Gold Standard for the Global Goals

METHODOLOGY

METHODOLOGY FOR EMISSION REDUCTIONS FROM SAFE DRINKING WATER SUPPLY

SDG 13

Publication Date: 03/05/2021

Version: 1.0

Next Planned Update: 03/05/2024

Contact details

The Gold Standard Foundation
Chemin de Balexert 7-9
1219 Châtelaine
International Environment House 2
Geneva, Switzerland
Tel: +41 22 788 70 80
Email: standards@goldstandard.org

SUMMARY

Applicable to projects and programmes that seek to introduce zero or low GHG water purification systems to provide safe drinking water, this methodology quantifies GHG emissions reductions displaced through decentralised thermal energy technologies.

Used in conjunction with the GHG Emissions Reduction & Sequestration Product Requirements, projects and programmes applying this methodology may be issued with GSVERs.

TABLE OF CONTENTS

1| Definition

For the purpose of this methodology, the following definitions apply:

a. **Community level water treatment technologies (CWT)** - Technologies that treat water at a central point to obtain safe water. The safe water may be supplied directly to the premises of users, or users may retrieve water from the central point or another distribution point. Water to be treated comes from an existing water supply or from a Community water supply technology.

   Example where supply is directly to the premises: Filtration and disinfection with chlorine, and piping to homes.

   Example where supply is at a central point: Filtration and disinfection with chlorine, and users retrieve water in plastic bottles from a water kiosk.

b. **Community water supply technologies (CWS)** - Technologies that generate a supply of water for a community. If the supplied water is safe water, then users may retrieve water from the supply point. If the supplied water is not safe, then the Community water supply technology is combined with HWT, IWT or CWT.

   Example where supply is of safe water from the supply point: New borehole, and users retrieve water in jerry cans from the borehole pump.

c. **Household water treatment technologies (HWT)** - Technologies that treat water in the home to obtain safe water. Water to be treated comes from an existing water supply or from a community water supply technology.

   Example: gravity filter in a home.

d. **Institutional water treatment technologies (IWT)** - Technologies that treat water on the premises of an institution to obtain safe water. Water to be treated comes from an existing water supply or from a community water supply technology.

   Example: large-scale gravity filter in a school.

e. **Safe drinking water (SDW)** - Safe drinking water is free from pathogens and elevated levels of toxic substances at all times (WHO, 2017)[1]. For the purpose of this methodology safe drinking water must conform to drinking water quality specified in relevant national microbiological quality standards of the host country. In case a national standard is not available, the water quality shall comply with WHO Guideline values for verification of microbial quality i.e., all water directly

[1] World Health Organization. (2017). Safely managed drinking water. Normative interpretation of terms used in SDG target 6.1, retrieved from Joint Monitoring Programme (JMP): https://washdata.org/sites/default/files/documents/reports/2017-07/JMP-2017-tr-smdw.pdf

intended for drinking must not have detectable E.Coli in any 100 ml sample (Table 7.10, page 149 WHO, 2017)[2].

f. **Public distribution system (PDS) -** A public water distribution service which is provided by government to people living within its jurisdiction, either directly or through an authorized party.

g. **Improved water sources** (WHO, 2017, page 85)**–** An improved drinking-water source is one that by the nature of its construction and design adequately protects the source from outside contamination, in particular by faecal matter. The underlying assumption is that improved sources are more likely to supply safe drinking-water than unimproved sources. Improved and unimproved water supply technologies are summarized below:

   i. **Improved water sources -** piped water into dwelling, yard or plot, public tap or standpipe, tubewell or borehole, protected dug well, protected spring, rainwater collection.

   ii. **Unimproved water sources** - unprotected dug well, unprotected spring, cart with small tank or drum provided by water vendor, tanker truck provision of water, surface water (river, dam, lake, pond, stream, canal, irrigation channel), bottled water[3].

Refer to Annex -2 for further information.

2| Scope, Applicability, and entry into force

2.1 | Scope

2.1.1 | This methodology is applicable to project activities that introduce a new, or rehabilitate an existing, zero-emission[4] or low-emission technology to supply safe drinking water.

2.1.2 | Technologies include household water treatment technologies (HWT), Institutional water treatment technologies (IWT), Community level water treatment technologies (CWT) and community water supply technologies (CWS). The methodology provides two sets of calculation methods and monitoring requirements, one set that applies to the HWT and IWT types of

[2] World Health Organization. (2017). Guidelines for Drinking-water Quality: fourth edition incorporating the first addendum. Geneva: World Health Organization.

[3] Bottled water is considered to be improved only when the household uses drinking-water from an improved source for cooking and personal hygiene.

[4] Zero emission technology refers here to emissions generated by technologies once installed within the targeted premises and operational – it does not refer to life cycle emissions such as upstream emissions associated with the production or delivery of the technology.

technologies, and another set that applies to the CWT and CWS types of technologies.

2.1.3 | Under this Methodology, a project's objectives are to reduce or avoid greenhouse gas emissions from boiling unsafe drinking water in the baseline, and to supply drinking water that is safe for consumption when it enters the project households or institutional premises. When the drinking water is treated in the household or institution (HWT or IWT), then the water supplied from the treatment technology should be safe. When the water is supplied or retrieved from a CWT or CWS directly to the premises of the household or institution, then the water entering the end-user premises should be safe.

2.2 | Applicability

2.2.1 | The methodology is applicable under the following conditions:

a. Eligible household water treatment technologies (HWT), institutional water treatment technologies (IWT), and community level water treatment technologies (CWT) include bleach/chlorine, water filter (ceramic, sand, composite, membrane, etc.), UV disinfection, etc.

b. Eligible community water supply technologies (CWS) include new installation of new borehole hand-pumps, borehole hand-pumps rehabilitation, solar powered drinking water pumps, etc. Water pumps powered by fossil-fuel engines are not eligible, with the exception of back-up fossil–fuel engines that are used for no more than 10% of operating hours (parameter SWDS 33).

c. All projects involving CWT and CWS technologies must also include ongoing maintenance and repair of the project technology.

d. Where the project involves the rehabilitation of an existing technology, the project developer shall provide evidence that the existing technology is non-operational and that there is no planned maintenance or repair for at least 3 months after the date it became non-operational (parameter SWDS 2).

e. This methodology allows for project activities to include safe water treatment and/or supply technologies implemented for end-users in households, and/or commercial premises such as shops or institutional premises including half or full day/boarding schools, prisons, army camps & refugee camps.

f. In cases where the safe water is retrieved at the CWT or CWS location, the water in its improved form shall be available within a distance of 1 km or less from the end-users, as demonstrated by satellite imaging or GPS

coordinates[5] of each CWT or CWS location. Alternatively, as a proxy, a total collection time of 30 minutes or less for a round trip, including queuing, using the travel modes of walking or pedaling may be demonstrated (parameter SDWS 1).

g. Project technology performance level (HWT and IWT): It shall be demonstrated based on report of laboratory testing[6] or official notification[7] that the project technology or equipment achieves either (i) the performance target classification 3-star or 2-star level, meaning "*Comprehensive Protection,"* as per the WHO International Scheme to Evaluate Household Water Treatment Technologies[8] (World Health Organization, 2011) or (ii) compliance with the national standard or guideline[9] for household drinking water treatment technology; if no national guideline or standard is available, then the project technology shall comply with the WHO International Scheme requirements as per (i) (parameter SDWS 2).

h. Project technology performance level (CWT and CWS): For each individual CWT or CWS, it shall be demonstrated at the start of each crediting period with water quality testing reports that the water directly supplied by the project water technology/source achieves both:

    i. microbial quality in line with either (i) national standards or guidelines for microbial quality of drinking water, or in the absence of

---

[5] Acceptable formats for GPS coordinates include DMS (degrees, minutes and seconds), DMM (degrees and decimal minutes), and DD (decimal degrees).

[6] The testing should be undertaken under conditions that are representative of the operation conditions of the project site(s) including feedwater.

[7] For example notifications from the national authority on health.

[8] International Scheme to Evaluate Household Water Treatment Technologies, WHO

Refer to the list of products tested by WHO https://www.who.int/water_sanitation_health/water-quality/household/hwts-products-evaluated/en/

[9] The national standard or guideline shall be based on laboratory efficacy testing that, at a minimum, includes quantitative microbial measures of pre- and post-treatment challenge waters that are representative of potential drinking water sources, and that includes measured reductions based on at least one pathogen class (bacteria, viruses, protozoa). "Challenge water" is synonymous with "test water". This is the experimental water that has been spiked with microbes (a "microbial challenge") in order to demonstrate the potential for the technology to reduce microbes.

such requirements, (ii) the guideline values for verification of microbial quality from the Guidelines for drinking-water quality (Table 7.10, WHO, 2017) [10]; and

ii. compliance with (i) national standards or guidelines on priority chemical contamination and physical and aesthetic aspects, or in the absence of such requirements, (ii) international standards or guidelines on priority chemical contamination[11] and physical and aesthetic aspects. (parameter SWDS 3).

i. The project must conduct annual water hygiene education campaigns for the end-users. (parameter SDWS 20).

j. A project applying this methodology may make SDG claims if relevant monitoring parameter(s) is included in the monitoring plan to demonstrate and confirm the project's contributions to SDGs[12]. See parameter SDWS 19.

2.3 | Safeguards

2.3.1 | Project shall document the national, regional and local regulatory framework for provision of safe drinking water in the project boundary (parameter SDWS 4). The project shall not undermine or conflict with any national, sub-national and local regulations or guidance for safe drinking water supply, operation and maintenance, including any tariff requirements.

2.3.2 | If the expected technical life of project technology (parameter SDWS 7) is shorter than the crediting period, describe measures to ensure that end users are provided replacement systems of comparable quality at the end of the expected technical life (for example, replace with comparable or better technology, retrofit with performance guarantee, etc.). This applies both for new technology and rehabilitated.

2.3.3 | All CWT and CWS projects must include ongoing maintenance and repair of the project technology. The PDD must describe the maintenance and repair plan, including the system for logging/documenting of technology operation and maintenance events including periods of downtime[13]. The log of operation and

[10] World Health Organization. (2017). Guidelines for Drinking-water Quality: fourth edition incorporating the first addendum. Geneva: World Health Organization.

