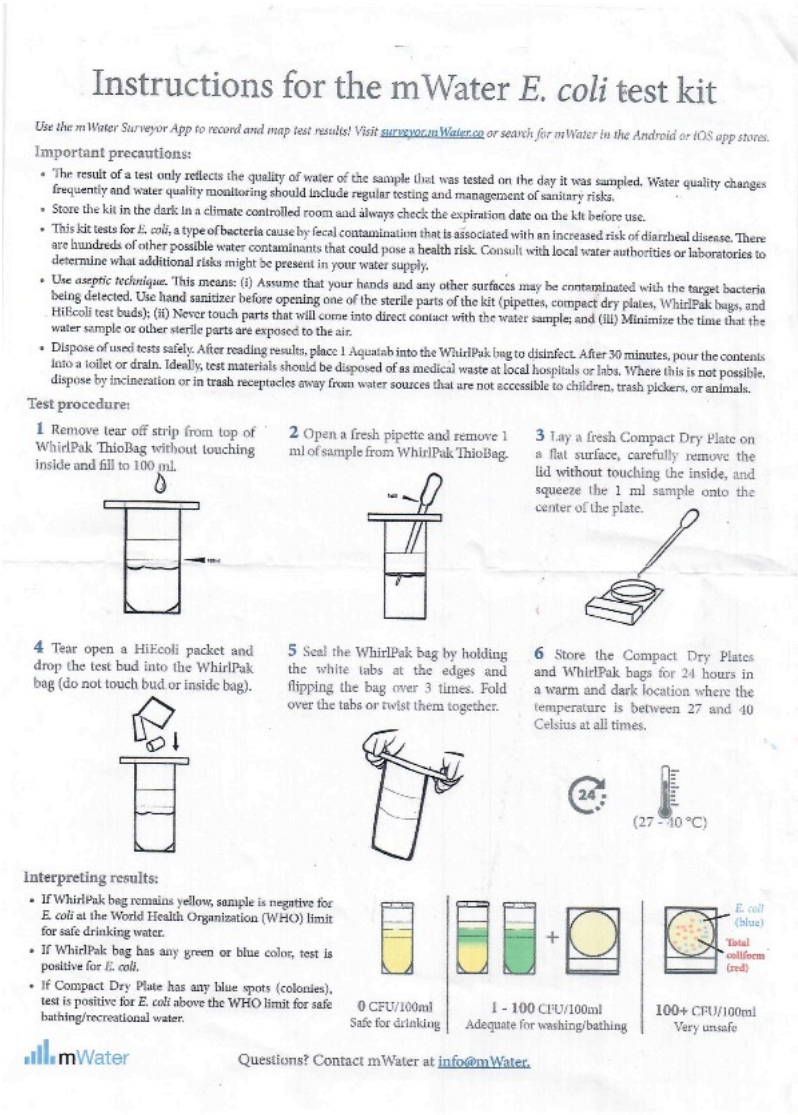
During this monitoring period, all water points have been tested for E.coli and for those, where needed, as well in the presence of a local health authority in the rainy season when there is a higher risk of contamination. There were no tests by an accredited laboratory during this monitoring period since the 2 years since the last accredited laboratory tests did not pass by yet. E.coli test results have been submitted to the VVB. For those water points which were rehabilitated within the last 6 months of the monitoring period or which were not functional in the rainy season, no E.coli tests in the presence of the local health authority were conducted.

All of the E.coli tests were negative, or in other words did not show any presence of E.coli in the water.

WAR conducts their own mWater presence/absence tests of E.coli. As image 3 shows, the mWater E.coli presence/absence test is straightforward and easy to use. People carrying out the mWater E.coli presence/absence test have been properly trained and have some test experience before carrying out the tests as part of the carbon project monitoring. The mWater website (http://www.mwater.co/kits.html) confirms that the tests 1) are easy-to-use; 2) do not require laboratory or extra equipment; 3) meet WHO guidelines.

The dates of the different tests can be found in the following document: 2022 W4C MP4 Project Water Point Database-Final.

Image 3: Instructions for the mWater E.coli test kit



Instructions for the mWater *E. coli* test kit

Use the mWater Surveyor App to record and map test results! Visit surveyor.mWater.co or search for mWater in the Android or iOS app stores.

Important precautions:

- The result of a test only reflects the quality of water of the sample that was tested on the day it was sampled. Water quality changes frequently and water quality monitoring should include regular testing and management of sanitary risks.
- Store the kit in the dark in a climate controlled room and always check the expiration date on the kit before use.
- This kit tests for *E. coli*, a type of bacteria cause by fecal contamination that is associated with an increased risk of diarrheal disease. There are hundreds of other possible water contaminants that could pose a health risk. Consult with local water authorities or laboratories to determine what additional risks might be present in your water supply.
- Use *aseptic technique*. This means: (i) Assume that your hands and any other surfaces may be contaminated with the target bacteria being detected. Use hand sanitizer before opening one of the sterile parts of the kit (pipettes, compact dry plates, WhirlPak bags, and HiEcoli test buds); (ii) Never touch parts that will come into direct contact with the water sample; and (iii) Minimize the time that the water sample or other sterile parts are exposed to the air.
- Dispose of used tests safely. After reading results, place 1 Aquatab into the WhirlPak bag to disinfect. After 30 minutes, pour the contents into a toilet or drain. Ideally, test materials should be disposed of as medical waste at local hospitals or labs. Where this is not possible, dispose by incineration or in trash receptacles away from water sources that are not accessible to children, trash pickers, or animals.

Test procedure:

1 Remove tear off strip from top of WhirlPak ThioBag without touching inside and fill to 100 ml.

2 Open a fresh pipette and remove 1 ml of sample from WhirlPak ThioBag.

3 Lay a fresh Compact Dry Plate on a flat surface, carefully remove the lid without touching the inside, and squeeze the 1 ml sample onto the center of the plate.

4 Tear open a HiEcoli packet and drop the test bud into the WhirlPak bag (do not touch bud or inside bag).

5 Seal the WhirlPak bag by holding the white tabs at the edges and flipping the bag over 3 times. Fold over the tabs or twist them together.

6 Store the Compact Dry Plates and WhirlPak bags for 24 hours in a warm and dark location where the temperature is between 27 and 40 Celsius at all times.

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(27 - 40 °C)

Interpreting results:

- If WhirlPak bag remains yellow, sample is negative for *E. coli* at the World Health Organization (WHO) limit for safe drinking water.
- If WhirlPak bag has any green or blue color, test is positive for *E. coli*.
- If Compact Dry Plate has any blue spots (colonies), test is positive for *E. coli* above the WHO limit for safe bathing/recreational water.

E. coli (blue)

Total coliform (red)

0 CFU/100ml
Safe for drinking

1 - 100 CFU/100ml
Adequate for washing/bathing

100+ CFU/100ml
Very unsafe

mWater

Questions? Contact mWater at info@mWater.

Hygiene campaigns

Community wide trainings are usually led by one or two trainers from Water Access Rwanda and the trained trainers in the village. Trainers are sensitized in so-called ToT 'Train of Trainers'. A mWater field book and a resource packet (visual diagrams of lessons) is used during the trainings. Several focus groups are created with each trainer leading one to talk about one of the lessons or to do the requested activity.

