Gold standard for the global goals
Monitoring report

September 2020, version 1

Gold Standard®

Title of the project	GS1247 (VPA 56) Improved Kitchen Regimes: Kayonza District Borehole Project, Rwanda GS1247 (VPA 57) Improved Kitchen Regimes: Kayonza District Borehole Project, Rwanda GS1247 (VPA 58) Improved Kitchen Regimes: Kayonza District Borehole Project, Rwanda GS1247 (VPA 59) Improved Kitchen Regimes: Kayonza District Borehole Project, Rwanda GS1247 (VPA 60) Improved Kitchen Regimes: Kayonza District Borehole Project, Rwanda GS1247 (VPA 61) Improved Kitchen Regimes: Kayonza District Borehole Project, Rwanda GS1247 (VPA 62) Improved Kitchen Regimes: Kayonza District Borehole Project, Rwanda GS1247 (VPA 63) Improved Kitchen Regimes: Kayonza District Borehole Project, Rwanda GS1247 (VPA 64) Improved Kitchen Regimes: Kayonza District Borehole Project, Rwanda GS1247 (VPA 106) Improved Kitchen Regimes: Kayonza District Borehole Project, Rwanda GS1247 (VPA 107) Improved Kitchen Regimes: Kayonza District Borehole Project, Rwanda GS1247 (VPA 108) Improved Kitchen Regimes: Kayonza District Borehole Project, Rwanda GS1247 (VPA 109) Improved Kitchen Regimes: Kayonza District Borehole Project, Rwanda GS1247 (VPA 110) Improved Kitchen Regimes: Kayonza District Borehole Project, Rwanda GS1247 (VPA 157) Improved Kitchen Regimes: Kayonza District Borehole Project, Rwanda GS1247 (VPA 158) Improved Kitchen Regimes: Kayonza District Borehole Project, Rwanda
Gold Standard project id	GS4897-4901, 5033-6, 5392-6 and 6837-8
Version number of the monitoring report	*5*
Completion date of the monitoring report	17/02/2021
Date of project design certification	GS4897-4901: 28/06/2017 GS5033-6 and 5392-3 and 5-6: 03/09/2017 GS5394, GS6837 and GS6838: 17/12/2018.
Start date of crediting period	GS4897: 15/12/2015 GS4898: 19/12/2015 GS4899: 10/12/2015 GS4900: 19/12/2015 GS4901: 18/12/2015 GS5033: 18/08/2016 GS5034: 25/08/2016 GS5035: 19/08/2016 GS5036: 16/08/2016 GS5392: 10/12/2015

	GS5393: 12/12/2015 GS5394: 01/10/2017 GS5395: 20/08/2016 GS5396: 17/08/2016 GS6837: 01/10/2017 GS6838: 01/10/2017
Duration of this monitoring period	GS4897 MP4: 01/10/2019 – 30/09/2020 GS4898 MP4: 01/10/2019 – 30/09/2020 GS4899 MP4: 01/10/2019 – 30/09/2020 GS4900 MP4: 01/10/2019 – 30/09/2020 GS4901 MP4: 01/10/2019 – 30/09/2020 GS5033 MP4: 01/10/2019 – 30/09/2020 GS5034 MP4: 01/10/2019 – 30/09/2020 GS5035 MP4: 01/10/2019 – 30/09/2020 GS5036 MP4: 01/10/2019 – 30/09/2020 GS5392 MP4: 01/10/2019 – 30/09/2020 GS5393 MP4: 01/10/2019 – 30/09/2020 GS5394 MP4: 01/10/2019 – 30/09/2020 GS5395 MP4: 01/10/2019 – 30/09/2020 GS5396 MP4: 01/10/2019 – 30/09/2020 GS6837 MP4: 01/10/2019 – 30/09/2020 GS6838 MP4: 01/10/2019 – 30/09/2020
Duration of previous monitoring period	01/10/2018 – 30/09/2019
Project representative(s)	James Walker
Host Country	Republic of Rwanda
Certification pathway (activity certification/impact certification)	Impact Certification
SDG Contributions targeted (as per approved PDD)	1 – SDG 3 – Good Health and Wellbeing 2 – SDG 5 – Gender Equality 3 – SDG 6 – Clean Water and Sanitation 4 – SDG 13 – Climate Action

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Gold Standard statement/product certification sought (GSVER/ADALYs/RECs etc.)	GSVER
Selected methodology(ies)	TPDDTEC v.1
Estimated amount of annual average certified SDG impact (as per approved PDD)	Estimates for SDGs 3, 5 and 6 have been supplied through the transition annex as the project began prior to the transition to GS4GGs. SDG 3: 80% reduction in exposure to household air pollution caused by boiling water. SDG 5: 0.5 hours saved on time collecting water. SDG 6: 25,387 persons with access to safe water across all VPAs. The estimated amounts for SDG 13 were as follows: GS4897: 10,000 tCO2e GS4898: 10,000 tCO2e GS4899: 10,000 tCO2e GS4900: 10,000 tCO2e GS4901: 10,000 tCO2e GS5033: 9,553 tCO2e GS5034: 9,610 tCO2e GS5035: 9,632 tCO2e GS5036: 9,653 tCO2e GS5392: 9,563 tCO2e GS5393: 8,246 tCO2e GS5394: 10,000 tCO2e GS5395: 9,617 tCO2e GS5396: 7,134 tCO2e GS6837: 9,997 tCO2e GS6838: 10,000 tCO2e
Total amount of certified SDG impact (as per approved methodology) achieved in this monitoring period	SDG 3 – Reduction in exposure to Household Air Pollution due to boiling water: 90% SDG 5 –1 hour saved on time collecting water (55.36% time saved compared to the baseline). SDG 6 – 22,652 additional persons with access to safe water SDG 13 – 38,968 tCO2e (total) Breakdown: GS4897: 2,594 tCO2e GS4898: 2,594 tCO2e GS4899: 2,569 tCO2e GS4900: 2,594 tCO2e GS4901: 2,075 tCO2e GS5033: 2,075 tCO2e GS5034: 2,075 tCO2e GS5035: 2,160 tCO2e GS5036: 2,594 tCO2e GS5392: 2,594 tCO2e GS5393: 2,594 tCO2e GS5394: 2,593 tCO2e GS5395: 2,594 tCO2e GS5396: 2,075 tCO2e GS6837: 3,113 tCO2e GS6838: 2,075 tCO2e

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SECTION A. Description of project

A.1. Purpose and general description of project

>> (Provide a brief summary of the detailed description given in section B.1 including purpose of the project, brief description of the installed technology and equipment and relevant dates for the project (e.g. construction start/end, commissioning, continued operation periods, etc.)

CO2balance is implementing 16 micro-scale VPAs in Kayonza District, Rwanda 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 76 boreholes were rehabilitated between 9th December 2015 and 22nd September 2016. The crediting periods for each VPA are given in section A.4 and have a lifetime of 7 years.

A.2. Location of project

>> (Provide host country, state/province, city/town details along with GPS co-ordinates.)

This project is located in Kayonza district in the Eastern Province of Rwanda. Below is the geographic reference to allow unique identification of the project boundary, which is taken as the administrative boundaries of Kayonza district. 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 woodfuel collection area and target area are considered the same.

Map 1 Country map of Rwanda

1)

Continent	Country	Region	District	Sector	Sub-Location	Geographical Reference	
Africa	Rwanda	Eastern Province	Kayonza	N/A	N/A	162	30.20

A.3. Reference of applied methodology

>>(Indicate title and version number of the methodology.)

The applied methodology is Technologies and Practices to Displace Decentralized Thermal Energy Consumption Version 1 (TPDDTEC).

A.4. Crediting period of project

>> (Provide start date and length of the crediting period as given in approved PDD.)

The start date of the crediting periods for each VPA are:
GS4897: 15/12/15
GS4898: 19/12/15
GS4899: 10/12/15
GS4900: 19/12/15
GS4901: 18/12/15
GS5033: 18/08/16
GS5034: 25/08/16
GS5035: 19/08/16
GS5036: 16/08/16
GS5392: 10/12/15
GS5393: 12/12/15
GS5394: 01/10/17
GS5395: 20/08/16
GS5396: 17/08/16
GS6837: 01/10/17
GS6838: 01/10/17

Each crediting period has a length of 7 years, as approved in the PDDs.

SECTION B. Implementation of project

B.1. Description of implemented project

>> (*Provide information on the implementation status of the project during this monitoring period. Specify any deviations / delays compared to information in approved project.)*

In partnership with Likano Project Development GmbH and Open Circle Investments Pty Ltd, CO2balance UK Ltd is implementing a number of Micro-Scale Voluntary Project Activities under PoA 1247 in the district of Kayonza which are eligible under the Gold Standard methodology Technologies and Practices to Displace Decentralized Thermal Energy Consumption. 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.

Kayonza is a largely rural district 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., Likano Project Development GmbH and Open Circle Investments Pty Ltd work with community groups and a local NGO partner, Rwandans4Water in Kayonza district, to identify broken down boreholes and renovate them so that they deliver clean, safe water and breakdowns are fixed rapidly.

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 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 totalled to give the total number of project technology days for this monitoring period. In total 76 boreholes were rehabilitated as part of 16 VPAs between the 9th December 2015 and 22nd September 2016. The date of rehabilitation, the project ID, location and number of people served by each borehole is given in the table below, which forms the project database. Each borehole is fitted with an Afridev pump. All households credited for use the water for domestic purposes.

