Gold Standard®

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

July 2017, Version 1

KEY PROJECT INFORMATION

Title of Project:	GS7591 VPA33 Zambian Central Province Safe Water (GS7688)
Title of the PoA	International Programme for Safe Water Access and Efficient Cookstoves (GS7591)
Brief description of Project:	The Small-Scale Voluntary Project Activity in the Central Province of Zambia is eligible under the Gold Standard methodology Technologies and Practices to Displace Decentralized Thermal Energy Consumption Version 3.1. The project will support the provision of safe water to hundreds of households within the Central Province. 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.
Expected Implementation Date: Expected duration of Project:	19/03/2020 *This is the date of the first borehole rehabilitation, which marks the earliest possible start of the project.* *Exact dates per VPAs will be confirmed at Verification once details of project water sources are available.* 15 years
Project Developer:	CO2balance UK Ltd.
Project Representative:	Emma Donnachie, CO2balance UK Ltd
Project Participants and any communities involved:	Village Water (partner NGO), ECHO (local NGO) and all the borehole communities
Version of PDD: Date of Version:	4 26/04/2021
Host Country / Location:	Republic of Zambia
Certification Pathway (Project Certification/Impact Statements & Products	Impact Statement and Products
Activity Requirements applied: (mark GS4GG if none relevant)	GS4GG Community Services Activity Requirements
Methodologies applied:	TPDDTEC v.3.1
Product Requirements applied:	VER
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 – 90% decrease in household smoke 2 – SDG 5 – Approximately 0.5 hours equivalent to 25% reduction in time collecting water and firewood 3 – SDG 6 – 41,234 additional people gain access to safe water 4- SDG 13 –60,000 tCO2e/yr

SECTION A. Description of project

A.1. Purpose and general description of project

The Small Scale Zambian Central Province Safe Water project is eligible under the Gold Standard methodology Technologies and Practices to Displace Decentralized Thermal Energy Consumption Version 3.1. The project will support the provision of safe water using borehole technology to hundreds of households within the Central Province in Zambia. 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.

These provinces are largely rural, where local people typically use wood fuel on inefficient three stone fires to purify their drinking, cleaning and washing water. This process results in the release of greenhouse gas emissions from the combustion of wood – this can be avoided if a technology that does not require fuel (wood or fossil) supplies clean water desired by households.

Many existing boreholes were established by community groups or community based organizations (CBOs) and have fallen into disrepair because maintenance programmes have been poorly managed, or proven too expensive. CO2balance UK Ltd will be working in partnership with the British registered NGO Village Water, that operates in the Central Province. CO2balance UK Ltd and Village Water will work with local NGO, ECHO, and communities in this province to identify communities in need of a safe water source, where boreholes will be installed; and identify broken down boreholes which will be rehabilitated, so that communities have reliable access to clean, safe water. The capacity of communities to maintain their boreholes will also be supported through the project to ensure that the water keeps flowing. The boreholes included under the project will be powered entirely by emission-free technologies such as hand or solar-powered pumps. The depth of the boreholes will be limited to 100m or less.

The number of boreholes per VPA will be limited by the amount of pure water supplied by each unit; to be calculated once actual survey data has been collected. CO2balance UK Ltd and Village Water will rehabilitate and install the boreholes and deliver the maintenance programme for all the boreholes included in the project activity 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 project is funded by marketing the anticipated carbon credits from the wood savings to ethical investors, so borehole owners must agree to transfer the emissions reductions over to CO2balance UK Ltd in return for them supplying the work to renovate the boreholes. 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

Eligibility criteria as per section 3.1.1 of GS4GG Principles & Requirements:

Eligibility Criteria	Description	Means of Verification (Checked at VPA Inclusion)
(a) Types of Project	Eligible Projects shall include physical action/implementation on the ground. Pre-identified eligible Project types are identified in the Eligibility Principles and Requirements section.	The projects involves the installation/rehabilitation of safe water sources. The project type is eligible under Community Services Activity Requirements s.3.1.1(b) and s3.1.1(d).

(b) Location of Project	Projects may be located in any part of the world.	The host country and location of each this VPA is specified in Section A.4.4, in line with the locations outlined in Section A.3 of the POA-DD.
(c) Project Area, Project Boundary and Scale	The Project Area and Project Boundary shall be defined. Projects may be developed at any scale although certain rules, requirements and limitations may apply under specific Activity Requirements, Impact Quantification Methodologies and Products Requirements. In order to avoid double counting the Project shall not be included in any other voluntary or compliance standards programme unless approved by Gold Standard (for example through dual certification). Also, if the Project Area overlaps with that of another Gold Standard or other voluntary or compliance standard programme of a similar nature, the project shall demonstrate that there is no double counting of impacts at design and performance certification (for example use of similar technology or practices through which the potential arises for double counting or misestimation of impacts amongst projects).	The project boundary, including GPS co-ordinates and maps are included in Section B.3 This VPA is not included by any other carbon standard and will be capped at the type (iii) projects small-scale threshold of 60,000tCO2e per year as per CDM small-scale requirements.
(d) Host Country Requirements	Projects shall be in compliance with applicable Host Country's legal, environmental, ecological and social regulations.	VPA is in compliance with Host Country requirements such as Drinking Water Quality-Specifications (http://www.puntofocal.gov.ar/notific_otros_miembros/zmb48_t.pdf), National Gender Policy (http://extwprlegs1.fao.org/docs/pdf/zam152916.pdf), Water Resources Management Act 2011(http://www.parliament.gov.zm/sites/default/files/documents/acts/Water_Resources_Management%2C%20Act%20No.%2021%20of%202011.pdf), Environmental Management Act 2011 (http://www.parliament.gov.zm/sites/default/files/documents/acts/Environmetal%20Mangement%20Act%2012%20of%202011.pdf)
(e) Contact Details	As part of the Project Documentation the Project Developer shall provide (i) name and (ii) contact details of all Project Participants; AND in case of an organisation (iii) the legal registration details and (iv) documentation by the governing jurisdiction that proves that the entity is in good standing (defined as being a legal or other appropriate entity registered in or allowed to operate within the required jurisdiction and with no evidence of insolvency or legal/criminal notices placed against it or any of its Directors). Gold Standard retains the right (at its own discretion) to refuse use of the Standard where reputational concerns are highlighted.	Contact details of the Project Developer are included in Appendix 1
(f) Legal Ownership	Full and uncontested legal ownership of any Products that are generated under Gold Standard Certification, (for example carbon credits) shall be demonstrated. Where such ownership is transferred from project beneficiaries this must be demonstrated transparently and with full, prior and informed consent (FPIC). Note that for certain Project types there is a requirement for full and uncontested legal land title/tenure to be demonstrated. These are contained within specific Activity or Product	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 UK Ltd. An elected representative from each water resources committee responsible for a borehole will sign a CTF on behalf of all users thereof.

	Requirements. All projects shall immediately report to Gold Standard any land title/tenure disputes arising.	
(g) Other Rights	As well as legal title and ownership, the Project Developer shall also demonstrate where required uncontested legal rights and/or permissions concerning changes in use of other resources required to service the Project (for example, access rights, water rights etc.). Any known disputes or contested rights must be declared immediately to Gold Standard by the Project Developer and resolved prior to further Project implementation in affected areas.	There are no disputes or contested rights that have been identified in relation to rights relevant to the project activity
(h) Official Development Assistance (ODA) Declaration	All Project Developers applying for project activities located in a country named by the OECD Development Assistance Committee's ODA recipient list and seeking Gold Standard Certification for carbon credits shall declare the Official Development Assistance (ODA) support. The Project Developer shall follow the GHG Emissions Reduction & Sequestration Product Requirements and submit the declaration at the time of Design Certification.	A declaration confirming that there is no diversion of ODA has been submitted
(i) Fraction of Non-Renewable Biomass	Reference from where fNRB shall be calculated for VPAs shall be included in the eligibility criteria to avoid confusion at the time of VPA inclusion and for consistency	The fNRB value will be calculated in accordance with TPDDTEC v.3.1 Annex 1 – see Section B.4.3
(j) Test for Wb,y parameter	The test for fixed parameter Wb,y is based on the water boiling test.	VPAs may apply the default Wb,y value of 0.4 kg/litre. If a VPA conducts field tests then the test for the Wb,y fixed parameter will be conducted following the WBT Protocol.
(k) Water Project Treatment Capacity	The treatment capacity limits of project technology/source are required to be monitored to ensure that the water consumption level applied for emission reductions must not be greater than the treatment capacity of the project technology/sources.	Treatment capacity calculations shall be provided at each Verification, and water consumption will be capped where data exceeds calculated Treatment Capacity.
(l) Cookstove Project Theoretical Savings	The theoretical wood savings from a cook stove project shall be estimated based on following- $Py = Bb,y * (1-\eta b/\eta p,y)$ Py - quantity of firewood consumed in project Bb,y - quantity of firewood consumed in baseline ηb – efficiency of baseline technology $\eta p,y$ – efficiency of project technology	N/A
(j) Double Counting	Conditions to confirm that VPAs are neither registered as CDM project activities, included in another registered PoAs, nor the project activities that have been deregistered.	PP will confirm that VPAs are not registered anywhere else, with the submission of unique IDs for each technology, and GPS coordinates of the project boundary
(k) Technical Specification	Specification of the technology/measure, such as the level and type of service, as well as performance specification based on, inter alia, testing/certification.	Technical specifications of Project Technology are included in Section A.5
(l) Start Dates	Conditions to check the start dates of VPAs through documentary evidence.	The start date of projects will be confirmed by carbon transfer forms, repair confirmation forms, or other suitable methods depending on the project type and circumstances.
(m) Applicability	Conditions to ensure compliance with the applicability of the applied methodologies, the applied standardized baselines and the other applied methodological regulatory documents.	Set out in Section B.2