[11] At the global level, the priority chemical contaminants are arsenic and fluoride. In absence of relevant national standards, compliance with the WHO guideline values (maximum 10 μg/L and 1.5 mg/L, respectively) shall be demonstrated.

[12] Indicator 6.1.1 "Proportion of population using safely managed drinking water services"

[13] Time during which the technology is out of action or unavailable for use.

maintenance shall be required during the monitoring period to demonstrate project technology operation.

2.4 | Entry into force

2.4.1 | The date of entry into force of this methodology is 02 August 2021.

3| Baseline Methodology

3.1 | Project Boundary

3.1.1 | The project boundary includes:

a. the physical, geographical sites of the low- or zero-greenhouse gas emitting technologies to treat/supply safe drinking water installed by the project activity,

b. any back-up engines or other equipment using fossil-fuel related to the low-greenhouse gas emitting technologies,

c. the electricity grid, in the case electricity is used by the project, and

d. the household, commercial and institutional buildings where the end users of safe water provided by the project are located.

3.2 | Emissions sources included in the project boundary

3.2.1 | The greenhouse gases included in or excluded from the project boundary are shown in table 1, below.

a. Baseline emissions from any gases indicated below may be omitted for simplification.

b. All project emissions from any of the gases indicated below must be accounted for, unless demonstrably negligible or not applicable to the individual project.

Table 1. Emissions sources included in or excluded from the project boundary

Scenario	Source	Gas	Included	Justification/Explanation
Baseline scenario	Emissions from wood fuels utilized for obtaining safe drinking water displaced due to project activity	CO_2	Yes	Major source of emissions
		CH_4	Yes	Minor source of emissions
		N_2O	Yes	Minor source of emissions
	Emissions from fossil fuels utilized for obtaining safe drinking water displaced due to project activity	CO_2	Yes	Major source of emissions
		CH_4	No	Excluded for simplification
		N_2O	No	Excluded for simplification
Project scenario	Emissions from electricity for operating	CO_2	Yes	Limited electrical energy may be required

	project water supply/treatment technology	CH_4	No	Excluded for simplification
		N_2O	No	Excluded for simplification
	Emissions from fossil fuels for operating project water supply/treatment technology	CO_2	Yes	Limited fuel energy may be required
		CH_4	No	Excluded for simplification
		N_2O	No	Excluded for simplification

3.3 | Demonstration of additionality

3.3.1 | The project developer shall demonstrate that the project could not or would not take place without carbon finance. Possible reasons for the need for carbon finance may be that the initial investment or the on-going marketing, distribution, quality control, manufacturing and maintenance costs are unaffordable for the target population.

3.3.2 | The project developer shall demonstrate additionality by conforming to additionality requirements of one of the options below,

a. Applicable GS4GG Activity Requirements;
b. CDM Tool 01 - Tool for the Demonstration and Assessment of Additionality;
c. CDM Tool 19- Demonstration of additionality of microscale project activities; (not applicable to Gold Standard microscale projects)
d. CDM Tool 21 – Demonstration of additionality of small-scale project activities; (applicable to small-scale projects only)
e. An approved Gold Standard VER additionality tool

3.4 | Baseline scenario determination

3.4.1 | For users that boil unsafe water for drinking in the pre-project scenario, the general baseline scenario is that users would have boiled water for drinking in the absence of the project activity.

3.4.2 | For household end-users currently drinking unsafe water, the principles of suppressed demand are applied, such that the general baseline scenario is assumed to be that users would have boiled water for drinking in the absence of the project activity[14]. The suppressed demand baseline does not apply to a

[14] As per GS4GG Principle and Requirements, application of suppressed demand baseline is limited to Micro & Small scale activities. In Refer to GHG emission reduction & sequestration product requirements for definition. For the purpose of this methodology the small scale project applies Type III definition i.e, GHG emission reduction for small scale project shall not exceed more than 60,000 ton CO_2e in any year of the crediting period.

large-scale project[15]. A large-scale project can only account the users that boil water in the pre-project scenario. The suppressed demand baseline may be applied for institutional end-users, except where the institution is connected to a public distribution network (PDN) that supplies safe drinking water - unless justified that supplied water quality doesn't meet safe water definition (parameter SDWS 12).

3.4.3 | In line with the paragraph 3.4.2 | above, for the case of end-users currently drinking unsafe water because e.g. energy poverty barriers result in less than the minimum required amount of safe drinking water, the principles of suppressed demand are applied and the baseline is set as a proxy technology (water boiling of an adequate quantity of drinking water) based on the standard of living achieved by peers (adequate supply of safe drinking water). Projects applying the suppressed demand baseline shall take into account any general rules or guidelines for suppressed demand published by the Gold Standard at the time of registration and crediting period renewal, as applicable.

3.5 | Selection and justification of the baseline scenario

3.5.1 | Each Project or VPA shall determine the applicable baseline scenario for fuel, technology and end-user group as applicable. Refer to TPDDTEC for guidelines on baseline scenario selection and justification. Each project or VPA shall document the following pre-project conditions that define the specific baseline scenario of the end-user group(s) of the project or VPA:

a. **Pre-project practices of boiling water, or drinking unsafe water (suppressed demand):** Document the drinking water sources and/or treatment technologies available and used in the project boundary (refer to 1|Definition, above for Water source definition and Annex -2 for further information).

b. **Efficiency of water boiling systems:** Document the baseline stove or water boiling technologies and technologies' thermal efficiency used in the project boundary.

c. **Baseline fuels:** Document the baseline cooking fuels used and/or fuels used for water boiling in the project boundary.

3.6 | Baseline Emissions

3.6.1 | The baseline emission factor shall be calculated as follows:

[15] A project or VPA that reduces more than 60,000 ton CO2e in any year of the crediting period.

$$EF_b = SE_{w,b,y} * \sum_f \left(x_f * (EF_{b,f,CO2} * f_{NRB,f,y} + EF_{b,f,nonCO2})\right) \div 10^9 \quad \text{Eq. 1}$$

Where:

EF_b	=	Emission factor for the use of fuel to obtain safe water in the baseline (tCO_2e/L)
$SE_{w,b,y}$	=	Specific energy required to boil water (kJ/L), to be calculated as per the paragraph below
x_f	=	Proportion of fuel *f* used in the baseline (fraction determined based on an energy basis)
$EF_{b,f,CO2}$	=	CO_2 emission factor from use of fuel *f* (tCO_2/TJ)
$EF_{b,f,nonCO2}$	=	Non-CO_2 emission factor arising from use of fuel *f*, when the baseline fuel *f* is biomass or charcoal (tCO_2e/TJ). This parameter is omitted when *f* is a fossil fuel.
$f_{NRB,f,y}$	=	Fractional non-renewability status of woody biomass fuel during year *y* (fraction). For biomass, it is the fraction of woody biomass that can be established as non-renewable. This parameter is omitted when *f* is a fossil fuel.
f	=	Index for baseline fuel types

3.6.2 | The specific energy required to boil water using the baseline technology ($SE_{w,b,y}$) is determined as follows, by calculating the energy input required to obtain 1 L of boiling water, including boiling and vaporization losses[16], taking into account default or measured stove efficiency.

$$SE_{w,b,y} = 360.83/\eta_{wb} \quad \text{Eq. 2}$$

Where:

360.83	=	Default amount of energy required to obtain 1 L of water after 5 minutes of boiling from a first principles approach[17] kJ/l

[16] The previous version of TPDDTEC Annex 3 assumed that purifying water by boiling would require boiling water for 10 minutes. This assumption is revised to 5 minutes, following WHO technical information that less than 5 minutes of boiling is sufficient for inactivation of enteric bacteria (Technical Brief WHO/FWC/WSH/15.02, 2015).

[17] This is calculated from the specific heat of water of 4.186 kJ/L °C, the difference between the initial and final water temperature assuming a start at 20 °C and end at 100 °C, evaporation of 1% of water during 5 minutes of boiling to obtain 1 L boiled water, and latent heat of water evaporation of 2260 kJ/L. Also, the latent heat required to boil one litre of water for five

η_{wb} = Efficiency of the stoves for baseline water boiling (%). Weighted average of baseline stove types.

3.6.3 | The baseline emissions shall be calculated as follows:

$$BE_y = EF_b \times \left(1 - C_b - X_{cleanboil,y}\right) \times Q_y \times M_{q,y} \quad \textit{Eq. 3}$$

Where:

BE_y = Baseline emissions from the use of fuel to obtain safe water in the baseline (tCO_2e)

C_b = Proportion of project end-users who in the baseline were already using a safe water supply that did not require boiling (%)

$X_{cleanboil,y}$ = Proportion of project end-users that boil safe water in the project year *y* (%)

Q_y = Quantity of safe drinking water provided by the project in year *y* (L)

$M_{q,y}$ = Modifier for the water quality in year *y*

3.6.4 | The quantity of safe drinking water provided by the project is calculated using one of two methods. Method 1 applies to CWT and CWS, and Method 2 applies to HWT and IWT.

a. Method 1 – CWT and CWS technologies

3.6.5 | In the case of CWT and CWS, the quantity of safe drinking water provided by the project $Q_y$is determined as follows:

$$Q_y = \min\left(Q_{m,y}, Q_{pop,y}\right) \quad \textit{Eq. 4}$$

Where:

$Q_{m,y}$ = Monitored quantity of safe water provided by the project in year *y* (L).