Details of Borehole maintenance can be found in the "Kayonza Maintenance MP4" document submitted. In total, 6 boreholes required major repairs during this monitoring period. KAY016 MUGANZA, was non-functional for 30 days. The other five suffered low water discharge but were still operational; these were subsequently non-operational for one day whilst the repairs were carried out. Other minor repairs were carried out and noted in the spreadsheet but did not cause any major disruption. The low water discharge for the boreholes that needed major repairs was incorporated into the ER calculations, whereby only half of the user numbers were able to be served during the period in which the boreholes were experiencing low discharge.

PP has also collected updated user lists for the monitoring period and will do so in subsequent in each subsequent year. The updated user list table below is taken from the total PTDs tab in the ER calculation spreadsheet.

Borehole ID	Pump Model	Date of Rehab	Start of MP	Village	No. of users
GS4897					
KAY001	AFRIDEV	14/12/2015	01/10/2018	Gacaca	616
KAY032	AFRIDEV	11/01/2016	01/10/2018	Sabasengo (ii)	530

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KAY004	AFRIDEV	23/01/2016	01/10/2018	Kayongo	641
KAY005	AFRIDEV	18/01/2016	01/10/2018	Karagari1	647
KAY006	AFRIDEV	28/12/2015	01/10/2018	Murenge	549
					2,983
GS4898					
KAY007	AFRIDEV	18/12/2015	01/10/2018	Kazeneza	359
KAY008	AFRIDEV	23/12/2015	01/10/2018	Kayebe	500
KAY010	AFRIDEV	14/01/2016	01/10/2018	Gakoma1	317
KAY011	AFRIDEV	04/02/2016	01/10/2018	Kigarama	710
KAY012	AFRIDEV	05/01/2016	01/10/2018	Nyamirama	305
					2,191
GS4899					
KAY013	AFRIDEV	09/12/2015	01/10/2018	Mbarara2	489
KAY014	AFRIDEV	10/12/2015	01/10/2018	Mbarara4	500
KAY016	AFRIDEV	16/12/2015	01/10/2018	Muganza	506
KAY044	AFRIDEV	30/12/2015	01/10/2018	Rwakabanda	607
KAY018	AFRIDEV	16/01/2016	01/10/2018	Miyaga	652
					2,754
GS4900					
KAY020	AFRIDEV	27/12/2015	01/10/2018	Rubirizi	573
KAY021	AFRIDEV	07/01/2016	01/10/2018	Nyagashanga	525
KAY023	AFRIDEV	21/12/2015	01/10/2018	Agashikiri	507
KAY024	AFRIDEV	18/12/2015	01/10/2018	Tubanire	334
KAY026	AFRIDEV	27/01/2016	01/10/2018	Nyakagarama	515
					2,454
GS4901					
KAY027	AFRIDEV	17/12/2015	01/10/2018	Seka	486
KAY028	AFRIDEV	29/01/2016	01/10/2018	Kidogo	782
KAY029	AFRIDEV	02/02/2016	01/10/2018	Miyange	761
KAY030	AFRIDEV	13/01/2016	01/10/2018	Rugeyo	707
					2,736
GS5033					
KAY046	AFRIDEV	17/08/2016	01/10/2018	Akamina	645
KAY047	AFRIDEV	05/09/2016	01/10/2018	Kabuga	714
KAY049	AFRIDEV	16/09/2016	01/10/2018	Nyamirama	604
KAY050	AFRIDEV	20/09/2016	01/10/2018	Rugunga	925
					2,888
GS5034					
KAY051	AFRIDEV	09/09/2016	01/10/2018	Macuba	685
KAY052	AFRIDEV	24/08/2016	01/10/2018	Buhabwa	905
KAY053	AFRIDEV	13/09/2016	01/10/2018	Mirambi3	343

KAY054	AFRIDEV	06/09/2016	01/10/2018	Karagari2	542
					2,475
GS5035					
KAY056	AFRIDEV	18/08/2016	01/10/2018	Karambo2	572
KAY057	AFRIDEV	30/08/2016	01/10/2018	Gacaca (li)	1,446
KAY058	AFRIDEV	31/08/2016	01/10/2018	Gahushyi	573
KAY059	AFRIDEV	21/09/2016	01/10/2018	Rusera	625
KAY060	AFRIDEV	14/09/2016	01/10/2018	Miyaga (li)	446
					3,662
GS5036					
KAY061	AFRIDEV	20/08/2016	01/10/2018	Bishenyi	518
KAY062	AFRIDEV	01/09/2016	01/10/2018	Gisenga	630
KAY063	AFRIDEV	15/09/2016	01/10/2018	Nyabombe	552
KAY064	AFRIDEV	20/09/2016	01/10/2018	Urugunga	578
KAY066	AFRIDEV	15/08/2016	01/10/2018	Akabarima	738
					3,016
GS5392					
KAY033	AFRIDEV	09/12/2015	01/10/2018	Mbarara1	623
KAY035	AFRIDEV	15/01/2016	01/10/2018	Gakoma2	416
KAY036	AFRIDEV	16/01/2016	01/10/2018	Cyamburara	553
KAY017	AFRIDEV	04/01/2016	01/10/2018	Rwakabanda (i)	599
KAY038	AFRIDEV	26/01/2016	01/10/2018	Buhoro	497
					2,688
GS5393					
KAY040	AFRIDEV	11/12/2015	01/10/2018	Mutembo	580
KAY041	AFRIDEV	30/01/2016	01/10/2018	Mirambi3	309
KAY042	AFRIDEV	19/01/2016	01/10/2018	Akabare1	719
KAY043	AFRIDEV	22/12/2015	01/10/2018	Agashikiri	548
KAY045	AFRIDEV	06/01/2016	01/10/2018	Nyamirama	300
					2,456
GS5394					
KAY002	AFRIDEV	25/01/2016	01/10/2018	Akarambo	684
KAY009	AFRIDEV	20/01/2016	01/10/2018	Akabare1	465
KAY025	AFRIDEV	28/01/2016	01/10/2018	Karama	485
KAY037	AFRIDEV	29/12/2015	01/10/2018	Rwakabanda (iii)	301
KAY039	AFRIDEV	11/12/2015	01/10/2018	Cyingogo	478
					2,413
GS5395					
KAY067	AFRIDEV	22/09/2016	01/10/2018	Ryakibanda	878
KAY068	AFRIDEV	19/08/2016	01/10/2018	Bicumbi	704

KAY069	AFRIDEV	29/08/2016	01/10/2018	Byimana	724
KAY070	AFRIDEV	02/09/2016	01/10/2018	Gisunzu	578
KAY071	AFRIDEV	07/09/2016	01/10/2018	Karagari2 (li)	492
					3,376
GS5396					
KAY73	AFRIDEV	19/09/2016	01/10/2018	Nyanga	623
KAY74	AFRIDEV	12/09/2016	01/10/2018	Mburabuturo	722
KAY75	AFRIDEV	16/08/2016	01/10/2018	Akabeza	694
KAY76	AFRIDEV	26/08/2016	01/10/2018	Butimba1	878
					2,917
GS6837					
KAY015	AFRIDEV	10/12/2015	01/10/2018	Mbarara3	502
KAY019	AFRIDEV	08/01/2016	01/10/2018	Ngumeri	599
KAY022	AFRIDEV	28/01/2016	01/10/2018	Nyakagarama	483
KAY003	AFRIDEV	11/01/2016	01/10/2018	Sabasengo (i)	563
KAY034	AFRIDEV	15/12/2015	01/10/2018	Kinihira	434
KAY031	AFRIDEV	30/12/2015	01/10/2018	Rwakabanda (ii)	301
					2,882
GS6838					
KAY048	AFRIDEV	23/08/2016	01/10/2018	Bugarura	628
KAY055	AFRIDEV	25/08/2016	01/10/2018	Butimba	847
KAY065	AFRIDEV	22/09/2016	01/10/2018	Agasharu	910
KAY072	AFRIDEV	08/09/2016	01/10/2018	Kazeneza(li)	593
					2,978

Photos taken during annual monitoring: conducting survey with local user (left), borehole in use in Cyingogogo (right)

Photos taken during annual monitoring: Rubrizi borehole with handwashing station (left), Muganza borehole (right)

Addressing of FAR's

MP 2 & 3:
Forward Action Request # 1: The PP shall monitor and report the operating status of each borehole as well as consider the non-available days in the ER.

- PP conducts a minimum of four borehole visits per MP (quarterly) to check the functioning and maintenance of the borehole. These visits form part of maintenance and repairs log, which records if any breakdown does occur and the number of days between the date of breakdown and date of repair; failure days. Please see "Kayonza Maintenance MP4" and repair confirmation forms submitted.

B.2. Post-registration changes

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

>> (Indicate whether any temporary deviations have been applied during this monitoring period. If applied, provide a description of the deviation(s). Include the reasons for the deviation(s), how it deviates from the monitoring plan, applied methodology(ies) and/or applied approaches, the duration for which the deviation(s) is(are) applicable and justification on the conservativeness of the approach. Also indicate if prior approval from GS-TAC have been sought on the deviation.)

No temporary deviations have been made during this monitoring period.

B.2.2. Corrections

>> (Indicate whether any corrections to project information or parameters fixed at validation have been applied.)

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

B.2.3. Changes to start date of crediting period

>> (Indicate whether any changes to the start date of the crediting period have been approved by Gold Standard that is relevant for this monitoring period.)

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

B.2.4. Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline

>> (Indicate whether any permanent changes from the approved monitoring plan, applied methodologies or applied approaches have been approved by GS-TAC that is relevant for this monitoring period.)