During these times the following WASH Facilities are usually set-up in a model house

- A pit latrine
- A tippy-tap handwashing facility
- An utensils drying rack
- A fence to keep animals out of key places
- A garbage disposal pit

At the end of the training, a WASH committee is either created, or the existing one presented to the village. The WASH Committee of five people should have at least one community-health worker.

Created or reactivated WASH committee have an active exercise to conduct a supervision aiming to assess hygiene and sanitation status in their own communities. The results of that assessment are to upgrade water, hygiene and sanitary facilities to be improved in all villages where local leaders contribute by organizing community workers to help vulnerable households as well the promise of sustainability of the water points. Yearly refresher trainings receive input form the WASH Committee on which practices the community is struggling to implement. Those is the focus of the refresher trainings and the field book with the resource package is used during these refresher trainings.

4,763 people in 61 Community campaigns have been trained so far as well as 26 trainers. See excel spreadsheet "2022 WASH Metrics.xlsx" for more details.

These campaigns were organized in the following periods:

- Bugesera: May 2022
- Kirehe: May 2022
- Ngoma: May 2022
- Nyagatare: July 2022
- Rusizi: Octobre 2022
- Rwamagana: May 2022

Leakage assessment

The leakage assessment has been carried out at the 3rd performance certification. Therefore, it has not been performed for the 4rd performance certification.

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.

Not applicable. In this project the baseline technologies are referring to the devices used for water boiling which are three stone fires, traditional cookstoves and to a minor extent improved cookstoves. As these baseline devices will be continued to be used by the families for cooking activities (even though the project will replace the need for boiling the water), the project does not

lead to the displacement of the baseline technologies outside the project boundary. This was confirmed in a leakage survey in which 97% of the households confirmed to continue using the device for cooking and 3% confirmed to have destructed the device which was previously used for boiling (see excel file "220614 W4C-Leakage survey_clean_final.xlsx" for more details. Hence, no leakage has to be accounted for.

b) Non-project users who previously used lower emitting energy sources use the non-renewable biomass or fossil fuels saved under the project activity.

Not applicable. The energy source used in the baseline for water boiling is firewood. It is very unlikely that users who previously (in the baseline) used for example non-GHG emitting methods like chlorine treatment for water purification would switch to boiling drinking water because another 'zero emission' technology is promoted by the project. Hence, no leakage has to be accounted for.

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.

Not applicable. Due to the relatively small size of the project, it's not expected that it will have significant influence on the national NRB fraction. Hence, no leakage has to be accounted for.

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.

Not applicable. As it was confirmed in the leakage survey, none of the interviewed households has applied the boiling of drinking water at the same time for space heating.
Hence, no leakage has to be accounted for.

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.

Not applicable. The technologies used in the baseline for water boiling are three stone fires, traditional cookstoves and to a minor extent improved cookstoves using non-renewable biomass and/or the end-users are lacking access to safe water. It is very unlikely that users who previously (in the baseline) used for example non-GHG emitting methods like chlorine treatment for water

purification would switch to boiling drinking water because another 'zero emission' technology is promoted by the project. Hence, no leakage has to be accounted for.

Usage and monitoring Survey

Usage/monitoring survey has been done on a sample basis as described in the registered monitoring plan. For details on the sampling approach, see section D.3 of this monitoring report.

Water Consumption Field Test (WCFT)

The project proponent has carried out WCFT during the 4nd performance certification on a sample basis to determine the actual safe water consumption and boiling volumes (both of raw/unsafe water and safe water) for the project scenario.

Three different volumetric variables have been measured:

Qp	Quantity of safe water in litres consumed in the project scenario p and supplied by project technology per person per day
Qp,rawboil,y	Quantity of raw or unsafe water boiled in the project scenario p per person per day
Qp,cleanboil,y	Quantity of safe (treated, or from safe supply) water boiled in the project scenario p per person per day

For details on the sampling approach, see section D.3 of this monitoring report.

SECTION D. DATA AND PARAMETERS

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

Relevant SDG Indicator	SDG 13, Climate action
Data/parameter:	C_j
Unit	Percentage
Description	Percentage of users of project safe water supply who were already in the baseline using a non-boiling safe water supply

Source of data	Baseline Survey[7]
Value(s) applied)	18.8 %
Choice of data or measurement methods and procedures	Note: The baseline study with 100 households has been conducted. A separate baseline survey report and excel calculation spreadsheet has been presented to the DOE at the time of validation and has been submitted to Gold Standard for Design Certification Review.
Purpose of data	Estimation of emission reductions
Additional comment	Transparent data analysis and reporting.

Relevant SDG Indicator	**SDG 13, Climate action**
Data/parameter:	X_{boil}
Unit	Percentage
Description	Percentage of premises that in the absence of the project activity would have used non-GHG emitting technologies like chlorine treatment techniques (if available) in the project boundary.
Source of data	Baseline Survey
Value(s) applied)	6.5 %

[7] See baseline survey report being made available at the time of DOE validation.

Choice of data or measurement methods and procedures	Note: The baseline study with 100 households has been conducted. A separate baseline survey report and excel calculation spreadsheet has been presented to the DOE at the time of validation and has been submitted to Gold Standard for Design Certification Review.
Purpose of data	Estimation of baseline emissions
Additional comment	Transparent data analysis and reporting. This parameter is only applied for premises that are under suppressed demand situation.

Relevant SDG Indicator	**SDG 13, Climate action**
Data/parameter:	$W_{b,y}$
Unit	Tonnes/Litre
Description	Quantity of wood fuel or fossil fuel required to boil 1 litre of water using technologies representatives of baseline scenario b during year y
Source of data	Baseline Water Boiling Test (BWBT)[8]
Value(s) applied)	0.00073277 (uncapped value from PDD) 0.0004 (capped value)

[8] See BWBT excel spreadsheet being made available at the time of DOE validation.

Choice of data or measurement methods and procedures	The BWBT is conducted to calculate the quantity of fuel required to purify by boiling one litre of water for 10 minutes. The BWBT was conducted on cooking devices and fuels representative of the results found in the baseline survey. All households in the baseline survey indicated to boil water with firewood which is in line with the BWBT only including households using firewood. Around 7.4% indicated to boil water on improved cookstoves. 2 out of 22 BWBTs have been conducted on improved cookstoves, which is equivalent to 9%, hence conservative. Around 61% and 31% indicated in the baseline survey to boil water on 3-stone fire and traditional firewood stoves (without a grate or chimney) respectively. 12 out of 22 BWBTs have been conducted on 3-stone fires and 8 out of 22 BWBTs on traditional firewood stoves. This is equivalent to 54.5% and 36.3%. The difference in the proportion between baseline survey and BWBT is considered to be irrelevant. Since the average firewood consumption on 3-stone fires and traditional firewood stoves varies by less than 1% (748 g vs. 753 g). One BWBT was conducted in a randomly selected household around each of the 22 different boreholes which had been identified for rehabilitation at the time of conducting WBT, hence resulting in 22 BWBTs around 22 boreholes in total. As the WBT excel spreadsheet shows, the endpoints of the 90% confidence interval lie within 30% of the estimated mean. The capped value of 400 g/l is based on the revised value elaborated in the Rule Update 'Application of TPDDTEC Methodology to Safe Water Supply Projects'.
Purpose of data	Estimation of baseline emissions
Additional comment	Transparent data analysis and reporting. Baseline only; Should be updated if ongoing monitoring surveys show that baseline water boiling technologies change over time.