$Q_{pop,y}$ = Quantity of safe drinking water that could be consumed by project end-users in year *y* (L)

3.6.6 | Quantity of safe drinking water shall be calculated as follows:

---

minutes is assumed to be equivalent to latent heat for the evaporation of 1 per cent of the water volume.

$$Q_{pop,y} = \sum_p HH_{p,y} \times HN_{p,y} \times QPW_p \times DO_{p,y} \quad \text{Eq. 5}$$

Where:

$HH_{p,y}$	=	Number of premises type *p* served by the project in year *y*
$HN_{p,y}$	=	Number of individuals per premises type *p* (e.g. household, school) in year *y*
QPW_p	=	Volume of drinking water per person per day for premises type *p* (L). Apply the default value or monitored value through water consumption field tests in the project scenario, capped at 5.5 L per person per day.
$DO_{p,y}$	=	Days the project technology is operational for end-users in premises *p* in year *y*

b. Method 2 – HWT and IWT technologies

3.6.7 | In the case of HWT and IWT, the quantity of safe drinking water provided by the project Q_y is determined as follows:

$$Q_y = \sum_p N_{p,y} \times U_{p,y} \times QPW_{hh,p,y} \times DP_{p,y} \quad \text{Eq. 6}$$

Where:

$N_{p,y}$	=	Number of premises type *p* with at least one project technology in year *y*
$U_{p,y}$	=	Usage rate of the project technology by premises type *p* during year *y* (%)
$QPW_{hh,p,y}$	=	Volume of drinking water per premises *p* per day in year *y* (L)
$DP_{p,y}$	=	Days the project technology is present for end-users in the premises *p* in year *y*

3.6.8 | The volume of drinking water per premises per day is determined by considering whether the capacity of the project device is sufficient to provide at least the default amount of drinking water, as follows:

$$QPW_{hh,p,y} = \min\left(\left(q_i \times t_{p,y} \times DN_{p,y}\right), \left(QPW_p \times HN_{p,y}\right)\right) \quad \text{Eq. 7}$$

Where:

q_i	=	Capacity of the HWT or IWT individual project technology (L/h)
$t_{p,y}$	=	Usage time of the project technology by premises type *p* in year *y* (h/day)
$DN_{p,y}$	=	Average number of individual project technologies in each project premises type *p* in year *y*

$HN_{p,y}$ = Number of individuals per premises type *p* (e.g. household, school) in year *y*

QPW_p = Volume of drinking water per person per day for premises type *p* (L). Apply the default value or monitored value through water consumption field tests in the project scenario, capped at 5.5 L per person per day.

3.7 | Project emissions

3.7.1 | Project emissions may result from the operation of new low-emission water treatment technologies. Project emissions (PE_y) shall be calculated as follows:

$$PE_y = PE_{ff,p,y} + PE_{ec,p,y} \quad \textit{Eq. 8}$$

Where:

PE_y = Project emissions in year *y* (tCO_2)

$PE_{ff,p,y}$ = Project emissions from fossil fuel use in year *y* (tCO_2)

$PE_{ec,p,y}$ = Project emissions from electricity use in year *y* (tCO_2)

3.7.2 | Project emissions from fossil fuel use are determined as follows.

$$PE_{ff,p,y} = \sum P_{p,f,y} \times NCV_f \times EF_f \quad \textit{Eq. 9}$$

Where:

$P_{p,f,y}$ = Quantity of fossil fuel *f* that is consumed in the project during year *y* (mass or volume units)

NCV_f = Net calorific value of fossil fuel *f* (TJ/fuel units)

EF_f = Emission factor of fossil fuel *f* (tCO_2/TJ)

3.7.3 | Project emissions from electricity use are estimated as follows.

$$PE_{ec,p,y} = \sum EC_{p,y} \times EF_{ec} \times (1 + TDL_{ec}) \quad \textit{Eq. 10}$$

Where:

$EC_{p,y}$ = Quantity of electricity that is used by the project during year *y* (kWh)

EF_{ec} = Emission factor associated with the electricity use (tCO_2/kWh)

TDL_{ec} = Transmission and distribution losses associated with the electricity use (%)

3.8 | Leakage emissions

3.8.1 | Where relevant, leakage relating to the non-renewable woody biomass shall be assessed as follows. Other types of leakage are excluded for simplification.

3.8.2 | Leakage emissions, LE_y, shall be calculated as follows:

3.8.2.1 | First, the project developer must evaluate, ex-ante, the following potential sources of leakage and provide an evidence-based description and preliminary quantification of each potential source and its relevance for the project:

a. Members of the population who do not participate in the project, and previously used lower emitting energy sources, instead use the non-renewable biomass saved under the project activity.

b. The project significantly reduces the NRB fraction within an area where other GHG mitigation project activities account for NRB fraction in their baseline scenario.

c. The project population compensates for loss of the space heating effect of water boiling by adopting some other form of space heating or by retaining some baseline wood fuel-burning practices.

Leakage risks deemed very low can be ignored as long as the case for their insignificance is substantiated.

3.8.2.2 | Second, for each source for which the leakage assessment expects an increase in non-renewable biomass fuel consumption by non-project households/users attributable to the project activity, then calculations must be undertaken to account for the leakage from this source. Leakage is either calculated as a quantitative emissions volume (tCO_2e) or as a percentage of total emission reductions. The project documentation shall include a projection of leakage emissions based on available data and information. The monitoring plan must include monitoring parameters to be registered during the leakage investigation every two years to populate the leakage calculation.

3.8.2.3 | Third, the project developer must conduct a leakage investigation every two years using relevant methods. For example, surveys to determine parameters for the leakage calculation may be combined with project monitoring surveys, as is applicable.

3.8.3 | If the ex-ante evaluation shows that leakage emissions are less than 5% of total emission reductions, then no monitoring is needed, and emission reductions simply shall be adjusted 5% down. In this case, the sources and magnitude of leakage emissions must be reassessed at the time of crediting period renewal.

3.9 | Emission reductions

3.9.1 | The emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y \qquad \textit{Eq. 11}$$

Where:

ER_y = Emission reductions in year y (t CO_2e/yr)

BE_y = Baseline emissions in year y (t CO_2e/yr)

PE_y = Project emissions in year y (t CO_2e/yr)

LE_y = Leakage emissions in year y (t CO_2e/yr)

3.10 |Changes required for methodology implementation in 2nd and 3rd crediting periods

3.10.1 |When the project developers apply for crediting period renewal, the baseline technologies and fuel types shall be reassessed, in addition to other relevant methodological parameters as per the latest version of the methodology available at the time submission of renewal of crediting period.

3.11 |General requirements for data and information sources

3.11.1 |In the following tables of data and parameters monitored and not monitored, there are cases where a variety of source documents or studies may be applied to determine a parameter, or to cross-check a parameter.

3.11.2 |When multiple sources are available and fulfill the requirements for defining or cross-checking a parameter, the most relevant source should be chosen. Criteria for relevance include geographical (e.g. more specific to the project boundary location), temporal (e.g. more recent), and others. The VVB shall assess the relevance of the source applied compared to the other sources available. While conservativeness is a guiding principle for selecting data, the source applied to define or cross-check the parameter may not be the most conservative, if it can be shown to be the most relevant. Two hypothetical examples follow to illustrate these requirements.

a. A national study from last year shows that average household size is 4, whereas a municipal study from the year before shows that the average household size in the rural areas where the project is implemented is 5. In this case, it is more relevant to apply the household size of 5 in the calculations.

b. The annual report of the Ministry of Education shows that the average number of students per rural elementary school is 60, whereas the records of the rural elementary school that participates in the project show that the average attendance was 40 students. In this case, it is more relevant to apply the number of students as 40 for the school in the calculations.

3.11.3 |When sampling or surveys are utilized to define parameters, the sampling and surveys must be undertaken with reference values from other relevant data sources in mind, and project-specific survey and sampling results are expected to correlate with results from other relevant data sources. Where project-specific results differ from relevant data sources in a way that is statistically significant, and the difference leads to less conservative results in the emission reduction calculations, then the project must provide justification for the differences. Further, the project may be required to substitute more conservative results from other data sources if the justification is not accepted by the VVB or certifier.

3.12 |Data and parameters not monitored

a. Related to water quality

Parameter ID	SDWS 1
Data/Parameter:	Number of household/institution per CWT/CWS
Data unit:	- Coordinates of CWT/CWS - Acceptable formats for GPS coordinates include DMS (degrees, minutes and seconds), DMM (degrees and decimal minutes), and DD (decimal degrees) - Number of end-user premises, quantity
Description:	End users premises (e.g. households, institutions) within 1 km distance of project water source or a total collection time of 30 minutes or less for a round trip, including queuing, using the travel modes of walking or pedaling. Recorded for each CWT/CWS installation ex-ante at the time of start of crediting period. In case of progressive installation - for new CWT/CWS units before 1st issuance for new units.
Source of data:	PDD shall include information; - GPS coordinates for each individual CWT and CWS location. For example, GPS coordinates of each project borehole. - Number of eligible household/institution for each borehole If there are any insurmountable barriers (e.g. river without bridge) transecting the circle defined by the 1 km radius or 30 mins distance, then end-users on the far side of the barrier shall be excluded from the count.
Any comment:	**Applies only for CWT and CWS where water is retrieved from the CWT or CWS location.** VVB shall verify - the location of each individual CWT and CWS - the location and number of households using publicly available information, satellite imagery and/or GPS device. All end-users included in surveys or sampling related to baseline determination or operation of the project shall be located within the 1 km radius of the CWT or CWS location.

Parameter ID	SDWS 2
Data/Parameter:	Project technology description
Data unit:	NA
Description:	The detailed description of the planned project technology shall include as a minimum:

	HWT and IWT: - manufacturer name, - product name (if applicable), - technology type, and - performance target classification as per the WHO International Scheme to Evaluate Household Water Treatment Technologies or proof of compliance with an applicable national standard or guideline for drinking water treatment technologies. **CWT and CWS**: - Manufacturer name, - product name (if applicable), - technology type, - capacity (in case of pumps: rated flow rate, or flow-rate calculation) For all technologies, any performance certifications issued by national standard body or an appropriate certification party recognised by national standards body or recognised International Organisation agency also shall be provided. **Rehabilitated technologies:** In case the project technology (CWT and CWS) is a rehabilitation, the following is also required as part of technology description: - Evidence of Non-operational time prior to proposed rehabilitation (at minimum with evidence letter from local representative or government, etc.); - Evidence of lack of an existing maintenance or repair plan (at minimum with evidence letter from local representative or government, etc.); - Original installation date/month (approximate month/year); and - Information/evidence to confirm the details of rehabilitation activity (e.g. parts replaced, specifications followed, personnel conducting the repairs and date of retrofitting)
Source of data:	**HWT and IWT:** Any of the following sources shall be used: - Manufacturer specifications - Third-party certification by a qualified entity, for example recognised certification agency by National/ International Standard body - Commercial guarantee **CWT and CWS:** Any of the following sources shall be used: - Manufacturer specifications

	- Commercial guarantee - Technical reports from the installer - Third-party certification by a qualified entity, for example recognised certification agency by National/ International Standard body **<u>Rehabilitated technologies:</u>** - Sources mentioned for CWT and CWS above and - Technical reports from a qualified entity that undertakes the rehabilitation Professional opinion or expert opinion is not accepted as a source for this parameter.
Any comment:	Any information not available at validation, the validating VVB shall raise a FAR for verification. The verifying VVB shall verify the information at the first verification and in case of progressive at first verification for the technology.