No permanent changes have been made for this monitoring period.

B.2.5. Changes to project design of approved project

>> (Indicate whether any changes to the design of the project have been approved by GS-TAC that is relevant for this monitoring period.)

A design change was conducted to the Kayonza boreholes programme during MP2. Following on from the observation at the previous verification that several VPAs in the programme were crediting over the annual cap of 10,000 tCO2e, the decision was taken to conduct a design change to register three additional VPAs (GS5394, GS6837 and GS6838) and redistribute boreholes into them from existing over-crediting VPAs. The design change was submitted to GS on 17th October 2018 and the review was completed on 7th December 2018.

SECTION C. Description of monitoring system applied by the project

>>

All surveys are administered by trained CO2balance staff and partner NGOs 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 in the Kigali office and are available scanned upon request of the UK team.

In accordance with the Gold Standard methodology Technologies and Practices to Displace Decentralized Thermal Energy Consumption, the survey samples are randomly selected from the borehole user record. The random sampling procedure is as follows. Following 90/30 precision, achieved using Raosoft Sample Size Calculator, it was found that 5 of the 8 sectors in Kayonza District would need to be selected for inclusion in the surveys. The 5 sectors were selected by generating a random list of numbers on the Research Randomizer online resource. An aggregate list was then generated of households located within the 5 selected sectors, and these were reordered according to a new random list of numbers, again generated using Research Randomizer. The first 120 of the random sample list were selected to be targeted for the Project survey and Usage survey in order to ensure that a minimum of 100 households could be reached. For the water consumption field test, 60 were selected to ensure that the minimum of 30 households could be reached. In total, 40 WCFTs were conducted on individual households. The RSG is reselected for every monitoring period to ensure that 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. Rwandans4Water 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) – Completed prior to first verification and then biennially on a minimum sample of 40 households.

- **Quality of the treated water** – The quality of the treated water will be assessed to ensure that it is fit for human consumption. The parameters used to assess the water quality will be in line with Rwandan standards for potable water and all parameters will be shown to be within levels considered acceptable for domestic human consumption as per the WHO guidelines. Tests are conducted by Mlab, a government accredited laboratory which conducts according to government guidelines.

- **Usage Survey** – As all boreholes have been installed within 1 year of the start of the crediting period and are expected to last the lifetime of the project, minimum samples of 30 for different aged technologies will not be necessary. Therefore the annual usage survey will be conducted using a minimum sample size of 100.

- **Project Survey** – Conducted on a minimum sample of 100 households, surveying end users currently using project technologies to explore changes in project scenario over time.

- **Leakage assessment –** Sources of leakage detailed within the methodology relevant to this project have been reviewed (see below).

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: Sources of leakage detailed within the methodology relevant to this project have here been reviewed.

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

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

(Copy this table for each piece of data and parameter)

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:	C_j
Unit	Percentage
Description	Portion of users of project safe water supply who were already in baseline using a non- boiling safe water supply.
Source of data	Baseline study. Credible literature, studies, survey, reports, relevant to the project target area
Value(s) applied)	0.0%
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
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:	$EF_{b,fuel,co2}$
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:	$EF_{b,fuel,non\ co2}$
Unit	tco2/TJ

Description	Non-co2 emission factor arising from use of fuels in baseline scenario
Source of data	IPCC default value
Value(s) applied)	8.692
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:	$EF_{p,fuel,co2}$
Unit	tco2/TJ
Description	co2 emission factor arising from use of fuels in project 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:	$EF_{p,fuel,nonco2}$
Unit	tco2/TJ
Description	Non-co2 emission factor arising from use of fuels in project scenario
Source of data	IPCC default value
Value(s) applied)	8.692
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:	$NCV_{b,fuel}$
Unit	TJ/ton
Description	Net calorific value of the fuels used in the baseline

Source of data	IPCC default value
Value(s) applied)	8.692
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:	$NCV_{p,fuel}$
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)	0.98
Choice of data or measurement methods and procedures	$f_{NRB,i,y}$
Purpose of data	Calculate ERs
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 **3.9.1:** 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 **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 b during year y
Source of data	Baseline Water Boiling Test
Value(s) applied)	0.0006592
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 and the GS WBT protocol guidelines.
Purpose of data	Calculate ERs
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 **3.9.1:** 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 **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)	0.0006592

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:	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)	0
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	

D.2. Data and parameters monitored

(Copy this table for each piece of data and parameter)

Relevant SDG Indicator/Safeguarding Principle	**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	$HAPR_y$
Unit	%
Description	Total reduction in Household Air Pollution from boiling water for project activity in year y (%)

Measured/calculated/default	Measured
Source of data	Kayonza_MP4_ERCalcs. Tab: SDG Impacts. Cell: D12.
Value(s) of monitored parameter	90% (All VPAs)
Monitoring equipment	-
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	Review the number of people using the borehole according to the household lists for each VPA and multiply by the usage rate to calculate the number of people now using a safe water source in order to calculate the amount of biomass that would have been burnt to purify the water in the baseline scenario. Deduct from this any individuals that still boil water in the project scenario.
QA/QC procedures:	-
Purpose of data	To calculate the additional number of persons who have access to safe water in the project activity compared to the baseline scenario and to calculate from that the percentage decrease in biomass used to purify water through boiling.
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
Data/parameter:	P_y
Unit	Number
Description	Number of persons consuming safe water
Measured/calculated/default	
Source of data	HH lists supplied by local administrative officials.
Value(s) applied)	As per household list for each VPA
Monitoring equipment	
Calculation method (if applicable):	Sum of the total number of people using each borehole in the project. The total number of households using each borehole will be established through lists supplied by the water resource committee and/or community group and/or district officer responsible for that borehole. Using this method, the total number of people using each borehole will be known.
QA/QC procedures:	
Purpose of data	Determination of number of persons using safe water.
Additional comments	Updated annually.

Relevant SDG Indicator/Safeguarding Principle	**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	TR_y
Unit	Percentage
Description	Total reduction time spent collecting water for project activity in year y (%)
Measured/calculated/default	Measured
Source of data	Kayonza_MP4_ERCalcs. Tab: SDG Impacts. Cell: D19.
Value(s) of monitored parameter	55.36% (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/Safeguarding Principle	**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	Kayonza Project survey Report July 2020, Q43. Tab: Report. Cell: B174-180.

Value(s) of monitored parameter	(Unpaid) Domestic work: 37% Income generating activities: 48% Religious activities: 8% Social and leisure activities: 22% Voluntary activities: 0% Education and training: 18% Other: 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. **6.1.1:** Proportion of population using safely managed drinking water services
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 annually
Source of data	HH lists and Usage Survey

Value(s) of monitored parameter	GS4897 1,350 GS4898 1,500 GS4899 1,350 GS4900 1,350 GS4901 3,062 GS5033 1,080 GS5034 1,350 GS5035 1,350 GS5036 1,350 GS5392 1,350 GS5393 1,350 GS5394 1,350 GS5395 1,350 GS5396 1,080 GS6837 1,620 GS6838 1,080 Total 22,922
Monitoring equipment	HH lists and surveys
Measuring/reading/recording frequency:	Measured annually
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 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:	$N_{p,y}$
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	Kayonza_MP4_ERCalcs. Tab: Total PTDs

Value(s) of monitored parameter	GS4897 520,125 GS4898 520,125 GS4899 515,231 GS4900 520,125 GS4901 416,100 GS5033 416,100 GS5034 416,100 GS5035 459,300 GS5036 520,125 GS5392 520,125 GS5393 520,125 GS5394 520,125 GS5395 520,125 GS5396 416,100 GS6837 624,150 GS6838 416,100 Total 7,840,181
Monitoring equipment	Borehole Project Database
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	Borehole users * (Total crediting days – non-operation days)
QA/QC procedures:	-
Purpose of data:	Calculate ERs
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 **3.9.1:** 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 **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:	$U_{p,y}$
Unit	Percentage
Description	Usage rate in project scenario p through year y
Measured/calculated/default	Measured
Source of data	Kayonza_US_MP4. Q7

Value(s) of monitored parameter	90%
Monitoring equipment	The usage survey has been carried out by staff trained by CO2balance and local in- country partner Rwandans4Water 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 3 & 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 **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:	$Q_{p,y}$
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	Kayonza_WCFT_MP4
Value(s) of monitored parameter	7.5 (Actual value: 12.51) Gacaca (ii): 3 (BH located in school facilities) (As per Section A3.2 TPDDTEC V3.1)
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 Rwandans4Water 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:	Value capped at 7.5

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 **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	Kayonza_WCFT_MP4
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 Rwandans4Water 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 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 **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	Kayonza_WCFT_MP4
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 Rwandans4Water 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 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
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
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 baseline technology
Additional comments:	The Kigali based recognised laboratory has certified each water supply in line with national standards which also adheres to the WHO guidelines.

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	Breakdown Days,y
Unit	Number
Description	Number of days a particular borehole was non-functioning during year y
Source of data	"Kayonza MP4 Maintainance".docx, Kayonza_MP4_ERCalcs_v3 NON CAP
Value(s) applied	1626 days
Measurement methods and procedures	RCF collection, Borehole visits, communications from WRC.
Monitoring frequency	Ongoing
QA/QC procedures	-
Purpose of data	Calculating ERs
Additional comment	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.

D.3. Implementation of sampling plan

>> (If data and parameters monitored described in section D.2 above are determined by a sampling approach, provide a description on how project participants implemented the sampling plan and surveys for those data and parameters according to the approved PDD.)