Relevant SDG Indicator	SDG 13, Climate action
Data/parameter:	$W_{p,y}$
Unit	Tonnes/Litre
Description	Quantity of wood fuel or fossil fuel required to boil 1 litre of water using technologies representatives of project scenario b during year y
Source of data	Baseline Water Boiling Test (BWBT)
Value(s) applied)	0.00073277 (uncapped value from PDD) 0.0004 (capped value)
Choice of data or measurement methods and procedures	Ex ante assumption is that the same water boiling technologies are prevalent in the baseline and project scenarios and therefore $W_{b,y}$ and $W_{p,y}$ are equal.
Purpose of data	Estimation of project emissions
Additional comment	Transparent data analysis and reporting. If the later monitoring surveys reveal that the same water boiling technologies are prevalent in the baseline and project scenarios, $W_{b,y}$ and $W_{p,y}$ are equal. Should be updated whenever new water boiling technologies are introduced over time. The capped value of 400 g/l is based on the revised value elaborated in the Rule Update 'Application of TPDDTEC Methodology to Safe Water Supply Projects'.

Relevant SDG Indicator	SDG 13, Climate action
Data/parameter:	$EF_{b,CO2}$
Unit	tCO_2/TJ
Description	CO_2 emission factor arising from use of fuels in baseline scenario
Source of data	IPCC default value for wood

Value(s) applied)	112
Choice of data or measurement methods and procedures	Deemed valid by TPDDTEC Methodology
Purpose of data	Estimation of baseline emissions
Additional comment	If EF is in units of tCO2/t_fuel, remove NCV term from emission calculations. Term can include a combination of emission factors from fuel production, transport and use in line with the emission sources included in the project. CO_2-emission factors for charcoal may be estimated from project specific monitoring or alternatively by researching a conservative wood to charcoal ratio (from IPCC, credible published literature, project-relevant measurement reports, or project-specific monitoring) and multiplying this value by the pertinent EF for wood.

Relevant SDG Indicator	**SDG 13, Climate action**
Data/parameter:	$EF_{b,non\text{-}CO2}$
Unit	tCO_2/TJ
Description	CO_2 emission factor arising from use of fuels in project scenario
Source of data	IPCC default value for wood
Value(s) applied)	8.692
Choice of data or measurement methods and procedures	Deemed valid by TPDDTEC Methodology

Purpose of data	Estimation of baseline emissions
Additional comment	If EF is in units of tCO2/t_fuel, remove NCV term from emission calculations. Term can include a combination of emission factors from fuel production, transport and use in line with the emission sources included in the project. CO_2-emission factors for charcoal may be estimated from project specific monitoring or alternatively by researching a conservative wood to charcoal ratio (from IPCC, credible published literature, project-relevant measurement reports, or project-specific monitoring) and multiplying this value by the pertinent EF for wood.

Relevant SDG Indicator	**SDG 13, Climate action**
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 for wood
Value(s) applied)	112
Choice of data or measurement methods and procedures	Deemed valid by TPDDTEC Methodology

Purpose of data	Estimation of project emissions
Additional comment	If EF is in units of tCO2/t_fuel, remove NCV term from emission calculations. Term can include a combination of emission factors from fuel production, transport and use in line with the emission sources included in the project. CO_2-emission factors for charcoal may be estimated from project specific monitoring or alternatively by researching a conservative wood to charcoal ratio (from IPCC, credible published literature, project-relevant measurement reports, or project-specific monitoring) and multiplying this value by the pertinent EF for wood.

Relevant SDG Indicator	**SDG 13, Climate action**
Data/parameter:	$EF_{p,non\text{-}CO2}$
Unit	tCO_2/TJ
Description	Non-CO_2 emission factor arising from use of fuels in project scenario
Source of data	IPCC default value for wood
Value(s) applied)	8.692
Choice of data or measurement methods and procedures	Deemed valid by TPDDTEC Methodology

Purpose of data	Estimation of project emissions
Additional comment	If EF is in units of tCO_2/t_fuel, remove NCV term from emission calculations. Term can include a combination of emission factors from fuel production, transport and use in line with the emission sources included in the project. Non-CO_2-emission factors for charcoal may be estimated from project specific monitoring or alternatively by researching a conservative wood to charcoal ratio (from IPCC, credible published literature, project-relevant measurement reports, or project-specific monitoring) and multiplying this value by the pertinent EF for wood.

Relevant SDG Indicator	**SDG 13, Climate action**
Data/parameter:	$f_{NRB,i,y}$
Unit	Fraction
Description	Non-renewability status of woody biomass fuel in scenario I during the year y
Source of data	Report 'Calculation of the fraction of non-renewable biomass (NRB) Rwanda, C4 EcoSolutions, 2021.
Value(s) applied)	0.98

Choice of data or measurement methods and procedures	The national fNRB parameter for the Republic of Rwanda was estimated using the latest guidance from Clean Development Mechanism (CDM Tool 30 EB 108 Annex 11 v3.0 2020. The estimation of woody biomass consumption was derived from the UN Statistics Division wood consumption and population statistics, in combination with the national average per capita woody biomass consumption. The domestic woody biomass consumption was estimated by multiplying the reported per capita consumption of fuelwood and charcoal by the 2018 population, disaggregated by urban and rural household areas and validated based on UN Statistics Division data. The non-domestic woody biomass consumption estimates provided by the UN Statistics Division have been conservatively applied. Geospatial data products for Rwanda were analyzed to estimate Rwanda's renewable biomass. The woody cover was disaggregated according to the FAO global ecological zones and the total woody cover extent was calculated for each ecological zone, within the protected areas and within areas that are either accessible or geographically remote. The default age-weighted mean annual increment (MAI) estimates of each ecological zone, as reported by the IPCC, was used for this study. For more details, please see document 'Calculation of the fraction of non-renewable biomass (NRB) Rwanda', C4 EcoSolutions, 2021.
Purpose of data	Estimation of emission reductions
Additional comment	The value of fNRB is fixed ex-ante for entire crediting period even though the project proponent may at any time choose to re-examine the fNRB during the crediting period. Since the crediting period is renewable, following GS rules NRB fraction will be reassessed as any other baseline parameters and updated in line with most recent data available.

