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

July 2017, Version 1

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KEY PROJECT INFORMATION

Title of Project:	GS1247 VPA 162 Improved Kitchen Regimes Manica Province Safe Water (Mozambique) (GS7135)
Title of the PoA:	GS1247 Improved Kitchen Regimes Multi-Country PoA
Brief description of Project:	The Micro-Scale Voluntary Project Activity in Manica Province (Mozambique) is eligible under the Gold Standard methodology Technologies and Practices to Displace Decentralized Thermal Energy Consumption Version 1. The project will support the provision of safe water using borehole technology to hundreds of households within Manica 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 Implemetation Date: Expected duration of Project:	10 December 2018 21 years
Project Developer:	CO2balance UK Ltd.
Project Representative:	Emma Donnachie
Project Participants and any communities involved:	Village Water (partner NGO)
Version of PDD: Date of Version:	5 17/09/2019
Host Country / Location:	Republic of Mozambique
Certification Pathway (Project Certification/Impact Statements & Products	Impact Statements & Products
Activity Requirements applied: (mark GS4GG if none relevant)	GS4GG
Methodologies applied:	TPDDTEC v.1
Product Requirements applied:	GHG Emissions Reductions & Sequestration
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 – 2260 additional people consuming safe water 2 – SDG 5 – Reduction of 0.5 hours time spent collecting water and firewood per day 3 – SDG 6 – 3125 additional people gain access to safe water 4- SDG 13 – 10,000 tCO2e

SECTION A. Description of project

A.1. Purpose and general description of project

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

The Micro-Scale VPA Manica Province Safe Water project is eligible under the Gold Standard methodology Technologies and Practices to Displace Decentralized Thermal Energy Consumption Version 1.0. The project will support the provision of safe water using borehole technology to hundreds of households within Manica Province, Mozambique. 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.

Manica Province is a largely rural province 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 will be working in partnership with British NGO, Village Water, that operate in Manica Province. CO2balance and Village Water will work with a local NGO and communities in Manica 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; based on ex ante calculations, the maximum number of boreholes that can be rehabilitated in one VPA to achieve 10,000 tCO2e is approximately 7, however, the exact number will be determined once actual survey data has been collected. CO2balance 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 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 Gold Standard

>> *(Describe how the project meets the eligibility criteria as per section 3.1.1 of GS4GG Principles & Requirements document and the relevant activity requirements document)*

The project is eligible under section 2.2 of the GS4GG Principles and Requirements Eligibility Criteria as it follows an established Gold Standard methodology. Concerning Section 3.1.1 on Eligible Project Types, and point 3.1.1.5, the project does not support geoengineering or entail energy production from fossil fuels or nuclear. Rather it supports a switch away from polluting technologies to an emissions-free means of accessing safe water.

The project is eligible under the Gold Standard Methodology: Technologies and Practices to Displace Decentralized Thermal Energy Consumption Version 1.0. By providing safe water through the rehabilitation and installation of broken boreholes, the project will ensure that households consume less firewood by displacing the need to boil water for purification. This will result in a reduction of carbon dioxide emissions.

This VPA and other associated VPAs within the Manica Province project boundary meet the relevant activity requirements for a micro scale project as follows:

Eligibility Criteria	Description	Means of Verification (Checked at VPA Inclusion)
VPA Location and Project Boundary	The geographical boundary within which the technologies are installed will be within the Project Boundary outlined in Section A.4.4.	The location of this VPA is specified in Section A.4.4, in which the CME states that the location is within Mozambique; one of the countries outlined in the PoA-DD. Each VPA will be uniquely defined by a range of GPS coordinates and current administrative maps to define the project boundary.
Scale of the Activity	Emission reductions achieved by each one of the activities considered under the micro-scale programme are limited to a maximum of 10,000 tonnes of CO2e in any year of their crediting period.	The total number of emission reductions in this VPA will be limited to 10,000t CO2e.
Technology and Target Group	Each VPA will involve the repair and maintenance of boreholes, to households and/or communities currently cooking with firewood on a traditional three-stone stove, for domestic purposes and/or currently boiling water as a treatment method before consumption.	This VPA will involve the repair and rehabilitation of boreholes that supply water to households currently boiling water as a treatment method (taking into account suppressed demand). Suppressed demand will be determined through a set of questions in the baseline survey that establish the method households use to purify their water, if any, and how they would choose to purify if they were not subject to monetary and access barriers.
Technology Output	The technologies will each have continuous energy outputs of less than 150kW per unit. This will be applied to the baseline technology with regards to the water technology units.	Calculations for the specific technology show that they are within the 150kW Limit. The estimated energy output of the baseline technology is 19.07 Kw, however, following the rehabilitation of the borehole is 0 Kw.
Baseline	The characteristics and current biomass/water consumption of households in the baseline scenario will be identified for each VPA.	A modified Water Boiling Test (WBT) will be carried out for the province of Manica Province in Mozambique.
Methodology	Each VPA will be in compliance with Gold Standard Methodology Technologies and Practices to	The applicability of the methodology is justified in Section B.2 and applies to each VPA.