The project proponent has elected to cross-sample technologies across all its homogenous borehole VPAs located within Kayonza district. 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. Following 90/30 precision, it was found that 5 sectors of the 8 sectors in Kayonza district which contain boreholes in the VPAs would need to be selected for inclusion in the surveys. 5 sectors were selected by generating a random list of numbers. An aggregate list was then generated of the households in the 5 selected sectors, and these were ordered according to a random list of numbers. The first 120 households were selected for the Project Survey and Usage Survey, which were conducted between 14/07/2020 and 16/07/2020. The WCFT was conducted during this MP, between 14/07/2020 and 17/07/2020.

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 outcomes

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

>> (*Provide details of equations and approaches used to calculate/estimate baseline values.*)

SDG 3 (Good Health and Wellbeing)

$P_{b,y} = W_{b,y} * Q_{p,y}$

Where :

$P_{b,y}$ Quantity of fuel that is consumed in the baseline scenario b during year y (kg/person-day)

$W_{b,y}$ Quantity of wood fuel or fossil fuel required to boil 1 litre of water using technologies representative of baseline scenario b during year y

$Q_{p,y}$ Quantity of safe water supplied in the project scenario p during year y, using the "zero or low" emissions' clean water supply technology

$0.00494 = 0.0006592 * 7.5$

SDG 5 (Gender Equality)

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

To establish $T_{b,y}$, $Trips_b$ and that the burden of collecting water falls on females, the Project Survey asks the following:

13	Before this project, who would usually go to this source to collect water for your household?	**1.** Male Adult	**2.** Female Adult
		3. Male Child	**4.** Female Child
14	How much time did it take to collect water?	*Please specify*	
15	How many trips were made per day?	*Please specify*	

$T_{b,y}$ = 102.78 minutes

SDG 6 (Clean Water and Sanitation)

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.

Cj = 0%

SDG 13 (Climate Action)

See section E3 for baseline emission calculations.

Baseline Emissions ($BE_{b,y}$)

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

Where:

$B_{b,y}$ = Quantity fuel consumed in the baseline scenario.

NRB = Country-specific default value for the fraction of non-renewable biomass.

$EF_{b,fuel,co2}$ = Emissions factor of fuel consumed in the baseline scenario (CO_2).

$EF_{b,fuel,nonco2}$ = Emissions factor of fuel consumed in the baseline scenario (non- CO_2).

$NCV_{b,fuel}$ = Net calorific value of fuel consumed in the baseline scenario.

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

>> (*Provide details of equations and approaches used to calculate/estimate project values.*)

SDG 3 (Good Health and Wellbeing)

$P_{p,y}$ Quantity of fuel that is consumed in the project scenario p during year y (kg/person-day)
$U_{p,y}$ Usage rate in project scenario p during year y

Where:

$P_{p,y} = W_{b,y} * Q_{p,cleanboil,y}$

Where:

$W_{b,y}$ Quantity of wood fuel or fossil fuel required to boil 1 litre of water using technologies representative of baseline scenario b during year y
$Q_{p,cleanboil,y}$ Quantity of safe water boiled in the project scenario p during year y, after installation of the project technology

Same for all VPAs

SDG 3 Good Health and Well-Being			
Parameter	Description	Value	Unit
$P_{b,y}$	Quantity of fuel that is consumed in the baseline scenario b during year y	0.00300	KG/Person/day
$P_{p,y}$	Quantity of fuel that is consumed in the project scenario p during year y	0	KG/Person/day
$U_{p,y}$	Usage rate in project scenario p during year y	90%	%
$W_{b,y}$	Quantity of wood fuel or fossil fuel required to boil 1 litre of water using	0.000	KG/L
$Q_{p,y}$	Quantity of safe water supplied in the project scenario p during year y, using the	7.5	Litre
$Q_{p,cleanboil,y}$	Quantity of safe water boiled in the project scenario p during year y, after	0	KG/L
HAPRy	Total reduction in Household Air Pollution for project activity in year y	90%	%

SDG 5

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

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)	

Same for all VPAs

SDG 5 Gender Equality			
Parameter	Description	Value	Unit
$T_{b,y}$	Time spent collecting water per household per borehole visit prior to project	102.78	Minutes
$Trips_b$	Number of water collection trips made per household per day prior to the proj	2.13	Number
$T_{p,y}$	Time spent collecting water per household per borehole visit in the project	42.33	Minutes
$Trips_p$	Number of water collection trips made per household per day in the project	2.31	Number
TR_y	Total reduction time spent collecting water for project activity in year y	55.36%	%

SDG 6

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

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

SDG 6	GS4897 1,350 GS4898 1,500 GS4899 1,350 GS4900 1,350 GS4901 3,062 GS5033 1,080 GS5034 1,350 GS5035 1,350 GS5036 1,350 GS5392 1,350 GS5393 1,350 GS5394 1,350 GS5395 1,350 GS5396 1,080 GS6837 1,620 GS6838 1080 Total 22,922

SDG 13
Project Emissions ($PE_{b,y}$)

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

Where:

$B_{p,y}$ = Quantity fuel consumed in project scenario.

NRB = Country-specific default value for the fraction of non-renewable biomass.

$EF_{p,fuel,co2}$ = Emissions factor of fuel used in the project scenario (CO_2).

$EF_{p,fuel,nonco2}$ = Emissions factor of fuel used in the project scenario (non- CO_2).

$NCV_{p,fuel}$ = Net calorific value of fuel used in the project scenario.

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

>>

SDG 3

$HAPR_y$ = 90% = ((4.944 - 0) / 4.944) *0.90

Where:

$HAPR_y = ((P_{b,y} – P_{p,y}) / P_{b,y}) * U_{p,y}$

$HAPR_y$	Total reduction in Household Air Pollution from boiling water for project activity in year y (%)
$P_{b,y}$	Quantity of fuel that is consumed in the baseline scenario b during year y (kg/person-day)
$P_{p,y}$	Quantity of fuel that is consumed in the project scenario p during year y (kg/person-day)
$U_{p,y}$	Usage rate in project scenario p during year y

The project has reduced household air pollution by 100% by removing the need to boil water to make it safe to consume.

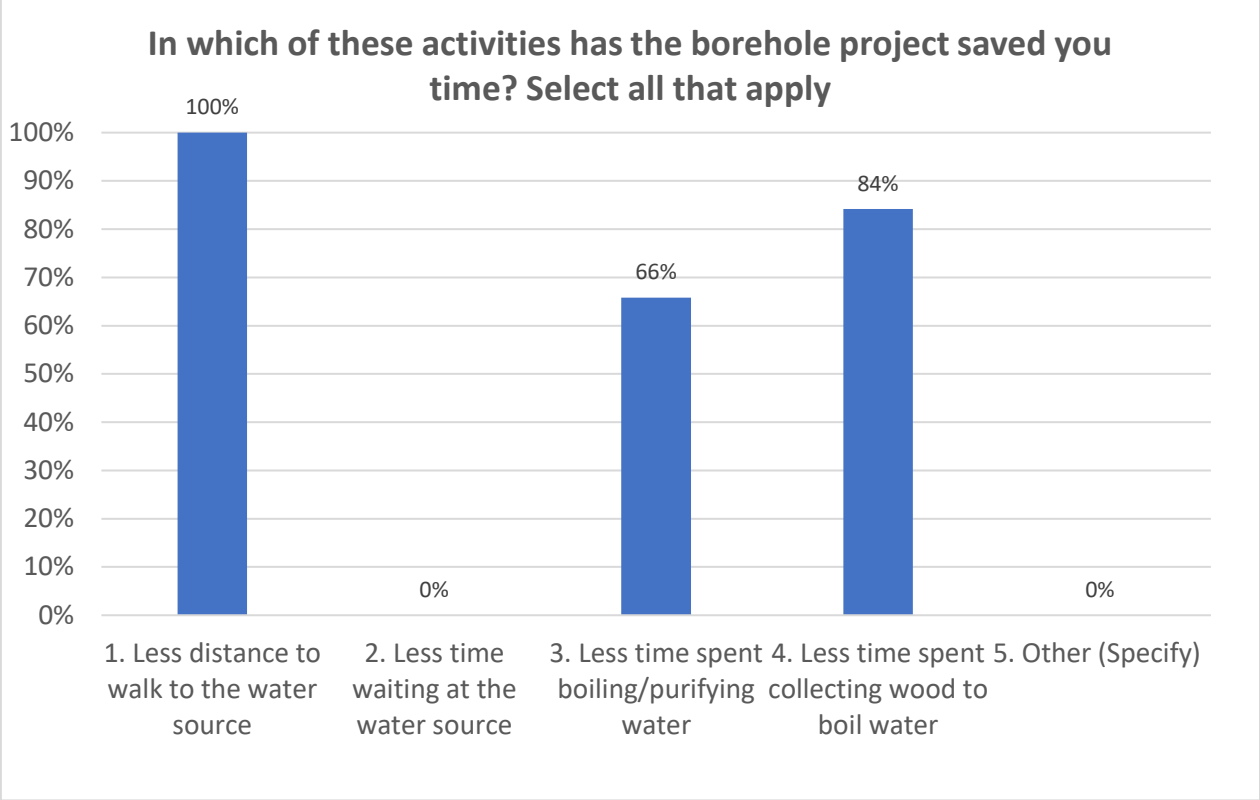
SDG 5

TR_y = 55.36% = (102.78*2.13) – (42.33*2.31) / (102.78*2.13)
$TR_y = (T_{b,y}*Trips_b) – (T_{p,y}*Trips_p) / (T_{b,y}*Trips_b)$