Relevant SDG Indicator	SDG 13, Climate action
Data/parameter:	$NCV_{b,fuel}$
Unit	TJ/tonne
Description	Net calorific value of the fuels used in the baseline
Source of data	IPCC default value for wood
Value(s) applied)	0.0156
Choice of data or measurement methods and procedures	Deemed valid by TPDDTEC Methodology
Purpose of data	Estimation of baseline emissions
Additional comment	Fixed for the entire crediting period If EF is in units of tCO_2/t_fuel, remove NCV term from emission calculations

Relevant SDG Indicator	SDG 13, Climate action
Data/parameter:	$NCV_{p,fuel}$
Unit	TJ/tonne
Description	Net calorific value of the fuels used in the project
Source of data	IPCC default value for wood
Value(s) applied)	0.0156
Choice of data or measurement methods and procedures	Deemed valid by Methodology
Purpose of data	Estimation of project emissions
Additional comment	Fixed for the entire VPA crediting period If EF in units of tCO_2/t_fuel, remove NCV term from emission calculations. This has same values as NCVbaseline in projects which reduce use of the same fuel.

Relevant SDG Indicator	SDG 13, Climate action
Data/parameter:	$EF_{CO2,diesel,y}$
Unit	tCO2/TJ
Description	CO2 emission factor of diesel fuel in year y
Source of data	IPCC, volume 2, chapter 1, Table 1.4
Value(s) applied)	74.1
Choice of data or measurement methods and procedures	Default value as per IPCC
Purpose of data	Estimation of project emissions
Additional comment	Fixed for the entire VPA crediting period

Relevant SDG Indicator	SDG 13, Climate action
Data/parameter:	$Density_{diesel}$
Unit	kg/l
Description	Density of diesel fuel
Source of data	Second National Communication under the UNFCCC by Republic of Rwanda (Ministry of Natural Resources), page 40.
Value(s) applied)	0.84
Choice of data or measurement methods and procedures	Average diesel density (determined by KOBIL, MINICOM, Rwanda Bureau of Standards)

Purpose of data	Estimation of project emissions
Additional comment	Fixed for the entire VPA crediting period Only applicable if diesel fuel consumption is measured in volume.

Relevant SDG Indicator	**SDG 13, Climate action**
Data/parameter:	$NCV_{diesel,y}$
Unit	TJ/tonne
Description	Net calorific value of diesel fuel in year y
Source of data	IPCC, volume 2, chapter 1, Table 1.2
Value(s) applied)	0.043
Choice of data or measurement methods and procedures	Default value as per IPCC
Purpose of data	Estimation of project emissions
Additional comment	Fixed for the entire VPA crediting period

D.2 Data and parameters monitored

Relevant SDG Indicator	**SDG 13, Climate action**
Data/parameter:	$N_{p,y}$
Unit	Persons.days
Description	Number of person.days consuming water supplied by project scenario p through year y
Measured/calculated/default	Calculated

Source of data	-End-user lists supplied by the WASH committee responsible for the water supply and treatment system -Borehole/Standpipe water point breakdown records -E.coli test results
Value(s) of monitored parameter	12,770,820
Monitoring equipment	mWater E.coli test kits
Measuring/reading/recording frequency:	At least biennially
Calculation method (if applicable):	The person days ($N_{p,y}$) have been calculated multiplying the technology days by the number of people indicated in the end-user list for the respective water point. The technology days again have been calculated taking into account the start and end date of the monitoring period, any days the water point was down and the days for which the water could not be ensured to be E.coli free. Or in other words, the days on which the borehole was down due to a technical issue were subtracted when calculating the project technology days. Since none of the E.coli tests has shown positive results, no deduction was necessary in that regard.
QA/QC procedures:	Transparent data analysis and reporting
Purpose of data:	Estimation of emission reductions
Additional comment:	See W4C MP4 Project Water Point Database_.xlsx for the detailed calculation of the number of person days ($N_{p,y}$).

Relevant SDG Indicator	**SDG 13, Climate action**
Data/parameter:	$Q_{p,y}$
Unit	Liters per person per day (l/person/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	WCFT
Value(s) of monitored parameter	5.698
Monitoring equipment	-Brand-new scales (ACE Series) have been used: Capacity 40 kg, precision: 5 g -Jerrycans having a capacity of each 20 litres
Measuring/reading/recording frequency:	At least biennially
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Transparent data analysis and reporting
Purpose of data:	Estimation of baseline emissions
Additional comment:	81 WCFT in randomly selected households have been conducted in person in the period between 09/08/2022 and 20/09/2022. Hence the sample size was bigger than the minimum sample size of 20 as required by the applied methodology and registered monitoring plan. Five outlier was removed when doing the statistical analysis. The sample size was sufficient to comply with the 90/10 rule, hence the mean value, being 5.698 t/p/day, of the 90% confidence interval has been applied. The relative precision achieved was 3.34%.

Relevant SDG Indicator	**SDG 13, Climate action**
Data/parameter:	$Q_{p,y,\ rawboil,y}$
Unit	Litres per person per day (l/person/day)

Description	Quantity of raw or 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	0.52
Monitoring equipment	-Brand-new scales (ACE Series) have been used: Capacity 40 kg, precision: 5 g -Jerrycans having a capacity of each 20 litres
Measuring/reading/recording frequency:	At least biennially
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Transparent data analysis and reporting
Purpose of data:	Estimation of emission reductions
Additional comment:	81 WCFT in randomly selected households have been conducted in person in the period between 09/08/2022 and 20/09/2022. Hence the sample size was bigger than the minimum sample size of 20 as required by the applied methodology and registered monitoring plan. No outlier was removed when doing the statistical analysis. The sample size was not sufficient to comply with the 90/10 rule. Therefore, the lower bound of the confidence interval was used (0.52 l/p/day).

Relevant SDG Indicator	**SDG 13, Climate action**
Data/parameter:	$Q_{p,cleanboil,y}$
Unit	Litres per person per day (l/person/day)
Description	Quantity of safe (treated, or from safe supply) water boiled in the project scenario p, after installation of project technology

Measured/calculated/default	Measured
Source of data	WCFT
Value(s) of monitored parameter	0.21
Monitoring equipment	-Brand-new scales (ACE Series) have been used: Capacity 40 kg, precision: 5 g -Jerrycans having a capacity of each 20 litres
Measuring/reading/recording frequency:	At least biennially
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Transparent data analysis and reporting
Purpose of data:	Estimation of project emissions
Additional comment:	81 WCFT in randomly selected households have been conducted in person in the period between 09/08/2022 and 20/09/2022. Hence the sample size was bigger than the minimum sample size of 20 as required by the applied methodology and registered monitoring plan. Thirteen outlier were removed when doing the statistical analysis. The sample size was not sufficient to comply with the 90/10 rule, hence the upper bound of the 90% confidence interval, being 0.21 l/p/day has been applied.