(n) Additionality	Conditions to ensure that VPAs meet the requirements for demonstration of additionality.	Set out in Section B.5
(o) LSC and EIA	Conditions related to undertaking local stakeholder consultation and environmental impact analysis.	Set out in Section E
(p) Target Group	Target group (e.g. domestic/commercial/industrial, rural/urban, grid-connected/offgrid), and where applicable, distribution mechanisms (e.g. direct installation).	Target Group: Domestic households in mainly rural locations within the Project Area Distribution Mechanism: Direct installation/rehabilitation
(q) Sampling	Sampling approaches are set out in each VPA and will follow the TPDDTEC v3.1 methodology.	Set out in Section B.7.2
(r) Crediting Period	All VPAs submitted for inclusion after the first crediting cycle of such PoA and completion of transition to GS4GG shall follow the GS4GG Certification Cycle (i.e. 5 years renewals.	Set out in Section C.

The project follows the Community Services Activity Requirements, the following table demonstrates how it meets criteria in sections 2. Eligible Project Types and section 3. General Eligibility Criteria.

Community Services Activity Requirements	
Requirements relevant to this VPA.	**Demonstration of meeting Requirements**
2. Eligibility Project Types	
2.1.2) All CSA projects shall lead to climate change mitigation and/or adaption by providing or improving access to services/resources at household or community level or institutional 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. As such, the project is an Eligible Project Type in line with the requirements.
2.1.3) Projects shall conform to the Principles and Requirements.	The project conforms with the Principles and Requirements detailed in the document. The project is eligible under section 4, Principle 1, section (a) of the Principles and Requirements as it follows an established Gold Standard methodology. Concerning point 4.1.7, 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.
3. General Eligibility Criteria	
3.1.1 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.	By providing safe water, the project activity reduces the energy requirements compared to the baseline scenario by ensuring that households consume less firewood through no longer needing to purify their water.
3.1.2 Project Area, boundary and scale Project Area and Boundary shall be defined in line with the applicable Impact Quantification Methodologies and Product Requirements. c) For the purpose of applying UNFCCC methodologies for quantification of GHG reductions, 'small scale' is defined as in CDM Modalities and Procedures for three project types; Renewable Energy, Energy Efficiency and Others.	The project Area and Boundary are defined in line with the applicable Methodology, outlined in Section A.4.4. The project is a Small-scale project issuing emission reductions which will be capped at the maximum savings of 60,000tCO2e per year in line with type (iii) projects CDM small-scale project threshold.

3.1.3 Suppressed Demand baseline Certain Impact Quantification methodologies allow projects to account Suppressed Demand scenario when establishing a baseline. In such cases, the application of Supressed Demand baseline is limited to Small Scale and Microscale Projects. Where a Supressed Demand baseline is applied, it is not possible to 'stack' Gold Standard Certified Impact Statements or Products as the definition of the baseline may be contradictory.	The VPA is a Small Scale project, therefore it is eligible to allow for suppressed demand in the 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 Certified Impact Statements or Products are intended to be stacked in case of suppressed demand baseline.
3.1.4 Legal ownership a) Projects involving the distribution of a large number of devices for services 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. b) The transfer for Product ownership shall be discussed during the local stakeholder consultations for projects.	a) It will be clearly communicated that CO2balance UK Ltd UK Ltd is the Co-ordinating/Managing Entity which communicates with the Gold Standard and the entity that is claiming ownership rights of and selling the emission reductions resulting from the project activity. The project is managed in the host country by Village Water. In agreement with Village Water, CO2balance UK Ltd have legal ownership of the carbon credits produced as a result of the project. Both parties maintain the right to operate the projects in the host country. 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 UK Ltd. An elected representative from each water resources committee responsible for a borehole will sign a CTF on behalf of all users thereof. b) The transfer of ownership was discussed during the local stakeholder consultation conducted by Village Water, OSCA and CO2balance UK Ltd, presenting the details of the project to the attendees. No issues were raised during the meeting voicing issues regarding the transfer of product ownership.

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

CO2balance UK Ltd is the Co-ordinating/Managing Entity which communicates with the Gold Standard; the project is managed in the Host Country by Village Water and local NGO partner. In agreement with Village Water, CO2balance UK Ltd 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.

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 UK Ltd. An elected representative from each water resources committee responsible for a borehole will sign a CTF on behalf of all users thereof. The project will ensure that it complies with Host Country's legal, environmental, ecological, and social regulations. Boreholes are managed by communities, who are recognised as the main users of the boreholes in the project.

There are no disputes or contested rights that have been identified in relation to rights relevant to the project activity

A.4. Location of project

A.4.1. Host Country

>>
The Republic of Zambia

A.4.2. Region/State/Province etc.

>>
Central Province

A.4.3. City/Town/Community etc.

>>
Various throughout the Central Province.

A.4.4. Physical/Geographical location

Below are details of the physical location to allow unique identification of the project. The Central Province is marked in yellow on the Google Earth image.

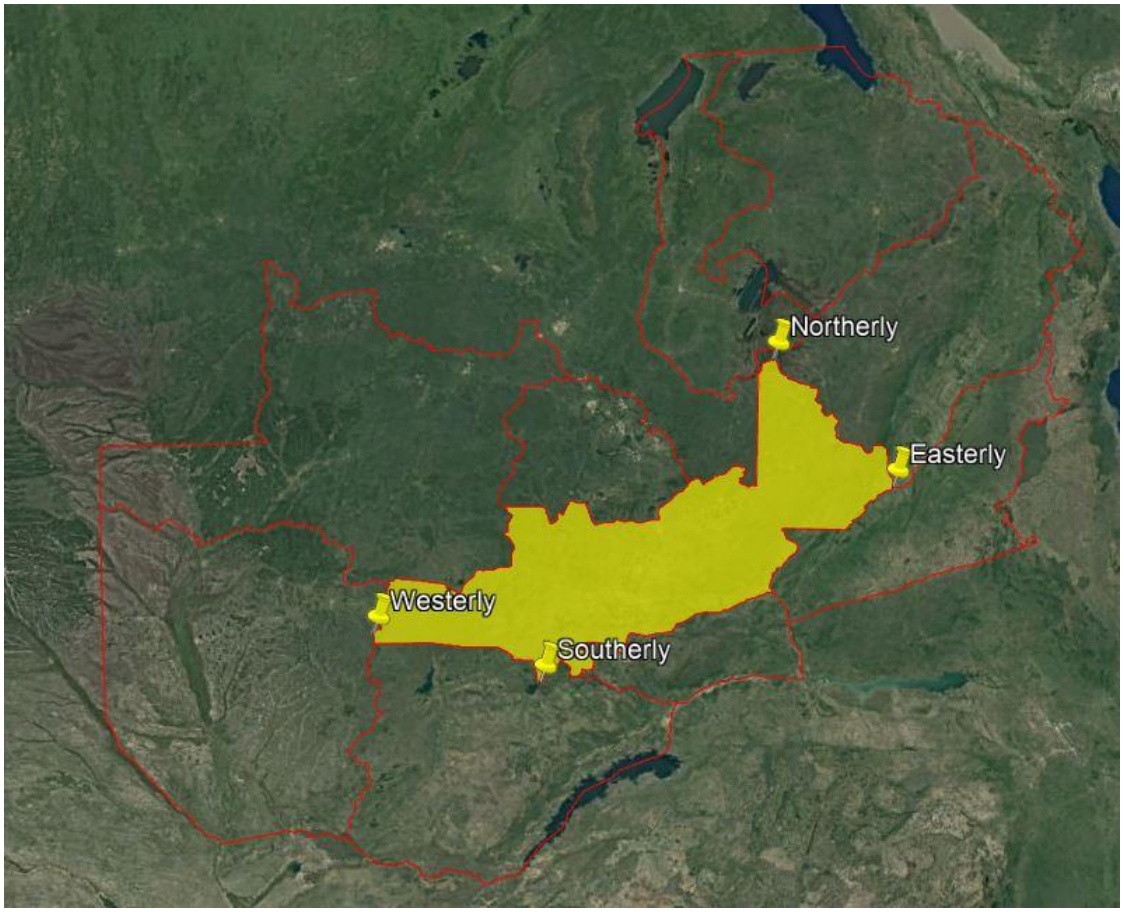


Figure 1. *Project Area with cardinal directions*

Project Area Coordinates		
	Latitude	Longitude
Northerly	-12.001698°	29.982113°
Easterly	-13.426182°	31.427431°
Southerly	-15.730997°	27.293390°
Westerly	-15.187147°	25.308841°

A.5. Technologies and/or measures

SDG Contribution

In this project, boreholes will be installed, and identified broken down boreholes will be rehabilitated so that they deliver clean, safe water for human consumption which contributes positively to SDG 6. Contribution to SDG 6 will be calculated based on the additional number of persons having access to safe water in the project activity compared to the baseline scenario. As boiling is common practice in the project areas, the process of boiling water on an inefficient stove or open fire has negative health impacts on the Zambian rural communities through the production of household air pollution; providing access to safe water and removing the need to boil, reduces the amount of non-renewable biomass burned. Therefore the amount of safe water provided by the rehabilitated boreholes, can be taken as a proxy indicator of how these VPAs contribute towards the SDG 3 target of substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.