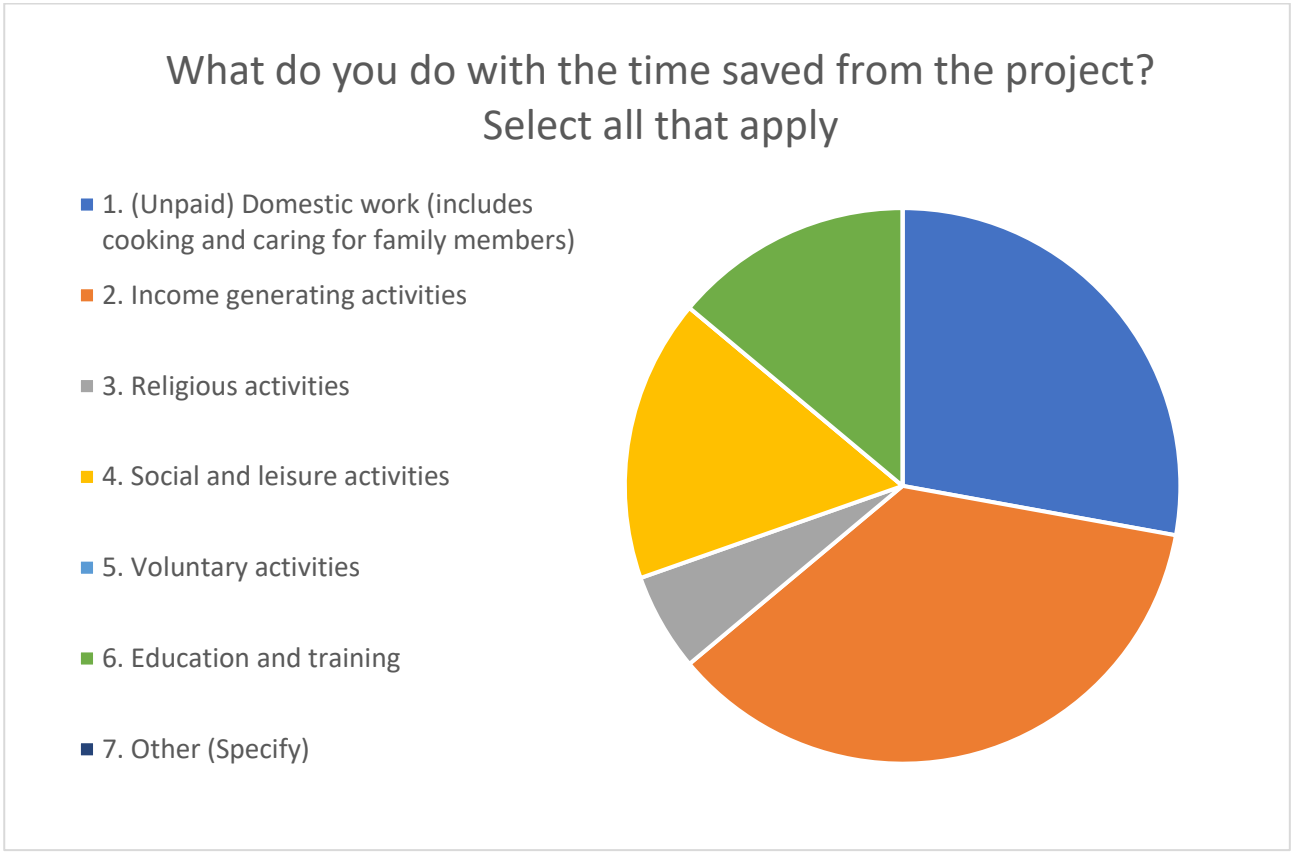
Where:

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 (hours)
$Trips_b$	Number of water collection trips made per household per day prior to the project
$T_{p,y}$	Time spent collecting water per household per day in project (hours)
$Trips_p$	Number of water collection trips made per household per day in the project

The project has saved households an average 60 minutes collecting water by reducing the distance needed to walk to the water source (100%), removing the need to treat the water (66%) and to collect necessary firewood for water purification (84%).



The 55.36% reduction in time spent collecting and treating water is used in the following ways:



SDG 6

P_{access} = 22,922 = 24,000 * (1 – 0) * 0.9

Where:

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

Using the above values for parameters Cj and Up,y, SDG was calculated for each VPA. The total number of additional persons having access to safe water in the project activity compared to the baseline scenario is 22,652.

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SDG 6 Impacts	
GS ID	Paccess
GS4897	1,350
GS4898	1,500
GS4899	1,350
GS4900	1,350
GS4901	3,062
GS5033	1,080
GS5034	1,350
GS5035	1,350
GS5036	1,350
GS5392	1,350
GS5393	1,350
GS5394	1,350
GS5395	1,350
GS5396	1,080
GS6837	1,620
GS6838	1,080
Total	22,922

SDG 13 and emission reductions

In MP4 the project achieved a total capped ERs of 144,626 tCO2e. Below is a summary of the ERs by VPA and vintage, followed by the total.

Gacaca (ii) is a borehole situated in a school. School term time, as well the closure of schools due to the covid-19 pandemic has been factored into the total amount of crediting days. A WCFT value of 3L has been applied to this borehole and its ERs determined individually then combined to the other boreholes in the VPA, to give the total VPA ERs.

GS ID	PTD Total	ERs		
		2019	2020	Total
GS4897	520,125	646	1,948	2,594
GS4898	520,125	646	1,948	2,594
GS4899	515,231	646	1,923	2,569
GS4900	520,125	646	1,948	2,594
GS4901	416,100	517	1,558	2,075
GS5033	416,100	517	1,558	2,075
GS5034	416,100	517	1,558	2,075
GS5035	459,300	559	1,601	2,160
GS5036	520,125	646	1,948	2,594
GS5392	520,125	646	1,948	2,594
GS5393	520,125	646	1,948	2,594
GS5394	520,125	646	1,947	2,593
GS5395	520,125	646	1,948	2,594
GS5396	416,100	517	1,558	2,075
GS6837	624,150	776	2,337	3,113
GS6838	416,100	517	1,558	2,075
Total	7,840,181	9,734	29,234	**38,968**

Gold Standard

GS 4897

Total Emission Reductions for Monitoring Period 4			
Baseline Fuel Use (Bby)			
Portion using safe water	Cj	fraction	0.0%
Person Days	Njy		520,125
Fuel to treat 1 litre of water using baseline tech	Wb,y	T/L	0.0004000
Quantity safe water litres consumed in project scenario supplied by project technology	Qp,y	L/pd	7.5
Quantity of raw water boiled in addition to project technology water	Qp, raw, y	L/pd	0
Quantity fuel consumed in baseline scenario	Bb,y	T	1560
Project Fuel Use (Pby)			
Portion of safe users	Cj	fraction	0.00%
Person Days	Njy		520125
Fossil fuel required to treat 1 litre for water in project scenario	Wp,y	T/L	0.0004000
Quantity of raw water boiled in addition to project tech water	Qp, raw, y	L/pd	0
Quantity of safe water boiled	Qp, cleanboil, y	L/pd	0
Quantity of fuel consumed in project scenario per HH	Bp,y	T	0
Constants			
NRB	NRB	Fraction	0.98
Emissions factor fuel (co2)	EFb,fuel,co2	tCO2/TJ	112
Emissions factor fuel (non-co2)	EFb, fuel, non-co2	TCO2/TJ	8.692
Net calorific value of fuel	NCV,b,fuel	TJ/T	0.0156
Emissions Reductions			
Baseline emissions per year	BEb,y	tCO2/y	2,883
Project emissions per year	PEp,y	tCO2/y	0
Usage rate	Up,y	fraction	0.9
Leakage	LEp,y	tCO2/y	0
Emission Reductions	**Ery**	**tCO2/y**	**2,595**
	ERs claimed		**2,594**

GS 4898

Total Emission Reductions for Monitoring Period 4			
Baseline Fuel Use (Bby)			
Portion using safe water	Cj	fraction	0.0%
Person Days	Njy		520,125
Fuel to treat 1 litre of water using baseline tech	Wb,y	T/L	0.0004000
Quantity safe water litres consumed in project scenario supplied by project technology	Qp,y	L/pd	7.5
Quantity of raw water boiled in addition to project technology water	Qp, raw, y	L/pd	0
Quantity fuel consumed in baseline scenario	Bb,y	T	1560
Project Fuel Use (Pby)			
Portion of safe users	Cj	fraction	0.00%
Person Days	Njy		520,125
Fossil fuel required to treat 1 litre for water in project scenario	Wp,y	T/L	0.0004000
Quantity of raw water boiled in addition to project tech water	Qp, raw, y	L/pd	0
Quantity of safe water boiled	Qp, cleanboil, y	L/pd	0
Quantity of fuel consumed in project scenario per HH	Bp,y	T	0
Constants			
NRB	NRB	Fraction	0.98
Emissions factor fuel (co2)	EFb,fuel,co2	tCO2/TJ	112
Emissions factor fuel (non-co2)	EFb, fuel, non-co2	TCO2/TJ	8.692
Net calorific value of fuel	NCV,b,fuel	TJ/T	0.0156
Emissions Reductions			
Baseline emissions per year	BEb,y	tCO2/y	2,883
Project emissions per year	PEp,y	tCO2/y	0
Usage rate	Up,y	fraction	0.9
Leakage	LEp,y	tCO2/y	0
Emission Reductions	**Ery**	**tCO2/y**	**2,595**
	ERs claimed		**2,594**