Parameter ID	**SDWS 3**
Data/Parameter:	Project technology performance level (CWT or CWS)
Data unit:	NA
Description:	The water directly supplied by the water source (CWS or from the CWT) must comply with i. Microbial quality in line with (i) national standards or guideline for microbial quality of drinking water, or in their absence, (ii) the guideline values for verification of microbial quality from the Guidelines for drinking-water quality, 4th edition (Table 7.10, WHO, 2017); and

	ii. Chemical quality (i) national standards or guidelines on priority chemical contamination and physical and aesthetic aspects, or in the absence of such requirements, (ii) international standards or guidelines on priority chemical contamination[18] and physical and aesthetic aspects. Once at the start of the crediting period, and microbial quality at the CWS and CWT location must be retested following an event that could lead to contamination of the source water (e.g. flooding).
Source of data:	Water quality test report
Any comment	Laboratories used for water quality testing must be approved by local health authorities and/or have quality accreditation; and The laboratory used shall have evidence to demonstrate that it has an adequate quality management plan in place which addresses both quality assurance and quality control test procedures. Table 4.6 Checklist for effective analytical quality assurance of WHO Guidelines, 1997 may be used as a guideline for laboratory compliance with quality assurance practices.
Any comment:	Applies in the case of CWT and CWS

Parameter ID	**SDWS 4**
Data/Parameter:	Regulatory framework for safe water supply
Data unit:	NA
Description:	List and provide a summary of any national, sub-national and local regulations or guidance for safe drinking water supply, operation and maintenance, including any tariff requirements. Describe how the project complies with the regulatory framework. Update at the start of each crediting period.
Source of data:	National, sub-national and local authorities
Any comment:	Applies to all project technology types. The project shall not undermine or conflict with any national, sub-national and local regulations or guidance for safe drinking water supply, operation and maintenance, including any tariff requirements. Where the regulatory framework establishes any cap on parameters used by the methodology, for example number of users per borehole, this shall be accounted for in emission

[18] At the global level, the priority chemical contaminants are arsenic and fluoride. In absence of relevant national standards, compliance with the WHO guideline values (maximum 10 µg/L and 1500 µg/L, respectively) shall be demonstrated. Table 8.8, Guidelines for drinking-water quality: fourth edition incorporating the first addendum. World Health Organization; 2017.

	reduction calculations.

Parameter ID	SDWS 5
Data/Parameter:	Water sources in the project boundary
Data unit:	NA
Description:	Identify the water sources in the project boundary, and identify whether they are used for drinking water, and for all that are used for drinking water, classify them as improved and unimproved water source, in line with water source section 1| Definition,1| above. Refer to Annex 2 for further information. Undertake at the start of each crediting period and at the time of project design change approval where the project boundary is being revised/expanded to new areas.
Source of data:	Any of the following sources shall be used: - Baseline study - Credible published literature for project region - Studies by academia, NGOs or multilateral institutions, or - Official government publications or statistics Source applied must not be more than 3 years old.
Any comment:	Applies to all project technology types.

b. Related to emission reductions

Parameter ID	SDWS 6
Data/Parameter:	Stove technologies used in the project boundary
Data unit:	NA
Description:	The proportion of different stove types used in premises in the geographical area of the project. If the project covers different types of end-users premises (e.g. households, institutions), then the stoves technologies should be determined for each premises type. Undertake at the start of each crediting period.
Source of data:	Any of the following sources shall be used: - Baseline survey, - Credible published literature for project region, - Studies by academia, NGOs or multilateral institutions, or - Official government publications or statistics Source applied must not be more than 3 years old. When a project specific baseline survey is conduct among the target population , follow the requirements outlined in 4.2 | below.
Any comment:	Applies to all project technology types. The classification shall consider at least the following categories of

	stoves types: - Three-stone fire or a conventional system for woody biomass lacking improved combustion air supply mechanism and flue gas ventilation system; - other conventional systems using woody biomass; - improved cookstoves (≥ 20% thermal efficiency); and - fossil fuel combusting systems. If the project or VPAs are implemented in different geographical locations, then the proportion of different stove types shall be defined for each location, where relevant.

Parameter ID	**SDWS 7**
Data/Parameter:	Expected technical life of project technology
Data unit:	Treatment volume or operational hours or time period (e.g. "eight years")
Description:	The expected technical life of an individual project technology shall be defined in the PDD. The details include both technology/device life and filter life, if a filter is used and it is replaceable.
Source of data:	**HWT/IWT:** Any one of the following sources shall be used: - Manufacturer specifications - Third-party certification by a qualified entity, for example recognised certification agency by National/ International Standard body - Commercial guarantee **CWS/CWT:** Any one of the following sources shall be used: - Manufacturer specifications - Guarantee from the installer - Third-party certification by a qualified entity, for example recognised certification agency by National/ International Standard body If none of the required sources mentioned above are available, report of representative and robust field study results may be acceptable. **Rehabilitated technologies:** - Guarantee from a qualified entity that undertakes the rehabilitation Professional opinion or expert opinion is not accepted as a source for this parameter.
Any comment:	Applies to all project technology types. If the expected technical life of the project technology is shorter

	than the crediting period, describe the measures to ensure that end users are provided replacement systems of comparable quality, e.g. replace with comparable or better technology, retrofit with performance guarantee, etc. This applies to both new and rehabilitated technology. The project shall ensure that the units are replaced with systems of comparable quality or retrofitted at the end of their technical life in order to continue claiming emission reductions. If no replacement or retrofitting is provided, emission reduction claims are limited to the expected technical life.

Parameter ID	**SDWS 8**
Data/Parameter:	x_f
Data unit:	Percentage of fuel *f* use in target population
Description:	The proportion of each different cooking fuel *f* used in the project boundary by end-users: - % among the target population if single fuel is used for water boiling. For example, the target population either use wood or charcoal - 60% end users use wood and 40% charcoal. - Weighted average on energy basis, if multifuel situation exists within premise. For example, a household that uses 1000 kg fuelwood per year and 500 kg charcoal per year for cooking and water boiling uses 51.4% fuelwood and 48.6% charcoal on an energy basis. If the project covers different types of end-users premises (e.g. households, schools), then the fuels used in the geographical area of the project by the same types of end-users are to be determined for each end-user premises type. Undertake assessment at the start of each crediting period.
Source of data:	Any of the following sources shall be used: - baseline survey, - credible published literature for project region, - studies by academia, NGOs or multilateral institutions, or - Official government publications or statistics Source applied shall not be more than 3 years old. When a baseline survey is used, follow the 4.2 | below.
Any comment:	Applies to all project technology types. The percentages applied shall be cross-checked against at least one other source on the list. For cross-check purposes, sources applied may be up to 5 years old. Further, cross-check with older sources may be used provided they provide conservative results

	(for example, an older source shows that in the past, a more carbon-intensive **fuel mix** was used).

Parameter ID	SDWS 9
Data/Parameter:	$EF_{b,f,CO2}$
Data unit:	tCO_2/TJ
Description:	CO_2 emission factor from use of fuels
Source of data:	IPCC defaults For wood and charcoal, the following defaults derived from the IPCC shall be applied: Wood: 112 tCO_2/TJ Charcoal: 165.22 tCO_2/TJ (includes charcoal production emissions)
Any comment:	-

Parameter ID	SDWS 10
Data/Parameter:	$EF_{b,f,nonCO2}$
Data unit:	tCO_2e/TJ
Description:	Non-CO_2 emission factor from use of fuels, in case the baseline fuel is biomass or charcoal
Source of data:	IPCC defaults For wood and charcoal, the following defaults derived from the IPCC shall be applied: AR5 GWP - Wood: 9.46 tCO_2e/TJ - Charcoal: 44.83 tCO_2e/TJ (includes production emissions of CH_4 and N_2O) AR4 GWP - Wood: 8.692 tCO_2e/TJ - Charcoal: 40.26 tCO_2e/TJ (includes production emissions of CH_4 and N_2O)
Any comment:	–

Parameter ID	SDWS 11
Data/Parameter:	η_{wb}
Data unit:	Percentage
Description:	Weighted average efficiency of the baseline water boiling devices. Calculate the weighted average of the water boiling efficiency in the project boundary using the proportion of different stove types used and the stove efficiencies.
Source of data:	The following default values may be applied to calculate the weighted average of the water boiling efficiency in the project

	boundary: - **Three-stone fire or a conventional system** for woody biomass lacking improved combustion air supply mechanism and flue gas ventilation system, that is without either a grate or a chimney: default efficiency 10%. - **Other conventional systems using woody biomass:** default efficiency 20%. - **Improved cookstoves:** manufacturer specification, or if not available, default efficiency 30%. - **Fossil fuel combusting system:** manufacturer specification, or if not available, following the testing procedure described below. In case other types of stoves are found in the project area, or if significant efficiency differences from the default values are expected, standard Water Boiling Tests may be undertaken to determine stove efficiency using representative sampling methods, following the most recent WBT protocol or when a sampling is used, follow the 4.2 | below.
Any comment:	-

Parameter ID	**SDWS 12**
Data/Parameter:	C_b
Data unit:	Percentage
Description:	Proportion of project end-users who in the baseline were already using safe water, either from an improved water source, or from a water treatment method other than boiling. At the start of each crediting period.
Source of data:	Any of the following sources shall be used: - Baseline survey - Credible published literature for project region - Studies by academia, NGOs or multilateral institutions - Official government publications or statistics Source applied must not be more than 3 years old. When a baseline survey is used, follow the 4.2 | below.
Any comment:	The percentages applied shall be cross-checked against at least one other source on the list. For cross-check purposes, sources applied may be up to 5 years old. Further, cross-check with older sources may be used provided they give conservative results (for example, an older source shows that in the past, fewer end-users were already using safe water). The safe water sources and percentages shall be consistent with the information reported for parameter *Water sources in the*

	project boundary (SWDS 5). Users who have access to a source of safe water in the baseline (either from an improved water source, or from a water treatment method other than boiling) may not be credited under the project, unless project demonstrates that the baseline source of water does not meet safe water quality criteria, by conducting water quality tests over a representative period of time of 6 months or by referring to credible published literature or other sources. Source applied must not be more than 3 years old.

