Gold Standard for the Global Goals
Key Project Information & VPA Design Document (PDD)

July 2017, Version 1

Gold Standard

KEY PROJECT INFORMATION

Title of Project:	GS1274 VPA 190 Zambia Eastern Province Safe Water Project (GS7456)
Title of PoA:	GS1247 Improved Kitchen Regimes Multi-Country PoA
Brief description of Project:	In this project co2balance and ROCs, a charity that works in Zambia, will renovate broken water points so that they deliver clean, safe water.
Expected Implementation Date: Expected duration of Project:	10/09/2019 15 years
Project Developer:	CO2balance UK Ltd.
Project Representative:	Emma Donnachie
Project Participants and any communities involved:	Implementation Partner- Reformed Open Community Schools (ROCS)
Version of PDD: Date of Version:	Version 4 21/02/2020
Host Country / Location:	Zambia
Certification Pathway (Project Certification/Impact Statements & Products	Impact Statement and Products
Activity Requirements applied: (mark GS4GG if none relevant)	GS4GG
Methodologies applied:	TPDDTEC v.1
Product Requirements applied:	None
Regular/Retroactive:	Regular
SDG Impacts:	1 – SDG 3 – Good Health and Well-being 2– SDG 5 - Gender Equality 3 – SDG 6 - Clean Water and Sanitation 4 – SDG 13 - Climate Action
Estimated amount of SDG Impact Certified	1 – SDG 3 – 2166 additional people consuming safe water 2 – SDG 5 – Reduction of 0.5 hours time spent collecting water and firewood 3 – SDG 6 – 2041 additional people gain access to safe water 4 – SDG 13 – Estimated at 9414 tCO2e per year (capped at 10,000 tCO2e per year)

SECTION A. Description of project

A.1. Purpose and general description of project

>> *(Provide a brief description of the project including the description of scenario existing prior to the implementation of the project.)*

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

Lundazi District in Eastern Province, Zambia is a largely rural district in which local people typically use wood fuel on inefficient three stone fires to boil their drinking water for purification. This process results in the release of greenhouse gas emissions from the combustion of wood - this can be avoided if a technology that does not require fuel (wood or fossil) supplies clean water desired by households. The Micro-Scale VPA Zambia Eastern Province Safe Water project is eligible under the Gold Standard methodology Technologies and Practices to Displace Decentralized Thermal Energy Consumption Version 1.0. By providing safe water, the project will ensure that households consume less firewood during the process of water purification and as a result there shall be a reduction of carbon dioxide emissions from the combustion process.

Many existing safe water sources in Lundazi District have fallen into disrepair because maintenance programmes have been poorly managed or proven too expensive. In this project local NGO, Reformed Open Community Schools (ROCS), will work with British company CO2balance to rehabilitate and maintain water points so that they deliver clean, safe water. The project will ensure that the quality of the water delivered by the safe water sources is fit for human consumption for the entire length of the project, which will be a minimum of five years.

In line with Section A.2.1 of the PoA, communities are encouraged to contribute funds for use of the borehole, to encourage community ownership of the borehole and long-term sustainability of the project. This is determined by the Water Resource Committees on a borehole by borehole basis depending on the capacity of the community to contribute.

The number of water points per VPA will be limited by the amount of pure water supplied by each unit. Based on ex-ante calculations, the maximum number of water points that can be rehabilitated in one VPA to achieve 10,000 tCO2e is approximately 7, however the exact number will be determined once actual survey data has been collected.

The project is funded by marketing the anticipated carbon credits from the wood savings to ethical investors, so water point owners must agree to transfer the emissions reductions over to CO2balance in return for them supplying the work to renovate the water points. This project will be developed under the Gold Standard carbon credit body, which in addition to checking that the carbon credits from this project are real, also measures local social, environmental and economic impact.

A.2. Eligibility of the project under approved PoA

>> *(Demonstrate how each VPA meets the eligibility criteria as defined in approved PoA)*

This VPA and other associated VPAs within the project boundary meet the eligibility in the approved PoA as follows:

Eligibility Criteria	Description	Means of Verification (Checked at VPA Inclusion)
VPA Location and Project Boundary	The geographical boundary within which the technologies are installed will be within the Project Boundary outlined in Section A.4.4.	The location of this VPA is specified in Section A.4.4, in which the CME states that the location is within Zambia; one of the countries outlined in the PoA-DD. Each VPA will be uniquely defined by a range of GPS coordinates and current administrative maps to define the project boundary.
Scale of the Activity	Emission reductions achieved by each one of the activities considered under the micro-scale programme are limited to a maximum of 10,000 tonnes of CO2e in any year of their crediting period.	The total number of emission reductions in this VPA will be limited to 10,000t CO2e.
Technology and Target Group	Each VPA will involve the repair and maintenance of boreholes, to households and/or communities currently cooking with firewood on a traditional three-stone stove, for domestic purposes and/or currently boiling water as a treatment method before consumption.	This VPA will involve the repair and rehabilitation of water points that supply water to households currently boiling water as a treatment method (taking into account suppressed demand). Suppressed demand will be determined through a set of questions in the baseline 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.

		The suppressed demand value was determined by multiplying the percentage of the total users who do not treat their water in the baseline scenario by the proportion of those that would do so in a non-GHG polluting method if they had the means. This therefore determines the percentage of the total sample that would use non-GHG emitting technologies to purify their water if they had the means. For reference of the calculation and figures, see Baseline Survey, Report Sheet, Q18 and Q21.
Technology Output	The technologies will each have continuous energy outputs of less than 150kW per unit. This will be applied to the baseline technology with regards to the water technology units.	Calculations for the specific technology show that they are within the 150kW Limit. The estimated energy output of the baseline technology is 25.19 Kw. However, following the rehabilitation of the water points the estimated energy output is 0 Kw.
Baseline	The characteristics and current biomass/water consumption of households in the baseline scenario will be identified for each VPA.	A modified Water Boiling Test (WBT) will be carried out for Lundazi District, Eastern Province
Methodology	Each VPA will be in compliance with Gold Standard Methodology Technologies and Practices to Displace Decentralized Thermal Energy Consumption Version 1.	The applicability of the methodology is justified in Section B.2 and applies to each VPA.
Additionality	Each VPA will demonstrate additionality according to the criteria outlined in the PoA-DD.	This VPA is within Zambia, an LDC listed under section A.4.1.2 of the PoA-DD. Projects within these countries are deemed additional, as mentioned under section A.4.2.1 of the PoA-DD.
Carbon Transfer	It will be clearly communicated that CO2balance is the entity	At the point of technology installation, a Carbon Transfer

	that is claiming ownership rights of and selling the emission reductions resulting from the project activity.	Form (CTF) will be signed and uploaded to our database stating that the rights to the carbon credits will lie with CO2balance. An elected representative from each water resources committee responsible for a borehole (The Village Administrator) will sign a CTF on behalf of all users thereof.
Avoiding Double Counting of Emission Reductions	Each VPA will ensure double counting of emission reductions is avoided, through the unique identification of each technology with an identification number.	Each water point rehabilitated and installed in this POA will be GPS referenced and given a unique ID ensuring that they are uniquely identifiable to this project. To avoid double counting each borehole will be assigned a unique ID upon rehabilitation consisting of a letter location reference (e.g., LUN) and a sequential number (starting from 001). The location of each borehole will also be recorded using GPS coordinates to act as a further mechanism to maintain the unique identification of the boreholes. The Unique ID and GPS coordinates are stated on the CTF for each borehole and stored in the project database. Each borehole will be labelled with the Unique ID
Avoiding Double Counting of Programme Activities	Each VPA will show that it is exclusive to the PoA and not registered as another project activity or VPA under another PoA.	This VPA is neither registered as a project activity with GS or any other standard or as a VPA of another PoA. The appropriate registries (Gold Standard and CDM) can be accessed to demonstrate this.

Air Quality	The water technologies will result in an improvement in indoor air pollution.	The amount of water boiled will be monitored throughout the project. The process of boiling water on an inefficient stove or open fire contributes to hazardous household air pollution. Providing access to safe water and removing the need to boil for purification reduces the amount of non-renewable biomass burned. Therefore the amount of safe water can be taken as a proxy indicator of how the project contributes towards the air improvement of indoor air quality.
Non-Diversion of ODA	There will be no diversion of ODA for any of the proposed VPAs.	A declaration of non-use of ODA has been completed and submitted covering each VPA.

The project is eligible under the Community Services Activity Requirements:

1.1 Eligible Project Types and Scope	
1.1.1) Projects shall lead to climate change mitigation and/or adaption by providing or improving access to services/resources at household or community or institution level. Eligible services include electricity and energy, water and sanitation, waste management, housing, etc.	By providing a safe water source in rural communities, the project improves access to safe water services/resources at community level.
1.1.2) In relation to the above all Projects shall therefore confirm to Gold Standard for the Global Goals Principles & Requirements (and associated documents)	The project conforms with GS4GG Principles and Requirements. The project is eligible under section 3.1.1 of the GS4GG Principles and Requirements as it follows an established Gold Standard methodology. Concerning point 3.1.1.5, the project does not support geoengineering or entail energy production from fossil fuels or nuclear. Rather it supports a switch away from polluting technologies to an emissions-free means of accessing safe water.
1.2 General Eligibility Criteria	
1.2.2 Types of Project – b) End-Use Energy Efficiency: Project activities that reduce energy requirements as compared to baseline scenario without affecting the level and quality of services or products where the end user of the products and services are clearly identified and when the physical intervention is required at the user end. For example, efficient cooking, heating, lighting, etc.	By providing safe water, the project activity reduces the energy requirements compared to the baseline scenario by removing the need for households to boil water for purification.
1.2.3 Project Area, Boundary and Scale Project Area and Boundary shall be defined in line with the applicable Methodologies or Product Requirements. The definition of scale is the same for all Projects, except Microscale which is defined as: a) Project issuing emission reductions less than or equal to 10,000 tCO2eq b) Project seeking any Gold Standard Certified Impact other than emission reductions and meeting one of the following criteria:	The project area and are defined in line with the applicable Methodology, outlined in Section A.4.4. The project is a Microscale project issuing emission reductions which will be capped at 10,000t CO2e per year.
1.2.4 Legal ownership: Projects involving the distribution of a large number of devices for services such as heating, cooking, lighting, electricity generation, water treatment technology such as waster filter etc. shall provide a clear description of the ownership of the Products that are generated under Gold Standard Certification all along the investment chain. In line with FPIC requirement, the proofs that end-users are aware of and willing to give up their rights on Products shall be provided.	CO2balance UK Ltd is the Co-ordinating/Managing Entity which communicates with the Gold Standard; the project is managed in the Host Country by ROCS. In agreement with ROCS, CO2balance have legal ownership of the carbon credits produced as result of the project. Both parties maintain the right to operate the projects in the host country, Zambia. Water points are managed by communities, who are recognised as the main users of the water points in the project. At the point of technology installation, a Carbon Transfer Form (CTF) will be signed and uploaded to our database stating that the rights to the carbon credits will lie with CO2balance. An elected representative from each water resources committee responsible for a water point will sign a CTF on behalf of all users thereof.
1.2.5 The transfer of Product ownership shall be discussed during the local stakeholder consultations for regular cycle projects.	The discussion of transfer of Product ownership was discussed in detail during the Local Stakeholder Consultation, presenting the details of the project to the local community members, officials and Community Leaders who attended. No issues were raised during the meeting voicing issues regarding the transfer of product ownership.