Gold Standard

GS 4899

Total Emission Reductions for Monitoring Period 4			
Baseline Fuel Use (Bby)			
Portion using safe water	Cj	fraction	0.0%
Person Days	Njy		515,231
Fuel to treat 1 litre of water using baseline tech	Wb,y	T/L	0.0004000
Quantity safe water litres consumed in project scenario supplied by project technology	Qp,y	L/pd	7.5
Quantity of raw water boiled in addition to project technology water	Qp, raw, y	L/pd	0
Quantity fuel consumed in baseline scenario	Bb,y	T	1546
Project Fuel Use (Pby)			
Portion of safe users	Cj	fraction	0.00%
Person Days	Njy		515,231
Fossil fuel required to treat 1 litre for water in project scenario	Wp,y	T/L	0.0004000
Quantity of raw water boiled in addition to project tech water	Qp, raw, y	L/pd	0
Quantity of safe water boiled	Qp, cleanboil, y	L/pd	0
Quantity of fuel consumed in project scenario per HH	Bp,y	T	0
Constants			
NRB	NRB	Fraction	0.98
Emissions factor fuel (co2)	EFb,fuel,co2	tCO2/TJ	112
Emissions factor fuel (non-co2)	EFb, fuel, non-co2	TCO2/TJ	8.692
Net calorific value of fuel	NCV,b,fuel	TJ/T	0.0156
Emissions Reductions			
Baseline emissions per year	BEb,y	tCO2/y	2,856
Project emissions per year	PEp,y	tCO2/y	0
Usage rate	Up,y	fraction	0.9
Leakage	LEp,y	tCO2/y	0
Emission Reductions	**Ery**	**tCO2/y**	**2,571**
	ERs claimed		**2,569**

GS 4900

Total Emission Reductions for Monitoring Period 4			
Baseline Fuel Use (Bby)			
Portion using safe water	Cj	fraction	0.0%
Person Days	Njy		520,125
Fuel to treat 1 litre of water using baseline tech	Wb,y	T/L	0.0004000
Quantity safe water litres consumed in project scenario supplied by project technology	Qp,y	L/pd	7.5
Quantity of raw water boiled in addition to project technology water	Qp, raw, y	L/pd	0
Quantity fuel consumed in baseline scenario	Bb,y	T	1560
Project Fuel Use (Pby)			
Portion of safe users	Cj	fraction	0.00%
Person Days	Njy		520,125
Fossil fuel required to treat 1 litre for water in project scenario	Wp,y	T/L	0.0004000
Quantity of raw water boiled in addition to project tech water	Qp, raw, y	L/pd	0
Quantity of safe water boiled	Qp, cleanboil, y	L/pd	0
Quantity of fuel consumed in project scenario per HH	Bp,y	T	0
Constants			
NRB	NRB	Fraction	0.98
Emissions factor fuel (co2)	EFb,fuel,co2	tCO2/TJ	112
Emissions factor fuel (non-co2)	EFb, fuel, non-co2	TCO2/TJ	8.692
Net calorific value of fuel	NCV,b,fuel	TJ/T	0.0156
Emissions Reductions			
Baseline emissions per year	BEb,y	tCO2/y	2,883
Project emissions per year	PEp,y	tCO2/y	0
Usage rate	Up,y	fraction	0.9
Leakage	LEp,y	tCO2/y	0
Emission Reductions	**Ery**	**tCO2/y**	**2,595**
	ERs claimed		**2,594**

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GS 4901

Total Emission Reductions for Monitoring Period 4			
Baseline Fuel Use (Bby)			
Portion using safe water	Cj	fraction	0.0%
Person Days	Njy		416,100
Fuel to treat 1 litre of water using baseline tech	Wb,y	T/L	0.0004000
Quantity safe water litres consumed in project scenario supplied by project technology	Qp,y	L/pd	7.5
Quantity of raw water boiled in addition to project technology water	Qp, raw, y	L/pd	0
Quantity fuel consumed in baseline scenario	Bb,y	T	1248
Project Fuel Use (Pby)			
Portion of safe users	Cj	fraction	0.00%
Person Days	Njy		416,100
Fossil fuel required to treat 1 litre for water in project scenario	Wp,y	T/L	0.0004000
Quantity of raw water boiled in addition to project tech water	Qp, raw, y	L/pd	0
Quantity of safe water boiled	Qp, cleanboil, y	L/pd	0
Quantity of fuel consumed in project scenario per HH	Bp,y	T	0
Constants			
NRB	NRB	Fraction	0.98
Emissions factor fuel (co2)	EFb,fuel,co2	tCO2/TJ	112
Emissions factor fuel (non-co2)	EFb, fuel, non-co2	TCO2/TJ	8.692
Net calorific value of fuel	NCV,b,fuel	TJ/T	0.0156
Emissions Reductions			
Baseline emissions per year	BEb,y	tCO2/y	2,307
Project emissions per year	PEp,y	tCO2/y	0
Usage rate	Up,y	fraction	0.9
Leakage	LEp,y	tCO2/y	0
Emission Reductions	**Ery**	**tCO2/y**	**2,076**
	ERs claimed		**2,075**

GS 5033

Total Emission Reductions for Monitoring Period 4			
Baseline Fuel Use (Bby)			
Portion using safe water	Cj	fraction	0.0%
Person Days	Njy		416,100
Fuel to treat 1 litre of water using baseline tech	Wb,y	T/L	0.0004000
Quantity safe water litres consumed in project scenario supplied by project technology	Qp,y	L/pd	7.5
Quantity of raw water boiled in addition to project technology water	Qp, raw, y	L/pd	0
Quantity fuel consumed in baseline scenario	Bb,y	T	1248
Project Fuel Use (Pby)			
Portion of safe users	Cj	fraction	0.00%
Person Days	Njy		416,100
Fossil fuel required to treat 1 litre for water in project scenario	Wp,y	T/L	0.0004000
Quantity of raw water boiled in addition to project tech water	Qp, raw, y	L/pd	0
Quantity of safe water boiled	Qp, cleanboil, y	L/pd	0
Quantity of fuel consumed in project scenario per HH	Bp,y	T	0
Constants			
NRB	NRB	Fraction	0.98
Emissions factor fuel (co2)	EFb,fuel,co2	tCO2/TJ	112
Emissions factor fuel (non-co2)	EFb, fuel, non-co2	TCO2/TJ	8.692
Net calorific value of fuel	NCV,b,fuel	TJ/T	0.0156
Emissions Reductions			
Baseline emissions per year	BEb,y	tCO2/y	2,307
Project emissions per year	PEp,y	tCO2/y	0
Usage rate	Up,y	fraction	0.9
Leakage	LEp,y	tCO2/y	0
Emission Reductions	**Ery**	**tCO2/y**	**2,076**
	ERs claimed		**2,075**

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GS 5034

Total Emission Reductions for Monitoring Period 4			
Baseline Fuel Use (Bby)			
Portion using safe water	Cj	fraction	0.0%
Person Days	Njy		416,100
Fuel to treat 1 litre of water using baseline tech	Wb,y	T/L	0.0004000
Quantity safe water litres consumed in project scenario supplied by project technology	Qp,y	L/pd	7.5
Quantity of raw water boiled in addition to project technology water	Qp, raw, y	L/pd	0
Quantity fuel consumed in baseline scenario	Bb,y	T	1248
Project Fuel Use (Pby)			
Portion of safe users	Cj	fraction	0.00%
Person Days	Njy		416,100
Fossil fuel required to treat 1 litre for water in project scenario	Wp,y	T/L	0.0004000
Quantity of raw water boiled in addition to project tech water	Qp, raw, y	L/pd	0
Quantity of safe water boiled	Qp, cleanboil, y	L/pd	0
Quantity of fuel consumed in project scenario per HH	Bp,y	T	0
Constants			
NRB	NRB	Fraction	0.98
Emissions factor fuel (co2)	EFb,fuel,co2	tCO2/TJ	112
Emissions factor fuel (non-co2)	EFb, fuel, non-co2	TCO2/TJ	8.692
Net calorific value of fuel	NCV,b,fuel	TJ/T	0.0156
Emissions Reductions			
Baseline emissions per year	BEb,y	tCO2/y	2,307
Project emissions per year	PEp,y	tCO2/y	0
Usage rate	Up,y	fraction	0.9
Leakage	LEp,y	tCO2/y	0
Emission Reductions	**Ery**	**tCO2/y**	**2,076**
	ERs claimed		**2,075**

GS 5035 (i)

Total Emission Reductions for Monitoring Period 4			
Baseline Fuel Use (Bby)			
Portion using safe water	Cj	fraction	0.0%
Person Days	Njy		416,100
Fuel to treat 1 litre of water using baseline tech	Wb,y	T/L	0.0004000
Quantity safe water litres consumed in project scenario supplied by project technology	Qp,y	L/pd	7.5
Quantity of raw water boiled in addition to project technology water	Qp, raw, y	L/pd	0
Quantity fuel consumed in baseline scenario	Bb,y	T	1248
Project Fuel Use (Pby)			
Portion of safe users	Cj	fraction	0.00%
Person Days	Njy		416,100
Fossil fuel required to treat 1 litre for water in project scenario	Wp,y	T/L	0.0004000
Quantity of raw water boiled in addition to project tech water	Qp, raw, y	L/pd	0
Quantity of safe water boiled	Qp, cleanboil, y	L/pd	0
Quantity of fuel consumed in project scenario per HH	Bp,y	T	0
Constants			
NRB	NRB	Fraction	0.98
Emissions factor fuel (co2)	EFb,fuel,co2	tCO2/TJ	112
Emissions factor fuel (non-co2)	EFb, fuel, non-co2	TCO2/TJ	8.692
Net calorific value of fuel	NCV,b,fuel	TJ/T	0.0156
Emissions Reductions			
Baseline emissions per year	BEb,y	tCO2/y	2,307
Project emissions per year	PEp,y	tCO2/y	0
Usage rate	Up,y	fraction	0.9
Leakage	LEp,y	tCO2/y	0
Emission Reductions	**Ery**	**tCO2/y**	**2,076**
	ERs claimed		**2,075**