	Displace Decentralized Thermal Energy Consumption Version 1.	
Additionality	Each VPA will demonstrate additionality according to the criteria outlined in the PoA-DD.	This VPA is within Mozambique, an LDC listed under section A.4.1.2 of the PoA-DD. Projects within these countries are deemed additional, as mentioned under section A.4.2.1 of the PoA-DD.
Carbon Transfer	It will be clearly communicated that CO2balance is the entity that is claiming ownership rights of and selling the emission reductions resulting from the project activity.	At the point of technology installation, a Carbon Transfer Form (CTF) will be signed and uploaded to our database stating that the rights to the carbon credits will lie with CO2balance. An elected representative from each water resources committee responsible for a borehole will sign a CTF on behalf of all users thereof.
Avoiding Double Counting of Emission Reductions	Each VPA will ensure double counting of emission reductions is avoided, through the unique identification of each technology with an identification number.	Each borehole rehabilitated and installed in this POA will be GPS referenced ensuring that they are uniquely identifiable to this project.
Avoiding Double Counting of Programme Activities	Each VPA will show that it is exclusive to the PoA and not registered as another project activity or VPA under another PoA.	This VPA is neither registered as a project activity with GS or any other standard or as a VPA of another PoA. The appropriate registries (Gold Standard and CDM) can be accessed to demonstrate this.
Non- Diversion of ODA	There will be no diversion of ODA for any of the proposed VPAs	A declaration of non-use of ODA has been completed and submitted covering each VPA
Air Quality	Both the efficient cook stove and water technologies will result in an improvement in indoor air quality	The amount of water boiled will be monitored throughout the project. The process of boiling water on an inefficient stove or open fire contributes to hazardous household air pollution. Providing access to safe water and removing the need to boil for purification reduces the amount of non-renewable biomass burned. Therefore the amount of safe

		water provided can be taken as a proxy indicator of how the project contributes towards the improvement of indoor air quality

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 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, Mozambique. 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

Republic of Mozambique

A.4.2. Region/State/Province etc.

Manica Province

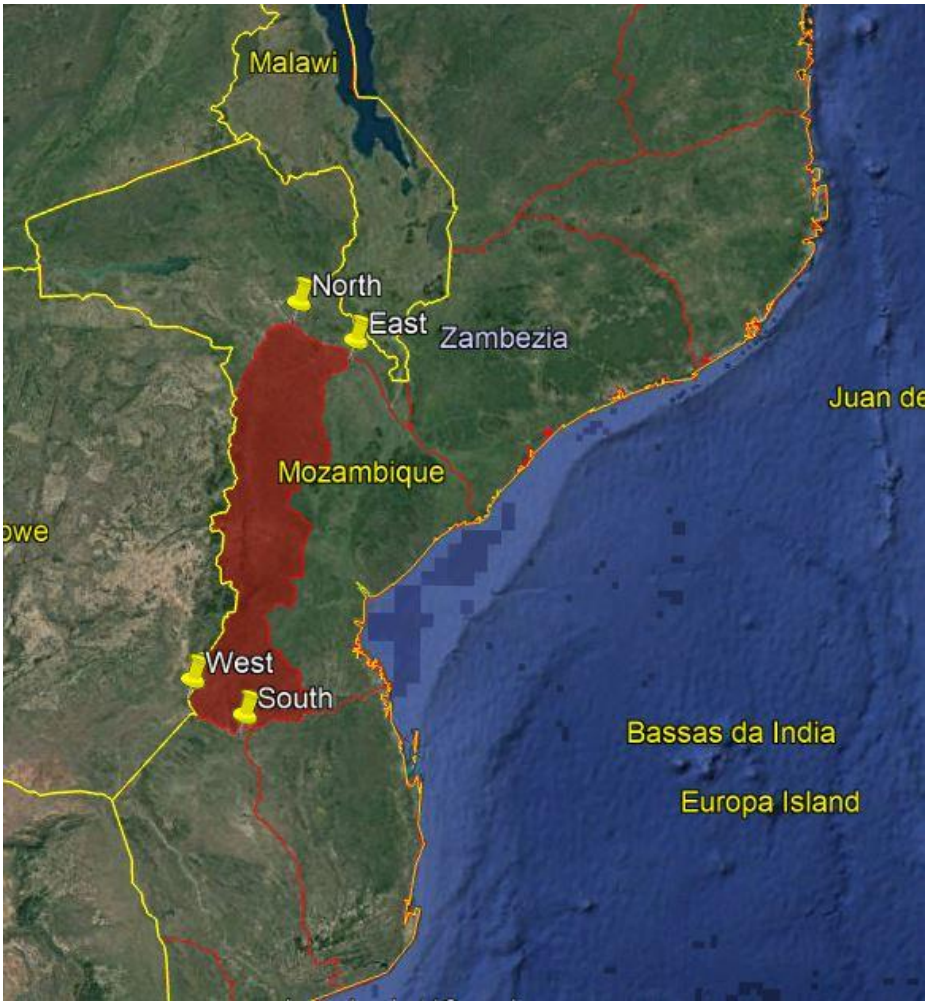
A.4.3. City/Town/Community etc.

Various throughout Manica Province

A.4.4. Physical/Geographical location

Below are details of the physical location to allow unique identification of the project. Manica Province is marked in red on the Google Earth image. The target area and the fuel collection area are defined as being contained within project boundary, with the outer limits of the project boundary being clearly defined below. As the majority of beneficiaries collect their wood fuel locally in close proximity to their homesteads, the woodfuel collection area and target area are considered the same.