1.2.7 Where Gold Standard methodologies allow for a Suppressed Demand baseline scenario, this shall be limited to Small and Microscale Projects. Where a Suppressed Demand baseline is applied, it is not possible to 'stack' Gold Standard Impact Statements or Products as the definition of baseline may be contradictory.	The VPA is a microscale project, therefore it is eligible for suppressed demand baseline scenario. The baseline scenario is assessed in terms of suppressed demand. Supressed demand is determined through a set of questions in the Baseline Project Survey that establish the method that 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. A fixed suppressed demand baseline has been opted for. However, in the event the project surveys show a substantial change in fuel use characteristics, a new baseline shall be conducted. No Gold Standard Impact Statements or Products shall be stacked.

A.3. Legal ownership of products generated by the project and legal rights to alter use of resources required to service the project

>> *(Justify that project owner has full and uncontested legal ownership of the products that are generated under Gold Standard Certification and has legal rights concerning changes in use of resources required to service the Project for e.g water rights, where applicable.*)

CO2balance UK Ltd is the Co-ordinating/Managing Entity which communicates with the Gold Standard; the project is managed in the Host Country by ROCS. In agreement with ROCS, CO2balance have legal ownership of the carbon credits produced as result of the project. Both parties maintain the right to operate the projects in the host country, Zambia. Water points are managed by communities, who are recognised as the main users of the water points in the project.

At the point of technology installation, a Carbon Transfer Form (CTF) will be signed and uploaded to our database stating that the rights to the carbon credits will lie with CO2balance. An elected representative from each water resources committee responsible for a water point will sign a CTF on behalf of all users thereof.

Zambia's National Water Policy was initially implemented 1994 and updated in 2010. The aim of the policy is reexamining a framework for delivering sustainable, safe water to their population, considering socio-economic and environmental factors associated with water scarcity and supply. The policy statement is to achieve sustainable water resource development with a view to facilitate an equitable provision of adequate, quantity and quality of water for all at reasonable costs and ensuring security under varying conditions. They called for a reexamination of the role of the water sector in water delivery and the need for institutional support and integration of modern principles within water resource management.

For the development, management and utilization of water resources to provide water for all, coordination is required between all sectors, clarity of roles and responsibilities of stakeholders and social, sustainable management and development of water sources, holistic approaches to policy development and promotion of investment especially in water infrastructure[1].

[1] http://extwprlegs1.fao.org/docs/pdf/zam158332.pdf

A.4. Location of project

A.4.1. Host Country

>>
Republic of Zambia

A.4.2. Region/State/Province etc.

>>
Lundazi District

A.4.3. City/Town/Community etc.

>>
Lundazi District- including Lundazi, Lumezi and Chasefu

A.4.4. Physical/Geographical location

>> (*Include information allowing the unique identification of this project.)*

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, with the outer limits of the project boundary being clearly defined below to allow unique identification of the project

To avoid double-counting each water point will be assigned a unique ID upon rehabilitation consisting of a letter location reference and a sequential number. The location of each water point will also be recorded using GPS coordinates and this will act as a further mechanism to maintain the unique identification of the water points.

Project Area Coordinates		
	Latitude	**Longitude**
North	11.6783°	33.3046°
East	12.3683°	33.5489°
South	13.3160°	32.9194°
West	12.9658°	31.9010°

A.5. Technologies and/or measures

>> *(Describe the technologies and measures to be employed and/or implemented by the project, including a list of the facilities, systems and equipment that will be installed and/or modified by the project. Include information essential to understand the purpose of the project and how it will contribute positively to three SDGs.)*

In this project, identified broken down water points will be rehabilitated so that they deliver clean, safe water for human consumption which contributes positively to SDG 6. Likewise, the additional persons consuming safe water is predicted to lead to a reduction in local water-borne diseases is predicted to decrease the

incidence of stomach related illnesses and diarrhoea, contributing positively to SDG 3. Many existing water points are owned by community groups or community-based organisations (CBOs) and have fallen into disrepair because maintenance programmes have been poorly managed, or proven too expensive. The water points and technologies rehabilitated as part of the project will be determined according to local needs. The boreholes included under the project will be entirely human operated and will be fitted with hand pump models that are commonly used in the area. The depth of the boreholes will be limited to 100m or less.

A comprehensive maintenance programme is required in order to guarantee a consistent supply of pure water from the borehole pumps that have been rehabilitated. Borehole pumps contain moving parts such as chains and bearings which require an annual service and/or replacement to prevent against failure. In addition, nuts and bolts commonly work themselves free and require regular replacement – these are checked and generally replaced on an annual basis. Other, more major parts in the pump assembly have a longer lifespan and require a less frequent replacement. Items such as handles, cylinders, top cones, riser pipes, connecting rods are checked over during the annual service and replaced if deemed necessary. The planned maintenance programme is carried out by local technicians under the supervision of a senior technician and will endure for the activity of the project.

Women and children are widely recognised as being principally responsible for natural resource collection. As the water points are usually located close to villages and provide a reliable safe water source, it is predicted that, once repaired, women's time spent collecting water will be reduced. This reduction in time poverty contributes positively to SDG 5. As mentioned above, the project location is a largely rural district where people typically use wood fuel on traditional three stone fires in order to purify their drinking water by boiling. The rehabilitation of water points proposes to displace the need to boil water by providing safe water from the source. This will achieve a reduction in GHG emissions and aligns with SDG 13.

Water Point Technology

Borehole/Hand pump:

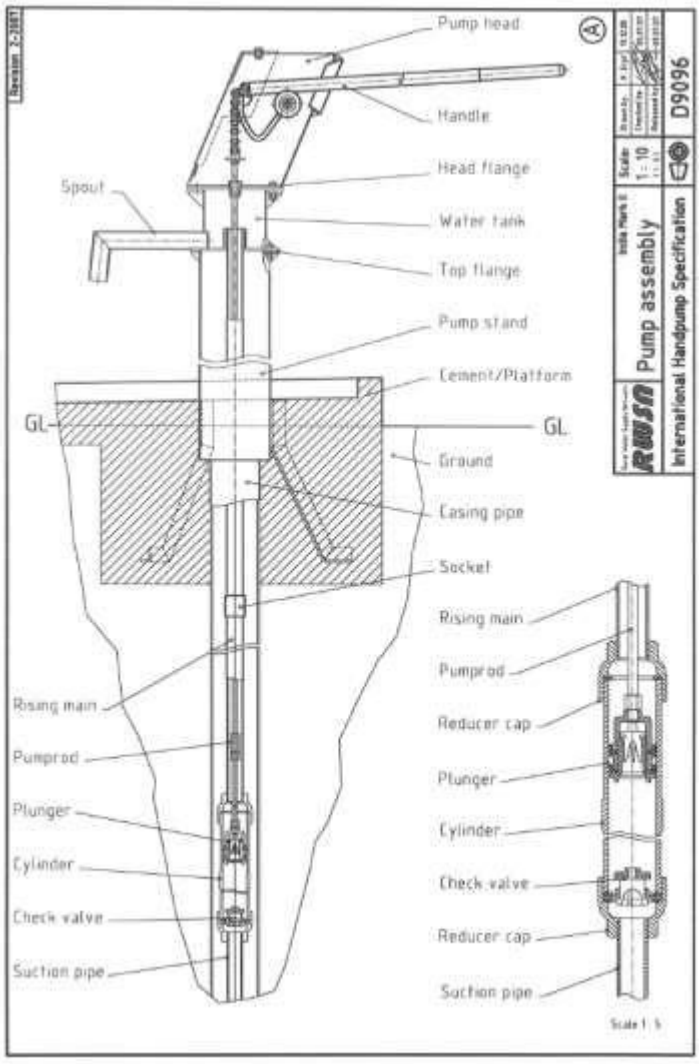
An example of the borehole technology in Zambia that will be renovated as part of the project is the India Mark II Hand Pumps as shown below. Other hand pump models that utilise the same basic design may also be included in the project. Other hand pump models include but are not limited to the India Mark III, Afridev, and the U3 modified pump. The project is not limited to any particular hand pump or water scheme; water points will be renovated according to local needs.

The India Mark II Hand Pump is a public domain pump that is reliable and popular with the communities.

India Mark II Hand Pump[2]:

[2] Rural Water Supply Network (2018) 'India Mark II'

http://www.rural-water-supply.net/en/implementation/public-domain-handpumps/india-mark-ii



Technical Specifications:

	India Mark II
Cylinder Diameter (mm)	50
Maximum Stroke (mm)	225
Approx. discharge at about 75 watt input (m3/h)	at 10 m head 1.8
	at 15 m head 1.3
	at 20 m head 1.0
	at 30 m head 0.8
Pumping Lift (m)	10-45
Water Consumption (litres per capita)	15-20

A.6. Scale of the project

>> (Define whether project is micro scale, small scale or others. Justify the scale referring to relevant activity requirement.)

This VPA and the other homogenous VPAs meet the project activity requirements for a micro scale project. Emission reductions achieved by each VPA is limited to a maximum of 10,000 tonnes of CO2e in any year of their crediting period.

A.7. Funding sources of project

>> *(Provide the public and private funding sources for the project. Confidential information need not be provided.)*

There is no public or ODA funding for this project activity, all revenue for the project will be derived from the sales of VERs.

SECTION B. Application of selected approved Gold Standard methodology

B.1. Reference of approved methodology

>>
Gold Standard Methodology: Technologies and Practices to Displace Decentralized Thermal Energy Consumption Version 1.0.

B.2. Applicability of methodology

>> *(Justify the choice of the selected methodology(ies) by demonstrating that the project meets each applicability condition of the applied methodology(ies))*

In accordance with the Gold Standard Methodology: Technologies and Practices to Displace Decentralized Thermal Energy Consumption Version 1.0, this micro scale VPA adheres to the following conditions:

Methodology Requirement	Project
1. 'The project boundary can be clearly identified, and the technologies counted in the project are not included in another voluntary market or CDM project activity. Project proponents must have a survey mechanism in place together with appropriate mitigation measures so as to prevent double counting in case of another similar activity within some of the target area in common.	The project area has been clearly demarcated using political boundaries recognised in Zambia. Each technology will be recorded using GPS coordinates and individually tagged with a unique identification code which is stored securely in the project database. Regular annual project surveys and continuous monitoring undertaken in follow-up visits, together with distribution records will ensure that the technologies included in the project are not double counted.