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GS 5035 (ii)

Total Emission Reductions for Monitoring Period 4			
Baseline Fuel Use (Bby)			
Portion using safe water	Cj	fraction	0.0%
Person Days	Njy		43,200
Fuel to treat 1 litre of water using baseline tech	Wb,y	T/L	0.0004000
Quantity safe water litres consumed in project scenario supplied by project technology	Qp,y	L/pd	3
Quantity of raw water boiled in addition to project technology water	Qp, raw, y	L/pd	0
Quantity fuel consumed in baseline scenario	Bb,y	T	52
Project Fuel Use (Pby)			
Portion of safe users	Cj	fraction	0.00%
Person Days	Njy		43,200
Fossil fuel required to treat 1 litre for water in project scenario	Wp,y	T/L	0.0004000
Quantity of raw water boiled in addition to project tech water	Qp, raw, y	L/pd	0
Quantity of safe water boiled	Qp, cleanboil, y	L/pd	0
Quantity of fuel consumed in project scenario per HH	Bp,y	T	0
Constants			
NRB	NRB	Fraction	0.98
Emissions factor fuel (co2)	EFb,fuel,co2	tCO2/TJ	112
Emissions factor fuel (non-co2)	EFb, fuel, non-co2	TCO2/TJ	8.692
Net calorific value of fuel	NCV,b,fuel	TJ/T	0.0156
Emissions Reductions			
Baseline emissions per year	BEb,y	tCO2/y	96
Project emissions per year	PEp,y	tCO2/y	0
Usage rate	Up,y	fraction	0.9
Leakage	LEp,y	tCO2/y	0
Emission Reductions	**Ery**	**tCO2/y**	**86**
	ERs claimed		**85**

GS 5036

Total Emission Reductions for Monitoring Period 4			
Baseline Fuel Use (Bby)			
Portion using safe water	Cj	fraction	0.0%
Person Days	Njy		520,125
Fuel to treat 1 litre of water using baseline tech	Wb,y	T/L	0.0004000
Quantity safe water litres consumed in project scenario supplied by project technology	Qp,y	L/pd	7.5
Quantity of raw water boiled in addition to project technology water	Qp, raw, y	L/pd	0
Quantity fuel consumed in baseline scenario	Bb,y	T	1560
Project Fuel Use (Pby)			
Portion of safe users	Cj	fraction	0.00%
Person Days	Njy		520,125
Fossil fuel required to treat 1 litre for water in project scenario	Wp,y	T/L	0.0004000
Quantity of raw water boiled in addition to project tech water	Qp, raw, y	L/pd	0
Quantity of safe water boiled	Qp, cleanboil, y	L/pd	0
Quantity of fuel consumed in project scenario per HH	Bp,y	T	0
Constants			
NRB	NRB	Fraction	0.98
Emissions factor fuel (co2)	EFb,fuel,co2	tCO2/TJ	112
Emissions factor fuel (non-co2)	EFb, fuel, non-co2	TCO2/TJ	8.692
Net calorific value of fuel	NCV,b,fuel	TJ/T	0.0156
Emissions Reductions			
Baseline emissions per year	BEb,y	tCO2/y	2,883
Project emissions per year	PEp,y	tCO2/y	0
Usage rate	Up,y	fraction	0.9
Leakage	LEp,y	tCO2/y	0
Emission Reductions	**Ery**	**tCO2/y**	**2,595**
	ERs claimed		**2,594**

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GS 5392

Total Emission Reductions for Monitoring Period 4			
Baseline Fuel Use (Bby)			
Portion using safe water	Cj	fraction	0.0%
Person Days	Njy		520,125
Fuel to treat 1 litre of water using baseline tech	Wb,y	T/L	0.0004000
Quantity safe water litres consumed in project scenario supplied by project technology	Qp,y	L/pd	7.5
Quantity of raw water boiled in addition to project technology water	Qp, raw, y	L/pd	0
Quantity fuel consumed in baseline scenario	Bb,y	T	1560
Project Fuel Use (Pby)			
Portion of safe users	Cj	fraction	0.00%
Person Days	Njy		520,125
Fossil fuel required to treat 1 litre for water in project scenario	Wp,y	T/L	0.0004000
Quantity of raw water boiled in addition to project tech water	Qp, raw, y	L/pd	0
Quantity of safe water boiled	Qp, cleanboil, y	L/pd	0
Quantity of fuel consumed in project scenario per HH	Bp,y	T	0
Constants			
NRB	NRB	Fraction	0.98
Emissions factor fuel (co2)	EFb,fuel,co2	tCO2/TJ	112
Emissions factor fuel (non-co2)	EFb, fuel, non-co2	TCO2/TJ	8.692
Net calorific value of fuel	NCV,b,fuel	TJ/T	0.0156
Emissions Reductions			
Baseline emissions per year	BEb,y	tCO2/y	2,883
Project emissions per year	PEp,y	tCO2/y	0
Usage rate	Up,y	fraction	0.9
Leakage	LEp,y	tCO2/y	0
Emission Reductions	**Ery**	**tCO2/y**	**2,595**
	ERs claimed		**2,594**

GS 5393

Total Emission Reductions for Monitoring Period 4			
Baseline Fuel Use (Bby)			
Portion using safe water	Cj	fraction	0.0%
Person Days	Njy		520,125
Fuel to treat 1 litre of water using baseline tech	Wb,y	T/L	0.0004000
Quantity safe water litres consumed in project scenario supplied by project technology	Qp,y	L/pd	7.5
Quantity of raw water boiled in addition to project technology water	Qp, raw, y	L/pd	0
Quantity fuel consumed in baseline scenario	Bb,y	T	1560
Project Fuel Use (Pby)			
Portion of safe users	Cj	fraction	0.00%
Person Days	Njy		520,125
Fossil fuel required to treat 1 litre for water in project scenario	Wp,y	T/L	0.0004000
Quantity of raw water boiled in addition to project tech water	Qp, raw, y	L/pd	0
Quantity of safe water boiled	Qp, cleanboil, y	L/pd	0
Quantity of fuel consumed in project scenario per HH	Bp,y	T	0
Constants			
NRB	NRB	Fraction	0.98
Emissions factor fuel (co2)	EFb,fuel,co2	tCO2/TJ	112
Emissions factor fuel (non-co2)	EFb, fuel, non-co2	TCO2/TJ	8.692
Net calorific value of fuel	NCV,b,fuel	TJ/T	0.0156
Emissions Reductions			
Baseline emissions per year	BEb,y	tCO2/y	2,883
Project emissions per year	PEp,y	tCO2/y	0
Usage rate	Up,y	fraction	0.9
Leakage	LEp,y	tCO2/y	0
Emission Reductions	**Ery**	**tCO2/y**	**2,595**
	ERs claimed		**2,594**

Gold Standard

GS 5394

Total Emission Reductions for Monitoring Period 4			
Baseline Fuel Use (Bby)			
Portion using safe water	Cj	fraction	0.0%
Person Days	Njy		520,125
Fuel to treat 1 litre of water using baseline tech	Wb,y	T/L	0.0004000
Quantity safe water litres consumed in project scenario supplied by project technology	Qp,y	L/pd	7.5
Quantity of raw water boiled in addition to project technology water	Qp, raw, y	L/pd	0
Quantity fuel consumed in baseline scenario	Bb,y	T	1560
Project Fuel Use (Pby)			
Portion of safe users	Cj	fraction	0.00%
Person Days	Njy		520,125
Fossil fuel required to treat 1 litre for water in project scenario	Wp,y	T/L	0.0004000
Quantity of raw water boiled in addition to project tech water	Qp, raw, y	L/pd	0
Quantity of safe water boiled	Qp, cleanboil, y	L/pd	0
Quantity of fuel consumed in project scenario per HH	Bp,y	T	0
Constants			
NRB	NRB	Fraction	0.98
Emissions factor fuel (co2)	EFb,fuel,co2	tCO2/TJ	112
Emissions factor fuel (non-co2)	EFb, fuel, non-co2	TCO2/TJ	8.692
Net calorific value of fuel	NCV,b,fuel	TJ/T	0.0156
Emissions Reductions			
Baseline emissions per year	BEb,y	tCO2/y	2,883
Project emissions per year	PEp,y	tCO2/y	0
Usage rate	Up,y	fraction	0.9
Leakage	LEp,y	tCO2/y	0
Emission Reductions	**Ery**	**tCO2/y**	**2,595**
	ERs claimed		**2,595**