The boreholes are usually located close to villages, and offer a reliable safe water source. Once repaired, it is predicted that women time spent collecting water, and their time spent collecting wood fuel for boiling water for purification will be reduced, contributing positively to SDG 5. The project will monitor the time reduction

collecting firewood and water as a result of the project. 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 project will provide support, technology, capacity building, training activities to raise awareness on climate change and related planning and management among the communities focusing on women, youth and local and marginalized communities. The rehabilitation of boreholes 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.

Borehole Technology

Many existing boreholes are owned by community groups or community based organizations (CBOs) and have fallen into disrepair because maintenance programmes have been poorly managed, or proven too expensive. The boreholes included under the project will be entirely human operated and will be fitted with hand pump models that are commonly used in the area such as India Mark II pumps (see below). 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 and installed. 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 the activity of the project.

The majority of pumps to be fixed are India Mark II pump as shown below. Other hand pump models that utilize the same basic design may also be included in the project. This includes but is not limited to the Afridev, and the U3 modified pump. The project is not limited to any particular model of hand-pump or water scheme; installation and rehabilitation will be according to local needs.

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

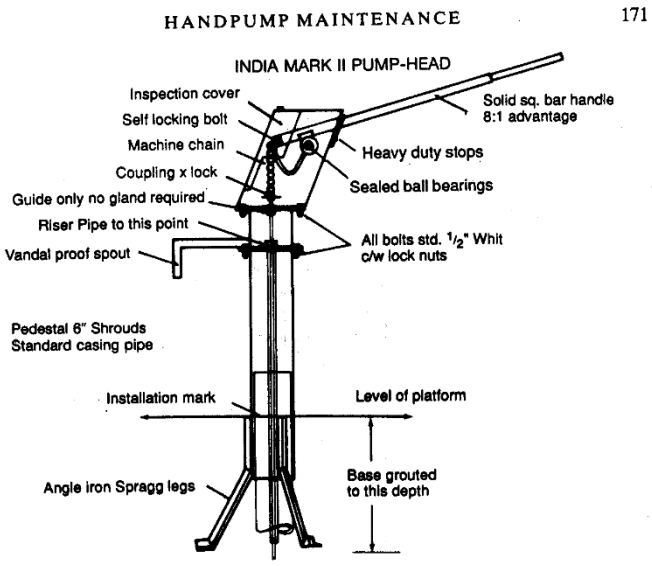


Figure 8.1 *The India Mark II pump-head*

Technical Specifications for the three most common models:

	Afridev	**India Mark II**	**U3 Modified**
Cylinder diameter (mm):	50	63.5	50
Maximum Stroke (mm):	225	125	125
Approx. discharge at about 75 watt input m3/h:	at 10 m head 1.4	at 10 m head 1.8	at 10 m head 1.2
	at 15 m head 1.1	at 15 m head 1.3	at 15 m head 1.0
	at 20 m head 0.9	at 20 m head 1.0	at 20 m head 0.8
	at 30 m head 0.7	at 30 m head 0.8	at 30 m head 0.6
Pumping lift (m):	10-45	10-50	10-45
Water consumption (lpcd):	15-20	15-20	15-20

A.6. Scale of the project

This VPA and the other homogenous VPAs within the Project Area boundary meet the relevant activity requirements for a small scale project. The emission reductions achieved by the SS-VPA will be limited to a maximum reduction in energy consumption, on the supply and/or demand side, with a maximum output (i.e. maximum savings) of 60,000tCO2e per year in line with the type (iii) projects CDM small-scale threshold.

A.7. Funding sources of project

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

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 3.1.

B.2. Applicability of methodology

In accordance with the Gold Standard Methodology: Technologies and Practices to Displace Decentralized Thermal Energy Consumption Version 3.1, small-scale VPAs listed in the Central Province boundary adhere 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.	The project area (Central Province) has been clearly demarcated using political boundaries recognized in Zambia. Each technology will be recorded using GPS coordinates and individually tagged with an identification code which is stored securely in the project database. Regular project surveys 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 boreholes 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. Boreholes 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 is 34.38 Kw which is well within the methodological limit of 150kw.
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, a WASH program will be carried out parallel to the project which will help 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 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.	A full explanation will be given to elected representatives of borehole users that CO2balance UK Ltd have committed to provide them with a rehabilitated and fully maintained for free on the basis that the emissions reductions will be transferred to CO2balance UK Ltd. This will be recorded using a Carbon Transfer Form, which elected representatives of borehole owners will sign confirming that they understand the agreement and will explain it to borehole 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 for boiling 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 fuels are not sold as part of this project therefore this point is not applicable.

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.	

B.3. Project boundary

Below are details of the physical location to allow unique identification of the project. The Central Province is marked in yellow on the Google Earth image.