Parameter ID	**SDWS 13**
Data/Parameter:	q_i
Data unit:	Litres per hour
Description:	Capacity of the household or institutional water treatment technology
Source of data:	Any of the following sources shall be used: - Manufacturer specifications - Design specifications - Third-party certification by a qualified entity, for example recognised certification/ testing agency by National/ International Standard body - Commercial guarantee by the seller An alternative approach can be proposed when information is not available as per the requirements. For example, Chlorine tablets come with a recommended dose per liter so dosage can be used to determine treatment capacity. Professional opinion or expert opinion is not accepted as a source for this parameter.
Any comment:	**Applies for HWT and IWT** If the capacity is expressed in other terms, e.g. litres per day, then convert to litres per hour by accounting for the parameter t_y.

Parameter ID	**SDWS 14**
Data/Parameter:	NCV_f
Data unit:	TJ/fuel units, i.e. mass or volume units
Description:	Net calorific value of fossil fuel *f*
Source of data:	Any of the following sources may be applied: - IPCC defaults - Fuel-specific value from invoice / fuel supplier - National defaults

Any comment:	**Applies to the calculation of project emissions** If a source different than the IPCC defaults is applied, then cross-check the value against the IPCC default and lower and upper range. If the value is outside this range, then the difference shall be justified.

Parameter ID	**SDWS 15**
Data/Parameter:	EF_f
Data unit:	tCO_2/TJ
Description:	Emission factor of fossil fuel *f*
Source of data:	Any of the following sources may be applied: - IPCC defaults - Fuel-specific value from invoice / fuel supplier - National defaults
Any comment:	**Applies to the calculation of project emissions** If a source different than the IPCC defaults is applied, then cross-check the value against the IPCC default. If the value is outside +/-2%, then the difference shall be justified.

Parameter ID	**SDWS 16**
Data/Parameter:	EF_{ec}
Data unit:	tCO_2/kWh
Description:	Emission factor associated with the electricity use
Source of data:	Any of the following sources may be applied: - Default 0.001 tCO_2/kWh if annual consumption is more than 250 kWh/year/household or institution - Default 0.0008 tCO_2/kWh if annual consumption is less than 250 kWh/year/household or institution - Determined by applying CDM Tool 05, "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" or CDM Tool 07 "Tool to calculate the emission factor for an electricity system"
Any comment:	-

Parameter ID	**SDWS 17**
Data/Parameter:	TDL_{ec}
Data unit:	%
Description:	Transmission and distribution losses associated with the electricity use
Source of data:	In order of preference:

	- Default value of 20%. - Literature – based on data as obtained from national, regional or local authorities, not more than 3 years old
Any comment:	-

4| Monitoring methodology

4.1 |Data and parameters monitored

a. Related to water quality

Parameter ID	SDWS 18
Data/Parameter:	$M_{q,y}$
Data unit:	fraction
Description:	Ongoing water quality indicated as the fraction of the samples that pass microbial quality standard requirements specified in relevant microbial quality standard for drinking water of the host country. In case a national standard is not available, the water quality shall comply with WHO Guideline values for verification of microbial quality i.e., all water directly intended for drinking must not have detectable E.Coli in any 100 ml sample i.e., less than 1 Colony Forming Unit (CFU) of E.Coli /100 ml.
Source of data:	Testing of water all appliances or at a representative sample of end-users at the following point where the water reaches the end-user premises: **HWT and IWT:** testing of the water that exits the treatment technology. **CWT or CWS**: where water is supplied directly to the premises of the household or institution (e.g. piped): testing of the water entering the household (e.g. coming out of the tap). **CWT or CWS**: where water is retrieved from the CWT or CWS location: testing of the water in the transport containers when it reaches the end-user premises (e.g. household, institution). The water quality test applies the bacterial quality standard <1 cfu E.coli/100ml, and the sampling determines the proportion of pass and fail results. Follow 4.2 |General requirements for sampling, below. The sampling results shall satisfy at minimum the 90/10 rule, i.e. the endpoints of the 90% confidence interval lie within +/- 10% of the estimated proportion in relative units. For example, the interval around a proportion of 85% tests passed, would have to lie between 76.5% and 93.5%. A minimum sample size of 30 must be selected.
Monitoring frequency:	Annual sampling, and the first round of testing shall be conducted at least after six months from the start date. Project developers may choose to undertake testing more

	frequently.
QA/QC procedures:	1. Laboratories used for water quality testing must be approved by local health authorities and/or have quality accreditation; and 2. The laboratory used must demonstrate that it has an adequate quality management plan in place which addresses both quality assurance and quality control test procedures. 3. Field testing kits also are eligible, e.g. based on Colony Forming Unit method or Most Probable Number method. To use the field testing kits the project shall meet the following requirements: a. Testing kits must be approved by national agency or meet standards set by relevant international organisation e.g. US-EPA, and b. Testing kits shall be tested for its accuracy and robustness prior to application for project level monitoring, whereby local or accredited laboratory shall conduct water quality tests using testing kits and a relevant ISO standard or an equivalent standard, in parallel with field testing kits.
Any comment:	**Applies in all cases** If the proportion of samples not meeting Safe Drinking Water Quality Standards exceeds a threshold, no emission reductions can be claimed for the corresponding monitoring period. Thresholds: - Project or VPA year 1: 20% - Project or VPA year 2: 15% - Project or VPA year 3 or above: 10% When the crediting period is renewed, the year number count continues, i.e. the second crediting period would encompass year 6, year 7, year 8, etc. Additionally, when the threshold is exceeded, the project shall provide an explanation for why this occurred and provide a remediation plan.

Parameter ID	**SDWS 19**
Data/Parameter:	*SDG claims*
Data unit:	-
Description:	A project applying this methodology may make SDG claims by including monitoring parameter(s) to demonstrate and confirm the project's contributions to SDGs. The project developer shall transparently include information in project documents (PDD & Monitoring reports) on following two aspects to make claims on SDG 6.1.1 contributions. i. Level of Service in the baseline/project scenario: The

	drinking water service levels classified in three categories: limited, basic or safely managed services. Households using improved drinking water sources which are located on premises, with water available when needed, and free from contamination*, are classified as having safely managed services. Households not meeting all of these criteria but using an improved source with water collection times of no more than 30 minutes per round trip are classified as having basic services, and those using improved sources with water collection times exceeding 30 minutes are classified as limited services. ii. Project contributions: The project developer shall select water service aspects i.e., Accessibility, Availability and Quality & identify the monitoring indicator(s) to monitor the project contributions. The project may use relevant monitoring indicators and information available in this methodology, for example SDWS 18 for Water Quality. The project may have contributions to one or all three aspects. The project developer shall only make claims on aspects that project is contributing to.
Source of data:	To be specified by the project developer
Monitoring frequency:	Annual
QA/QC procedures:	To be specified by the project developer
Any comment:	Optional

Parameter ID	**SDWS 20**
Data/Parameter:	Water hygiene education campaigns
Data unit:	NA
Description:	Hygiene campaigns carried out among project safe water end-users.

The following guidelines apply for conducting these campaigns[19]

- Hygiene refers to access to sanitation amenities, equipment and infrastructure, as well as to the behaviour in respect to regular and correct use of such amenities. It also refers to behaviour that prevents infections from water-related diseases.
- The project developer shall report the activities conducted each year in a detailed "Report of annual hygiene campaigns results" and summarize the results in the project monitoring reports.
- Any major changes in the health status of the water users as a result of contaminated water (e.g. an outbreak of water related disease) must be reported and, if relevant, a strategy put in place to address it through the subsequent hygiene campaign.
- The detailed method used to assess hygienic handling of clean water must be provided with the PDD and verified by the VVB.
- The details of the method should be adjusted to suit the circumstances of each project and also to suit learning year on year.

The impacts of the hygiene campaign shall be assessed using the WHO/UNICEF Joint Monitoring Programme Core questions for drinking water and hygiene to determine the fraction of the households and institutions where Safe water and Hygiene practices are found to fulfill "safely managed" or "basic" requirements.