GS 5395

Total Emission Reductions for Monitoring Period 4			
Baseline Fuel Use (Bby)			
Portion using safe water	Cj	fraction	0.0%
Person Days	Njy		520,125
Fuel to treat 1 litre of water using baseline tech	Wb,y	T/L	0.0004000
Quantity safe water litres consumed in project scenario supplied by project technology	Qp,y	L/pd	7.5
Quantity of raw water boiled in addition to project technology water	Qp, raw, y	L/pd	0
Quantity fuel consumed in baseline scenario	Bb,y	T	1560
Project Fuel Use (Pby)			
Portion of safe users	Cj	fraction	0.00%
Person Days	Njy		520,125
Fossil fuel required to treat 1 litre for water in project scenario	Wp,y	T/L	0.0004000
Quantity of raw water boiled in addition to project tech water	Qp, raw, y	L/pd	0
Quantity of safe water boiled	Qp, cleanboil, y	L/pd	0
Quantity of fuel consumed in project scenario per HH	Bp,y	T	0
Constants			
NRB	NRB	Fraction	0.98
Emissions factor fuel (co2)	EFb,fuel,co2	tCO2/TJ	112
Emissions factor fuel (non-co2)	EFb, fuel, non-co2	TCO2/TJ	8.692
Net calorific value of fuel	NCV,b,fuel	TJ/T	0.0156
Emissions Reductions			
Baseline emissions per year	BEb,y	tCO2/y	2,883
Project emissions per year	PEp,y	tCO2/y	0
Usage rate	Up,y	fraction	0.9
Leakage	LEp,y	tCO2/y	0
Emission Reductions	**Ery**	**tCO2/y**	**2,595**
	ERs claimed		**2,594**

Gold Standard

GS 5396

Total Emission Reductions for Monitoring Period 4			
Baseline Fuel Use (Bby)			
Portion using safe water	Cj	fraction	0.0%
Person Days	Njy		416,100
Fuel to treat 1 litre of water using baseline tech	Wb,y	T/L	0.0004000
Quantity safe water litres consumed in project scenario supplied by project technology	Qp,y	L/pd	7.5
Quantity of raw water boiled in addition to project technology water	Qp, raw, y	L/pd	0
Quantity fuel consumed in baseline scenario	Bb,y	T	1248
Project Fuel Use (Pby)			
Portion of safe users	Cj	fraction	0.00%
Person Days	Njy		416,100
Fossil fuel required to treat 1 litre for water in project scenario	Wp,y	T/L	0.0004000
Quantity of raw water boiled in addition to project tech water	Qp, raw, y	L/pd	0
Quantity of safe water boiled	Qp, cleanboil, y	L/pd	0
Quantity of fuel consumed in project scenario per HH	Bp,y	T	0
Constants			
NRB	NRB	Fraction	0.98
Emissions factor fuel (co2)	EFb,fuel,co2	tCO2/TJ	112
Emissions factor fuel (non-co2)	EFb, fuel, non-co2	TCO2/TJ	8.692
Net calorific value of fuel	NCV,b,fuel	TJ/T	0.0156
Emissions Reductions			
Baseline emissions per year	BEb,y	tCO2/y	2,307
Project emissions per year	PEp,y	tCO2/y	0
Usage rate	Up,y	fraction	0.9
Leakage	LEp,y	tCO2/y	0
Emission Reductions	**Ery**	**tCO2/y**	**2,076**
	ERs claimed		**2,075**

GS 6837

Total Emission Reductions for Monitoring Period 4			
Baseline Fuel Use (Bby)			
Portion using safe water	Cj	fraction	0.0%
Person Days	Njy		624,150
Fuel to treat 1 litre of water using baseline tech	Wb,y	T/L	0.0004000
Quantity safe water litres consumed in project scenario supplied by project technology	Qp,y	L/pd	7.5
Quantity of raw water boiled in addition to project technology water	Qp, raw, y	L/pd	0
Quantity fuel consumed in baseline scenario	Bb,y	T	1872
Project Fuel Use (Pby)			
Portion of safe users	Cj	fraction	0.00%
Person Days	Njy		624,150
Fossil fuel required to treat 1 litre for water in project scenario	Wp,y	T/L	0.0004000
Quantity of raw water boiled in addition to project tech water	Qp, raw, y	L/pd	0
Quantity of safe water boiled	Qp, cleanboil, y	L/pd	0
Quantity of fuel consumed in project scenario per HH	Bp,y	T	0
Constants			
NRB	NRB	Fraction	0.98
Emissions factor fuel (co2)	EFb,fuel,co2	tCO2/TJ	112
Emissions factor fuel (non-co2)	EFb, fuel, non-co2	TCO2/TJ	8.692
Net calorific value of fuel	NCV,b,fuel	TJ/T	0.0156
Emissions Reductions			
Baseline emissions per year	BEb,y	tCO2/y	3,460
Project emissions per year	PEp,y	tCO2/y	0
Usage rate	Up,y	fraction	0.9
Leakage	LEp,y	tCO2/y	0
Emission Reductions	**Ery**	**tCO2/y**	**3,114**
	ERs claimed		**3,113**

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GS 6838

Total Emission Reductions for Monitoring Period 4			
Baseline Fuel Use (Bby)			
Portion using safe water	Cj	fraction	0.0%
Person Days	Njy		416,100
Fuel to treat 1 litre of water using baseline tech	Wb,y	T/L	0.0004000
Quantity safe water litres consumed in project scenario supplied by project technology	Qp,y	L/pd	7.5
Quantity of raw water boiled in addition to project technology water	Qp, raw, y	L/pd	0
Quantity fuel consumed in baseline scenario	Bb,y	T	1248
Project Fuel Use (Pby)			
Portion of safe users	Cj	fraction	0.00%
Person Days	Njy		416,100
Fossil fuel required to treat 1 litre for water in project scenario	Wp,y	T/L	0.0004000
Quantity of raw water boiled in addition to project tech water	Qp, raw, y	L/pd	0
Quantity of safe water boiled	Qp, cleanboil, y	L/pd	0
Quantity of fuel consumed in project scenario per HH	Bp,y	T	0
Constants			
NRB	NRB	Fraction	0.98
Emissions factor fuel (co2)	EFb,fuel,co2	tCO2/TJ	112
Emissions factor fuel (non-co2)	EFb, fuel, non-co2	TCO2/TJ	8.692
Net calorific value of fuel	NCV,b,fuel	TJ/T	0.0156
Emissions Reductions			
Baseline emissions per year	BEb,y	tCO2/y	2,307
Project emissions per year	PEp,y	tCO2/y	0
Usage rate	Up,y	fraction	0.9
Leakage	LEp,y	tCO2/y	0
Emission Reductions	**Ery**	**tCO2/y**	**2,076**
	ERs claimed		**2,075**

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

Item	Actual values achieved during this monitoring period
SDG 3	90% reduction in Household Air Pollution from boiling water for project activity in year y (%)
SDG 5	1 hours (60.45 minutes) saved on time collecting water (55.36 time saved compared to the baseline).
SDG 6	GS4897 1,350 GS4898 1,500 GS4899 1,350 GS4900 1,350 GS4901 3,062 GS5033 1,080 GS5034 1,350 GS5035 1,350 GS5036 1,350 GS5392 1,350 GS5393 1,350 GS5394 1,350 GS5395 1,350 GS5396 1,080 GS6837 1,620 GS6838 1,080 Total 22,922
SDG 13	GS4897: 2,594 tCO2e GS4898: 2,594 tCO2e GS4899: 2,569 tCO2e GS4900: 2,594 tCO2e GS4901: 2,076 tCO2e GS5033: 2,075 tCO2e GS5034: 2,075 tCO2e GS5035: 2,160 tCO2e GS5036: 2,594 tCO2e GS5392: 2,594 tCO2e GS5393: 2,594 tCO2e GS5394: 2,595 tCO2e GS5395: 2,594 tCO2e GS5396: 2,075 tCO2e GS6837: 3,113 tCO2e GS6838: 2,075 tCO2e Total: 38,968 tCO2e

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

Not supplied in the PDD for SGDs 3, 5 and 6 as the project began prior to transition.

Item	Values estimated in ex ante calculation of approved PDD	Actual values achieved during this monitoring period
SDG 3	80% reduction in Household Air Pollution from boiling water for project activity in year y (%)	90% reduction in Household Air Pollution from boiling water for project activity in year y (%)
SDG 5	0.5 hours saved on time collecting water	1 hours (60.45 minutes) saved on time collecting water (55.36 time saved compared to the baseline).
SDG 6	25,387 persons with access to safe water across all VPAs	22,652 persons with access to safe water across all VPAs
SDG 13	GS4897: 10,000 tCO2e GS4898: 10,000 tCO2e GS4899: 10,000 tCO2e GS4900: 10,000 tCO2e GS4901: 10,000 tCO2e GS5033: 9,553 tCO2e GS5034: 9,610 tCO2e GS5035: 9,632 tCO2e GS5036: 9,653 tCO2e GS5392: 9,563 tCO2e GS5393: 8,246 tCO2e GS5394: 10,000 tCO2e GS5395: 9,617 tCO2e GS5396: 7,134 tCO2e GS6837: 9,997 tCO2e GS6838: 10,000 tCO2e	GS4897: 2,594 tCO2e GS4898: 2,594 tCO2e GS4899: 2,569 tCO2e GS4900: 2,594 tCO2e GS4901: 2,076 tCO2e GS5033: 2,075 tCO2e GS5034: 2,075 tCO2e GS5035: 2,160 tCO2e GS5036: 2,594 tCO2e GS5392: 2,594 tCO2e GS5393: 2,594 tCO2e GS5394: 2,595 tCO2e GS5395: 2,5940 tCO2e GS5396: 2,075 tCO2e GS6837: 3,113 tCO2e GS6838: 2,075 tCO2e

SECTION F. Stakeholder inputs and legal disputes

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

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No inputs or grievances were received during the monitoring period.

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

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

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

No legal contests or disputes arose during the monitoring period.