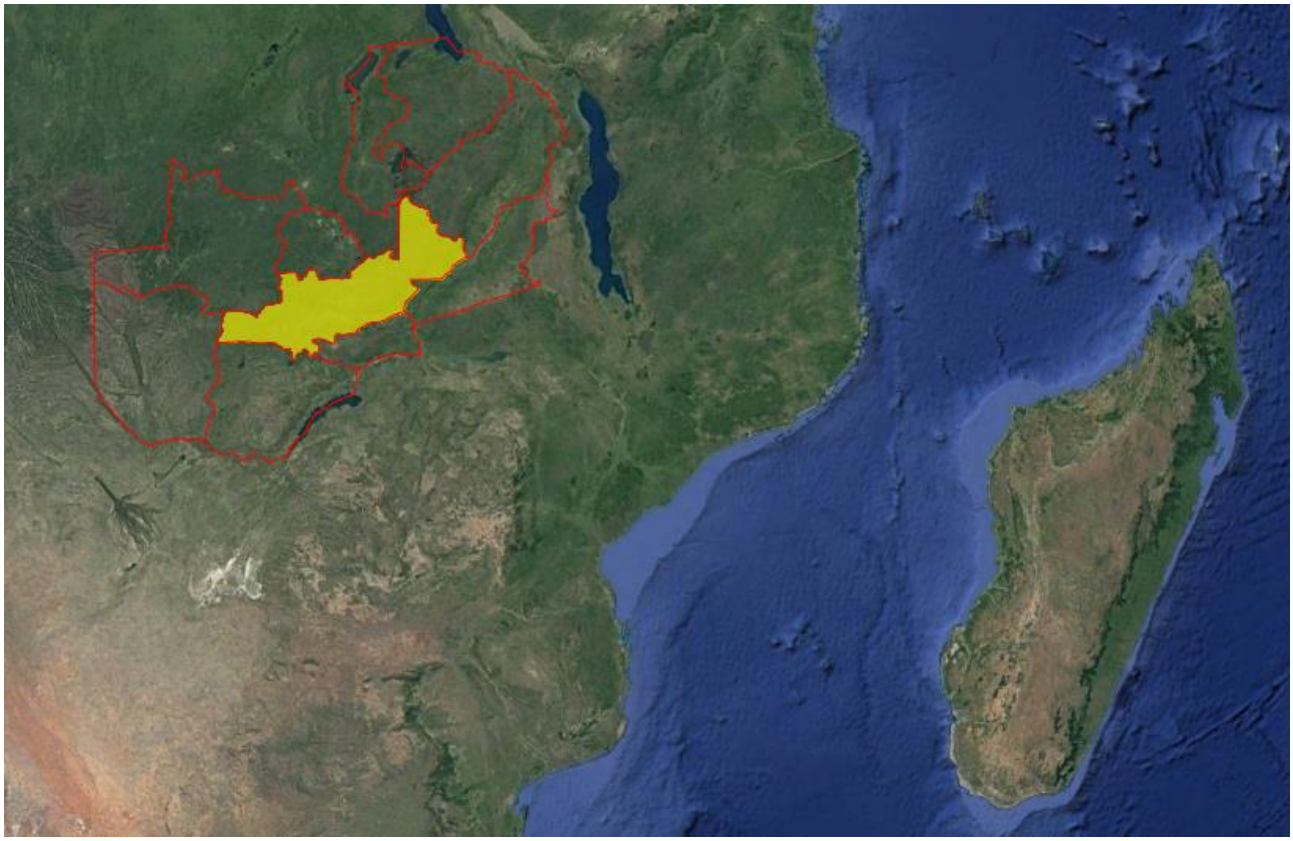


Figure 2. Zambia Boundaries

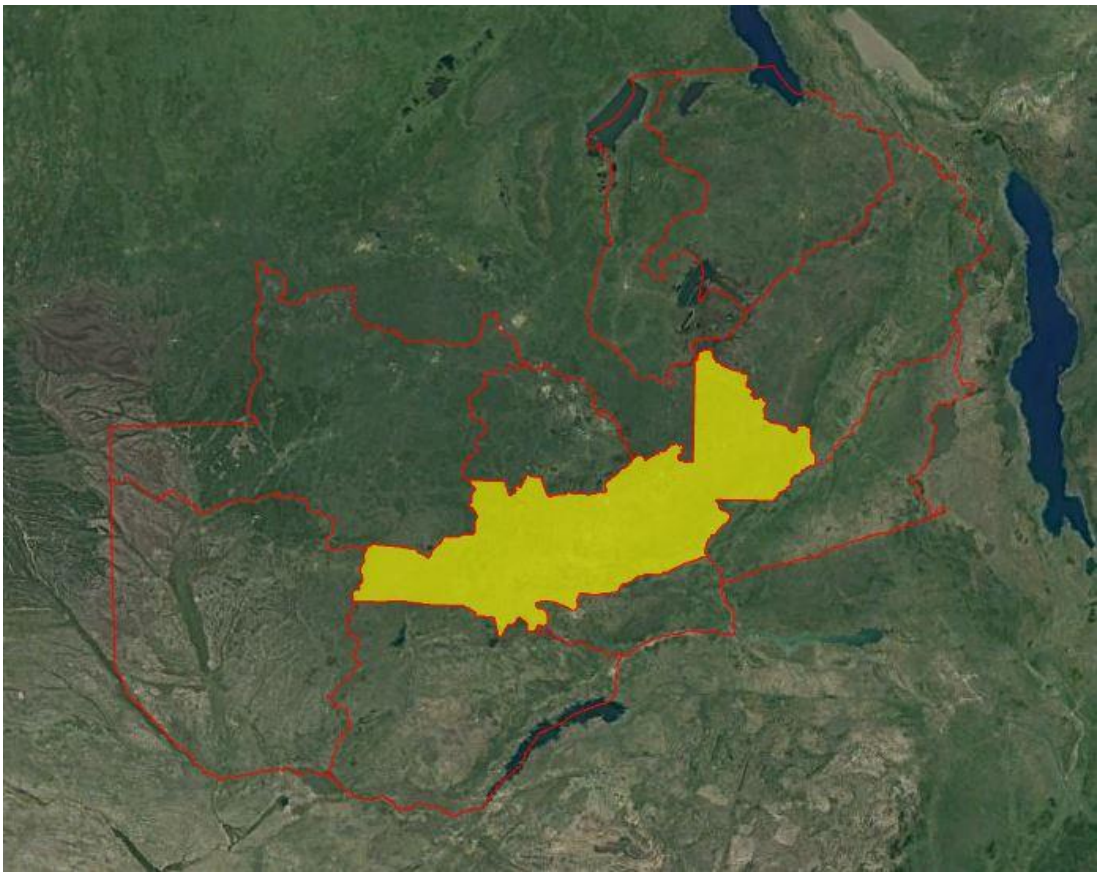


Figure 3. Central Province boundaries

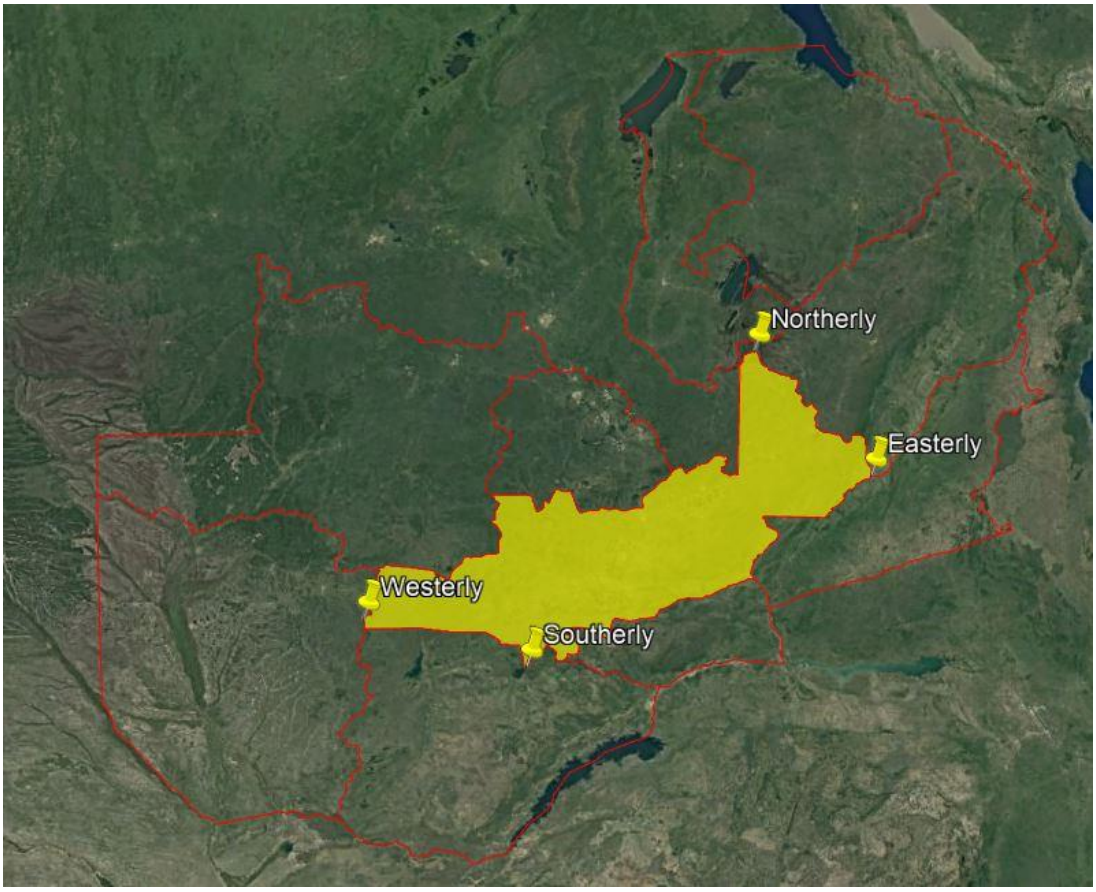


Figure 4. Project Area with cardinal directions

Project Area Coordinates		
	Latitude	Longitude
Northerly	-12.001698°	29.982113°
Easterly	-13.426182°	31.427431°
Southerly	-15.730997°	27.293390°
Westerly	-15.187147°	25.308841°

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	CO_2	Yes	Important source of emissions
		CH_4	Yes	Important source of emissions
		N_2O	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	CO_2	Yes	Important source of emissions
		CH_4	Yes	Important source of emissions
		N_2O	Yes	Gas included in the calculations. Emissions factors for fuel in stationery combustion by the IPCC

B.4. Establishment and description of baseline scenario

In the baseline scenario in the Central Province, Zambia, local people mainly 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 local communities have access to safe water and therefore do not need to boil water as a treatment method.

According to the baseline studies, almost the totality of the people in the Central Province of Zambia do not have access to safe water and rely on unprotected wells, lakes and other open water sources that are highly susceptible to contamination. 75% of the respondents make the water safe to drink, of those 98% depend on boiling, and only 2% use purification tablets. The remaining 25% are forced to drink dirty water due to suppressed demand factors such as lack of access to fuel, time and financial resources.

Examples of baseline water sources used when improved sources are not available

CO2balance UK Ltd seeks to register this project as a Gold Standard small scale project using the methodology "Technologies and Practices to Displace Decentralized Thermal Energy Consumption Version 3.1." Many existing boreholes have been poorly managed or proven too expensive to maintain properly. In this project CO2balance UK Ltd will work with local partner, Village Water, ECHO,community groups and local government in the Central Province to identify communities without access to a safe water source where boreholes will be installed; and identify broken down boreholes which will be renovated 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 the cap of 60,000tCO2e per year is approximately 157, however, the exact number will be determined once actual survey data has been collected. CO2balance UK Ltd 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 a least developed country (LDC) and is one of the poorest countries in the world with a Human Development Index ranking of 143 out of 189 countries worldwide as of 2018[1].

Baseline Scenario:

The baseline scenario is assessed through use of:

- Baseline Project Survey
- Baseline Water Boiling Test (BWBT)

[1] http://hdr.undp.org/en/countries/profiles/ZMB

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 ensure that the baseline data collected is conservative and representative of the entire project population, a minimum of 100 Baseline Project surveys and 40 BWBTs will be conducted in line with 90/30 confidence precision sampling on a minimum of 8 randomly selected communities throughout the project area.

For the baseline survey- 8 communities were selected according to 90/30 confidence/precision on a population of 159 villages within the Project Districts. On average, 14 households from each community were surveyed in the baseline survey totalling 110 responses. This surpasses the methodology minimum sample size of 100.

For the WBT- PP surveyed 40 HH within the project area meeting the sample size in the methodology 'Group size <300'

As the project technology is installed at the start of the project, the baseline scenario is considered fixed throughout the crediting period. However, in the event the project surveys show a substantial change in fuel use characteristics, a new baseline shall be conducted.

B.4.1 Baseline Project Surveys

In-line with Gold Standard requirements the Baseline Project 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 will be captured in the surveys:

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

A total of 110 Baseline Water Surveys were conducted across the project area between 06/01/2020 and 06/02/2020, in randomly selected households. The survey comprises of 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 includes household information, household characteristics, where drinking water is obtained and whether it has to be treated to be safe for consumption. Further questions inquire about cooking methods and fuel types used and how these acquired, and time spent on these tasks.