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



Project Area Coordinates		
	Latitude	Longitude
North	16°23'7.12"S	33°47'4.90"E
South	21°35'9.51"S	33° 4'3.46"E
East	16°51'59.19"S	34°32'5.72"E
West	21° 8'12.18"S	32°22'0.32"E

A.5. Technologies and/or measures

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. Likewise, the reduction in local water-borne diseases is predicted to decrease the incidence of stomach related illnesses and diarrhoea, contributing positively to SDG 3. Many existing 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 boreholes are usually located close to villages, and offer a reliable safe water source. Once repaired, it is predicted that womens time spent collecting water, and their time spent collecting wood fuel for boiling water for purification will be reduced, contributing positively to SDG 5. As mentioned above, the project location is a largely rural district where people typically use wood fuel on traditional three stone fires in order to purify their drinking water by boiling. The rehabilitation of borheoles 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

The majority of pumps to be fixed are Afridev 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 India Mark III, 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 Afridev is a public domain pump that is reliable and popular with the communities.

Technical Specifications:

	Afridev
Cylinder Diameter (mm)	63.5
Maximum Stroke (mm)	125
Approx. discharge at about 75 watt input (m3/h)	At 10m head 1.4
	At 15 m head 1.1
	At 20m head 0.9
	At 30m head 0.7
Pumping Lift (m)	10-50
Water Consumption (litres per capita)	15-20

A.6. Scale of the project

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

A.7. Funding sources of project

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

SECTION B. Application of selected approved Gold Standard methodology

B.1. Reference of approved methodology

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

B.2. Applicability of methodology

In accordance with the Gold Standard Methodology: Technologies and Practices to Displace Decentralized Thermal Energy Consumption Version 1.0, micro scale VPAs listed in the Manicaland 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 (Manica Province) has been clearly demarcated using political boundaries recognized in Mozambique. 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 19.07 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. The baseline survey indicated that most respondents would use a traditional wood fire to boil water which consists of a three-stone fire.
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 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. 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 will have been eliminated.
b) Records of renewable fuel sales may not be used as sole parameters for emission reduction calculation, but may be used as data informing the equations in section 2.0 of this methodology if correlated to data on distribution and results of field tests and surveys confirming (a) actual use of the renewable fuel and usage patterns such as average fraction of non-renewable fuels used in mixed combustion or seasonal variation of fuel types, (b) GHG emissions, (c) evidence of CO levels not deteriorating (d) any further factors effecting emission reductions significantly.	Renewable fuels are not sold as part of this project therefore this point is not applicable.

B.3. Project boundary

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

The physical boundary of the project is show in section A.4.4 of this document.

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

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

B.4. Establishment and description of baseline scenario

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

In Manica Province, Mozambique, local people typically use wood fuel on inefficient three stone fires for cooking and water purification. This process results in the release of greenhouse gas emissions from the combustion of wood. This can be avoided if a technology is used that is more efficient.

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

CO2balance seeks to register this project as a Gold Standard micro scale project using the methodology "Technologies and Practices to Displace Decentralized Thermal Energy Consumption Version 1." Many existing boreholes have been poorly managed, or proven too expensive to maintain properly. In this project CO2balance will work with local partner, Village Water, community groups and local government in Manica 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 10,000 tCO2e is approximately 7, however, the exact number will be determined once actual survey data has been collected. CO2balance will rehabilitate and deliver the maintenance programme for each borehole to ensure that the quality of the water delivered by the boreholes is fit for human consumption for the entire length of the project, which will be a minimum of five years.

The baseline situation is not expected to change significantly during the next years considering the current situation in Mozambique, its economic development of the last years and predictions for the future. Mozambique is a least developped country (LDC) and is one of the poorest countries in the world with a Human Development Index ranking of 180 out of 188 countries worldwide as of 2018[1].

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

The baseline scenario is assessed through use of:

- Baseline Project Survey
- Baseline Water Boiling Test

In accordance with the GS4GG Methodology "Technologies and Practices to Displace Decentralized Thermal Energy Consumption" (TPDDTEC), baseline surveys are carried out using representative and random sampling. The sample size is determined in line with the methodological minimum sample size and confidence requirements. In order to determine a representative sample population, a sample was determined based on boreholes identified throughout the project area to be included in the project. In order to satisfy 90/30 precision, the recommended sample size of communities to be included in the baseline survey is 8. In order to ensure that the baseline data collected was conservative and representative of the entire project population, surveys were carried out on 12 communities throughout the project area.

The Baseline Project Survey was conducted 08/11/2018- 31/05/2019 and the Baseline Water Boiling Test was conducted 03/12/2018 – 07/12/2018.

As the project technology is installed at the start of the project, the baseline scenario is considered fixed throughout the crediting period.