In-person or telephone or by messaging (e.g. text, app) based survey shall be conduct covering all the JMP core questions for

[19] Guidance on hygiene technologies, training, and surveys appropriate for rural communities and institutions in low-income areas can be found in many publications. Some examples are:

- "Safe Water Storage", Centres for Disease Control and Prevention, 2012
- "Water, Sanitation, and Hygiene Improvement, Training Package for the Prevention of Diarrheal Disease, Guide for Training Outreach Workers" USAID Hygiene Improvement Project, 2009
- "A manual on hygiene promotion", Water, Environment and Sanitation Technical Guidelines Series No. 6, United Nations Children's Fund (UNICEF). The London School of Hygiene and Tropical Medicine (LSHTM), 1999
- "Water, sanitation and hygiene standards for schools in low-cost settings", edited by John Adams, Jamie Bartram, Yves Chartier, Jackie Sims, World Health Organization, 2009

	drinking water and core questions for hygiene. For sampling requirements, follow section 4.2 |General requirements for sampling, below. The JMP core questions for households, schools and health care facilities are available at https://washdata.org/monitoring/methods/core-questions
Source of data:	Report of annual hygiene campaigns results
Monitoring frequency:	Annually
QA/QC procedures:	The fraction of the households where Safe water and Hygiene practices are found to fulfill "safely managed" or "basic" requirements is expected to increase over time as a result of the hygiene campaigns.
Any comment:	Applies to all project technology types.

b. Related to emission reductions

Parameter ID	**SDWS 21**
Data/Parameter:	$f_{NRB,f,y}$
Data unit:	percentage
Description:	Fractional non-renewability status of woody biomass fuel during year *y*, in case the baseline fuel is biomass or charcoal
Source of data:	Determined by: - CDM TOOL30[20], Calculation of the fraction of non-renewable biomass
Monitoring frequency:	One of three options, with the option defined and fixed at project design certification stage: - Determined ex-ante and fixed for a given crediting period (if it is fixed ex-ante, then include $f_{NRB,f,y}$ in the "data and parameters fixed ex ante" section of the PDD), or - Updated biennially - Updated at each monitoring and verification
QA/QC procedures:	Requirements of the CDM TOOL30

[20] Default values endorsed by designated national authorities and approved by the CDM can be applied, if default value is valid at the time of project submission for design review. http://cdm.unfccc.int/methodologies/standard_base/index.html,

Any comment:	-

Parameter ID	SDWS 22
Data/Parameter:	$X_{cleanboil,y}$
Data unit:	percentage
Description:	Proportion of project end-users that boil safe (treated, or from safe supply) water after installation of project technology in year *y*
Source of data:	Project survey This survey may be performed in person, by telephone, by messaging (e.g. text, app), appropriate to the context. For sampling, follow the section 4.2 |General requirements for sampling, below.
Monitoring frequency:	Annually
QA/QC procedures:	-
Any comment:	-

Parameter ID	SDWS 23
Data/Parameter:	$Q_{m,y}$
Data unit:	Liters/ year
Description:	Monitored quantity of safe water provided by the CWS/CWT project in year *y*
Source of data:	At the central location of the CWS or CWT: **Option 1:** Flow meter measures water volume directly **Option 2:** Operation sensor measures directly operation time or pump stroke count, and volume is calculated as capacity (defined in *Project technology description*) multiplied by operation time or pump strokes, depending on the sensor type. This may be measured on a sampling basis, in which case follow the section 4.2 |General requirements for sampling, below.
Monitoring frequency:	Continuously
QA/QC procedures:	Follow manufacturer, sector, national or international standards or guidelines for calibration and maintenance of the measurement device.
Any comment:	Applies to CWT and CWS projects

Parameter ID	SDWS 24
Data/Parameter:	QPW_p
Data unit:	Liters/person/day
Description:	Volume of drinking water per person per day for premises type *p*

Source of data:	**Option 1**: Apply the default value per person. In the case of institutions, such as schools, the value should reflect the expected drinking water use per person while on the premises of the institution, in line with the following defaults: - Full-day premises: 4 L/person/day - Boarding school: 4 L/person/day - Half-time premises: 3 L/person/day **Option 2:** Water Consumption Field Tests. - In all cases, the value is capped at 5.5 L/person/day The water consumption field test (WCFT) measures project-supplied clean water consumption volumes. The WCFT is conducted with end users representative of the project scenario target population and currently using the project technology. The WCFT must be designed to ensure that monitoring is representative of typical technology use practices and that: - it is transparent and can easily be replicated, - it is evidently conservative, - the sample is randomly selected so as to not introduce a material bias, and - the impact of daily and seasonal variations on the expected average water consumption is accounted for The WCFT must be conducted over 3 days, not including weekends, and averaged value (l/person/day) value should be determined after excluding outliers. It must be made explicit to the households/institutions that they must behave and consume water normally, reflecting typical daily water consumption pattern. Any sampling methods can be used, provided that the sample is selected randomly. Minimum sample size for HWT is 30. In case of IWT, the minimum sample size shall be determined considering the project technology type and in line with the sampling approach applied. For minimum sample size requirements for different sampling approach Guidelines for sampling and surveys for CDM project activities and programmes of activities
Monitoring frequency:	Every two years
QA/QC procedures:	-
Any comment:	Applies in all cases Cap is determined based on WHO recommendations (Domestic Water Quantity, Service Level and Health, Table 2: Volumes of water required for hydration, WHO 2003). https://www.who.int/water_sanitation_health/diseases/WSH03.02.pdf

Parameter ID	SDWS 25
Data/Parameter:	$HN_{p,y}$
Data unit:	Number
Description:	Number of individuals per premises type *p* in the project boundary in year *y*
Source of data:	Any of the following sources shall be used: - Project survey - Official government publications or statistics - Credible published literature for project region, or - Studies by academia, NGOs or multilateral institutions Source applied must not be more than 3 years old. When a project survey is used, follow the section 4.2 |General requirements for sampling, below.
Monitoring frequency:	Annual
QA/QC procedures:	The value applied shall be cross-checked against at least one other source on the list. For cross-check purposes, sources applied may be up to 5 years old. Further, cross-check with older sources may be used provided they provide conservative results.
Any comment:	

Parameter ID	SDWS 26
Data/Parameter:	$HH_{p,y}$
Data unit:	Number
Description:	Number of premises type *p* served by the project in year *y*
Source of data:	Survey of the premises (e.g. households, schools) within 1 km distance of project water source to check how often the premises used the project water source during the year. This survey may be part of the project survey and may be performed in person, by telephone, by messaging (e.g. text, app), appropriate to the context. Premises that report at least every-two-days use may be counted. For sampling, follow the section 4.2 |General requirements for sampling, below.
Monitoring frequency:	Annually
QA/QC procedures:	NA
Any comment:	Applies to CWS and CWT projects

Parameter ID	SDWS 27

Data/Parameter:	$DO_{p,y}$
Data unit:	Days
Description:	Days the project technology is operational for end-users in premises p in year *y*
Source of data:	In order of preference: 1. Measure directly using operation sensor, or 2. Demonstrate from log of operation and maintenance system.
Monitoring frequency:	Annually
QA/QC procedures:	Values higher than 347 days may only be applied when option 1 is used. 347 days is 95% of days, in line with pump-maintenance in the literature. For schools and other institutions, as applicable, the days must also be limited by the number of school days in the period, taking into account weekends and holidays.
Any comment:	Applies to CWT, CWS projects and IWT (schools)

Parameter ID	**SDWS 28**
Data/Parameter:	$N_{p,y}$
Data unit:	Number
Description:	Accumulated number of premises type *p* with at least one individual project technology in year *y*
Source of data:	Sales or distribution records
Monitoring frequency:	Annually
QA/QC procedures:	Sales or distribution records to include: i. Date of sale/distribution ii. Geographic area of sale iii. Model/type of project technology sold iv. Quantity of project technologies sold Name and telephone number, and address (if available) or other traceable indicator of premises identity and location for all end users.
Any comment:	Applies to HWT and IWT projects. Units shall not be counted in $N_{p,y}$ after the end of their technical life, unless this is addressed by the measures to manage the cases where the expected technical life of the project technology is shorter than the crediting period, namely replacement or retrofit as described in the parameter SDWS 7.

Parameter ID	**SDWS 29**
Data/Parameter:	$U_{p,y}$

Data unit:	percentage
Description:	Usage rate of the project technology by premises type *p* during year *y*
Source of data:	Survey the premises with a project technology to determine the usage rate of the project technology during the year. The usage survey guidelines are provided in Annex -1. - **Option 1:** In-person survey of project premises (e.g. households, schools) covering all topics outlined in Annex -1. Households that show at least once-in-two-days use may be counted as users. The resulting fraction is multiplied by 100% to get $U_{p,y}$. - **Option 2:** Survey performed by telephone or messaging (e.g. text, app), covering topics 1, 2 and 3 of Annex -1. Households that report at least once-in-two-days use may be counted as users. The resulting fraction is multiplied by 75% to get $U_{p,y}$ Where project technologies of different ages are being credited, the sample shall be representative of the distribution of project technology ages. The minimum sample size for HWT - for individual technology age-group shall be minimum 30 household. The minimum sample size for IWT – for individual technology age group shall be determined considering the project technology type and in line with the sampling approach applied. For minimum sample size requirements for different sampling approach Guidelines for sampling and surveys for CDM project activities and programmes of activities
Monitoring frequency:	Annually
QA/QC procedures:	Where a WCFT is undertaken to determine QPW_p, this may be used to cross check the usage percentage.
Any comment:	The usage survey provides a single usage parameter that is representative for project technologies in the total sales record. Applies to all HWT and IWT technologies and projects

Parameter ID	**SDWS 30**
Data/Parameter:	$t_{p,y}$
Data unit:	Hours per day
Description:	Usage time of the project technology by premises type *p* in year *y*
Source of data:	Determined via Project survey **Option 1.** Observational sample-based survey of project household practices.

	Option 2. Interview survey performed by telephone or messaging (e.g. text, app). **Option 3.** Default of 5 hours. For sampling, follow the section 4.2 |General requirements for sampling, below.
Monitoring frequency:	Annual
QA/QC procedures:	
Any comment:	Applies to HWT and IWT

Parameter ID	**SDWS 31**
Data/Parameter:	$DP_{p,y}$
Data unit:	Days
Description:	Average days the project technology is present for end-users in the premises *p* in year *y*
Source of data:	Sales or distribution records. Based on the sales or distribution records of "Date of sale/distribution" and ex-ante parameter "Expected technical life of project technology," determine for each project device how many days of the 365 days of the year it was in the premises and within its technical life. Calculate the average for all the project technology by premises type *p* to obtain this parameter.
Monitoring frequency:	Annually
QA/QC procedures:	For schools and other institutions, as applicable, the days must also be limited by the number of school days in the period, taking into account weekends and holidays.
Any comment:	Applies to HWT and IWT projects

Parameter ID	**SDWS 32**
Data/Parameter:	$DN_{p,y}$
Data unit:	Number
Description:	Average number of individual project technologies in each project premises type *p* in year *y*
Source of data:	Sales or distribution records. Based on the sales or distribution records of "Quantity of project technologies sold" and identifying information of buyer/recipient, calculate the average number of project devices per premises. If the project covers different types of end-users (e.g. households, institutions), the average number must be determined per premises type *p*.
Monitoring frequency:	Annually

QA/QC procedures:	NA
Any comment:	Applies to HWT and IWT projects

Parameter ID	**SDWS 33**
Data/Parameter:	$P_{p,f,y}$
Data unit:	mass or volume units (e.g. kg, Litres, standard m^3)
Description:	Quantity of fossil fuel *f* that is consumed in the project during year *y*
Source of data:	Any of the following methods shall be used: - Direct measurement with meter, scales - Estimation with e.g. tank capacity table - Taken from fuel invoice or purchase receipt, or - In the case of direct fuel use by water treatment systems, may be estimated from the manufacturer's specification of the equipment and operating hours or volumes (e.g. fuel consumption per hour times utilization hours or fuel consumption per litre times the litres of water treated).
Monitoring frequency:	Continually
QA/QC procedures:	Follow manufacturer, sector, national or international standards or guidelines for calibration and maintenance of the measurement device.
Any comment:	Where back-up fossil-fuel engine(s) are used, use the monitored fuel amount to estimate the number of operating hours during the monitoring period, and compare this to the total number of operating hours of the project pump for the same period. If the use of the engine surpasses 10% of pump operating hours, then determine the number of days in which the backup technology was used to operate the pump for more than 10% of total operating hours during the day. The project is ineligible for crediting on the days when the use of back-up technology was more than the 10% threshold, and the number of ineligible days shall be subtracted from $DO_{p,y}$.