Relevant SDG Indicator	**SDG 13, Climate action**
Data/parameter:	$U_{p,y}$
Unit	Percentage
Description	Usage rate in project scenario p during year y
Measured/calculated/default	Surveyed and calculated
Source of data	Annual usage survey

Value(s) of monitored parameter	78.83%
Monitoring equipment	Not applicable
Measuring/reading/recording frequency:	Annual or more frequently, in all cases on time for any request for issuance
Calculation method (if applicable):	The methodology requires to sample at least 100 households, however the PP decided to do some oversampling, hence 130 households were visited in person. At least 30 households of each of the represented 4 age groups were sampled in line with the applied methodology. 95% and 84% of all interviewed households use a project water point in the dry season and wet season respectively, resulting in a weighted average of 89.68%. Further, in line with the applied methodology, households living more than 1 km away from the associated borehole (considering a 5% threshold for materiality limit) and for which the borehole was rehabilitated more than 2 years ago were discarded. To evaluate the distance using GPS coordinates, the Haversine formula (https://en.wikipedia.org/wiki/Haversine_formula) was used. Taking this into account, the usage rate was revised to 78.83% (instead of 89.68%).
QA/QC procedures:	Transparent data analysis and reporting
Purpose of data:	Estimation of emission reductions

Additional comment:	The sampling frame for the usage/monitoring surveys consisted of all functioning boreholes at the time of usage/monitoring survey.[9] For the detailed usage/monitoring survey results, see "20230707_GS6598_W4CR_Usage Monitoring survey analysis_MP4_v0.1.xlsx"

Relevant SDG Indicator	**SDG 13, Climate action**
Data/parameter:	$LE_{p,y}$
Unit	tCO2e /year
Description	Leakage in project scenario p during year y
Measured/calculated/default	Surveyed
Source of data	Monitoring (leakage) survey
Value(s) of monitored parameter	0
Monitoring equipment	Not applicable
Measuring/reading/recording frequency:	Every two years
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Transparent data analysis and reporting
Purpose of data:	Estimation of emission reductions

[9] Including non-functioning boreholes into the sampling frame would result in a double-discount. Since the calculation of project technology days already discounts the days when a water point is defunct.

Additional comment:	A leakage survey has been conducted between 30/05/2022 and 20/06/2022 along with a re-assessment of the information provided in the PDD and revealed that there is no leakage (for details see excel spreadsheet "220614 W4C-Leakage survey_clean_final.xlsx".

Relevant SDG Indicator	**SDG 13, Climate action**
Data/parameter:	Quality of the treated water
Unit	As appropriate in alignment with QA/QC procedures
Description	Performance of the treatment technology – less than 1 Colony Forming Unit (CFU) of E.Coli / 100 ml of safe water
Measured/calculated/default	Measured through tests
Source of data	E.coli tests
Value(s) of monitored parameter	See detailed results for each water point in excel spreadsheet "W4C MP4 Project Water Point Database_.xlsx"and supporting documentation
Monitoring equipment	mWater E.coli test kits
Measuring/reading/recording frequency:	The first test within 6 months of the stated project start date, afterwards quarterly
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Transparent data analysis and reporting
Purpose of data:	Estimation of emission reductions

Additional comment:	During this monitoring period, all water points have been tested for E.coli and for those, where needed, as well in the presence of a local health authority in the rainy season when there is a higher risk of contamination. All water points for which carbon credits are claimed for during this monitoring period were tested once by an accredited laboratory[10] E.coli test results have been submitted to the VVB. For those water points which were rehabilitated within the last 6 months of the monitoring period or which were not functional in the rainy season, no E.coli tests in the presence of the local health authority were conducted. All of the E.coli tests were negative, or in other words did not show any presence of E.coli in the water.

Relevant SDG Indicator	**SDG 13, Climate action**
Data/parameter:	Hygiene campaigns
Unit	-
Description	Hygiene campaigns carried out among project technology users.
Measured/calculated/default	Campaigns
Source of data	Annual hygiene campaigns results

[10] The same approach has been approved by GS for project https://mer.markit.com/br-reg/public/master-project.jsp?project_id=103000000004445. A formal request for deviation has been submitted to GS and has been approved on 17/01/2019.

Value(s) of monitored parameter	4,763 people in 61 Community campaigns have been trained so far as well as 26 trainers. See excel spreadsheet "2022 WASH Metrics.xlsx" for more details. .
Monitoring equipment	Not applicable
Measuring/reading/recording frequency:	Annually
Calculation method (if applicable):	Not applicable
QA/QC procedures:	-
Purpose of data:	Estimation of emission reductions
Additional comment:	Prior to the project the local communities received no regular training on water, sanitation and health related issues

Relevant SDG Indicator	**SDG 13, Climate action**
Data/parameter:	Capacity
Unit	Liters per day
Description	Treatment capacity of the project technology/improved sources
Measured/calculated/default	Manufacturer specification Measured
Source of data	Afridev and India Mark II discharge capacity Water point yield tests
Value(s) of monitored parameter	See detailed results for each water point in excel spreadsheet "W4C MP3 Project Water Point Database_.xlsx"
Monitoring equipment	Not applicable
Measuring/reading/recording frequency:	Once at the time of registration or at inclusion of new technology

Calculation method (if applicable):	Not applicable
QA/QC procedures:	-
Purpose of data:	Estimation of emission reductions
Additional comment:	The water volume values used in the calculations of emission reductions must be justified in terms of capacity of the project technology/improved sources. The discharge capacity provided by the manufacturer of the Afridev and India Mark II pumps were compared with the yield test results and the lower value was used to check whether the capacity is enough to serve the number of people indicated in the end-user lists by the WASH Committees. The number of people have been multiplied with the default value of 7 l/p/day. The yield test is based on manual pumping activity for 1 minute. This test is repeated at least 3 times and an average value is taken. For the tap water points belonging to a standpipe system the available amount of water is based on the quantity of water pumped per minute.

Relevant SDG Indicator	**SDG 13, Climate action**
Data/parameter:	$EF_{grid,y}$
Unit	tCO_2e/MWh
Description	CO_2 emission factor of the grid electricity in year y
Measured/calculated/default	Default
Source of data	https://pub.iges.or.jp/pub/iges-list-grid-emission-factors
Value(s) of monitored parameter	0.654

Monitoring equipment	Not applicable
Measuring/reading/recording frequency:	At the time of issuance
Calculation method (if applicable):	Not applicable
QA/QC procedures:	-
Purpose of data:	Estimation of project emissions
Additional comment:	Not applicable for this 4rd monitoring period. Since no grid electricity has been consumed for pumping water in a standpipe system to the different water points or any other water point.

Relevant SDG Indicator	**SDG 13, Climate action**
Data/parameter:	ECy
Unit	MWh
Description	Quantity of grid electricity consumed for pumping water in a standpipe system to the different water points in year y.
Measured/calculated/default	Measured
Source of data	On-site measurements (electricity meters)
Value(s) of monitored parameter	0
Monitoring equipment	Electricity meters
Measuring/reading/recording frequency:	Continuous monitoring and at least monthly recording (provided that there is consumption of grid electricity)
Calculation method (if applicable):	Not applicable
QA/QC procedures:	-

Purpose of data:	Estimation of project emissions
Additional comment:	Not applicable for this 4rd monitoring period. Since no grid electricity has been consumed for pumping water in a standpipe system to the different water points or any other water point.

Relevant SDG Indicator	**SDG 13, Climate action**
Data/parameter:	$FC_{diesel,y}$
Unit	l/year (volume unit)
Description	Quantity of diesel consumed for pumping water in a standpipe system to the different water points or any other water point in year y
Measured/calculated/default	Measured
Source of data	On-site measurements
Value(s) of monitored parameter	1,472.16
Monitoring equipment	Recording of the time (HH:MM) the diesel generators were active.[11]
Measuring/reading/recording frequency:	Continuous monitoring and at least monthly recording (provided that there is diesel consumption)
Calculation method (if applicable):	Not applicable

[11] This is a deviation to the registered monitoring plan. Since it is not doable and practical to record diesel consumption using rulers or weighing scales.