B.5. Demonstration of additionality

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

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

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

B.6. Sustainable Development Goals (SDG) outcomes

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

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

SDG	Target	Indicators	Explain
SDG 3 – Good Health and Well-being	3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination	3.9.2 Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene	By providing safe water from the water point, the project reduces the occurrence of water-borne diseases locally. This, in turn, is predicted to decrease the incidence of

		(exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services)	stomach related illnesses and diarrhoea associated with the consumption of water-borne diseases.
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 projects provide equitable access to clean affordable drinking water for all those local to the rehabilitated water points. Anyone is allowed to use the water point free of charge which will provide monitored safe drinking water for all.
SDG 5 - Gender Equality	5.4 Recognise 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	Projects alleviate the strain of domestic work by providing safe water sources close to villages. It is predicted that time spent collecting firewood will be reduced through the removed need for wood fuel to boil water. As a result, the physical burden of collecting firewood is lessened.
SDG 13 - Climate Action	13.B Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities	Total project emissions reductions	The projects will meet SDG 13 by realising a real reduction in CO2e emissions. Furthermore, in pursuance of SDG 5 – Gender Equality, the projects will focus on women and youth. Water points are located in mainly remote rural areas and thus serve marginalised communities.

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

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

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

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

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

The outcome for SDG 3 is quantified as the additional number of persons consuming safe water in the project activity compared to the baseline scenario (P_{safe}). The number of persons using each water point (P_y) 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_i) is determined through the baseline survey and

deducted. Additionally, the percentage of users who consumed safe water by boiling it in the baseline (Pb, boil) is deducted. Calculations are as follows (parameters from sections B.6.3 and B.7.1 will be applied):

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

Where:

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

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

Globally, women and girls perform the majority of unpaid domestic work.[2] This leaves them with less time than men 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 cooking, and collecting firewood and water, must be added to their market productive work, making time much more scarce.[3] Women are widely recognised as being principally responsible for collection of natural resources such as firewood and water.[4]

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[5]. 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 reduction in time spent collecting water and firewood by the project activity are then calculated as follows:

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

Where:

[2] 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

[3] 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

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

[5] 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 time spent collecting water and firewood for project activity in year y (%)
$T_{b,y}$ Time spent collecting water and firewood per household per day prior to project (hours)
$T_{p,y}$ Time spent collecting water and firewood per household per day in project (hours)

It is predicted that time spent collecting water and firewood will be reduced as a result of the project. To infer as to what project participants are doing with their time saved from the project, qualitative questions will be included in the monitoring surveys which ask repondents 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. The usage rate ($U_{p,y}$) will be determined through the annual usage 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

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

Relevant SDG Indicator	SDG 13 (Climate Action)
Data/parameter	$EF_{b,co2}$
Unit	tCO_2/TJ
Description	CO_2 emission factor arising from use of wood fuel in baseline scenario
Source of data	Calculated from IPCC defaults; Volume 2: 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 2, Table 2.5
Value(s) applied	112 – see GS Methodology
Choice of data or Measurement methods and procedures	Deemed valid by Methodology
Purpose of data	Calculation of baseline emissions
Additional comment	

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

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

Purpose of data	Calculation of emission reductions

Additional comment	

Relevant SDG Indicator	SDG 13 (Climate Action)
Data/parameter	$EF_{p,co2}$
Unit	tCO_2/TJ
Description	CO_2 emission factor arising from use of wood fuel in project scenario
Source of data	Volume 2: 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 2, Table 2.5
Value(s) applied	112
Choice of data or Measurement methods and procedures	Deemed valid by Methodology
Purpose of data	Calculation of emission reductions
Additional comment	

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

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

Purpose of data	Calculation of emission reductions
Additional comment	

Relevant SDG Indicator	SDG 13 (Climate Action)
Data/parameter	NCV_b
Unit	TJ/ton
Description	Net calorific value of the wood fuel used in the baseline

Source of data	http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf Table 1.2
Value(s) applied	0.0156
Choice of data or Measurement methods and procedures	Deemed valid by Methodology
Purpose of data	Calculation of emission reductions
Additional comment	

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

Relevant SDG Indicator	SDG 13 (Climate Action)
Data/parameter	$W_{b,y}$
Unit	T/litre
Description	Quantity of wood fuel that is used to treat 1 litre of water in the baseline scenario b during year y
Source of data	Baseline Water Boiling Test
Value(s) applied	0.00097
Choice of data or Measurement methods and procedures	The baseline water boiling test is used to determine the amount of wood used to purify 1 litre of water by boiling. This data is gathered according to: *Technologies and Practices to Displace Decentralized Thermal Energy Consumption* Version 1, *Draft General Guidelines On Sampling And Surveys*; EB37 Annex 27; and *Standard For Sampling And Surveys For CDM Project Activities and Programme of Activities* (Version 02); EB65 Annex 2
Purpose of data	Calculation of emission reductions

Additional comment	40 WBTs were carried out in Manica Province between 03/12/2018-07/12/2018. To ensure conservativeness WBTs were carried out on dry days with dry wood at the end of the dry season.