2. Technologies have a continuous useful energy output of less than 150kW per unit (defined as total energy delivered usefully from start to end of operation of a unit divided by time of operation). For technologies or practices that do not deliver thermal energy in the project scenario but only displace thermal energy supplied in the baseline scenario, the 150kW threshold applies to the displaced baseline technology.	The project technology does not deliver thermal energy; the rehabilitation and installation of water points displace energy supplied in the baseline as they eliminate the need to purify water through boiling; the 150kw threshold therefore applies to the baseline technology. Water points displace energy supplied in the baseline as they eliminate the need to purify water through boiling. Based on the results of the WBT, the estimated energy output of the baseline technology is 25.19 Kw which is well within the methodological limit of 150kw. This has been proven via calculation.
3. The use of the baseline technology as a backup or auxiliary technology in parallel with the improved technology introduced by the project activity is permitted as long as a mechanism is put into place to encourage the removal of the old technology and the definitive discontinuity of its use.	As noted in the Gold Standard Methodology p.5. '*the removal and continued non-use of three stone fires and other easily constructed traditional devices (the baseline technology replaced by this project activity) is in many cases unlikely and impractical to monitor*.' However, local people will be educated on the health and environmental benefits of abandoning inefficient use of the baseline technology. Furthermore, an initial WASH program will be carried out during the baseline survey to increase awareness regarding water use, health and hygiene among local communities. This education programme will act as a mechanism to encourage the removal of old technology.
a) The project documentation must provide a clear description of the approach chosen and the monitoring plan must allow for a good understanding of the extent to which the baseline technology is still in use after the introduction of the improved technology, whether the existing baseline technology is not surrendered at the time of the introduction of the improved technology, or whether a new baseline technology is acquired and put to use by targeted end users during the project crediting period.	Overall use of the baseline technology will be monitored in conjunction with that of the project technology, as will the emergence of any other baseline technology by targeted end users. As per the Methodology kitchen surveys will be carried out at regular intervals to determine any changes in baseline technology use.
b)''The success of the mechanism put into place must therefore be monitored, and the approach must be adjusted if proven unsuccessful. If an old technology remains in use in parallel with the improved technology, corresponding emissions must of course be accounted for as part of the project emissions.''	Parallel baseline technology use (three stone fires or traditional equivalent) will be revealed during monitoring and its effect on emissions reductions will be captured in the parameter Q, p, clean boil, y and in the usage surveys. The uptake rate U will also be determined by surveys and hence used to account for parallel baseline and project technology use.
4. The project proponent must clearly communicate to all project participants the entity that is claiming ownership rights of and selling the emission reductions resulting from the project activity. This must be communicated to the	A full explanation will be given to elected representatives of water point users that co2balance have committed to provide them with a rehabilitated and fully maintained for free on the basis that the emissions reductions will be

technology producers and the retailers of the improved technology or the renewable fuel in use in the project situation by contract or clear written assertions in the transaction paperwork. If the claimants are not the project technology end users, the end users should be notified that they cannot claim for emission reductions from the project.	transferred to co2balance. This will be recorded using a Carbon Transfer Form, which elected representatives of water point owners will sign confirming that they understand the agreement and will explain it to water point users.
5. Project activities making use of a new biomass feedstock in the project situation (e.g. shift from non-renewable to green charcoal, plant oil or renewable biomass briquettes) must comply with relevant Gold Standard specific requirements for biomass related project activities, as defined in the latest version of the Gold Standard rules.	As the technology used in this project has been specifically designed to displace baseline feedstock use via fuelwood, rather than a new biomass feedstock, this criterion is not applicable to this project. The emission reductions from this project will result from a change in quantity of fuel consumed, rather than change of fuel type.
a) Adequate evidence is supplied to demonstrate that indoor air pollution (IAP) levels are not worsened compared to the baseline, and greenhouse gases (as listed in section 2.1) emitted by the project fuel/stove combination are estimated with adequate precision. The project fuel/stove combination may include instances in which the project stove is a baseline stove.	The fuel used in both the project and baseline scenario is the same, as such there are no additional harmful gases released in the project scenario. The baseline technology has also not changed; rather its use will have been eliminated.
b) Records of renewable fuel sales may not be used as sole parameters for emission reduction calculation, but may be used as data informing the equations in section 2.0 of this methodology if correlated to data on distribution and results of field tests and surveys confirming (a) actual use of the renewable fuel and usage patterns such as average fraction of non-renewable fuels used in mixed combustion or seasonal variation of fuel types, (b) GHG emissions, (c) evidence of CO levels not deteriorating (d) any further factors effecting emission reductions significantly.	Renewable fuels are not sold as part of this project therefore this point is not applicable.

B.3. Project boundary

>> *(Present a flow diagram of the project boundary, physically delineating the project, based on the description provided in section A.5 above.)*

The physical boundary of the project is defined in section A.4.4 of this document. The physical delineating of the project boundary, Lundazi District is displayed below in Figure 1.

Figure 1 Location of Zambia within Southern Africa

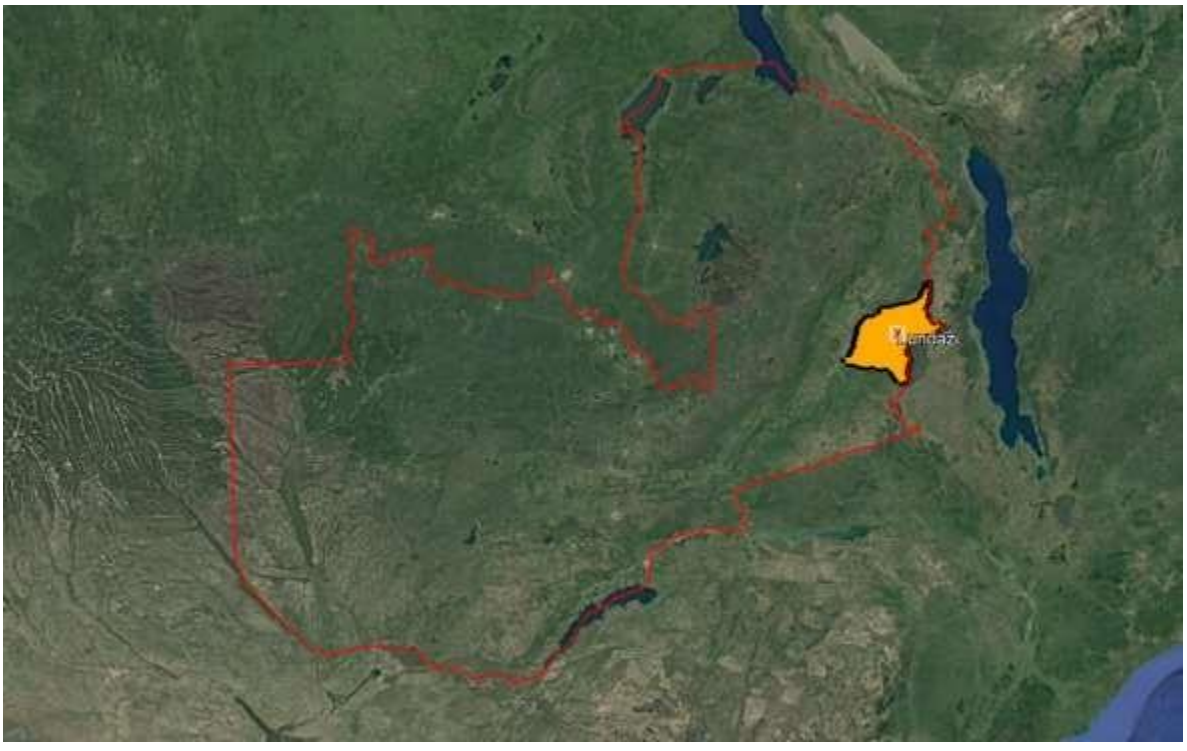


Figure 2 Location of Project Boundary within Eastern Zambia

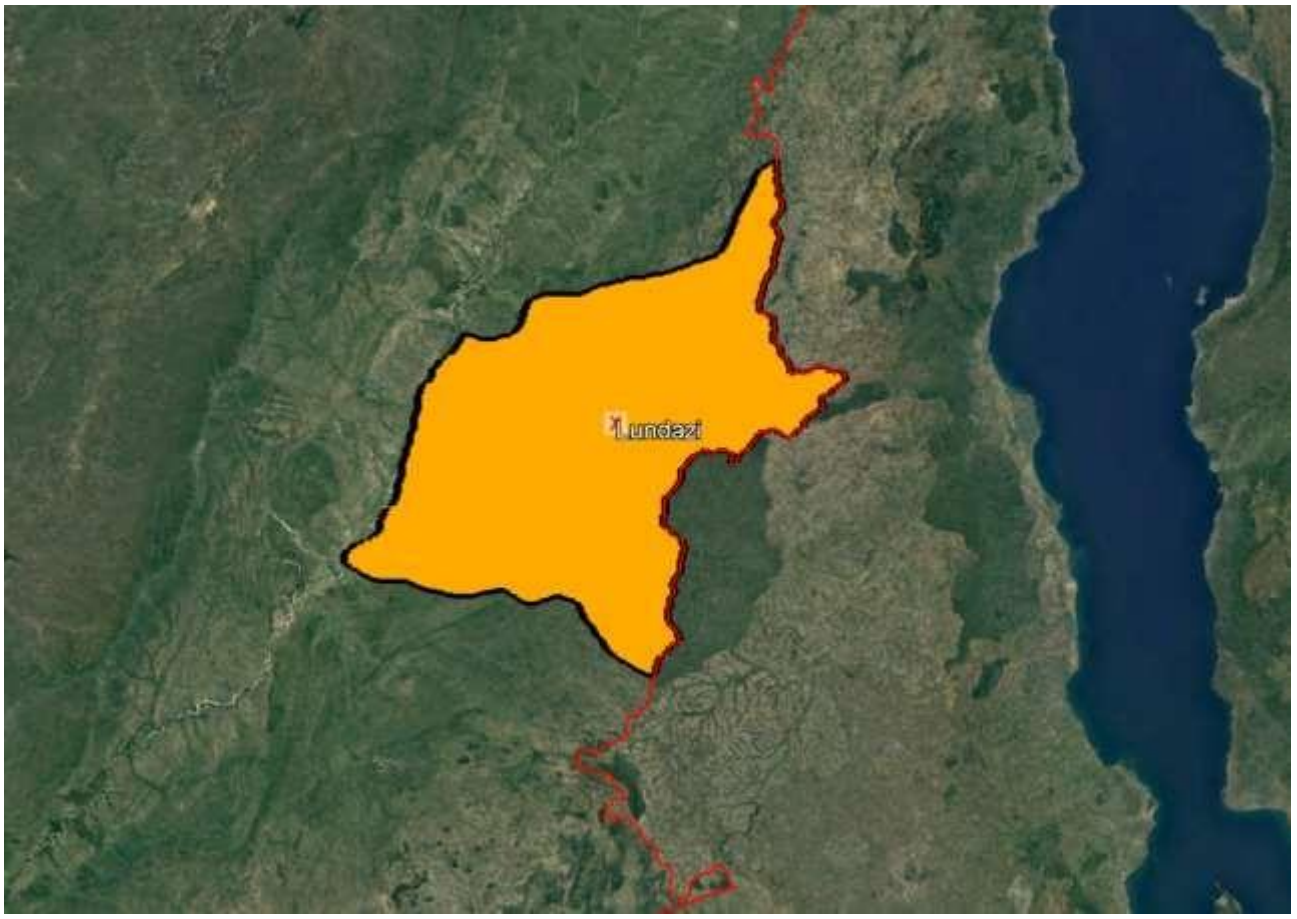


Figure 3 The Project area - Lundazi District, Eastern Zambia

For the purpose of GHG mitigation/sequestration following table shall be completed (delete if not required)

Source		GHGs	Included?	Justification/Explanation
Baseline scenario	Combustion of wood fuel to boil water	CO2	Yes	Important source of emissions
		CH4	Yes	Important source of emissions
		N2O	Yes	Gas included in the calculations. Emissions factors for fuel in stationery combustion by the IPCC
Project scenario	Combustion of wood fuel to boil water	CO2	Yes	Important source of emissions
		CH4	Yes	Important source of emissions
		N2O	Yes	Gas included in the calculations. Emissions factors for fuel in stationery combustion by the IPCC

B.4. Establishment and description of baseline scenario

>> (Explain how the baseline scenario is established in accordance with guidelines provided in GS4GG Principles & Requirements and the selected methodology(ies). In case suppressed demand baseline is used then same should be explained and justified.)