Suppressed Demand:

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.

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

- Xboil: 0%
- Cj: 2.73%

B.4.2 Water Boiling Test

The Baseline Water Boiling Test (BWBT) is conducted to calculate the quantity of fuel required to purify one litre of water by boiling for 10 minutes using technologies and fuels representative of the baseline scenario. The BWBT is conducted using the 90/30 rule for selection of samples on a minimum of 30 households, accounting for variability in the types of prevalent baseline technologies. A total of 40 WBT were conducted between 06/01/2020 and 06/02/2020.

The tests reveal information regarding current boiling technologies and fuel and amount of fuel needed to conduct the test; i.e. the difference between the volume of wood fuel at the start of the test and at the end. The BWBT is conducted in-line with Gold Standard requirements within the latest methodology.

The main objective is to establish a conservative estimate of the baseline fuel required to boil 1 litre of water within the target area.

The outcome of the BWBT field study was 1.374kg, and therefore a conservative cap of 0.4kg is being applied.

B.5. Demonstration of 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 4.1.9 - 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[2] and so this project is deemed additional by the relevant activity requirement s4.1.9(b).

B.6. Sustainable Development Goals (SDG) outcomes

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

SDG	Target	Indicators	Explain

[2] https://unctad.org/topic/least-developed-countries/list

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.	3.9.1 Mortality rate attributed to household and ambient air pollution	By providing safe water from the borehole, the project removes the need to boil water for purification therefore reducing the amount of non-renewable biomass burned as a result.
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 water. In regards 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 centre of communities, and removing the need to purify water by boiling, 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 safely managed drinking water services	The project provides equitable access to clean affordable drinking water for all those local to the rehabilitated borehole. Anyone is allowed to use the borehole 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.	13.B.1Number of least developed countries and small island developing States that are receiving specialized support, and amount of support, including finance, technology and capacity-building, for mechanisms for raising capacities for effective climate change-related	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.

		planning and management, including focusing on women, youth and local and marginalized communities.	

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

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.

The baseline surveys show that boiling is common practice in all project areas, meaning that although people in the baseline did not have access to safe water, many were consuming safe water after purification. The process of boiling water on an inefficient stove or open fire has other health impacts; the burden of diseases from household air pollution (HAP) has been well documented[3,4]. Providing access to safe water and removing the need to boil, reduces the amount of non-renewable biomass burned. Therefore the amount of safe water provided can be taken as a proxy indicator of how these VPAs contribute towards the SDG 3 target of substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.

The Baseline Water Boiling Test in each region shows the amount of biomass used to boil 1 litre of water and the Water Consumption Field Test during the project measures water use. The quantity of biomass used in the baseline can be calculated by combining these figures, and by deducting any safe water boiled, we can calculate the quantity of biomass used in the project scenario. This difference will then be used to calculate the % decrease in fuel use, which is the figure used to calculate the VPAs' contribution to the SDG target.

Calculations are as follows (parameters from sections B.5.1 of the VPA-DD will be applied):

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

Where:

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

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

Where :

[3] Smith, K., et al. (2014). 'Millions Dead', Available https://www.annualreviews.org/doi/abs/10.1146/annurev-publhealth-032013-182356 , Accessed 06/04/2018

[4] Burnett, R., et al. (2014). 'An Integrated Risk Function for Estimating the Global Burden of Disease Attributable to Ambient Fine Particulate Matter Exposure', Available https://ehp.niehs.nih.gov/1307049/ , Accessed 06/04/2018

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

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

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

Where :

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

Qp,cleanboil,y Quantity of safe water boiled in the project scenario p during year y, after installation of the project technology

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

Globally, women and girls perform the majority of unpaid domestic work.[5] 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.[6] Women are widely recognised as being principally responsible for natural resource collection.[7]

By reducing the amount of firewood required by households for water purification, the project has the potential to reduce the *time poverty* of women, because the time burden of collecting firewood, which falls disproportionately on women, will be reduced.

These trends also 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 burden of collecting water[8]. As the safe water sources are located centrally within communities, closer to public institutions and villages, the distance travelled to collect water will be reduced, reducing the time per trip spent collecting water. In addition, as the water sources will be maintained, they will provide a reliable water supply, ensuring that water needs for cooking, drinking, and food preparation can be met by one central water source, so the time spent collecting water is minimised.

The average % decrease per household in time spent collecting water and firewood 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:

[5] 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

[6] 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

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

[8] 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

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

It is predicted that time spent collecting 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.

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

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

Where:

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

And:

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

Where

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

And:

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

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

Relevant SDG Indicator	SDG 13.B.1 (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 https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf
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.B.1 (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	IPCC Default emissions factor: Non-CO2 Emissions from Stationary Combustion. Annex 1, Table 2 and Table 3. https://www.ipcc-nggip.iges.or.jp/public/gp/bgp/2_2_Non-CO2_Stationary_Combustion.pdf Global Warming Potential: https://www.ghgprotocol.org/sites/default/files/ghgp/Global-Warming-Potential-Values%20%28Feb%2016%202016%29_1.pdf
Value(s) applied	9.46

<table>
<tr><td>Choice of data or Measurement methods and procedures</td><td>Deemed valid by Methodology
<table>
<tr><th>Gas</th><th>Default Emissions factor (kg_gas/TJ_{NCV})</th><th>GWP of gas</th><th>Default Emissions factor (kg_CO₂e/TJ_{NCV})</th><th>Default Emissions factor (t_CO₂e/TJ_{NCV})</th></tr>
<tr><td>CH_4</td><td>300</td><td>28</td><td>8,400</td><td>8.4</td></tr>
<tr><td>N_2O</td><td>4</td><td>265</td><td>1,060</td><td>1.06</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>9.46</td></tr>
</table></td></tr>
<tr><td>Purpose of data</td><td>Calculation of emission reductions</td></tr>
<tr><td>Additional comment</td><td>-</td></tr>
</table>

Relevant SDG Indicator	SDG 13.B.1 (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; https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf
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.B.1 (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	IPCC Default emissions factor: Non-CO2 Emissions from Stationary Combustion. Annex 1, Table 2 and Table 3. https://www.ipcc-nggip.iges.or.jp/public/gp/bgp/2_2_Non-CO2_Stationary_Combustion.pdf Global Warming Potential: https://www.ghgprotocol.org/sites/default/files/ghgp/Global-Warming-Potential-Values%20%28Feb%2016%202016%29_1.pdf

Value(s) applied	9.46
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	28	8,400	8.4
N_2O	4	265	1,060	1.06
			Total	**9.46**

Purpose of data	Calculation of emission reductions
Additional comment	-

Relevant SDG Indicator	SDG 13.B.1 (Climate Action)
Data/parameter	NCV_b
Unit	TJ/ton
Description	Net calorific value of the wood fuel used in the baseline
Source of data	TPDDTEC v.3.1
Value(s) applied	0.015
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.B.1 (Climate Action)
Data/parameter	NCV_p
Unit	TJ/ton
Description	Net calorific value of the wood fuel used in the project
Source of data	TPDDTEC v.3.1
Value(s) applied	0.015
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.B.1 (Climate Action), SDG 3.9.1 (Good Health and Wellbeing)
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	0.0004 WBT cap applied
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* CDM-EB50-A30-STAN Version 08.0
Purpose of data	Calculation of emission reductions
Additional comment	-

Relevant SDG Indicator	SDG 13.B.1 (Climate Action), SDG 6.1.1 (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	0.0004 WBT cap applied
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* CDM-EB50-A30-STAN Version 08.0
Purpose of data	Calculation of emission reductions
Additional comment	-

Relevant SDG Indicator	SDG 13.B.1 (Climate Action), SDG 6.1.1 (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 Project Survey
Value(s) applied	2.73%
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.B.1 (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 Project Survey. Credible literature, studies, survey, reports, relevant to the project target area
Value(s) applied	0%
Choice of data or Measurement methods and procedures	Suppressed demand will be determined through a set of questions in the project survey that establish the method households use to purify their water, if any, and how they would choose to purify if they were not subject to monetary and access barriers. This is in line with the Gold Standard principles of suppressed demand outlined in annex 2 of the Methodology. 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 5.4.1 (Gender Equality)
Data / Parameter	$T_{b,y}$
Unit	Hours
Description	Baseline time spent collecting water and firewood per household per trip
Source of data	Baseline Project Survey
Value(s) applied	1.99 hours
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	

Relevant SDG Indicator	SDG 3.9.1 (Good Health and Well-Being)
Data / Parameter	$P_{b,y}$
Unit	Kg/household
Description	Quantity of fuel that is consumed in the baseline scenario b during year y (kg/household-day)
Source of data	Baseline Survey
Value(s) applied	0.00280
Choice of data or Measurement methods and procedures	Baseline Water Boiling Test Result.
Purpose of data	Calculation of SDG 3