Relevant SDG Indicator	SDG 13 (Climate Action), SDG 6 (Clean Water and Sanitation)
Data/parameter	$W_{p,y}$
Unit	T/litre
Description	Quantity of wood fuel that is used to treat 1 litre of water in the project scenario p during year y
Source of data	Baseline Water Boiling Test
Value(s) applied	0.00097
Choice of data or Measurement methods and procedures	The baseline water boiling test is used to determine the amount of wood used to purify 1 litre of water by boiling. This data is gathered according to: *Technologies and Practices to Displace Decentralized Thermal Energy Consumption* Version 1*, Draft General Guidelines On Sampling And Surveys*; EB37 Annex 27; and *Standard For Sampling And Surveys For CDM Project Activities and Programme of Activities* (Version 02); EB65 Annex 2
Purpose of data	Calculation of emission reductions
Additional comment	

Relevant SDG Indicator	SDG 13 (Climate Action), SDG 6 (Clean Water and Sanitation)
Data/parameter	Cj
Unit	Percentage
Description	Portion of users of project safe water supply who were already in baseline using a non-boiling safe water supply
Source of data	Baseline Study
Value(s) applied	0.79%
Choice of data or Measurement methods and procedures	Deemed valid by Methodology
Purpose of data	Calculation of emission reductions
Additional comment	

Relevant SDG Indicator	SDG 13 (Climate Action)
Data/parameter	Xboil Non Suppressed Demand
Unit	Percentage
Description	Percentage of premises that in the absence of the project activity would have used non-GHG emitting technologies like chlorine treatment techniques (if available) in the project boundary,.
Source of data	Baseline study. Credible literature, studies, survey, reports, relevant to the project target area
Value(s) applied	14.29%

Choice of data or Measurement methods and procedures	Suppressed demand will be determined through a set of questions in the project survey that establish the method households use to purify their water, if any, and how they would choose to purify if they were not subject to monetary and access barriers. This is in line with the Gold Standard principles of suppressed demand outline in annex 2. A fixed suppressed demand baseline has been opted for, however , in the event the project surveys show a substantial change in fuel use characteristics, a new baseline shall be conducted.
Purpose of data	Calculation of emission reductions
Additional comment	

Relevant SDG Indicator/Safeguarding Principle	SDG 5 (Gender Equality)
Data / Parameter	$T_{b,y}$
Unit	Hours
Description	Baseline time spent collecting water and firewood per household per day
Source of data	Baseline kitchen survey
Value(s) applied	3.67 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	

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

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

SDG	Calculation	Ex-Ante Estimate of Net Benefit
SDG 3	$P_{safe} = P_y * (1 - C_j) * (1 - P_{b,boil})$ P_{safe} = 3500 * (1 – 0.0079) * (1 – 0.349) = 2260	2260 additional people consuming safe water in the project activity
SDG 5	$TR_y = (T_{b,y} - T_{p,y}) / T_{b,y}$ TRy= (3.67 – 3.17) / 3.67 = 14%	Approximately 0.5 hours saved per day collecting water and firewood/ 14% reduction in time
SDG 6	$P_{access} = P_y * (1 - C_j) * U_{p,y}$ P_{access} = 3500 * (1 – 0.0079) * 0.9 = 3125	3125 additional people with access to safe water in the project activity
SDG 13	ERy=((BEb,y -PEp,y) *Up,y - LEp,y)*(1-Xboil) ERy= ((15,909 – 1059) * 0.9 – 0) * (1- 0.1429) ERy= 11,455 Where: $BE_{b,y} = B_{b,y} * ((fNRB_y * EF_{b,fuel,co2}) + EF_{b,fuel,nonco2}) * NCV_{b,fuel}$ BEb,y = 9220 * ((0.91 * 112) + 8.692) * 0.0156 BEb.y = 15,909 And: $B_{b,y} = (1 - C_j) * N_{p,y} * W_{b,y} * (Q_{p,y} + Q_{p,rawboil,y})$ Bb,y = (1-0.0079) * 1277500 * 0.00097 * (7.5 + 0) Bb,y = 9220 Where $PE_{p,y} = B_{p,y} * ((fNRB_y * EF_{p,fuel,co2}) + EF_{p,fuel,nonco2}) * NCV_{p,fuel}$ PEp,y = 614 * ((0.91 * 112) + 8.692) * 0.0156 PEp,y = 1059 And: $B_{p,y} = (1 - C_j) * N_{p,y} * W_{p,y} * (Q_{p,rawboil,y} + Q_{p,cleanboil,y})$ Bp,y = (1 – 0.0079) * 1277500 * 0.00097 * (0 + 0.5) Bp,y = 614	Capped Emission Reductions of 10,000 tonnes of CO_2 per year Full Ex-Ante calculations will be provided at Validation

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

SDG 3

Year	Baseline estimate	Project estimate	Net benefit

Year A	1,240 people with access to safe water	3500 people gaining access to safe water	2260 additional people gaining access to safe water
Year B	1,240 people with access to safe water	3500 people gaining access to safe water	2260 additional people gaining access to safe water
Year C	1,240 people with access to safe water	3500 people gaining access to safe water	2260 additional people gaining access to safe water
Year D	1,240 people with access to safe water	3500 people gaining access to safe water	2260 additional people gaining access to safe water
Year E	1,240 people with access to safe water	3500 people gaining access to safe water	2260 additional people gaining access to safe water
Total	1,240 people with access to safe water	3500 people gaining access to safe water	2260 additional people gaining access to safe water
Total number of crediting years			
Annual average over the crediting period	1,240 people with access to safe water	3500 people gaining access to safe water	2260 additional people gaining access to safe water