In Lundazi District, Zambia, local people typically use wood fuel on inefficient three stone fires for cooking and water purification. This process results in the release of greenhouse gas emissions from the combustion of wood. This can be avoided if communities have access to safe water and therefore do not need to boil water as a treatment method.

A large proportion of the population of Zambia do not have access to safe water, many of whom depend on boiling as the only treatment method available or are forced to drink dirty water due to suppressed demand factors such as lack of access to fuel, time and financial resources.

Co2balance seeks to register this project as a Gold Standard micro scale project using the methodology "Technologies and Practices to Displace Decentralized Thermal Energy Consumption Version 1." Many existing water points have been poorly managed or proven too expensive to maintain properly. In this project CO2balance will work with ROCS, community groups and local government in Lundazi District, Zambia to identify broken down water points and renovate them so that they deliver clean and safe water.

The number of boreholes per VPA will be limited by the amount of pure water supplied by each unit; based on ex ante calculations, the maximum number of boreholes that can be rehabilitated in one VPA to achieve 10,000 tCO2e is approximately 6, however, the exact number will be determined once actual monitoring data has been collected. CO2balance will rehabilitate and deliver the maintenance programme for each borehole to ensure that the quality of the water delivered by the boreholes is fit for human consumption for the entire length of the project, which will be a minimum of five years.

The baseline situation is not expected to change significantly during the next years considering the current situation in Zambia, its economic development of the last years and predictions for the future. Zambia is an LDC and is one of the poorest countries in the world with a Human Development Index ranking of 144 out of 189[3] countries worldwide.

Baseline Scenario:

The baseline scenario is assessed through use of:

- Baseline Survey
- Baseline Water Boiling Test

In accordance with the GS4GG Methodology "Technologies and Practices to Displace Decentralized Thermal Energy Consumption" (TPDDTEC), baseline surveys are carried out using representative and random sampling. The sample size is determined in line with the methodological minimum sample size and confidence requirements. In order to determine a representative sample population, a sample was determined based on boreholes identified throughout the project area to be included in the project. In order to satisfy 90/30 precision, the recommended sample size of communities to be included in the baseline survey was 7. As the project technology is installed at the start of the project, the baseline scenario is considered fixed throughout the crediting period.
In order to fully understand the baseline scenario, CO2balance conducted a total of 100 Baseline Surveys and 40 BWBTs across the project area, Lundazi District.

[3] https://countryeconomy.com/hdi/zambia

The Baseline Survey was conducted 04-06/10/2018, whilst the Baseline Water Boiling Test was conducted 16/04 03/09/2019.

B.4.1 Baseline Survey

In-line with Gold Standard requirements the Baseline Survey provides critical information on target population characteristics, water and fuel consumption needed to purify water, suppressed demand and leakage. According to the relevant Gold Standard methodology the following information was captured in the surveys:

- Address or location
- Telephone number (when possible)
- Number of people served by baseline technology
- Typical baseline technology usage patterns and tasks (commercial, institutional, domestic ect)
- Types of baseline technology used and estimated frequency
- Types of fuels used and estimated quantities.
- Season variation in baseline technology and fuel use
- Sources of fuels and prices paid or effort made

In total 100 Baseline Water Surveys were conducted across the project area, in randomly selected households. The survey comprises questions covering broad topic areas such as household characteristics, water use before and after the safe water project and wood fuel use in the area.

Information collected to inform the baseline included household information, household characteristics, where drinking water was obtained and whether it had to be treated to be safe for consumption. Further questions were asked about cooking methods, fuel types used and how these acquired, and time spent on these tasks.

The results of the baseline survey revealed all people did not have access to a safe water source, using either rivers/streams or open wells, with 95% of respondents consuming unsafe water without treating it. The most common cooking technology was a three-stone fire (96% of respondents) and firewood (97%) was the dominant fuel source for cooking and boiling water.

B.4.2 Baseline Water Boiling Test

In-line with Gold Standard requirements the baseline water boiling test provides critical information of the most common cooking process in households that use biomass for fuel when purifying water. Respondents were asked at the beginning of the survey which cooking implement and fuel they used for boiling water, and these were used in the test. The main objective is to establish a conservative estimate of baseline fuel required to boil 1 litre of water within the target area.
The results of the baseline water boiling test revealed that three-stone fires and firewood were the technology and fuel used for water purification.

The results from the simplified WBT were tabulated and analysed. As per the guidance in the TPDDTEC v.1 methodology, the data was first checked for outliers. Any data values that fell outside of the lower or upper bounds were removed from the analysis. The confidence interval of the remaining data was determined and assessed to see if it was less than 30% of the mean (the precision required by the methodology Annex 3). The following tables show the results of the study and the respective figures determined to represent Wb,y:

Mean (T/L)	0.001185
Mean (Kg/L)	1.185342
Sample	38
STDEV	0.685831

1st	0.59625
3rd	1.7075
IQR	1.11125
Lower	-0.48153
Upper	2.852217
CONF	0.11531
10% Mean	0.118534

Suppressed Demand:

The baseline scenario is assessed in terms of suppressed demand. Suppressed demand is determined through a set of questions in the Baseline Survey that establish the method that 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. A fixed suppressed demand baseline has been opted for. However, in the event the project surveys show a substantial change in fuel use characteristics, a new baseline shall be conducted.

Suppressed demand (xboil) and Cj were calculated from the survey results:

- Xboil: 1.82%
- Cj: 1.82%

B.5. Demonstration of additionality

>> (If the proposed project is not a type of project that is deemed additional, as stated below, then follow guidelines in section 3.5.1 of GS4GG Principles & Requirements to demonstrate additionality.)

The table below is only applicable if the proposed project is deemed additional, as defined by the applied approved methodology or activity requirement or product requirement.

Specify the methodology or activity requirement or product requirement that establish deemed additionality for the proposed project (including the version number and the specific paragraph, if applicable).	As demonstrated in the Gold Standard for the Global Goals Community Services Activity Requirements section 2.5.2 - Projects that meet any of the following criteria are considered as deemed additional and therefore are not required to prove Financial Additionality at the time of Design Certification: 1. (a) Positive list (Annex B) 2. (b) Projects located in LDC, SIDS, LLDC 3. (c) Micro-scale projects
Describe how the proposed project meets the criteria for deemed additionality.	Zambia is an LDC. This project is also a Micro-scale project and so is deemed additional by the relevant activity requirement.

B.6. Sustainable Development Goals (SDG) outcomes

B.6.1. Relevant target for each of the three SDGs

>> (Specify the relevant SDG target for each of three SDGs addressed by the project. Refer most recent version of targets here.)

SDG	Target	Indicators	Explain
SDG 3 – Good Health and Well-being	3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.	3.9.2 Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services)	By providing safe water, the project reduces the occurrence of water-borne diseases locally. This, in turn, is predicted to decrease the incidence of stomach related illnesses and diarrhoea associated with the consumption of unsafe water.
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	Women are widely recognised as being principally responsible for collection of natural resources such as firewood and water. In regard to time, women are poorer than men as unpaid domestic duties must be added to their market productive work, making time much more scarce. By ensuring that there is a safe water source at the center of communities, the project will reduce the time poverty of women.

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 safe water	The Project provides equitable access to clean affordable drinking water for all those local to the rehabilitated borehole. Anyone is allowed to use the water point which will provide monitored safe drinking water for all.
SDG 13 - Climate Action	13.B 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	Total project emissions reductions	The projects will meet SDG 13 by realising a real reduction in CO2e emissions. Furthermore, in pursuance of SDG 5 – Gender Equality, the projects will focus on women and subsequently youth. Boreholes are located in mainly remote rural areas and thus serve marginalised communities.

B.6.2. Explanation of methodological choices/approaches for estimating the SDG outcome

>> *(Explain how the methodological steps in the selected methodology(ies) or proposed approach for calculating baseline and project outcomes are applied. Clearly state which equations will be used in calculating net benefit.)*

Outcomes for SDG 3 (Good Health and Well-Being) are calculated as follows:

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

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

The outcome for SDG 3 is quantified as the additional number of persons consuming safe water in the project activity compared to the baseline scenario (P_{safe}). The number of persons using each water point is determined in the sensitization process during the rehabilitation. The percentage of users who were already consuming safe water in the baseline without boiling it (C_j) is determined through the baseline survey and deducted. Additionally, the percentage of users who consumed safe water by boiling it in the baseline (Pb, boil) is deducted. Calculations are as follows (parameters from sections B.6.3 and B.7.1 will be applied):

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

Where:

P_{safe}	Number of additional persons consuming safe water in the project activity compared to the baseline scenario.
P_y	Number of persons having access to safe water in the project activity.
C_j	Expressed as a percentage, the portion of users of the project technology j who in the baseline were already consuming safe water without boiling it.
$P_{b, boil}$	Percentage ofpersons boiling water for purification in the baseline scenario.

Outcomes for SDG 5 (Gender Equality) are calculated as follows:

Globally, women and girls perform the majority of unpaid domestic work.[8] This leaves them with less time to rest, study and realise their economic potential, leaving them in *time poverty*. In regards to time, women are poorer than men as unpaid domestic duties, such as collecting firewood and water, must be added to their market productive work, making time much more scarce.[9] Women are widely recognised as being principally responsible for natural resource collection.[10]

These trends suggest that, by ensuring that there is a safe water source at the centre of communities, the projects have the potential to reduce the *time poverty* of women, because the time burden of collecting water, which falls disproportionately on women, will be reduced[11]. As the water sources will be centrally located in communities the distance travelled to collect water will be reduced. In addition, as the water sources will be maintained they will provide a reliable water supply, minimising time spent searching for water sources to provide adequate water for households. The average % decrease per household in time spent collecting water will be taken as a proxy contribution towards the SDG target.

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

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

Where:

TR_y Total reduction time spent collecting water and firewood for project activity in year y (%)

[7] WHO/UNICEF (2005) Water for Life: Making it Happen, p4

[8] UN (2017) 'Progress towards the Sustainable Development Goals (E/2017/66)'. Available at https://unstats.un.org/sdgs/files/report/2017/secretary-general-sdg-report-2017--EN.pdf

[9] Charmes, J 'A Review of Empirical Evidence on Time Use in Africa from UN-Sponsored Surveys', in Word Bank (2006) 'Gender, Times Use, and Poverty in Sub-Saharan Africa'. World Bank Working Paper No. 73

[10] Nankhuni (2004) 'Environmental Degradation, Resource Scarcity and Children's Welfare in Malawi: School Attendance, School Progress, and Children's Health'

[11] Hutton, Haller, and Bartram (2007) 'Global cost-benefit analysis of water supply and sanitation interventions' in Journal of Water and Health 5(4): p 481- 502

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

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

It is predicted that time spent collecting water and firewood will be reduced as a result of the project. To infer as to what project participants are doing with their time saved from the project, qualitative questions will be included in the monitoring surveys which ask respondents how they spend their time saved and answers will be divided into designated time use categories. In some circumstances, it may be the case where respondents comment on the tasks they undertook in their spare time and these are recorded by field staff.