Additional comment	-

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

SDG	Calculation	Ex-Ante Estimate of Net Benefit
SDG 3.9.1	$HAPR_y = ((P_{b,y} - P_{p,y})/P_{b,y}) * U_{p,y}$ $HAPR_y = ((0.00280-0)/0.00280) * 0.9\% = 90\%$ *Where:* $P_{b,y} = W_{b,y} * Q_{p,y}$ $P_{b,y} = 0.0004 * 7 = 0.00280$ *And:* $P_{p,y} = W_{b,y} * Q_{p,cleanboil,y}$ $P_{p,y} = 0.0004 * 0 = 0$	90% decrease in household smoke
SDG 5.4.1	$TR_y = (T_{b,y} - T_{p,y})/ T_{b,y}$ TRy= (1.99 – 1.49)/1.99 = 25%	Approximately 0.5 hours saved per trip collecting water and firewood equivalent to 25% reduction time
SDG 6.1.1	$P_{access} = P_y * (1 - C_j) * U_{p,y}$ P_{access} = 47100 * (1-2.73%) * 90% = 41,234	41,234 additional people with access to safe water in the project activity
SDG 13.B.1	ERy=((BEb,y -PEp,y) *Up,y - LEp,y)*(1-Xboil) ERy= ((66,843- 0) * 90% - 0) * (1- 0) = 60,159 Where: $BE_{b,y} = B_{b,y} * \left(\left(fNRB_y * EF_{b,fuel,co2}\right) + EF_{b,fuel,nonco2}\right) * NCV_{b,fuel}$ $BE_{b,y}$ = 44,482*((0.81*112)+9.46)*0.015 = 66,843 And: $B_{b,y} = (1 - C_j) * N_{p,y} * W_{b,y} * (Q_{p,y} + Q_{p,rawboil,y})$ $B_{b,y}$ = (1-2.73%) * 16,331,925 * 0.0004 * (7+0) = 44,482 Where $PE_{p,y} = B_{p,y} * \left(\left(fNRB_y * EF_{p,fuel,co2}\right) + EF_{p,fuel,nonco2}\right) * NCV_{p,fuel}$ $PE_{p,y}$ = 0 * ((0.81* 112) + 9.46) * 0.015 = 0 And: $B_{p,y} = (1 - C_j) * N_{p,y} * W_{p,y} * (Q_{p,rawboil,y} + Q_{p,cleanboil,y})$ Bp,y = (1-2.73%)* 16,331,925 * 0.0004 * (0 + 0) = 0	60,159 tonnes of CO_2 saved per year (capped emissions 60,000 tCO_2 per year)

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

SDG 3

Year	Baseline estimate	Project estimate	Net benefit
Year A	100% household smoke from water purification	10% household smoke from water purification	90% decrease in household smoke
Year B	100% household smoke from water purification	10% household smoke from water purification	90% decrease in household smoke
Year C	100% household smoke from water purification	10% household smoke from water purification	90% decrease in household smoke
Year D	100% household smoke from water purification	10% household smoke from water purification	90% decrease in household smoke
Year E	100% household smoke from water purification	10% household smoke from water purification	90% decrease in household smoke
Total	100% household smoke from water purification	10% household smoke from water purification	90% decrease in household smoke
Total number of crediting years	5 years	5 years	5 years
Annual average over the crediting period	100% household smoke from water purification	10% household smoke from water purification	90% decrease in household smoke

SDG 5

Year	Baseline estimate	Project estimate	Net benefit
Year A	1.99 hours collecting water and firewood	1.49 hours collecting water and firewood	0.5 hours saved collecting water and firewood (equivalent to 25% reduction time)
Year B	1.99 hours collecting water and firewood	1.49 hours collecting water and firewood	0.5 hours saved collecting water and firewood (equivalent to 25% reduction time)

Year C	1.99 hours collecting water and firewood	1.49 hours collecting water and firewood	0.5 hours saved collecting water and firewood (equivalent to 25% reduction time)
Year D	1.99 hours collecting water and firewood	1.49 hours collecting water and firewood	0.5 hours saved collecting water and firewood (equivalent to 25% reduction time)
Year E	1.99 hours collecting water and firewood	1.49 hours collecting water and firewood	0.5 hours saved collecting water and firewood (equivalent to 25% reduction time)
Total	1.99 hours collecting water and firewood	1.49 hours collecting water and firewood	0.5 hours saved collecting water and firewood (equivalent to 25% reduction time)
Total number of crediting years	5 years	5 years	5 years
Annual average over the crediting period	1.99 hours collecting water and firewood	1.49 hours collecting water and firewood	0.5 hours saved collecting water and firewood (equivalent to 25% reduction time)

SDG 6

Year	Baseline estimate	Project estimate	Net benefit
Year A	5,866 people with access to safe water	47,100 people with access to safe water	41,234 additional people with access to safe water
Year B	5,866 people with access to safe water	47,100 people with access to safe water	41,234 additional people with access to safe water
Year C	5,866 people with access to safe water	47,100 people with access to safe water	41,234 additional people with access to safe water
Year D	5,866 people with access to safe water	47,100 people with access to safe water	41,234 additional people with access to safe water
Year E	5,866 people with access to safe water	47,100 people with access to safe water	41,234 additional people with access to safe water
Total	5,866 people with access to safe water	47,100 people with access to safe water	41,234 additional people with access to safe water
Total number of crediting years	5 years	5 years	5 years

Annual average over the crediting period	5,866 people with access to safe water	47,100 people with access to safe water	41,234 additional people with access to safe water

SDG 13

Year	Baseline estimate	Project estimate	Net benefit
Year A	60,000 tCO_2e	0 tCO2e	60,000 tCO_2e
Year B	60,000 tCO_2e	0 tCO2e	60,000 tCO_2e
Year C	60,000 tCO_2e	0 tCO2e	60,000 tCO_2e
Year D	60,000 tCO_2e	0 tCO2e	60,000 tCO_2e
Year E	60,000 tCO_2e	0 tCO2e	60,000 tCO_2e
Total	300,000 tCO_2e	0 tCO2e	300,000 tCO_2e
Total number of crediting years	5 years	5 years	5 years
Annual average over the crediting period	60,000 tCO_2e		60,000 tCO_2e

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

Relevant SDG Indicator	SDG 13.B.1 (Climate Action), SDG 6.1.1 (Clean Water and Sanitation)
Data / Parameter	Np,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 16,331,925. Value to be provided in time for 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 this 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.B.1 (Climate Action), SDG 6.1.1 (Clean Water and Sanitation) SDG 3.9.1 (Good Health and Well-Being)
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 UK Ltd 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.B.1 (Climate Action), SDG 3.9.1 (Good Health and Well-Being)
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. 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. Volume capped at 7 litres per person per day as per the methodology. The WCFT will be carried out by staff trained by co2balance UK Ltd 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 13.B.1 (Climate Action), SDG 3.9.1 (Good Health and Well-Being) SDG 6.1.1 (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. 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 UK Ltd 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 13.B.1 (Climate Action)
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 first 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 UK Ltd 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 6.1.1 (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	Certified 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. Water testing will be conducted by certified technicians from accredited laboratories.
Monitoring frequency	Quarterly
QA/QC procedures	The first test will be within 6 months of the rehabilitation. A sample of boreholes will be tested each quarter. Results will be certified by a credible 3rd part y.
Purpose of data	Criteria of methodology
Additional comment	Water is tested in accredited laboratories. Tested water is collected from source.

Relevant SDG Indicator	SDG 13.B.1 (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 3.9.1 (Good Health and Wellbeing) SDG 6.1.1 (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 47,100. 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
Monitoring frequency	Continuous
QA/QC procedures	Household information of water point users is gathered during project sensitization. Lists are double checked.
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 5.4.1 (Gender Equality)
Data / Parameter	$T_{p,y}$
Unit	Hours
Description	Project time spent collecting water and firewood per household per trip
Source of data	Project survey
Value(s) applied	Estimated at 1.49. 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.
Monitoring frequency	Annually
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	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	

Relevant SDG Indicator	SDG 3.9.1 (Good Health and Well-Being)
Data / Parameter	$P_{p,y}$
Unit	Kg/household
Description	Quantity of fuel that is consumed in the project scenario p during year y (kg/household-day)
Source of data	Baseline and Project Surveys
Value(s) applied	Estimated at 0. Actual value to be provided in time for each verification.
Measurement methods and procedures	Baseline Water Boiling Test
Monitoring frequency	Annual
QA/QC procedures	N/A
Purpose of data	Calculation of SDG 3
Additional comment	-

Relevant SDG Indicator	SDG 13.B.1 (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 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 6.1.1 (Clean Water and Sanitation), SDG 3.9.1 (Good Health and Well-Being)
Data / Parameter	Hygiene campaigns/Education Programme
Unit	Outcome of WASH meetings
Description	Hygiene campaigns carried out among project technology users
Source of data	Annual hygiene campaign results
Value(s) applied	Number of participants attending WASH training
Measurement methods and procedures	WASH Report
Monitoring frequency	Annual
QA/QC procedures	Sharing and checking of meeting pictures and participants lists.
Purpose of data	In accordance with TPDDTEC v3.1 methodology
Additional comment	-

B.7.2. Sampling plan

Cross sampling of devices will be applied across all homogenous VPAs in Central Province. Homogenous VPAs are defined as those that are sharing a common baseline, and meet the criteria laid out in B.2 of the POA-DD. The number of boreholes that will need to be sampled for a 90/30 confidence/precision (90% confidence interval and 30% margin of error) in accordance with the TPDDTEC v3.1 methodology 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
- Usage Surveys- Completed annually
- Water Consumption Field Tests- Completed every 2 years

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

>>

Monitoring surveys and data collection is intended to be carried out with a mobile application and all the records will be stored on an online platform.