SDG 5

Year	Baseline estimate	Project estimate	Net benefit
Year A	3.67 hours collecting water and firewood	3.17 hours collecting water and firewood	0.5 hours saved collecting water and firewood
Year B	3.67 hours collecting water and firewood	3.17 hours collecting water and firewood	0.5 hours saved collecting water and firewood
Year C	3.67 hours collecting water and firewood	3.17 hours collecting water and firewood	0.5 hours saved collecting water and firewood
Year D	3.67 hours collecting water and firewood	3.17 hours collecting water and firewood	0.5 hours saved collecting water and firewood
Year E	3.67 hours collecting water and firewood	3.17 hours collecting water and firewood	0.5 hours saved collecting water and firewood
Total	3.67 hours collecting water and firewood	3.17 hours collecting water and firewood	0.5 hours saved collecting water and firewood
Total number of crediting years			
Annual average over the crediting period	3.67 hours collecting water and firewood	3.17 hours collecting water and firewood	0.5 hours saved collecting water and firewood

SDG 6

Year	Baseline estimate	Project estimate	Net benefit

Year A	375 people consuming safe water	3500 people consuming safe water	3125 additional people consuming safe water
Year B	375 people consuming safe water	3500 people consuming safe water	3125 additional people consuming safe water
Year C	375 people consuming safe water	3500 people consuming safe water	3125 additional people consuming safe water
Year D	375 people consuming safe water	3500 people consuming safe water	3125 additional people consuming safe water
Year E	375 people consuming safe water	3500 people consuming safe water	3125 additional people consuming safe water
Total	375 people consuming safe water	3500 people consuming safe water	3125 additional people consuming safe water
Total number of crediting years			
Annual average over the crediting period	375 people consuming safe water	3500 people consuming safe water	3125 additional people consuming safe water

SDG 13

Year	Baseline estimate	Project estimate	Net benefit
Year A	10,000 tCO2e	0 tCO2e	-10,000 tCO2e
Year B	10,000 tCO2e	0 tCO2e	-10,000 tCO2e
Year C	10,000 tCO2e	0 tCO2e	-10,000 tCO2e
Year D	10,000 tCO2e	0 tCO2e	-10,000 tCO2e
Year E	10,000 tCO2e	0 tCO2e	-10,000 tCO2e
Total	50,000 tCO2e	0 tCO2e	-50,000 tCO2e
Total number of crediting years			
Annual average over the crediting period	10,000 tCO2e	0 tCO2e	-10,000 tCO2e

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

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

Relevant SDG Indicator	SDG 13 (Climate Action)
Data/parameter	$f_{NRB,i,y}$
Unit	Fractional non-renewability
Description	Non-renewability status of woody biomass fuel in scenario i during year y

Source of data	CDM Default stated in following document: https://cdm.unfccc.int/DNA/fNRB/index.html
Value(s) applied	0.91
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	The UNFCCC default fNRB value for the Republic of Mozambique expired in December 2017. In absence of an updated calue, the previously applied value shall be used. This will be updated once a revised figure is put forward for the CDM default value.

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

Relevant SDG Indicator	SDG 13 (Climate Action), SDG 6 (Clean Water and Sanitation)
Data / Parameter	Qp,y
Unit	Litres per person per day

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

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

Relevant SDG Indicator	SDG 6 (Clean Water and Sanitation)
Data / Parameter	Qp,rawboil, y
Unit	Litres per person per day
Description	The raw of unsafe water that is still boiled after installation of the water treatment technology
Source of data	Water Consumption Field Test (WCFT)
Value(s) applied	Estimated at 0. Actual value to be provided in time for 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 to meet the specific requirements of the methodology. All data presented in excel is subject to checking and cross referencing of a sample of the raw data by co2balance UK Ltd.

Monitoring frequency	Biennial (Every 2 years)
QA/QC procedures	Clear guidance is provided to field staff and results are spot checked against the hard copy of the surveys.
Purpose of data	Emission reduction calculations
Additional comment	Measured boiled water consumed for drinking, cooking and basic personal hygiene considered unsafe for human consumption prior to boiling. This is assumed from the stated water source.

Relevant SDG Indicator	SDG 6 (Clean Water and Sanitation)
Data / Parameter	Quality of Treated Water
Unit	Parameters as per national standards
Description	Performance of the treatment technology
Source of data	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 Mozambique. 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	Annually
QA/QC procedures	The first test will be within 6 months of the rehabilitation. At least one test each year conducted and certified by a credible 3rd party.
Purpose of data	Criteria of methodology
Additional comment	Mozambique Regulation on water quality for human consumption available: http://extwprlegs1.fao.org/docs/pdf/moz65565.pdf

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

Relevant SDG Indicator/Safeguarding Principle	SDG 3 (Good Health and Wellbeing) SDG 6 (Clean Water and Sanitation)
Data / Parameter	P_y
Unit	Number
Description	Number of persons having access to safe water from the project activity
Source of data	Water point Project Database
Value(s) applied	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 (Gender Equality)
Data / Parameter	$T_{p,y}$
Unit	Hours
Description	Project time spent collecting water and firewood per household per day
Source of data	Project survey
Value(s) applied	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/Safeguarding Principle	SDG 5 (Gender Equality)
Data / Parameter	T_{usage}
Unit	
Description	Usage of time saved by the project activity
Source of data	Project survey
Value(s) applied	Value to be provided in time for each verification.
Measurement methods and procedures	Established through questions in the project survey on a representative sample of the end users.
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	SDG 5 imipact calculation
Additional comment	

B.7.2. Sampling plan

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

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

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

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

- Project Surveys- Completed annually
- Usage Surveys- Completed annually
- Water Consumption Field Tests- Completed biennially

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

B.7.3. Other elements of monitoring plan

>>

Installation Record

A comprehensive installation record will record the following information:

- 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 original documentation being stored in the appropriate office for the respective VPAs.