Outcomes for SDG 6 (Clean Water and Sanitation) are calculated as follows:

The outcome for SDG 6 is quantified as the additional number of persons having access to safe water in the project activity compared to the baseline scenario (P_{access}). The number of persons using each borehole is determined in the sensitization process during the rehabilitation. The percentage of users who were already consuming safe water in the baseline without boiling it (C_j) will be determined through the baseline survey. Calculations are as follows (parameters from sections B.6.3 and B.7.1 will be applied):

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

Where:

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

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

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

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

Outcomes for SDG 13 (Climate Action)

GHG emission reductions, are calculated using the parameters in Section B.6.3 and B.7.1. Full calculations will be provided in time for each Verification.

The overall reduction in CO2 emission reductions is calculated as follows:

ERy=((BEb,y -PEp,y) *Up,y - LEp,y)*(1-Xboil)

Where:

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

And:

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

Where

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

And:

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

Where:

$BE_{b,y}$ Baseline emissions in baseline scenario b per year y

$PE_{p,y}$ Project emissions in project scenario p per year y

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

$LE_{p,y}$ Leakage in project scenario p during year y

X_{boil} Expressed as a percentage, the portion of premises that in the absence of the project activity would have used non-GHG emitting technologies if they were available in the project boundary

B.6.3. Data and parameters fixed ex ante for monitoring contribution to each of the three SDGs

(Include a compilation of information on the data and parameters that are not monitored during the crediting period but are determined before the design certification and remain fixed throughout the crediting period like IPCC defaults and other methodology defaults. Copy this table for each piece of data and parameter.)

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 wood fuel in baseline scenario
Source of data	Calculated from IPCC defaults; Volume 2: 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 2, Table 2.5
Value(s) applied	112 – see GS Methodology
Choice of data or Measurement methods and procedures	Deemed valid by Methodology
Purpose of data	Calculation of baseline emissions
Additional comment	-

Relevant SDG Indicator	SDG 13 (Climate Action)
Data/parameter	$EF_{b,non\ co2}$
Unit	tCO_2e/TJ
Description	Non-CO_2 (CH_4 and N_2O) emission factor arising from use of wood fuel in baseline scenario

Source of data	Default emissions factor: http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html#table-2-14 Global Warming Potential: http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html#table-2-14
Value(s) applied	8.692
Choice of data or Measurement methods and procedures	Deemed valid by Methodology

Gas	Default Emissions factor (kg_gas/TJ_{NCV})	GWP of gas	Default Emissions factor (kg_CO_2e/TJ_{NCV})	Default Emissions factor (t_CO_2e/TJ_{NCV})
CH_4	300	25	7,500	7.5000
N_2O	4	298	1,192	1.1920
			Total	**8.692**

Purpose of data	Calculation of emission reductions
Additional comment	-

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 wood fuel in project scenario
Source of data	Volume 2: 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 2, Table 2.5
Value(s) applied	112
Choice of data or Measurement methods and procedures	Deemed valid by Methodology
Purpose of data	Calculation of emission reductions
Additional comment	-

Relevant SDG Indicator	SDG 13 (Climate Action)
Data/parameter	$EF_{p,non\ co2}$
Unit	tCO_2e/TJ
Description	Non-CO_2 (CH_4 and N_2O) emission factor arising from use of wood fuel in project scenario
Source of data	Default emissions factor: http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html#table-2-14 Global Warming Potential: http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html#table-2-14
Value(s) applied	8.692

Choice of data or Measurement methods and procedures	Deemed valid by Methodology

Gas	Default Emissions factor (kg_gas/TJ_{NCV})	GWP of gas	Default Emissions factor (kg_CO_2e/TJ_{NCV})	Default Emissions factor (t_CO_2e/TJ_{NCV})
CH_4	300	25	7,500	7.5000
N_2O	4	298	1,192	1.1920
			Total	**8.692**

Purpose of data	Calculation of emission reductions
Additional comment	-

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

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

Additional comment	-

Relevant SDG Indicator	SDG 13 (Climate Action)
Data/parameter	$W_{b,y}$
Unit	T/litre
Description	Quantity of wood fuel that is used to treat 1 litre of water in the baseline scenario b during year y
Source of data	Baseline Water Boiling Test
Value(s) applied	0.001185
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	Calculation of emission reductions
Additional comment	-

Relevant SDG Indicator	SDG 13 (Climate Action), SDG 6 (Clean Water and Sanitation)
Data/parameter	$W_{p,y}$
Unit	T/litre
Description	Quantity of wood fuel that is used to treat 1 litre of water in the project scenario p during year y
Source of data	Baseline Water Boiling Test
Value(s) applied	0.001185
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	Calculation of emission reductions
Additional comment	-

Relevant SDG Indicator	SDG 13 (Climate Action), SDG 6 (Clean Water and Sanitation)
Data/parameter	Cj

Unit	Percentage
Description	Portion of users of project safe water supply who were already in baseline using a non-boiling safe water supply
Source of data	Baseline Study
Value(s) applied	1.82%
Choice of data or Measurement methods and procedures	Deemed valid by Methodology
Purpose of data	Calculation of emission reductions
Additional comment	-

Relevant SDG Indicator	SDG 13 (Climate Action)
Data/parameter	Xboil Non Suppressed Demand
Unit	Percentage
Description	Percentage of premises that in the absence of the project activity would have used non-GHG emitting technologies like chlorine treatment techniques (if available) in the project boundary.
Source of data	Baseline study. Credible literature, studies, survey, reports, relevant to the project target area
Value(s) applied	1.8%
Choice of data or Measurement methods and procedures	Suppressed demand will be determined through a set of questions in the project survey that establish the method households use to purify their water, if any, and how they would choose to purify if they were not subject to monetary and access barriers. This is in line with the Gold Standard principles of suppressed demand outline in annex 2. A fixed suppressed demand baseline has been opted for, however in the event the project surveys show a substantial change in fuel use characteristics, a new baseline shall be conducted.
Purpose of data	Calculation of emission reductions
Additional comment	-

Relevant SDG Indicator/Safeguarding Principle	SDG 5 (Gender Equality)
Data / Parameter	$T_{b,y}$
Unit	Hours
Description	Baseline time spent collecting water and firewood per household per day
Source of data	Baseline survey
Value(s) applied	2.2
Measurement methods and procedures	Established through questions in the baseline on a representative sample of the end users
Purpose of data	To measure the % decrease in hours spent collecting water and firewood, a responsibility falling disproportionately on women, as an indicator of reduced time poverty of women.
Additional comment	-

B.6.4. Ex ante estimation of outcomes linked to each of the three SDGs

>> (Provide a transparent ex ante calculation of baseline and project outcomes (or, where applicable, direct calculation of net benefit) during the crediting period, applying all relevant equations provided in the selected methodology(ies) or as per proposed approach. For data or parameters available before design certification, use values contained in the table in section B.6.3 above. For data/parameters not available before design certification and monitored during the crediting period, use estimates contained in the table in section B.7.1 below)

SDG	Calculation	Ex-Ante Estimate of Net Benefit
GS7456		
SDG 3	$P_{safe} = P_y * (1 - C_j) * (1 - P_{b,boil})$ $P_{safe} = 2310$* (1- 0.0182) * (1 – 0.045) = 2166	2166 additional people consuming safe water in the project activity
SDG 5	$TR_y = (T_{b,y} - T_{p,y}) / T_{b,y}$ $TRy = (2.2 - 1.7) / 2.2 = 22.7\%$	Approximately 0.5 hours saved per trip collecting firewood and water/ 22.7% time saving
SDG 6	$P_{access} = P_y * (1 - C_j) * U_{p,y}$ $P_{access} = 2310$ * (1- 0.0182) * 0.9 = 2041	2041additional people with access to safe water in the project activity
SDG 13	$ERy=((BEb,y - PEp,y) * Up,y - LEp,y) * (1-Xboil)$ $ERy= ((11,412 - 759) * 0.9 - 0) * (1-0.018) = 9414$ Where: $BE_{b,y} = B_{b,y} * ((fNRB_y * EF_{b,fuel,co2}) + EF_{b,fuel,nonco2}) * NCV_{b,fuel}$ BEb,y = 7359 * ((0.81 * 112) + 8.692) * 0.0156 = 11,412 And: $B_{b,y} = (1 - C_j) * N_{p,y} * W_{b,y} * (Q_{p,y} + Q_{p,rawboil,y})$ Bb,y = (1-0.0182) * 843,150 * 0.001185 * (7.5 + 0) = 7359 Where $PE_{p,y} = B_{p,y} * ((fNRB_y * EF_{p,fuel,co2}) + EF_{p,fuel,nonco2}) * NCV_{p,fuel}$ PEp,y = 490 * ((0.81 * 112) + 8.692) * 0.0156 = 759 And: $B_{p,y} = (1 - C_j) * N_{p,y} * W_{p,y} * (Q_{p,rawboil,y} + Q_{p,cleanboil,y})$ Bp,y = (1-0.0182) * 843,150 * 0.001185 * (0 + 0.5) = 490	9414 tonnes of CO_2 per year Emission Reductions. Capped at 10,000 tonnes of CO_2 per year

B.6.5. Summary of ex ante estimates of each SDG outcome

SDG 3

Year	Baseline estimate	Project estimate	Net benefit

15/08/2019 – 14/08/2020	144 people already consuming safe water in the baseline scenario	2310 people in the project activity	2166 additional people consuming safe water in the project activity
15/08/2020 – 14/08/2021	144 people already consuming safe water in the baseline scenario	2310 people in the project activity	2166 additional people consuming safe water in the project activity
15/08/2021 – 14/08/2022	144 people already consuming safe water in the baseline scenario	2310 people in the project activity	2166 additional people consuming safe water in the project activity
15/08/2022 – 14/08/2023	144 people already consuming safe water in the baseline scenario	2310 people in the project activity	2166 additional people consuming safe water in the project activity
15/08/2023 – 14/08/2024	144 people already consuming safe water in the baseline scenario	2310 people in the project activity	2166 additional people consuming safe water in the project activity
Total	144 people already consuming safe water in the baseline scenario	2310 people in the project activity	2166 additional people consuming safe water in the project activity
Total number of crediting years			5 years
Annual average over the crediting period	144 people already consuming safe water in the baseline scenario	2310 people in the project activity	2166 additional people consuming safe water in the project activity

SDG 5

Year	Baseline estimate	Project estimate	Net benefit
15/08/2019 – 14/08/2020	2.2 hours spent collecting water and firewood per trip in the baseline scenario	1.7 hours spent collecting water and firewood per trip in the project activity	0.5 hours saved collecting water and firewood per trip in the project activity
15/08/2020 – 14/08/2021	2.2 hours spent collecting water and firewood per trip in the baseline scenario	1.7 hours spent collecting water and firewood per trip in the project activity	0.5 hours saved collecting water and firewood per trip in the project activity
15/08/2021 – 14/08/2022	2.2 hours spent collecting water and firewood per trip in the baseline scenario	1.7 hours spent collecting water and firewood per trip in the project activity	0.5 hours saved collecting water and firewood per trip in the project activity
15/08/2022 – 14/08/2023	2.2 hours spent collecting water and firewood per trip in the baseline scenario	1.7 hours spent collecting water and firewood per trip in the project activity	0.5 hours saved collecting water and firewood per trip in the project activity