QA/QC procedures:	The measured fuel consumption is cross-checked by invoices/bills received at the time of purchase.
Purpose of data:	Estimation of project emissions
Additional comment:	A diesel generator (in the standpipe system Rukoronko) have been used from time to time as a back-up to solar energy during this monitoring period. The diesel consumption has been calculated based on the time (HH:MM) the diesel generators were active (see excel spreadsheet rukoronko fuel_v2.xlsx) and the calculated diesel fuel consumption per hour. This calculated diesel consumption has been compared with the purchase receipts and the higher value based on purchase receipts has been used for conservativeness. As per the registered monitoring plan, project emissions from diesel consumption have only to be taken into account, if they are material, i.e. if they are more than 5% of the overall project emissions. Since project emissions from diesel consumption were only 0.10% of the overall project emissions, no project emissions from diesel consumption have to be deducted from the emission reductions.

Relevant SDG Indicator	**SDG 1, No poverty**
Data/parameter:	$Q_{tot,p,y}$
Unit	l/y (litres/year)[12]

[12] The registered PDD refers to litres/year, however the value indicated herewith is referring to litres of safe water provided during the monitoring period.

Description	Total quantity of safe water in litres per year supplied by the rehabilitated/newly drilled boreholes of the project to the communities in year y
Measured/calculated/default	Measured and calculated
Source of data	Lists supplied by the WASH committee responsible for the water points
Value(s) of monitored parameter	72,769,585 l/monitoring period
Monitoring equipment	Not applicable
Measuring/reading/recording frequency:	At least biennially
Calculation method (if applicable):	Calculated as: $Q_{tot,p,y} = N_{p,y} * Q_{p,y}$ Where $N_{p,y}$ = Number of person.days consuming water supplied by project scenario p through year y $Q_{p,y}$ = Quantity of safe water supplied in the project scenario p during the year y, using the "zero or low" emissions' clean water supply technology $Q_{tot,p,y}$ = 12,770,820 * 5.698 = 72,769,585 l/monitoring period
QA/QC procedures:	Transparent data analysis and reporting
Purpose of data:	Estimation of SDG impact
Additional comment:	The value of 72,769,585 efers to the "total quantity of safe water in litres per year supplied by the rehabilitated/newly drilled boreholes of the project to the communities" during the monitoring period.

Relevant SDG Indicator	SDG 3, Good health and well-being
Data/parameter:	$P_{IWBD, y}$
Unit	Fraction
Description	Proportion of households perceiving less often incidence of water borne diseases like cholera, diarrhea, typhoid fewer or Hepatitis A/E since the start of the project in year y
Measured/calculated/default	Determined through survey
Source of data	Monitoring/usage survey
Value(s) of monitored parameter	Amongst the households using the project water point: 98% perceived less often incidence of water borne disease 1% reported "No change" 1% does not know.
Monitoring equipment	Not applicable
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	Not applicable
QA/QC procedures:	The raw data and analysis of the data have been made available to the VVB.
Purpose of data:	Data for the parameter "Proportion of households perceiving less often incidence of water borne diseases like cholera, diarrhea, typhoid fewer or Hepatitis A/E".
Additional comment:	The survey results show that the project positively contributes to the reduction of waterborne diseases. 98% of the surveyed households appreciate a reduction of waterborne diseases, while 7% reported no change.

Relevant SDG Indicator	SDG 5, Gender equality
Data/parameter:	PITEC, y
Unit	Fraction
Description	Proportion of women in households perceiving reduced amount of time and effort spent for collecting water and wood fuel since the start of the project in year y
Measured/calculated/default	Determined through survey
Source of data	Monitoring/usage survey
Value(s) of monitored parameter	In terms of time and effort spent for collecting water, amongst the households using the project water point: 92% of women perceive a reduced amount and effort for collecting water. 7% do not perceive any change in time and effort for collecting water 1% reported an increase In terms of time and effort spent for collecting wood fuel, amongst the households using the project water point: 93% of women perceive a reduced amount and effort for collecting woodfuel. 7% do not perceive any change in time and effort for collecting woodfuel
Monitoring equipment	Not applicable
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	Not applicable

QA/QC procedures:	The raw data and analysis of the data have been made available to the VVB for review.
Purpose of data:	Data for the parameter "Proportion of women in households perceiving reduced amount of time and effort spent collecting water and wood fuel since the start of the project".
Additional comment:	The survey results show that the project positively contributes to the amount of time and efforts needed for women to collect water and wood fuel. For more than 92% and 93% of all surveyed households, less time and efforts are needed to collect water and fuel wood respectively.

Relevant SDG Indicator	**SDG 6, Clean water and sanitation**
Data/parameter:	$N_{WASH, y}$
Unit	Number
Description	Number of organized Water Sanitation and Hygiene trainings in year y
Measured/calculated/default	Calculated as the sum of the different trainings
Source of data	Records of Water Sanitation and Hygiene sensitization and training campaigns
Value(s) of monitored parameter	4,763 people in 61 Community campaigns have been trained so far as well as 26 trainers. See excel spreadsheet "2022 WASH Metrics.xlsx" for more details.
Monitoring equipment	Not applicable
Measuring/reading/recording frequency:	Annual

Calculation method (if applicable):	The different community campaigns and Training of Trainers have been summed up.
QA/QC procedures:	Records of Water Sanitation and Hygiene sensitization and training campaigns have been made available to the VVB for review.
Purpose of data:	Data for the parameter "Number of organized Water Sanitation and Hygiene trainings"
Additional comment:	2018: 2,926 people and 106 trainers trained 2019: 3,226 people and 94 trainers trained 2020: 36 trainers trained[13] 2021: 1,019 people and 102 trainers trained 2022: 4,763 people and 26 trainers trained

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

Data/Parameter	Value obtained in this monitoring period[14]	Value obtained last monitoring period[15]
SDG 13	56,311 tCO_2e	30,975 tCO_2e
SDG 1	72,769,585 litres of clean water	41,440,235 litres of clean water
SDG 3	98% (perceive less often incidence of water-borne diseases) 1% do no not report any change 1% do not know	98% (perceive less often incidence of water-borne diseases)

[13] There were no community trainings in 2020 due to the COVID pandemic.

[14] The monitoring period comprises of 14 months.

[15] The monitoring period comprises of 12 months.

SDG 5	92% (of women perceiving less time to collect water) 7% do not report any chage 1% report an increase 93% (of women perceiving less time to collect wood fuel) 7% do not report any change	93% (of women perceiving less time to collect water) 7% do not report any change 81% (of women perceiving less time to collect wood fuel) 17% doe not report any change 2% perceive more time or effort
SDG 6	4,763 people in 61 communities and 26 trainers	7,171 people and 338 trainers

D.4. Implementation of sampling plan

Usage/Monitoring Survey

As per the applied methodology/registered monitoring plan, the minimum total sample size for Usage/Monitoring Survey is 100, with at least 30 samples for project technologies of each age being credited.