Project Database

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

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

Ongoing Monitoring Studies

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

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

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

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

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

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

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

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

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

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

e) *Leakage Assessment*- Completed every other year

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

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

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

g) *Project Technology Days (Np,y)*

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.

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.
  - Records will be requested during follow up visits
- *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

21 years

C.1.1. Start date of project

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

10/12/2018

This is the estimated date of the first borehole rehabilitation, which marks the start of the project.

C.1.2. Expected operational lifetime of project

>> (Specify in years)
21 years

C.2. Crediting period of project

5 years renewable

C.2.1. Start date of crediting period

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

11/12/2018

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.)

5 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)
3.1 Human Rights	a. The Project Developer and the Project shall respect internationally proclaimed human rights and shall not be complicit in	No	The project will adhere to all human rights requirements including respecting internationally proclaimed human	During all trainings, it will be emphasised that project beneficiaries should support vulnerable or less mobile

	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.		rights and Universal Declaration of Human Rights and will not discriminate in any way.	community members to access water
3.2 Gender Equality and Women's Rights	Is there a possibility that the Project might reduce or put at risk women's access to or control of resources, entitlements and benefits?	No	The project will increase women's access to resources such as water by making safe water available in the community.	
	Is there a possibility that the Project can adversely affect men and women in marginalised or vulnerable communities (e.g., potential increased burden on women or social isolation of men)?	No	The burden on the whole community of travelling far to collect water and gather firewood for water purification will be reduced. This will also mitigate the social isolation of spending a long time collecting these resources.	
	Is there a possibility that the Project might not take into account gender roles and the abilities of women or men to participate in the decisions/designs of the project's activities (such as lack of time, child care duties, low literacy or educational levels,	No	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	

	or societal discrimination)? Is there a possibility that the Project might not take into account gender roles and the abilities of women or men to benefit from the Project's activities (e.g., Does the project criteria ensure that it includes minority groups or landless peoples)? Does the Project design contribute to an increase in women's workload that adds to their care responsibilities or that prevents them from engaging in other activities? Would the Project potentially reproduce or further deepen discrimination against women based on gender, for instance, regarding their full participation in design and implementation or access to opportunities and benefits?	 No No No	to provide feedback on the project, regardless of their situation. Both women and men will benefit from the project activities, no group is excluded from participating in the project activities and the water sources are open to the whole community. The project will decrease the workload of women in collecting water and firewood, thereby allowing more time to engage in other activities. 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. 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.	

	Would the Project potentially limit women's ability to use, develop and protect natural resources, taking into account different roles and priorities of women and men in accessing and managing environmental goods and services? Is there a likelihood that the proposed Project would expose women and girls to further risks or hazards?	No	No further risks or hazards for women and girls have been identified.	
3.3 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
3.4.1 Sites of Cultural and Historical Heritage	Does the Project Area include sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture (e.g., knowledge, innovations, or practices)?	No	The project area does not include cultural and historic sites. The focus of the project is rehabilitating and installing water point infrastructure only.	

3.4.2 Forced Eviction and Displacement	Does the Project require or cause the physical or economic relocation of peoples (temporary or permanent, full or partial)?	No	The project will not impact the physical or economic relocation of peoples. The focus of the project is rehabilitating and installing water point infrastructure only.	
3.4.3 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.	
3.4.4 Indigenous Peoples	Are indigenous peoples present in or within the area of influence of the Project and/or is the Project located on land/territory claimed by indigenous peoples?	No	The water points are located on government owned land and cater to local communities near the water point.	
3.5 Corruption	The Project shall not involve, be complicit in or inadvertently contribute to or reinforce corruption or corrupt Projects.	Yes	The project shall ensure that all forms of corruption are avoided. Project beneficiaries are able to contact the project developer and implementer through the continuous grienvance mechanism to report any form of corruption.	Water point committees will be formed and supported to manage the boreholes. They will receive training through WASH workshops where any forms of corruption will be discouraged. Participants will be educated on the benefits of the project. Community members will have lines of communitication with the project developers to report any complaints or grievances. During the establishment and training of the water

				point committees, rules and regulations surrounding corruption will be elaborated to ensure that all local community level corruption concerns are addressed. These will be recorded in the minutes of the initial water point committee meeting and discussed during follow up visits.
3.6.1 Labour Rights		No	The project will adhere to labour laws and requirements	
3.6.2 Negative Economic Consequences	Are there economic impacts and potential risks to the local economy?	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
4.1.1 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.	
4.1.2 Energy Supply	Will the Project use energy from a local grid or power supply (i.e., not connected to a national or regional grid) or fuel resource (such as wood, biomass) that provides for other local users?	No	Only hand pumped boreholes that use no electricity are included in the project.	
4.2.1 Impact on natural water	Will the Project affect the natural or pre-existing pattern of	No	There will be no significant change in the volume of water	

patterns and flow	watercourses, ground-water and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity?		consumed by the households.	
4.2.2 Erosion and/or water body stability	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.	
4.3.1. Landscape modification and soil	Does the Project involve the use of land and soil for production of crops or other products?	No	No crops or other products will be produced in the project.	
4.3.2 Vulnerability to Natural Disaster	Will the Project be susceptible to or lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions?	No	There will be no impact by the project to natural disasters.	
4.3.3 Genetic Resources	Could the Project be negatively impacted by the use of genetically modified organisms or GMOs (e.g., contamination, collection and/or harvesting, commercial development)?	No	No GMOs will be used in the project and the boreholes would not be affected by GMOs as they are all protected.	