15/08/2023 – 14/08/2024	2.2 hours spent collecting water and firewood per trip in the baseline scenario	1.7 hours spent collecting water and firewood per trip in the project activity	0.5 hours saved collecting water and firewood per trip in the project activity
Total	2.2 hours spent collecting water and firewood per trip in the baseline scenario	1.7 hours spent collecting water and firewood per trip in the project activity	0.5 hours saved collecting water and firewood per trip in the project activity
Total number of crediting years			5 years
Annual average over the crediting period	2.2 hours spent collecting water and firewood per trip in the baseline scenario	1.7 hours spent collecting water and firewood per trip in the project activity	0.5 hours saved collecting water and firewood per trip in the project activity

SDG 6

Year	Baseline estimate	Project estimate	Net benefit
15/08/2019 – 14/08/2020	268 people with access to safe water in the baseline scenario	2310 people in the project activity	2041 additional people with access to safe water in the project activity
15/08/2020 – 14/08/2021	268 people with access to safe water in the baseline scenario	2310 people in the project activity	2041 additional people with access to safe water in the project activity
15/08/2021 – 14/08/2022	268 people with access to safe water in the baseline scenario	2310 people in the project activity	2041 additional people with access to safe water in the project activity
15/08/2022 – 14/08/2023	268 people with access to safe water in the baseline scenario	2310 people in the project activity	2041 additional people with access to safe water in the project activity
15/08/2023 – 14/08/2024	268 people with access to safe water in the baseline scenario	2310 people in the project activity	2041 additional people with access to safe water in the project activity

Total	268 people with access to safe water in the baseline scenario	2310 people in the project activity	2041 additional people with access to safe water in the project activity
Total number of crediting years			5 years
Annual average over the crediting period	268 people with access to safe water in the baseline scenario	2310 people in the project activity	2041 additional people with access to safe water in the project activity

SDG 13

Year	Baseline estimate	Project estimate	Net benefit
15/08/2019 – 14/08/2020	9414 tCO2e	0 tCO2e	9414 tCO2e
15/08/2020 – 14/08/2021	9414 tCO2e	0 tCO2e	9414 tCO2e
15/08/2021 – 14/08/2022	9414 tCO2e	0 tCO2e	9414 tCO2e
15/08/2022 – 14/08/2023	9414 tCO2e	0 tCO2e	9414 tCO2e
15/08/2023 – 14/08/2024	9414 tCO2e	0 tCO2e	9414 tCO2e
Total	47070 tCO2e	0 tCO2e	47070 tCO2e
Total number of crediting years			5 years
Annual average over the crediting period	9414 tCO2e	0 tCO2e	9414 tCO2e

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

(Include specific information on how the data and parameters that need to be monitored in the selected methodology(ies) or proposed approaches or as per mitigation measures from safeguarding principles assessment or as per feedback from stakeholder consultations would actually be collected during monitoring. Copy this table for each piece of data and parameter.)

Relevant SDG Indicator	SDG 13 (Climate Action)
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 stated in following document: https://cdm.unfccc.int/Panels/ssc_wg/meetings/035/ssc_035_an20.pdf and later reviewed in https://iopscience.iop.org/1748-9326/12/11/115002/media/ERL_12_11_115002_suppdata.pdf
Value(s) applied	0.81
Choice of data or Measurement methods and procedures	Default values of fraction of non-renewable biomass as outlined by the UNFCCC CDM
Purpose of data	Calculation of emission reductions
Additional comment	-

Relevant SDG Indicator	SDG 13 (Climate Action), SDG 6 (Clean Water and Sanitation)
Data / Parameter	N p,y
Unit	Project Technology Days
Description	Number of persons consuming water supplied by project scenario p through year y
Source of data	Borehole Project Database
Value(s) applied	Estimated at 843,150. Actual value to be provided in time for each verification.
Measurement methods and procedures	Sum of the total number of people using each borehole in the project multiplied by the number of days crediting each borehole earns in each monitoring period
Monitoring frequency	Continuous
QA/QC procedures	Calculations are double-checked
Purpose of data	Emission reduction calculations
Additional comment	Household lists of borehole users including details for the main contact from the household

Relevant SDG Indicator	SDG 13 (Climate Action), SDG 6 (Clean Water and Sanitation)
Data / Parameter	U p,y
Unit	Percentage
Description	Usage rate in project scenario p through year y
Source of data	Annual Usage Survey
Value(s) applied	Estimated at 0.9. Actual value to be provided in time for each verification
Measurement methods and procedures	Annual usage survey will be carried out by staff trained by co2balance to meet the specific requirements of the methodology. All data presented in excel is subject to checking and cross referencing of a sample of the raw data by co2balance UK Ltd
Monitoring frequency	Annual
QA/QC procedures	Clear guidance is provided to field staff and results are spot checked against the hard copy of the surveys.
Purpose of data	Emission reduction calculations
Additional comment	Questions are asked in a face-to-face survey and designed to establish whether a household can be considered a regular user of the borehole

Relevant SDG Indicator	SDG 13 (Climate Action), SDG 6 (Clean Water and Sanitation)
Data / Parameter	Qp,y
Unit	Litres per person per day
Description	Quantity of safe water supplied in the project scenario p during the year y using the zero or low emissions clean water supply technology
Source of data	Water Consumption Field Test (WCFT)
Value(s) applied	Estimated at 7.5
Measurement methods and procedures	Method used similar to Kitchen Performance Test in which the volume of water consumed in each household is averaged over 3 days. Volume capped at 7.5 litres per person per day as per the methodology. The WCFT will be carried out by staff trained by co2balance to meet the specific requirements of the methodology. All data presented in excel is subject to checking and cross referencing of a sample of the raw data by co2balance UK Ltd.
Monitoring frequency	Biennial (Every 2 years)
QA/QC procedures	Clear guidance is provided to field staff and results are spot checked against the hard copy of the surveys.
Purpose of data	Emission reduction calculations
Additional comment	Measured water consumption is limited to drinking, cooking and basic personal hygiene. The quantity of safe water under these categories consumed in the project scenario is quantified through measurements and survey.

Relevant SDG Indicator	SDG 6 (Clean Water and Sanitation)
Data / Parameter	Qp,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
Source of data	Water Consumption Field Test (WCFT)
Value(s) applied	Estimated at 0.5. Actual value to be provided in time for each verification
Measurement methods and procedures	Method used similar to Kitchen Performance Test in which the volume of water consumed in each household is averaged over 3 days. The WCFT will be carried out by staff trained by co2balance to meet the specific requirements of the methodology. All data presented in excel is subject to checking and cross referencing of a sample of the raw data by co2balance UK Ltd.
Monitoring frequency	Biennial (Every 2 years)
QA/QC procedures	Clear guidance is provided to field staff and results are spot checked against the hard copy of the surveys.
Purpose of data	Emission reduction calculations
Additional comment	Measured boiled water consumed for drinking, cooking and basic personal hygiene considered safe for human consumption prior to boiling. This is assumed from the stated water source.

Relevant SDG Indicator	SDG 6 (Clean Water and Sanitation)

Data / Parameter	Qp,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
Source of data	Water Consumption Field Test (WCFT)
Value(s) applied	Estimated at 0. Actual value to be provided in time for each verification
Measurement methods and procedures	Method used similar to Kitchen Performance Test in which the volume of water consumed in each household is averaged over 3 days. The WCFT will be carried out by staff trained by co2balance to meet the specific requirements of the methodology. All data presented in excel is subject to checking and cross referencing of a sample of the raw data by co2balance UK Ltd.
Monitoring frequency	Biennial (Every 2 years)
QA/QC procedures	Clear guidance is provided to field staff and results are spot checked against the hard copy of the surveys.
Purpose of data	Emission reduction calculations
Additional comment	Measured boiled water consumed for drinking, cooking and basic personal hygiene considered unsafe for human consumption prior to boiling. This is assumed from the stated water source.

Relevant SDG Indicator	SDG 6 (Clean Water and Sanitation)
Data / Parameter	Quality of Treated Water
Unit	Parameters as per national standards
Description	Performance of the treatment technology
Source of data	Laboratory Tests
Value(s) applied	Certificates supplied at verification
Measurement methods and procedures	The water quality will be tested in line with national standards in Zambia. The water samples will be taken at source by the testing body.
Monitoring frequency	Annually
QA/QC procedures	The first test will be within 6 months of the rehabilitation. At least one test each year conducted by accredited laboratory.
Purpose of data	Criteria of methodology
Additional comment	Water quality tests are certified by accredited laboritories. Tested water is collected from source.

Relevant SDG Indicator	SDG 13 (Climate Action)
Data / Parameter	LEp,y
Unit	tCO2e per year
Description	Leakage in project scenario p during year y
Source of data	Baseline and monitoring surveys
Value(s) applied	0
Measurement methods and procedures	Assessed every two years using baseline and monitoring surveys
Monitoring frequency	Biennial
QA/QC procedures	

Purpose of data	Emission reduction calculations
Additional comment	

Relevant SDG Indicator/Safeguarding Principle	SDG 3 (Good Health and Wellbeing) SDG 6 (Clean Water and Sanitation)
Data / Parameter	P_y
Unit	Number
Description	Number of persons having access to safe water from the project activity
Source of data	Water point Project Database
Value(s) applied	Estimated at 2695. Actual value to be provided in time for first verification.
Measurement methods and procedures	Sum of the total number of people using each water point in the project. The number of users included in the Project Database will be monitored throughout the project. The Water Resource Committees appointed to each borehole will monitor the users and update the user list if changes are noted. Information will be sent to CO2balance to update the Project Database.
Purpose of data	To measure the additional persons with access and provision to safe water in the project scenario, which will positively impact good health and wellbeing, as well as access to clean water and sanitation
Additional comment	

Relevant SDG Indicator/Safeguarding Principle	SDG 5 (Gender Equality)
Data / Parameter	$T_{p,y}$
Unit	Hours
Description	Project time spent collecting water and firewood per household per day
Source of data	Project survey
Value(s) applied	Estimated at 1.7 hours. Actual value to be provided in time for each verification.
Measurement methods and procedures	Established through questions in the project survey on a representative sample of the end users.
Purpose of data	To measure the % decrease in hours spent collecting water and firewood, a responsibility falling disproportionately on women, as an indicator of reduced time poverty of women. SDG 5 impact calculation
Additional comment	

Relevant SDG Indicator/Safeguarding Principle	SDG 5 (Gender Equality)
Data / Parameter	T_{usage}
Unit	
Description	Usage of time saved by the project activity
Source of data	Project survey
Value(s) applied	Value to be provided in time for each verification.
Measurement methods and procedures	Established through questions in the project survey on a representative sample of the end users.
Purpose of data	SDG 5 impact calculation