Installation Record

A comprehensive installation record will record the following information:

- Date of installation/rehabilitation
- GPS location of the borehole
- Model of the borehole
- Quantity of boreholes installed
- The total number of people obtaining their water from each borehole
- Mode of use: commercial/domestic

The installation record will be backed up electronically, with any 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 on the online platform and/or on the Project Database for the entire life cycle of the project. The data may be archived during the project in order to maintain clarity and security.

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 biennially, 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 UK Ltd 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 monitoring project survey surveys end users using project technologies to explore changes in the project scenario over time. The survey asks questions on household characteristics, water use, woodfuel use and WASH.

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. A sample of boreholes will be tested each quarter in line with the methodology.

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 re-examine the assessment at any time.

g) Np,y Project Technology Days

Number of persons consuming water supplied by project scenario p through year y. Sum of the total number of people using each borehole in the project multiplied by the number of days crediting each borehole earns in this monitoring period. The total number of households using each borehole will be determined through information supplied by our NGO partner. Using this method, the total number of people using each borehole will be known and hence a figure for person days can be calculated. All monitoring tasks will be selected at random.

h) WASH campaign

A hygiene campaign is conducted annually in the format of Water, Sanitation and Hygiene (WASH) training at the community level.

The trainings act to promote the practice of well-functioning Water Resource Committees at each borehole to ensure good hygienic tendencies are adopted by the communities. WASH practices are also monitored annually as a series of questions in the Project Survey to determine the effectiveness of the trainings and to monitor the health status of the villages with regards to avoiding the spread of water borne diseases.

Safeguarding Monitoring

In line with Section 2.2 of Safeguarding Principles & Requirements, safeguarding principles that were identified as relevant to the project and requiring mitigation measures through the Stakeholder Consultation shall be monitored:

- *Gender Equality and Women's Rights:*
  - Time saved through the collection of firewood shall be monitored through the annual Monitoring Project Survey
  - How time saved is used will be monitored through the annual Monitoring Project Survey
- *Corruption:*
  - 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.
- *Negative Economic Consequences:*
  - To ensure long term sustainability of the water points, and avoid unexpected breakdowns and spending, training will be conducted at the beginning of the project on conducting minor maintenance.
- *Community Health, Safety, and Working Conditions:*
  - Incidences of water borne illnesses will be monitored through the annual Monitoring Project Survey
  - 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 training.

SECTION C. Duration and crediting period

C.1. Duration of project

C.1.1. Start date of project

19/03/2020
This is the date of the first borehole rehabilitation, which marks the earliest start of the project. Exact dates per VPAs will be confirmed at Verification once details of project water sources are available.

C.1.2. Expected operational lifetime of project

15 years

C.2. Crediting period of project

15 years; 5 years twice renewable

C.2.1. Start date of crediting period

20/03/2020
Exact dates per VPAs will be confirmed at Verification once details of projects water sources are available

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

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)
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 participation and inclusion.	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.	During all trainings, it will be emphasised that project beneficiaries should support vulnerable or less mobile community members to access water
2 Gender Equality and Women's Rights	The Project shall not directly or indirectly reinforce gender-based discrimination and shall not lead to/contribute to adverse impacts on gender equality and/or the situation of women. Specifically, this shall include (not exhaustive): (a) Sexual harassment and/or any forms of violence against women – address the multiple risks	No	The burden on the whole community of travelling far to collect water and	

	of gender-based violence, including sexual exploitation or human trafficking.		gather firewood for water purification will be reduced. This will also mitigate the social isolation of spending a long time collecting these resources		
	(b) Slavery, imprisonment, physical and mental drudgery, punishment or coercion of women and girls.	No	The project will decrease the drudgery by reducing time spent on water and firewood collection		
	(c)Restriction of women's rights or access to resources (natural or economic).	No	The project will increase women's access to resources such as water by making safe water available in the community. 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.		
	(d) Recognise women's ownership rights regardless of marital status – adopt project measures where possible to support to women's access to inherit and own land, homes, and other assets or natural resources. Projects shall apply the principles of non-discrimination, equal	No	The project will decrease the workload of women in collecting water and firewood, thereby allowing more time to engage in other activities.		

	treatment, and equal pay for equal work, specifically:			
	(a) Where appropriate for the implementation of a Project, paid, volunteer work or community contributions will be organised to provide the conditions for equitable participation of men and women in the identified tasks/activities.	Yes	Equal participation of women and men in decision making will be encouraged by promoting their equal membership on water point committees. These WPCs will be trained to facilitate the participation of members depending on their specific circumstances. They will also assist all communities members to provide feedback on the project, regardless of their situation.	
	(b) Introduce conditions that ensure the participation of women or men in Project activities and benefits based on pregnancy, maternity/paternity leave, or marital status.	Yes	The project aims to benefit the whole community equally and women's equal participation in the LSC and water point committees is encouraged	
	(c) Ensure that these conditions do not limit the access of women or men, as the case may be, to Project participation and benefits.	Yes	The project will encourage equal participation of men and women.	
	3.2.3 The Project shall refer to the country's national gender strategy or equivalent national commitment to aid in assessing gender risks.	Yes	The analysis of the project is in line with the country gender strategy.	

3 Community Health, Safety and Working Conditions	The Project shall avoid community exposure to increased health risks and shall not adversely affect the health of the workers and the community.	Yes	The project will reduce the community exposure to water borne illness through the 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.	Incidences of water borne illnesses will be monitored through the annual Monitoring Project Survey. 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 training
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 sites or structures of historic and cultural value. Project activities do not compromise historic, cultural or religious practices.	
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 will not impact the physical or economic relocation of peoples. The focus of the project is rehabilitating and installing water point infrastructure only.	
4.3 Land Tenure and Other Rights	Does the Project require any change to land tenure arrangements and/or other rights?	No	The project will not impact on land tenure arrangements or rights.	
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	No	The project will take place on land owned either by the county government or by local people for which	

	land/territory claimed by indigenous peoples?		their permission will first be sought.	
5 Corruption	The Project shall not involve, be complicit in or inadvertently contribute to or reinforce corruption or corrupt Projects.	No	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 grievance mechanism to report any form of corruption.	
6.1 Labour Rights	The Project Developer shall ensure that there is no forced labour and that all employment is in compliance with national labour and occupational health and safety laws, with obligations under international law, and consistency with the principles and standards embodied in the International Labour Organization (ILO) fundamental conventions. Where these are contradictory and a breach of one or other cannot be avoided, then guidance shall be sought from Gold Standard.	No	The project will adhere to labour laws and requirements	
	Child labour, as defined by the ILO Minimum Age convention is not allowed. The Project Developer shall use adequate and verifiable mechanisms for age verification in recruitment procedures. Exceptions are children for	No	The projects will not use child labour	

	work on their families' property as long as: (a) Their compulsory schooling (minimum of 6 schooling years) is not hindered, AND (b) The tasks they perform do not harm their physical and mental development, AND (c) The opinions and recommendations of an Expert Stakeholder shall be sought and demonstrated as being included in the project design.			
6.2 Negative Economic Consequences	Does the project cause negative economic consequences during and after project implementation, e.g., for vulnerable and marginalised social groups in targeted communities?	Yes	The project is not expected to have any negative economic impacts or cause any risks.	To ensure long term sustainability of the water points, and avoid unexpected breakdowns and spending, training will be conducted at the beginning of the project on conducting minor maintenance. The project is expected to benefit all members of the community
7.1 Emissions	Will the Project increase greenhouse gas emissions over the Baseline Scenario?	No	The project will reduce greenhouse gas emissions compared to the baseline scenario.	
7.2 Energy Supply	Will the Project use energy from a local grid or power supply (i.e., not connected	No	Only hand pumped boreholes that use no electricity are	

	to a national or regional grid) or fuel resource (such as wood, biomass) that provides for other local users?		included in the project. The project will reduce fuel use due to reducing the need for water purification by boiling	
8.1 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	There will be no significant change in the volume of water consumed by the households.	
8.2 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 boreholes 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.	
9.1 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 will be produced in the project.	
9.2 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.	
9.3 Genetic Resources	Could the Project be negatively impacted by the use of genetically modified organisms or GMOs (e.g., contamination, collection	No	No GMOs will be used in the project and the boreholes would not be affected by	

	and/or harvesting, commercial development)?		GMOs as they are all protected.	
9.4 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.	
9.5 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 hazardous or non-hazardous chemicals and/or materials.	
9.6 Pesticides and fertilizers	Will the Project involve the application of pesticides and/or fertilisers?	No	No pesticides and/or fertilisers will be used in the project.	
9.7 Harvesting of forests	Will the Project involve the harvesting of forests?	No	As the project reduces the consumption of firewood, there is a positive impact on forests.	
9.8 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 the quantity or nutritional quality of food.	
9.9 Animal Husbandry	Will the Project involve animal husbandry?	No	The project will not involve animal husbandry.	
9.10 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 water points and decreases the consumption of firewood, having a positive impact on conserving forest ecosystems.	
9.11 Endangered Species	Are there any endangered species identified as potentially being present within the Project boundary (including those that may route through the area)?	No	There are several endangered species in Zambia. The project is not envisaged to have any impact on their habitat as it only	

			affects borehole infrastructure.	
	Does the Project potentially impact other areas where endangered species may be present through transboundary affects?	No	The project only impacts borehole infrastructure and does not impact other areas where endangered species are present.	