130 randomly selected households have been visited in person in the period between 30/04/2023 and 04/07/2023. Usage survey has been conducted together with the monitoring survey, however the latter one has been only fully carried out in case that the household was a user. In line with the applied TPDDTEC methodology, any sampling methods can be used, provided that the sample is selected randomly. If sampling approach other than simple random sampling is applied, 'Guidelines for sampling and survey for CDM project activities and program of activities' must be followed.

The sample for the usage/monitoring surveys resulted in 46 water points (out of 61 water points), being 20 water points of age group 1-2, 4 water points of age group 2-3, 9 water points of age group 3-4 and 14 of age group 4-5.

Simple random sampling was the applied sampling method. The sampling frame consisted of all the households which were recorded in end-user lists by the WASH committees using the project water points.

A random number generator tool[16] was used to generate a random sample list amongst all households. Those households which were at the top of the list were selected for the survey, going down the list until the pre-defined sample size was reached. The methodology requires to sample at least 100 households, however the PP decided to do some oversampling, hence 130 households were visited in person.

The surveys have been conducted with smartphones using the mWater survey app. As soon as the surveyor got connected to the internet, the recorded survey data have been transferred to a centralized database from where the data was exported later on to an excel spreadsheet.

Enumerators were trained by the carbon consultants, both in form of a theoretical and practical training at the time of conducting the surveys for the first monitoring period. A refresher training was carried out prior to this 4rd usage/monitoring survey.

Some of the surveys conducted for the first monitoring period were done in presence of the carbon consultants to ensure that the enumerators had correctly understood the survey questions.

A quality check for plausibility and consistency has been carried out by the carbon consultants after the raw data had been received.

Water Consumption Field Test (WCFT)

As per the applied methodology/registered monitoring plan, two valid options are allowed for the statistical analysis of the WCFT. In all cases, the sample size must be greater than 20:

1. 90/10 rule. When the sample size is large enough to satisfy the "90/10 rule", i.e. the endpoints of the 90% confidence interval lie within +/- 10% of the estimated mean, overall emission reductions can be calculated on the basis of the estimated MEAN of each of the respective variables measured through the WCFT.
2. When the sample size is such that the results do not meet the"90/10rule",the result used for each of the respective variables measured through the WCFT is not the mean (or average) test result, but a lower value, i.e. the lower bound of the one- sided 90% confidence interval (in order to reach a conservative estimate) is used for the parameters and $Q_{p,y}$ and $Q_{p,y, rawboil,y}$ and a higher value, i.e. the upper bound of the one-sided

[16] https://www.randomdraws.com/random-sequence-generator/

90% confidence interval (in order to reach a conservative estimate) is used for the parameter $Q_{p,cleanboil,y}$.

81 randomly selected households have been visited in person in the period between 09/08/2022 and 20/09/2022. Each household has been visited on 4 consecutive days. On the first day an introduction and explanations were given, and some questions were raised related to the water consumption practices. On the 2nd to 4th day the actual measurements took place.
Simple random sampling was the applied sampling method. The sampling frame consisted of all the households which were recorded in end-user lists by the WASH committees using the project water points. RAND and VLOOKUP Functions were used to generate random sample lists of households for each of the 4 districts. Those households which were at the top of the list were selected for the WCFT, going down the list until the calculated sample size for each of the districts was reached. The total sample size of 81 was proportionally assigned to the 4 districts, taking into account the number of water points per district. Or in other words, districts with a higher number of water points resulted in having a higher sample size than districts with a lower number of water points. Hence, 29 households for both Bugesera and Rusizi have been sampled, whereas 26 households for both Rwamagana and Ngoma and 26 from Kirehe and Nyagatare, .
The WCFT have been conducted with smartphones using the mWater survey app. As soon as the surveyor got connected to the internet, the recorded data have been transferred to a centralized database from where the data was exported later on to an excel spreadsheet.
Enumerators were trained by the carbon consultants, both in form of a theoretical and practical training. Some pilot WCFT were done in presence of the carbon consultants to ensure that the enumerators had correctly understood the questions and measurement procedure. A quality check for plausibility and consistency has been carried out by the carbon consultants after the raw data of those pilot WCFT had been received.
A detailed description about the WCFT procedures is described in the WCFT protocol, made available to the VVB.

Water quality testing

As per the applied methodology/registered monitoring plan, the samples for water quality tests are collected at the source, i.e. the boreholes. The 90/10 precision rule must be followed in calculating the sample size required for testing water quality.

All project water points have been systematically tested for E.coli, hence sampling is not applicable for water quality testing for this monitoring period.

SECTION E. CALCULATION OF SDG IMPACTS

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

Calculation of baseline value for SDG 13 Impact

The equation used to calculate the baseline fuel consumption is calculated in line with the applied methodology and registered PDD and is as follows:

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

Where:

$B_{b,y}$	Quantity of fuel consumed in baseline scenario b during the year in tonnes (L/p/d)
X_{boil}	Percentage of premises that in the absence of the project activity would have used non-GHG emitting emitting technologies like chlorine treatment techniques (if available) in the project boundary
C_j	Percentage of users of project safe water supply who were already in baseline using a non boiling safe water supply
$N_{p,y}$	Number of person.days consuming water supplied by project scenario p through year y
$W_{b,y}$	Quantity of fuel in tonnes required to treat 1 litre of water using technologies representative of baseline scenario b in year y as per Baseline Water Boiling Test.
$Q_{p,y}$	Quantity of safe water in litres consumed in the project scenario p and supplied by project technology per person per day in year y
$Q_{p,rawboil,y}$	Quantity of raw water boiled in the project scenario p per person per day

The total safe water consumed in the project scenario is the amount of safe water supplied by the project technology and consumed in the project scenario, plus the amount of raw water boiled after introducing the project technology (respectively represented above as Qp,y + Qp,rawboil,y). This total is assumed to be equivalent to the water boiled in the baseline. If the total of these two volumes exceed the cap stipulated in the applied TPDDTEC methodology (7 l/p/day), the project proponent's claim for emission reductions may not exceed the cap.

The transparent calculations of the outcome of SDG 13 (i.e. CO_2e reductions) are provided in a separate excel spreadsheet uploaded to GS Registry. For the used data/parameters, see the sections D.1 and D.2. in this monitoring report.

Calculation of baseline value for SDG 1, SDG 3, SDG 5 and SDG 6 Impacts

In line with the registered PDD (page 18), the SDG impacts SDG 1, SDG 3, SDG 5 and SDG 6 of this project activity are not certified as 'Certified Impact Statements' and therefore, for these SDG impacts no specific methodologies for estimation and monitoring are applied.