Additional comment	

Relevant SDG Indicator/Safeguarding Principle	Safeguarding Principle: Corruption
Data / Parameter	Reported cases of corruption arising from project activity
Unit	
Description	Report on any cases of corruption arising from the project activity communicated by communities
Source of data	Continuous input mechanism
Value(s) applied	
Measurement methods and procedures	The communities will be able to communicate any cases of corruption through the continuous input mechanism. The continuous input mechanism will be monitored and any reports of corruption will be acted on.
Purpose of data	To monitor 'Corruption' safegaruding principle.
Additional comment	

Relevant SDG Indicator/Safeguarding Principle	Safeguarding Principle: Negative Economic Consequences
Data / Parameter	Community maintenance trainings
Unit	
Description	To ensure long term sustainability of the water points, and avoid unexpected breakdowns and spending
Source of data	Training Reports
Value(s) applied	
Measurement methods and procedures	Training will be conducted at the beginning of the project on conducting minor maintenance.
Purpose of data	To monitor 'Negative Economic Consequences' safeguarding principle.
Additional comment	

Relevant SDG Indicator/Safeguarding Principle	Safeguarding Principle: Community Health, Safety and Working Conditions
Data / Parameter	WASH trainings
Unit	
Description	Community WASH trainings conducted to promote hygiene and sanitation practices for the reduction of cases of water borne diseases
Source of data	Training reports, Monitoring Project Survey
Value(s) applied	
Measurement methods and procedures	For each borehole rehabilitated within this project a WASH programme will be carried out by the project including WASH training at the beginning of the project, as well as subsequent WASH follow-up trainings. Each training will follow an agenda and have a participation list collected. The trainings will involve introducing the concept of WASH, duties of village WASH and provide hands-on demonstrations with the community group. Incidences of water borne illnesses will also be monitored through the annual Monitoring Project Survey
Purpose of data	To monitor 'Community Health, Safety and Working Conditions' safeguarding principle.
Additional comment	

B.7.2. Sampling plan

>> *(If data and parameters monitored in section B.7.1 above are to be determined by a sampling approach, provide a description of the sampling plan.)*

Cross sampling of devices will be applied across all homogenous VPAs in the project area for the Project Survey, Usage Survey, and Water Consumption Field Tests. Homogenous VPAs are defined as those that are sharing a common baseline. The number of boreholes that will need to be sampled for a 90/30 confidence/precision will be determined; out of those boreholes, households will be randomly sampled, complying with the minimum sample size for the particular survey/test.

Individual participants will be randomly selected from the borehole user database. Sample sizes will be in line with the Gold Standard requirements. The random sample group is reselected for every monitoring period to ensure the selection remains random.

The surveys below will be monitored under the cross-sampling approach;

- Project Surveys- Completed annually (minimum total sample size of 100)
- Usage Surveys- Completed annually (minimum total sample size of 100)
- Water Consumption Field Tests- Completed biennially (minimum total sample size of 30)

The surveys will be conducted so as to ensure that they are within the end date of the respective monitoring periods for each VPA.

B.7.3. Other elements of monitoring plan

>>

Installation Record

A comprehensive Installation Record will record the following information in paper format and will be backed up electronically. The original documentation will be stored in the ROCS Zambia office. Paper records will be filled out by the water point mechanic; CO2balance UK Ltd will supervise and assist water point contractors in generating the appropriate records during the construction phase of the project. During the rehabilitation process, ROCS will collect water point data, perform quality control checks of the water point, audit delivered materials, collect carbon transfer forms, and educate water point recipients on proper usage.

For each water point, the following information will be documented:

- Date of rehabilitation
- Unique Water Point ID
- Details of elected Water Point Committees
- GPS location of the water point
- Model of the water point
- Quantity of water points installed
- The total number of people obtaining their water from each water point and details of all all water point end users
- Mode of use: commercial/domestic

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

Project Database

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

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

The end users of the borehole are identified and included in the borehole user list for the duration of the project and updated when required.

Ongoing Monitoring Studies

The following ongoing monitoring studies are conducted for each project scenario following verification of the associated initial project studies.

a) *Water consumption field test* - Completed bienially, prior to first verification and then every other year after first verification

The water consumption field test determines three parameters *viz* Q,p,y – the quantity of water supplied in the project scenario using the clean water supply technology; Q p,rawboil,y – the raw or unsafe water that is still boiled after installation of the water supply technology and Qp, cleanboil,y – quantity of safe water boiled in the project scenario after installation of the water supply technology.

The measurement method used is similar to Kitchen Performance Test in which the volume of water consumed in each household is averaged over 3 days. The WCFT will be carried out by staff trained by co2balance to meet the specific requirements of the methodology. All data presented in excel is subject to checking and cross referencing of a sample of the raw data by co2balance UK Ltd

b) *Usage Survey*- Completed annually, on time for any request of issuance

The usage survey provides a single usage parameter Up,y that is weighted based on drop off rates that are representative of the age distribution for project technologies in the installation record.

c) *Monitoring Project Survey* – Completed annually, on time for any request of issuance

The project survey surveys end users using project technologies to explore changes in the project scenario over time.

d) *Quality of the treated water* - Completed annually

The quality of the treated water is assessed to ensure that it is fit for human consumption. It will be assessed in accordance with national standards in Zambia .

e) *Leakage Assessment*- Completed every other year

The potential sources of leakage will be investigated (LEp,y). If the assessment quantifies an increase in fuel consumption by the non-project households attributable to the project activity, then calculations will be adjusted to account for this.

f) *Non-renewable Biomass Assessment Update*- Reassessed at renewal of crediting period

In accordance with the methodology, the NRB assessment will remain fixed for the entire crediting period, although the project proponent may choose to reexamine the assessment at any time.

SECTION C. Duration and crediting period

C.1. Duration of project

C.1.1. Start date of project

>> (Specify start date of the project, in the format of DD/MM/YYYY. Describe how this date has been determined as per the definition of start date provided in section 3.4.3 of GS4GG Principles & Requirements document and provide evidence to support this date.)

14/08/2019.

The start date of the project is the date the first borehole was rehabilitated under the project, and therefore the earliest date expenditure are committed to the implementation of the project. Evidence is provided in the form of a CTF signed by a certified borehole technician.

C.1.2. Expected operational lifetime of project

>> (*Specify in years)*

15 years

C.2. Crediting period of project

C.2.1. Start date of crediting period

>> *(Specify in dd/mm/yyyy. This can be start of project operation or two years prior to the date of Project Design Certification, whichever is later.)*

15/08/2019

C.2.2. Total length of crediting period

>> *(Specify the total length of crediting period sought in line with GS4GG Principles & Requirements or relevant activity requirements.)*

15 years, 5 years renewable

SECTION D. Safeguarding principles assessment

D.1. Analysis of social, economic and environmental impacts

>> *(Refer the GS4GG Safeguarding Principles and Requirements document for detailed guidance on carrying out this assessment.)*

Safeguarding principles	Assessment questions	Assessment of relevance to the project (Yes/potentially/ no)	Justification	Mitigation measure (if required)
3.1 Human Rights	a. The Project Developer and the Project shall respect internationally proclaimed human rights and shall not be complicit in violence or human rights abuses of any kind as defined in the Universal Declaration of Human Rights. b. The Project shall not discriminate with regards to	No	The project will adhere to all human rights requirements including respecting internationally proclaimed human rights and Universal Declaration of Human Rights and will not discriminate in any way.	

	participation and inclusion.			

3.2 - Gender Equality and Women's Rights	a. Is there a possibility that the Project might reduce or put at risk women's access to or control of resources, entitlements and benefits?	No	The project will increase women's access to resources such as water by making safe water available in the community.	
	b. Is there a possibility that the Project can adversely affect men and women in marginalised or vulnerable communities (e.g., potential increased burden on women or social isolation of men)?	No	There will be less of a burden on women and children especially, as less firewood for purification needs to be collected.	
	c. Is there a possibility that the Project might not take into account gender roles and the abilities of women or men to participate in the decisions/designs of the project's activities (such as lack of time, child care duties, low literacy or educational levels, or societal discrimination)?	No	The project takes into account gender roles during the LSC and throughout. Both men and women are encouraged to give feedback about the project during the LSC in varius formats of communication. Equal participation of women and men in decision making is also encouraged by promoting their equal membership on water point committees.	
	d. Is there a possibility that the Project might not take into account gender roles and the abilities of women or men to benefit from the Project's activities (e.g., Does the project criteria ensure that it includes minority groups or landless peoples)?	No	No groups are excluded from participating in the project. Measures to include women, children and minority groups are exercised in the LSC	

			and will continue to be throughout the project.	
	e. Does the Project design contribute to an increase in women's workload that adds to their care responsibilities or that prevents them from engaging in other activities?	No	The project will lead to a decrease in women's workload due to the provision of safe water, thereby allowing more time to engage in other activities.	
	f. Would the Project potentially reproduce or further deepen discrimination against women based on gender, for instance, regarding their full participation in design and implementation or access to opportunities and benefits?	No	The project aims to benefit the whole community equally and women's equal participation in the LSC and water resource committees is encouraged.	
	g. Would the Project potentially limit women's ability to use, develop and protect natural resources, taking into account different roles and priorities of women and men in accessing and managing environmental goods and services?	No	The project will increase women's ability to use, develop, and protect natural resources by making safe water more readily available and enabling women to participate in project decision-making.	
	h. Is there a likelihood that the proposed Project would expose women and girls to further risks or hazards?	No	The project is not found to impose further risks for women and girls.	
3.3 Community Health, Safety and Working Conditions	The Project shall avoid community exposure to increased health risks and shall not adversely affect the	Yes	The project will reduce the community exposure to water borne illness through the	

	health of the workers and the community.		provision of a safe water source, and will reduce the risk of household air pollution by removing the need for households to boil water for purification.	
3.4.1 Sites of Cultural and Historical Heritage	Does the Project Area include sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture (e.g., knowledge, innovations, or practices)?	No	The project area does not include cultural and historic sites. The focus of the project is rehabilitating existing water point infrastuctrure only.	
3.4.2 Forced Eviction and Displacement	Does the Project require or cause the physical or economic relocation of peoples (temporary or permanent, full or partial)?	No	The project rehabilitates existing water points that have been in place for many years.	
3.4.3 Land Tenure and Other Rights	Does the Project require any change to land tenure arrangements and/or other rights?	No	No changes to land tenure arrangements and/or rights are required.	
3.4.4 Indigenous Peoples	Are indigenous peoples present in or within the area of influence of the Project and/or is the Project located on land/territory claimed by indigenous peoples?	No	The water points are located on government owned land and cater to local communities near the water point.	
3.5 Corruption	The Project shall not involve, be complicit in or inadvertently contribute to or reinforce corruption or corrupt Projects.	Yes	The project shall ensure that all forms of corruption are avoided. Project beneficiaries are able to contact the project developer and implementer through the continuous grienvance mechanism to report	