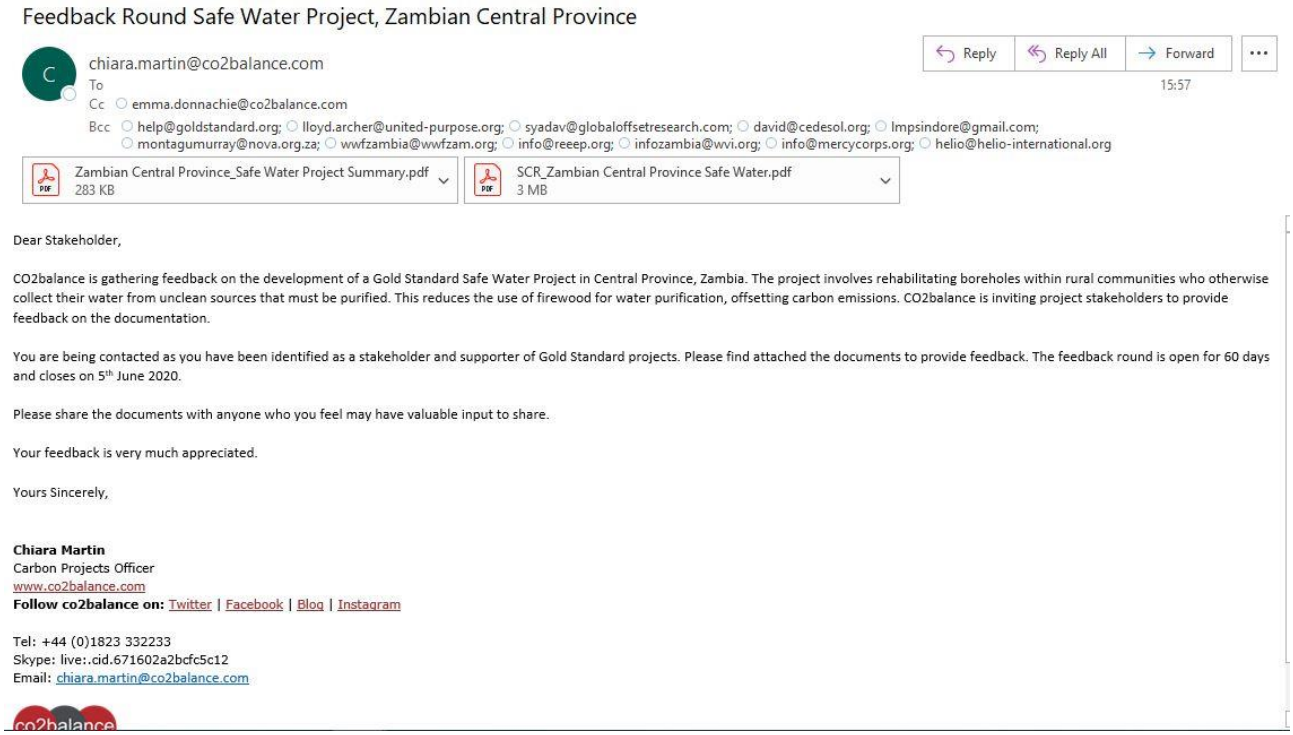
SECTION E. Local stakeholder consultation

E.1. Solicitation of comments from stakeholders

A local stakeholder consultation was conducted in Manyama Village (Chibombo District) in Central Province on 6th November 2019. In preparation for the meeting, CO2balance UK Ltd, Village Water, and OSCA 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.
The invitations for the consultation meeting were issued a month in advance.

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 also consulted on their recommendations for monitoring the project and on the best approach for conducting the continuous input/grievance mechanism.

The Stakeholder Feedback Round began in April 2020 for a period of 60 days. International stakeholders were invited to give feedback on the SCR report and Project Summary via email on the 03/04/2020. In country stakeholders were invited by the field staff to leave feedback on the documents which were distributed at a community level on the 09/04/2020. No feedback has been received to date. The email shared with international stakeholders appears below:



Feedback Round Safe Water Project, Zambian Central Province

chiara.martin@co2balance.com
To
Cc emma.donnachie@co2balance.com
Bcc help@goldstandard.org; lloyd.archer@united-purpose.org; syadav@globaloffsetresearch.com; david@cedesol.org; lmpsindore@gmail.com; montagumurray@nova.org.za; wwfzambia@wwfzam.org; info@reeep.org; infozambia@wvi.org; info@mercycorps.org; helio@helio-international.org

Reply | Reply All | Forward | ...
15:57

Zambian Central Province_Safe Water Project Summary.pdf 283 KB
SCR_Zambian Central Province Safe Water.pdf 3 MB

Dear Stakeholder,

CO2balance is gathering feedback on the development of a Gold Standard Safe Water Project in Central Province, Zambia. The project involves rehabilitating boreholes within rural communities who otherwise collect their water from unclean sources that must be purified. This reduces the use of firewood for water purification, offsetting carbon emissions. CO2balance is inviting project stakeholders to provide feedback on the documentation.

You are being contacted as you have been identified as a stakeholder and supporter of Gold Standard projects. Please find attached the documents to provide feedback. The feedback round is open for 60 days and closes on 5th June 2020.

Please share the documents with anyone who you feel may have valuable input to share.

Your feedback is very much appreciated.

Yours Sincerely,

Chiara Martin
Carbon Projects Officer
www.co2balance.com
Follow co2balance on: Twitter | Facebook | Blog | Instagram

Tel: +44 (0)1823 332233
Skype: live:.cid.671602a2bcfc5c12
Email: chiara.martin@co2balance.com

E.2. Summary of comments received

Overall the comments were valuable and the stakeholders demonstrate genuine interest in the project. 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. It was noted that is very important for the community to be engaged and involved in the programme. It was also pointed that the communities receive comprehensive training to ensure the sustainability of the project. The stakeholders finally expressed great concern about the current climate situation and enthusiasm to take action.

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.

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

E.3. Report on consideration of comments received

The questions received during the initial Question and Answer section during the meeting are summarised in the following table:

Stakeholder comment	Was comment taken into account (Yes/ No)?	Explanation (Why? How?)
What are the criteria for boreholes to be included in the programme?	Yes	The criteria will be based on equity not equality. The communities with the greatest need will be prioritized. Longest distance to water points and population affected among other key factors. OSCA will work with community leaders, council

		members and other stakeholders to identify pumps in need of rehabilitation.
The area included in the programme is both urban and rural, how will you balance the beneficiaries?	Yes	The project will be implemented in Central Province and will initially focus on rural communities who don't have access to safe water. The exact location and number of communities to be included in the project is not yet confirmed. Each water point will be assessed on a needs basis and determined if they can be included in the project in line with the eligibility criteria.
How will local artisans be involved?	Yes	The project will work with the local authority to identify the local artisans who will be then involved in the rehabilitations under the supervision of OSCA. Women artisans will be prioritised.
Will the project affect the water table?	Yes	The project is focused on the sustainable use of the water source. During the technical assessment, a study of the potential impacts on the aquifer will be carried out. During the WASH training, sustainable water use will be emphasised.
What kind of pipes will be used?	Yes	The type of pipes to be used will be determined during the technical assessment with preference for plastic/PVC ones to avoid corrosion.
What kind of technologies will be included in the project? Will the project be able to include additional green technologies to tackle climate change, such as solar panels or community forests?	Yes	The project will focus on the rehabilitation of manual hand pumps. Other emission-free pumps, such as solar powered, may be included in the project. Communities are encouraged to organise local initiatives such as tree planting in line with the enthusiasm of local communities and organisations
Can shallow wells be included?	Yes	The depth of boreholes will be limited to 100m or less. A technical assessment will be

		carried out to assess the characteristics of the boreholes and estimate the feasibility of the rehabilitation and inclusion in the programme.
Could the project involve the rehabilitations of the dams?	Yes	This project does not include the rehabilitation of dams, but is focused on rehabilitating safe water sources in rural communities so that households have access to safe water.
One member of a local parish stated that his church group has been already involved in projects involving rehabilitations of boreholes and communal taps, replacement of galvanized iron pipes with PVC and installation of solar pumps. The member showed great interest in taking part in the project and the will to share the knowledge acquired during the previous experiences.	Yes	This comment was welcomed and it was confirmed that CO2balance UK Ltd, Village Water and OSCA will encourage the participation of local communities to share their knowledge, ideas and experiences.
Participants indicated that the majority of the communities have few clean water points and had invited the Government and other well-wishers/institutions to come to their aid by drilling more boreholes and attend to those that have faced challenges in terms of low water table and/or salty water. It was also emphasized that most boreholes have galvanized pipes in need to be replaced with PVC pipes.	Yes	This comment was welcomed and it was explained that Village Water and OSCA work with communities and local government to identify water points in the region. The programme will focus on the rehabilitation of existing non-functional pumps because there is a high number of broken pumps that offer an affordable and widespread access to safe water for communities. It was also explained that there will be a technical study which will include an assessment of the situation of the aquifer and the conditions of the pipes.

Appendix 1. Contact information of project participants

Organization name	CO2balance UK Ltd
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 Manager
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

N/A