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

The equation used to calculate the project fuel consumption is calculated in line with the applied methodology and registered PDD and is as follows:

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

Where :

$B_{p,y}$	Quantity of fuel f consumed in project scenario p during the year y in tonnes
C_j	Percentage of users of project safe water supply who were already in baseline using a non boiling safe water supply
$N_{p,y}$	Number of person.days consuming water supplied by project scenario p through year y
$W_{b,y}$	Quantity of fuel in tonnes required to treat 1 litre of water using technologies representative of baseline scenario b in year y as per Baseline Water Boiling Test.
$Q_{p,rawboil,y}$	Quantity of raw water boiled in the project scenario p per person per day
$Q_{p,cleanboil,y}$	Quantity of safe water boiled in the project scenario p per person per day in year y

Project emissions from possible grid electricity consumption

$$PE_{EC,y} = EF_{grid,y} \times EC_y$$

PE_{EC}	Project emissions from grid electricity consumption during year y in tCO_2e
$EF_{grid,y}$	CO_2 emission factor of the grid electricity in year y
EC_y	Quantity of grid electricity consumed for pumping water in a standpipe system to the different water points or any other water point in year y

Project emissions from possible diesel consumption

$$PE_{FC,y} = EF_{CO2,diesel,y} \times FC_{diesel,y} \times NCV_{diesel,y} \times Density_{diesel}$$

$PE_{FC,y}$	Project emissions from diesel consumption during year y in tCO_2e
$EF_{CO2,diesel,y}$	CO_2 emission coefficient of diesel in year y
$FC_{diesel,y}$	Quantity of diesel consumed for pumping water in a standpipe system to the different water points or any other water point in year y
$NCV_{diesel,y}$	Net calorific value of diesel in year y
$Density_{diesel}$	Density of diesel in year y (only relevant in case that volume of diesel consumption is measured)

The transparent calculations of the outcome of SDG 13 (i.e. CO_2e reductions) are provided in a separate excel spreadsheet uploaded to GS Registry. For the used data/parameters, see the sections D.1 and D.2. in this monitoring report.

Calculation of project scenario for SDG 1, SDG 3, SDG 5 and SDG 6 outcomes

In line with the registered PDD (page 18), the SDG impacts SDG 1, SDG 3, SDG 5 and SDG 6 of this project activity are not certified as 'Certified Impact Statements' and therefore, for these SDG impacts no specific methodologies for estimation and monitoring are applied.

E.3. Calculation of leakage

Not applicable. See section C of this MR.

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

SDG	SDG Impact	Baseline estimate	Project estimate	Net benefit

13	Certified Emissions Reductions/Removals	64,418[17] tCO_2e 35,164 tCO2e (with capped $W_{b,y}/W_{p,y}$ value)	8,107[18] tCO_2e 4,425 tCO_2e (with capped $W_{b,y}/W_{p,y}$ value)	56,311 tCO_2e
1	Total quantity of safe water in litres per year supplied by the rehabilitated/ newly drilled boreholes of the project to the communities	0	72,768,585 litres	72,769,585 litres of clean (safe) water has been provided during the monitoring period.
3	Proportion of households perceiving less often incidence of water borne diseases like cholera, diarrhea, typhoid fewer or Hepatitis A/E since the start of the project	0	98%	Less people (98%) suffering of diarrhea and other water-borne diseases in the project scenario compared to the baseline scenario.
5	Proportion of women in households perceiving reduced amount of time and effort spent for collecting water and wood fuel since the start of the project	0	93%	More than 92% and 93% of the women need less time and efforts to collect water and wood fuel respectively.

[17] Rounded value taking into account the usage rate

[18] Rounded value taking into account the usage rate

6	Number of organized Water Sanitation and Hygiene trainings	0	4,763 people from 61 communities trained through: 23 Community campaigns, 5 Train of Trainers campaigns and 42 Community Re-trainings	2022 :4,763 people in 61 Community campaigns have been trained so far as well as 26 trainers. 2018: 2,926 people and 106 trainers trained 2019: 3,226 people and 94 trainers trained 2020: 36 trainers trained 2021: 1,019 people and 102 trainers trained

Revised ERs have been calculated based on the default value of 0.0004 tons/litre for the "Quantity of wood fuel or fossil fuel required to boil 1 litre of water using technologies" resulting in 30,739 tCO_2e. The ERs based on the "Quantity of wood fuel or fossil fuel required to boil 1 litre of water using technologies" value of the registered PDD results in 56,311 tCO_2e. The PD requests an issuance of the full amount (56,311 tCO_2e), however makes sure that 25,572 tCO_2e carbon credits from another GS project will be retired prior to issuance to account for the difference.

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[19] achieved during this monitoring period
13	64,558 tCO_2e	56,311 tCO_2e
1	80,482,500 l/monitoring period	72,769,585 l/monitoring period
3	80%	98%
5	90%	92% (less time needed for women to collect water) 93% (less time needed for women to collect wood fuel)
6	70 campaigns[20]	4,763 people from 61 communities trained through: 23 Community campaigns, 5 Train of Trainers campaigns and 42 Community Re-trainings

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

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

[20] It was foreseen to conduct one campaign per water point.

See ER calculation sheet on how the values for SDG 13 and SDG 1 have been calculated. The values for SDG 3 and 5 were taken from the PDD. The value for SDG 6 of 66 campaigns assumed that one campaign per water point would be conducted.

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

SDG 13 : Actual emission reductions are lower than the estimated ones. Actual emission reductions are 13 % lower than the estimated ones. The main reason is a lower "Quantity of safe water supplied by project technology" resulted from the Water Consumption Field test than the ex ante estimation.

SDG 1: The actual value slightly exceeds the estimated value (+9%). The actual value is based on surveys with end-users while the ex-ante value was a pure estimate.

SDG 3: The actual value slightly exceeds the estimated value. The actual value is based on surveys with end-users while the ex-ante value was a pure estimate.

SDG 5: The average actual value is slightly higher (92% and 93%) than the estimated value (90%). The actual value is based on surveys with end-users while the ex-ante value was a pure estimate.

SDG 6: The actual value exceeds the estimated value taking into account the sum of WASH campaigns carried out for communities and trainers.

SECTION F. SAFEGUARDS REPORTING

Mandatory Principles	How requirements were met in this monitoring period
Principle 1. Human Rights	The project developer took care that the project respects internationally proclaimed human rights and is not complicit in violence or human rights abuses of any kind as defined in the Universal Declaration of Human Rights as mentioned in the PDD.

	There was no discrimination with regards to participation and inclusion during the monitoring period.
Principle 2. Gender Equality	The project activity did not endorse any form of discrimination based on gender during the monitoring period. It fully complied with all gender equality and women's right requirements as outlined in the PDD.
Principle 3. Community Health, Safety and Working Conditions	The Project did not expose the community to increased health risks and did not adversely affect the health of the workers and the community during the monitoring period.
Principle 5. Corruption	The Project did not involve any kind of corruption during the monitoring period.
Principle 6.1 Labour Rights	The project did respect all labour rights during the monitoring period.
Project Specific Principles	
Principle n.	Not applicable

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 comments or grievances have been received for the project during the monitoring period in the physical grievance books located in the district offices nor by Email or phone. Physical grievance books are located at the district offices, and every user or stakeholder can write any comment. There is also a general email address, as well as a phone number.

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

No Grievance was reported during the monitoring period.

Water Point Custom ID	Grievances Expressed	Action Taken

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

Not applicable. Since no legal contest or dispute has arisen with the project 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