			any form of corruption.	
3.6. Economic Impacts	a. **Labour Rights** **b. Negative Economic Consequences**	Yes	The project will adhere to labour laws and requirements. The project will put in place a maintenance fund to ensure economic sustainability, and will not lead to negative economic consequences.	
4.1.1 Emissions	Will the Project increase greenhouse gas emissions over the Baseline Scenario?	No	GHG emissions will be reduced in the project through replacing water purification using firewood with access to safe water.	
4.1.2 Energy Supply	Will the Project use energy from a local grid or power supply (i.e., not connected to a national or regional grid) or fuel resource (such as wood, biomass) that provides for other local users?	No	The project will reduce consumption of biomass through removing the need to boil unsafe water.	
4.2.1 Impact on Natural Water Patterns/Flows	Will the Project affect the natural or pre-existing pattern of watercourses, ground-water and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity?	No	The project uses existing aquifers and the volume of water consumed by residents is not predicted to change by having access to safe water.	
4.2.2 Erosion and/or Water Body Instability	Could the Project directly or indirectly cause additional erosion and/or water body instability or disrupt the natural pattern of erosion?	No	The water is taken from water points at household usage levels. Therefore it is extremely unlikely that there will be	

			additional erosion and/or water body instability or disruption of the natural pattern of erosion.	
4.3.1 Landscape Modification and Soil	Does the Project involve the use of land and soil for production of crops or other products?	No	No crops or other products are produced in the project.	
4.3.2 Vulnerability to Natural Disaster	Will the Project be susceptible to or lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions?	No	There will be no impact by the project to natural disasters.	
4.3.3 Genetic Resources	Could the Project be negatively impacted by the use of genetically modified organisms or GMOs (e.g., contamination, collection and/or harvesting, commercial development)?	No	No GMOs will be used in the project.	
4.3.4 Release of pollutants	Could the Project potentially result in the release of pollutants to the environment?	No	As safe ground water is used, there is no risk or releasing pollutants to the environment.	
4.3.5 Hazardous and Non-hazardous Waste	Will the Project involve the manufacture, trade, release, and/ or use of hazardous and non-hazardous chemicals and/or materials?	No	The project does not deal with harzardous or non-hazardous chemicals and/or materials.	
4.3.6 Pesticides & Fertilisers	Will the Project involve the application of pesticides and/or fertilisers?	No	No pesticides and/or fertilisers are to be used in the project.	
4.3.7 Harvesting of Forests	Will the Project involve the harvesting of forests?	No	The project reduces the consumption of firewood, therefore having a positive impact on forest conservation.	

4.3.8 Food	Does the Project modify the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives?	No	The project has no impact on modifying foods or altering crop regimes.	
4.3.9 Animal husbandry	Will the Project involve animal husbandry?	No	The project does not involve animal husbandry.	
4.3.10 High Conservation Value Areas and Critical Habitats	Does the Project physically affect or alter largely intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or sites identified?	No	The project rehabilitates existing water points and decreases the consumption of firewood having a positive impact on conserving forest ecosystems.	
4.3.11 Endangered Species	a. Are there any endangered species identified as potentially being present within the Project boundary (including those that may route through the area)? b. Does the Project potentially impact other areas where endangered species may be present through transboundary affects?	No No	The project is not envisaged to have any impact on species habitat as it only affects existing infrastructure. The project only impacts existing infrastructure and does not impact other areas where endangered species are present.	

SECTION E. Local stakeholder consultation

E.1. Solicitation of comments from stakeholders

>> (Describe how stakeholder consultation was conducted in accordance with GS4GG Stakeholder Procedure Requirements and Guidelines.)

A local stakeholder consultation was conducted in Lundazi on 28th February 2019. In preparation for the meeting, CO2balance and ROCS identified the key international and local stakeholders that would need to be informed of the project and consulted on the activities to be conducted. Those identified included Gold Standard international NGO partners, government officials from relevant departments in Zambia and members of the communities to be targeted by the project.

Invitations were issued a month in advance via email to international stakeholders, and at least 2 weeks in advance by letter and word of mouth to local stakeholders.

During the meeting, the planned project activities were presented to stakeholders and they were invited to make comments and raise questions. A sustainable development and safeguarding exercise was then conducted to solicit the stakeholders' views on any risks within the project and the contributions that it should make to sustainable development.

Stakeholders were consulted on their recommendations for monitoring the project and on the best approach for conducting the continuous input/grievance mechanism. Stakeholders shared a number of ideas for ensuring communication lines with everyone was maintained and effective. The following methods were chosen:

	Method Chosen (include all known details e.g. location of book, phone, number, identity of mediator)	**Justification**
Continuous Input / Grievance Expression Process Book	Log books will be held by water point committees at each borehole. Community members will be informed that they can record their comments in the books. The comments in the books will be collected by ROCS and reviewed by CO2balance during their regular monitoring visits.	This will allow community members without access to a telephone or the internet to send comments to the organisations implementing the project. It will also ensure that illiterate community members can leave comments as WPC members will records comments on their behalf.
Telephone access	The following telephone numbers were shared with stakeholders: UK CO2balance Project Manager: +44 (0)1823 332233 ROCS District Programmes Officer: +260 977 510 542	Stakeholders with telephone access may find this the most convenient way to contact the project partners.
Internet/email access	Email addresses for the relevant person at CO2balance and ROCS were shared with stakeholders: UK CO2balance Project Manager: emma.donnachie@co2balance.com ROCS Zambia Project Coordinator: Kalaluka.mubu@rocsedu.org Gold Standard: helpdesk@goldstandard.org	Stakeholders with internet access may find this the most convenient way to contact the project partners.

The Stakeholder Feedback Round began 25/07/2019 for a period of 60 days, ending 23/09/2019. International stakeholders were invited to give feedback on the SCR report and Project Summary via email on the 25/07/2019. Our in-country partner Reformed Open Community Schools (ROCS) made the documents available at their local office in Lundazi District and distributed copies of the documents at the community level for 60 days. No feedback was received during the period.

E.2. Summary of comments received

>> (Provide a summary of key comments received during the consultation process.)

These comments received during the LSC are presented in section E.3 alongside the responses given to stakeholders.

E.3. Report on consideration of comments received

>> (Describe how the comments have been addressed by providing a clarification to the stakeholder or by altering the design of the project or by proposing to monitor any anticipated negative impacts etc.)

Stakeholder comment	Was comment taken into account (Yes/ No)?	Explanation (Why? How?)
Clarification was requested on the handover process to communities of the rehabilitated boreholes, as it is important to ensure that communities have a sense of ownership of the resource	Yes	It was confirmed that once the borehole has been rehabilitated, the community will receive WASH training in order to ensure water quality standards over the course of the project, and the everyday operation and management of the borehole will be handed over to the responsibility of the water point committee. The project will encourage water point committees to raise contributions from local committees in order to generate funds for works such as fencing of the boreholes. Generating this funding is hoped to generate a sense of community ownership of the boreholes. Water point committees will be strengthened and trained in the project (including in basic maintenance of the boreholes), to ensure that they are empowered to manage the boreholes. It was also explained that the project will be implemented for a minimum of 5 years, throughout which time the boreholes will be annually monitored and tested for water quality, and a fund will also be established for major maintenance and repairs to ensure sustainability of the project.
Stakeholders requested clarification on the availability of local trained pump minders and spare parts	Yes	It was highlighted that as part of the project water point committees will be trained in the project, including on basic maintenance of the water points. As communities will be required to contribute to minor maintenance of the water points, funds will be available for local

		technicians if needed. For more major repairs beyond the scope of the community, the maintenance funding through the project will be able to contribute. It was clarified that spare parts are available on the market locally. It was requested of the Council to work towards making the spare parts available at a subsidized cost.
Stakeholders requested clarity on the role and added benefit that each of the stakeholders represented at the meeting could bring to the project	Yes	Representatives of each group of stakeholders presented what they saw as their potential role for ensuring the success of the project. • The representative from Zambia National Service responded that they could offer training services to pump minders and reaching very remote communities. • The Diwa Ward Councilor commented that councilors can provide key data for where broken boreholes are situated. • The Magodi Councilor commented that they can facilitate communication and information dissemination so that communities understand fully what the project is about. • The Council commented that they can assist with WASH training and resources • The Council also commented that they have oversight of functional and non functional boreholes in the area so it is important to liaise with them on identification on boreholes. • The traditional leaders highlighted that they can play a key role in ensuring community ownership and engagement of the project • The community representatives highlighted

		that all community members need to work together to ensure that the boreholes are maintained and properly used
Appreciation was given for the boreholes planned thus far but it was highlighted that the area of the valley is in need of safe water solutions in rural communities	Yes	It was explained that ROCS work with communities and key local stakeholders to identify communities and water points in the region. The water points that are most feasible to repair, and communities in need of a new water point are identified in terms of community interest and participation, technical viability and water access in the community. New borehole location is determined based on environmental and geological surveys and analysis. It was explained that we hope to expand the project in future based upon the success of the initial boreholes included in the project.
It may not work on open water wells, especially those that have water throughout the year. One borehole is very expensive. The money for one borehole can work on several open wells to improve them.	No	Open wells are considered unimproved water sources as they are open to contamination. As the project is committed to providing safe water for communities, it is important that it focuses on a technology that minimizes the risk of contamination. Boreholes are a protected, improved safe water source, and as there are broken boreholes in the project area in need of rehabilitation, the project will primarily focus on these.
The type of hand pump to be installed is not reviewed.	No	The type of handpump included in the project is not limited and will be according to local needs and availability.
Its concentration seems to be involving the local leadership forgetting the community. Note that community members are very important in most projects.	Yes	Community members are the key stakeholders in the project. As such, the majority of people invited were community members through personal and public invitations. Throughout the meeting community members were encouraged to share their views on the project design to ensure that on the ground impacts are maximised.
Maybe not clearly stated is how sustainable the project will take	Yes	The provision of major spare parts that aren't affordable for

care of tools – spare parts per boreholes		the WPCs to procure is accounted for within the project. It was underlined to stakeholders that contributions from the community are key to ensuring that the community has ownership of the project, but a maintenance fund is in place for major repairs.

Based on the comments, the project is not going to be altered, but all implementing partners have noted again the need to continue ensuring that boreholes are identified with the input of key stakeholders at the community and government level, and that processes are in place to ensure community ownership of the boreholes. It was also noted that all stakeholders should be encouraged to work together to support the project to ensure its success. It was well noted that communities receive comprehensive training to ensure the sustainability of the project.

Overall comments received from stakeholders were constructive and helpful, re-affirming the approach adopted by the project whilst emphasising areas where care must be taken to ensure sustainability.

The Stakeholder Feedback Round began 25/07/2019 for a period of 60 days, ending 23/09/2019. International stakeholders were invited to give feedback on the SCR report and Project Summary via email on the 25/07/2019. Our in-country partner Reformed Open Community Schools (ROCS) made the documents available at their local office in Lundazi District and distributed copies of the documents at the community level for 60 days. No feedback was received during the period.

Appendix 1. Contact information of project participants

Organization name	CO2balance
Registration number with relevant authority	4889958 (UK company registration number)
Street/P.O. Box	Cook Way
Building	1 Discovery House
City	Taunton
State/Region	Somerset
Postcode	TA2 6BJ
Country	UK
Telephone	+441823332233
Fax	N/A
E-mail	emma.donnachie@co2balance.com
Website	www.co2balance.com
Contact person	Emma Donnachie
Title	Project Officer
Salutation	Ms
Last name	Donnachie
Middle name	
First name	Emma

Department	Projects
Mobile	N/A
Direct fax	N/A
Direct tel.	+441823332233
Personal e-mail	emma.donnachie@co2balance.com

Appendix 2. Summary of post registration design changes

None