Parameter ID	**SDWS 34**
Data/Parameter:	$EC_{p,y}$
Data unit:	kWh
Description:	Quantity of electricity that is used by the project during year *y*
Source of data:	Any of the following methods shall be used:

	- Direct measurement with electric meter - Sample based using electricity loggers, or - In the case of direct electricity use by water treatment systems, may be estimated from the manufacturer's specification of the equipment and operating hours or volumes (e.g. electricity consumption per hour times utilization hours or electricity consumption per litre times the litres of water treated). For sampling, follow the section 4.2 |General requirements for sampling, below.
Monitoring frequency:	Continually
QA/QC procedures:	Follow manufacturer, sector, national or international standards or guidelines for calibration and maintenance of the measurement device.
Any comment:	NA

Parameter ID	**SDWS 35**
Data/Parameter:	LE_y
Data unit:	tCO_2e per year
Description:	Leakage emissions during year y
Source of data:	Sources established by following Leakage emissions section
Monitoring frequency:	Every two years
QA/QC procedures:	Compliance with the general requirements for sampling and general requirements for data and information sources
Any comment:	Monitoring parameters required for calculating leakage emissions shall be included in the monitoring plan in the PDD as required to monitor and quantify the sources of leakage determined by following the Leakage emissions section.

4.2 | General requirements for sampling

4.2.1 | When sampling is applied to determine mean (average) parameter values or proportion (e.g. yes/no) parameter values for both ex-ante and monitored data and parameters, the guidelines provided in this section shall always be applied. Additionally, for the sampling related to some parameters, specific requirements apply, and these are described in the parameter tables.

4.2.2 | A statistically valid sample can be used to determine parameter values, as per the relevant requirements for sampling in the "Methodology for Sampling and surveys for CDM project activities and programme of activities." Minimum 90% confidence interval and a 10% margin of error requirement shall be achieved for the sampled parameters. In any case, for proportion parameter values, a

minimum sample size of 30, or the whole group size if this is lower than 30, must always be applied. Further, cross-VPA sampling is not accepted across groups larger than 10 VPAs.

4.2.3 | When a baseline and project survey is used the following sample size guidelines should be applied, unless otherwise stated for specific parameters:

Group size	Minimum sample size
<300	30 or population size, whichever is smaller
300 to 1000	10% of group size
> 1000	100

4.2.4 | All end-users included in surveys or sampling related to baseline determination or operation of the project shall be located within the 1 km radius of the CWT or CWS location.

4.2.5 | For guidance, project developers may refer to the valid version of the "Guidelines for sampling and surveys for CDM project activities and programmes of activities" for the type of sampling approach (simple random, cluster, stratified etc.) applicable to their project context.

ANNEX 1: Usage Surveys Guidelines – HWT Technologies

This annex provides guidelines to design and conduct usage surveys for point of use water filtration technologies i.e., Household Water Treatment (HWT). In case of IWT, the guidelines can be used to design project, technology context, end user specific usage surveys for outlined topics below.

The usage surveys to cover each of the six topics (option 1) or topic 1,2,3 (option 2) outlined in the table below to identify the project technology users ((parameter SWDS 29, $U_{p,y}$). Additionally, other topics relevant to specific technology types and project conditions are required to provide accurate estimates of the usage of the units.

The project developer needs to clearly define what is deemed a success or a failure for each topic area as part of its usage survey design submitted as part of PDD. Non-applicability of any of the below mentioned topics in the context of a project activity needs to be justified by the PD and validated by the VVB.

These guidelines should be used in the survey to determine usage rates and the survey template needs to be provided as part of project documentation in time for validation by the VVB.

Sufficient precautions should be taken by enumerators to ensure that there is no bias while conducting the usage surveys. For example:

i. The survey should not be conducted immediately after capacity building/awareness programs in the target households
ii. Surveyors should not wear clothes with logos of their employers, etc.

Topic - 1	**Introductory question and water treatment**	
Action	Rational / Reason	Examples survey questions *Project developer should define appropriate questions according to project technology.*
1. Ask if the respondent does anything to their water to make it safe (without reading out options)	This is to clarify if the respondent purifies water and does not consume raw/untreated water in the project scenario.	Q. Did you do anything to make your water safer to drink?
2. Ask what the respondent uses to make water safe? (without reading out options)	This question will address if the project specific HWT technology is used.	Q. How did you make this water safer to drink?
3. Ask if the person being interviewed is the primary user of HWT unit in the household	This ensures that usage related questions are directed to the person who is aware of how to use the filter.	Q. Are you the main user / operator of the filter in the household?
Expected outcome	It should be first established if the household purifies water. And if it does, does it do so using the HWT technology. Once this is established it should be ensured that the primary user / operator of the filter is present and	

questions are directed towards that person. If the primary user is not present, the survey should be stopped, to ensure that subsequent questions are answered most accurately.

Type of answers (reporting/ observation)	Reporting
Example reference for further information	WHO 2012 - A toolkit for monitoring and evaluating household water treatment and safe storage programmes. (Table 1, p 19, Indicator 1.).

Indicator	Question/Request	Answer/observation
Self-report treating drinking-water	What do you usually do to the water to make it safer to drink? (more than one answer may be possible)	- Nothing - Water is already safe - Boil Bleach/chlorine - Strain through cloth - Filter - Solar disinfection Stand and settle - Other (specify) - Do not know

Topic - 2	**Rate of usage**	
Action	Rational / Reason	Examples survey questions *Project developer should define appropriate questions according to project technology.*
4. Ask how often the respondent uses the water treatment technology?	This question checks the previous questions by quantifying it and obtains additional information on the frequency of use	Q. How often do you filter water? Q. When was the last time you filtered water using the HWT device? Q. Have you used the HWT device in the last two days? *(The project developer should decide appropriate frequency of water treatment to be considered as usage, based on local practices and circumstances)*

Expected outcome	This will rule out users who report low frequency usage of the project HWT unit.
Type of answers (reporting/ observation)	Reporting
Example reference for further information	WHO 2012 - A toolkit for monitoring and evaluating household water treatment and safe storage programmes. (Table 2, p 20, Indicator 9.).

Indicator	Question/Request	Answer/observation
Consistently treating drinking-	Have you ever used the HWTS method? In last month? In last week? Always?	Yes No

	water with HWTS	When do you not use?	- When there is no money, - When there is no time, - During the rainy season, - During the dry season, - Never not use, - other

Topic - 3	**Water storage**	
Action	Rational / Reason	Examples survey questions *Project developer should define appropriate questions according to project technology.*
5. Ask and observe whether and how the respondent stores the filtered water	This question will inform whether filtered water can be or is being stored.	Q. Is there a safe storage container[21] that contains filtered water in it? Q. If 'no', when was the last time there was filtered water in it?
Expected outcome	This will rule out users of the project HWT unit that do not store filtered water.	
Type of answers (reporting/ observation)	Reporting and observation	
Example reference for further information	WHO 2012 - A toolkit for monitoring and evaluating household water treatment and safe storage programmes. (Table 1, p 19, Indicator 3 & 4.).	

Indicator	Question/Request	Answer/observation
Self-report safely storing water	How do you store your drinking water? (more than one answer may be possible)	- Do not store water - In container with no lid or cover - In container with lid but no spigot/tap - In container with lid and spigot - In narrow-mouthed container

[21] A safe storage container is one that meets the following criteria –

- Has a small opening with a lid or cover that prevents insertion of potentially contaminated hands or objects
- A size appropriate for household water treatment method with permanently attached instructions for using treatment method and cleaning the container
- (Reference: http://www.cdc.gov/safewater/storage.html)
- Never used to collect water from the source
- Cleaned once per week with safe water

			- Other (specify) - Do not know
	Observation of safely stored drinking-water	Ask to see stored drinking-water. (more than one answer may be possible)	- Completely covered with lid - Open, uncovered - Narrow opening - Spigot - Beyond reach of animals - Clean (free of dirt, debris, garbage, faecal matter, etc.) - Dirty - Other (specify)

Topic - 4	**Physical signs of usage**	
Action	Rational / Reason	Examples survey questions *Project developer should define appropriate questions according to project technology.*
6. Observe to see if the HWT unit shows signs of usage, e.g. wet filter, water in storage receptacle, dust on filter, hanging properly, etc. *Questions shall be specific to the HWT technology design. For example,* - *the wetness of the unit may not be relevant for all HWT technology types.* - *Presence of dust on the filter could be an indication of non- -usage of the HWT unit*	This may give an indication of whether the unit has been in use recently	NA NA
Expected outcome	The will rule out the respondent with HWT unit but not in use as a Non-user.	
Type of answers (reporting/ observation)	Observation	
Example reference for further information	WHO 2012 - A toolkit for monitoring and evaluating household water treatment and safe storage programmes. (Table 1, p 19, Indicator 2.).	