4.3.4 Release of pollutants	Could the Project potentially result in the release of pollutants to the environment?	No	As safe ground water is used, there is no risk of releasing pollutants to the environment.	
4.3.5 Hazardous and Non-hazardous Waste	Will the Project involve the manufacture, trade, release, and/ or use of hazardous and non-hazardous chemicals and/or materials?	No	The project does not deal with harzardous or non-hazardous chemicals and/or materials.	
4.3.6 Pesticides 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.	
4.3.7 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.	
4.3.8 Food	Does the Project modify the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives?	No	The project has no impact on the quantity or nutritional quality of food.	
4.3.9 Animal Husbandry	Will the Project involve animal husbandry?	No	The project will not involve animal husbandry.	
4.3.10 High Conservation Value Areas and Critical Habitats	Does the Project physically affect or alter largely intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or sites identified?	No	The project rehabilitates water points and decreases the consumption of firewood, having a positive impact on conserving forest ecosystems.	

4.3.11 Endangered Species	a. Are there any endangered species identified as potentially being present within the Project boundary (including those that may route through the area)?	No	There are several engandered species in Mozambique. The project is not envisaged to have any impact on their habitat as it only affects borehole infrastructure.	
	b. 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

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

A local stakeholder consultation was conducted in Dombe on 21st November 2018. In preparation for the meeting, CO2balance, Village Water, and Dorcas Mozambique 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 Mozambique and members of the communities to be targeted by the project.

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

During the meeting, the planned project activities were presented to stakeholders and they were invited to make comments and raise questions. A sustainable development and safeguarding exercise was then conducted to solicit the stakeholders' views on any risks within the project and the contributions that it should make to sustainable development. Stakeholders were also consulted on their recommendations for monitoring the project and on the best approach for conducting the continuous input/grievance mechanism.

International stakeholders were invited to give feedback via an email sent on the 13th February 2019 which provided a link to the stakeholder interface on the CO2balance dashboard. The feedback round was open for a period of 60 days until the 14th April 2019. No feedback has been received to date.

In country stakeholders were invited by the field staff to leave feedback on the documents which were distributed at a community level within the same timeframe as international stakeholders. No feedback has been received to date.

E.2. Summary of comments received

>> (Provide a summary of key comments received during the consultation process.)
These comments are presented in section E.3 alongside the responses given to stakeholders.

E.3. Report on consideration of comments received

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

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?)
Large communities are currently fetching water from the rivers. Thank you for this exciting venture but there are also a lot of other neighbouring communities that will still be fetching water from communities	Yes	It was explained that Village Water and Dorcas Mozambique work with communities and local government to identify community and water points in the region. The water points that are most feasible to repair are identified in terms of community interest and participation, technical viability and water access in the community. Communities in need of a new water point are also identified based on community interest/participation, access to safe water and borehole location is determined based on environmental and geological surveys and analysis.
There is a need to ensure that the project is sustainable. Often we see interventions where the organisation installs or repairs a borehole and then leaves. It is interesting to hear that you said you will be training the people in the communities on borehole maintenance.	Yes	This comment was welcomed and it was confirmed that the project will encourage water point committees to raise contributions from local committees in order to generate funds for works such as fencing of the boreholes. Generating this funding is hoped to generate a sense of community ownership of the boreholes. Water point comittees will be strengthened and trained in the project, to ensure that they are empowered to manage the boreholes. It was also explained that the project will be implemented for a minimum of 5 years, throughout which time the boreholes will be annually monitored and tested for water quality, and a fund will also be established for major maintenance and repairs to ensure sustainability of the project.
Carbon emissions are a great threat to future generations. It was suggested that the partnership must continue to construct durable water sources and avoid opening	Yes	It was explained that water sources will be installed and repaired and a ongoing maintenance and repair programme will be put in place

too many water sources that are not durable which can contribute to environmental degradation. It was suggested that each community should have a pump to avoid the current situation of long queues for people fetching water		for the duration of the lifetime of the project. The location of new boreholes being drilled/installed will be determined based upon environmental and geological mapping and surveys to ensure borehole functionality and that there is no negative environmental impact. It was explained that we hope to expand the project in future based upon the success of the initial boreholes included in the project.
It was highlighted that the area chosen for the project is in great need and also has a good water table; and emphasised that the local Government and NGOs can work together to do something positive in these communities.	Yes	It was confirmed that CO2balance, Village Water, and Dorcas Mozambique will work with communities and the local Government to ensure the success and sustainability of the project.

Based on these comments, the project is not going to be altered, but all implementing partners have noted again the need to continue ensuring that boreholes are identied with the input of key stakeholders at the community and government level. It was well noted that communities receive comprehensive training to ensure the sustainability of the project.

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

Appendix 1. Contact information of project participants

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