Indicator	Question/Request	Answer/observation

	Observation of drinking-water treatment method	Ask to see drinking-water treatment method.	- Observe boiled water, fuel source - Observe chlorine bottle/ tablets, test - FCR - Observe cloth, and if it appears intact - Observe filter, and if it appears intact (i.e. not broken) - Observe if bottles are in house/on roof - Observe settling containers or sediment - Other (if other option listed) - None

Topic - 5	**Demonstration & knowledge**	
Action	Rational / Reason	Examples survey questions *Project developer should define appropriate questions according to project technology.*
7. Ask the individual responsible for filtering to demonstrate use either directly or by asking for water.	A user shall be capable of using the HWT unit.	Q. Can you please show us how you filter water? Q. Can you please give us a cup of drinking water?
Expected outcome	Inability to use the project HWT unit would rule the respondent as a Non-user.	
Type of answers (reporting/ observation)	Observation	

Example reference for further information

WHO 2012 - A toolkit for monitoring and evaluating household water treatment and safe storage programmes. (Table 1, p 19, Indicator 2 (as for topic 4) & Table 2, p 20, Indicator 5 & 6 (below)).

Indicator	Question/Request	Answer/observation
Knowledge of correct use	Please describe how to use this method.	- Dependent on method. For examples of correct use questions for filter Can you describe how you use the filter? - Add water to filter - Store safely - Clean filter when dirty? Followed by How many times per month do you clean filter?
Demonstration of correct use	Please show me how you use this method.	

Topic - 6	**Functionality**

Action	Rational / Reason	Examples survey questions *Project developer should define appropriate questions according to project technology.*
8. Observe whether the HWT unit is currently functional, e.g. tap and filter element are functional	This is to ensure that the unit is functional	Refer to topic 2 questions
Expected outcome	This would rule out users with a non -functional unit	
Type of answers (reporting/ observation)	Observation	
Example reference for further information	WHO 2012 - A toolkit for monitoring and evaluating household water treatment and safe storage programmes. (Table 1, p 19, Indicator 2 (as for topic 4)	

ANNEX 2: Definition of Water Sources

Reference: JMP 2018 core questions for household surveys

Definitions of improved sources of drinking water	Notes on classification
• **Piped into dwelling:** also called a 'household connection', is a piped water supply connected with in-house plumbing to one or more taps (for example in the kitchen or bathroom). • **Piped into compound, yard or plot:** also called a 'yard tap', is a piped water supply connected to a tap in the compound, yard or plot outside the house. • **Piped to neighbour:** refers to a household obtaining drinking water from a neighbour's piped water supply (household connection or yard tap). • **Public tap or standpipe:** also known as a public fountain, is a public water point from which people can collect water. • **Borehole or tubewell:** is a deep hole that has been driven, bored or drilled, in order to reach groundwater. Boreholes/tubewells are constructed with casing, or pipes, which prevent the small diameter hole from caving in and protect the water source from infiltration by run-off water. Water is delivered through a pump which may be powered by human, animal, wind, electric, diesel or solar means. • **Protected well:** is a dug well that is protected from runoff water by a well lining or casing that is raised above ground level to form a headwall and an apron that diverts spilled water away from the well. A protected well is also covered so that contaminated materials (including bird droppings and small animals) cannot enter the well. Water is delivered through a pump or manual lifting device. • **Protected spring:** is a natural spring protected by a "spring box", made of brick, masonry, or concrete, that is built around the spring so that water flows directly out of the box into a pipe or cistern, without being exposed to runoff or other sources of contamination. • **Rainwater collection:** refers to a system whereby rain is collected or harvested from large surfaces (by roof or ground catchment) and stored in a container, tank or cistern until used. • **Tanker-truck:** refers to water sold or distributed by a provider who transports large quantities of water into a community using a motorized truck with a tank. • **Cart with small tank/drum:** refers to water sold or distributed by a provider who transports a tank or drum with small quantities of water into a community using donkey carts, small motorized vehicles and other means. • **Water kiosk:** refers to a water point from which water is sold in small quantities. Households typically bring their own containers to be filled. • **Bottled water:** is sold by commercial providers in small or large bottles or refillable containers. This does not include water from other sources stored in plastic bottles. • **Sachet water:** is similar to bottled water but is packaged in a plastic bag rather than a bottle.	1. The term **drinking water source** refers to the point from which water is collected (for example the tap or borehole/well/spring) and not the origin of the water supplied (for example surface water or groundwater). 2. **Improved drinking water sources** are those which by nature of their design and construction have the potential to deliver safe water. Improved sources include: piped water, boreholes or tubewells, protected dug wells, protected springs, rainwater and packaged or delivered water. 3. **Packaged and delivered water** can potentially deliver safe water but were previously treated as unimproved due to lack of data on accessibility, availability and quality. For SDG monitoring the JMP will treat them as '**improved**' and classify them as limited, basic or safely managed based on the new SDG criteria. 4. **Public taps or standpipes** can have one or more taps. They are typically made of brickwork, masonry or concrete and located in public spaces. Households using privately owned taps in a neighbour's yard should be classified as '**piped to neighbour**'. 5. **Boreholes** from which water is pumped into an overhead tank which supplies households in the same compound, should be classified as '**borehole or tubewell**'. However boreholes delivering water to an overhead tank which supplies multiple compounds through a reticulated piped system should be classified as one of the types of '**piped water**', depending on where the household collects the water. 6. **Protected wells** may be fitted with a range of lifting devices (for example motorized pumps, hand pumps, ropes and windlasses with buckets) but if the well lacks a cover then it should be classified as '**unprotected well**'. 7. **Rainwater collection** comprises a range of different technologies designed to capture and store rainwater for drinking. Groundwater catchments require filtration and unfiltered surface water should be classified as '**surface water**'. 8. **Water kiosks** are similar to public standpipes, but with a more commercial approach to collecting fees. **Water refill stations** are similar to water kiosks, but operators typically provide households with dedicated containers that are then sanitized before being refilled. These should be classified as '**bottled water**'.
Definitions of unimproved sources of drinking water	**Notes on classification**
• **Unprotected well:** is a dug well that lacks any of the following: a lining or casing that is raised above ground level to form a headwall; an apron that diverts spilled water away from the well; a cover which prevents contaminated materials (including bird droppings and small animals) from entering the well; or a pump or manual lifting device. • **Unprotected spring:** is a natural spring that lacks a "spring box" to protect against run off and other sources of contamination (including bird droppings and animals). • **Surface water:** refers to open water sources located above ground including rivers, reservoirs, lakes, ponds, streams, canals, and irrigation channels.	9. **Unimproved drinking water sources** are those which by nature of their design and construction are unlikely to deliver safe water. Unimproved sources include: unprotected dug wells, unprotected springs, and surface water. 10. The term **drinking water source** refers to the point from which water is collected and not the origin of the water supplied. For example, piped water originating from a surface water reservoir would be classified as piped water, while water collected directly from a lake or river would be classified as surface water.

METHODOLOGY

ANNEX 3: Monitoring schedule

A summary of the information requirements and monitoring parameters is presented in the table below.

Stage	General details	Relevant parameter ID	HWT/ IWT	CWT/ CWS	Update/monitoring frequency	Source/remarks
At registration (for some parameters information can be provided before 1st verification)	Regulatory framework regarding safe water supply in host country	SWDS 4	Yes	Yes	Ex-ante & update at CP renewal	Local, subnational or national regulatory documents
	Water sources in the project boundary	SWDS 5	Yes	Yes	Ex-ante & update at CP renewal	Baseline study, published literature, government publication or third party studies
	Number of households within 1Km/30 min distance	SWDS 1	NO	Yes	Ex-ante & update at CP renewal	GPS coordinates of the technology and households in 1 Km radius or within 30 mins travel distance
	Project end-users who in the baseline were already using safe water	SWDS 12	Yes	Yes	Ex-ante & update at CP renewal	Baseline study, published literature, government publication or third party studies
	Baseline cooking technology & fuel types in use in project boundary	SWDS 6 SWDS 8	Yes	Yes	Ex-ante & update at CP renewal	Baseline study, published literature, government publication or third party studies
	Baseline technology efficiency	SWDS 11	Yes	Yes	Ex-ante & update at CP renewal	Default, or technology specific test following WBT protocol

	Project technology details / rehabilitated technology – CWT/CWS & expected technical life of the project technology	SWDS 2 SWDS 7	Yes	Yes	Ex-ante	Manufacturer specifications, third-party certification by a qualified entity, for example recognised certification agency by National/ International Standard body, Commercial guarantee Refer to the parameter details.
	Treatment capacity of the project technology	SWDS 13	Yes	No	Ex-ante	Manufacturer specifications, third-party certification by a qualified entity, for example recognised certification agency by National/ International Standard body, Commercial guarantee by seller
	Project technology performance level – microbial quality & priority chemical content (Arsenic & fluoride)	SWDS 3	No	Yes	Ex-ante & update at CP renewal or in case of incidents such as flooding	Accredited laboratory
At verification	Water quality test	SWDS 18	Yes	Yes	Annual	Sample based testing, minimum sample size 30, third party laboratory or field testing kits
	Water hygiene education campaigns	SWDS 20	Yes	Yes	Annual	Sample survey, In-person or telephone or by messaging (e.g. text, app) based survey
	Proportion of project end-users that boil safe (treated, or from safe supply) water after installation of project technology	SWDS 22	Yes	Yes	Annual	Sample survey, In-person or telephone or by messaging (e.g. text, app) based survey
	Quantity of safe water provided by the CWS/CWT	SWDS 23	No	Yes	Continuous, annual reporting	Volume or operational time or other parameter monitoring

Volume of drinking water per person per day	SWDS 24	Yes	Yes	Default or Once in two year if WCFT is conducted	Default 4L/person per day, 3L/person for half time premises, or sample based WCFT capped at 5.5 L/person per day, minimum sample size 30
Number of individuals per households/ premises	SWDS 25	Yes	Yes	Annual	Project surveys, Official government publications or statistic, Credible published literature for project region, or, Studies by academia, NGOs or multilateral institutions, source must be 3 year old.
Number of households/premises	SWDS 26	No	Yes	Annual	Project surveys, in person, by telephone, by messaging (e.g. text, app), appropriate to the context
Days the project technology is operational for end-users in premises	SWDS 27	No	Yes	Annual	Direct measurement or estimation based on log of operation and maintenance
Number of households with at least one HWT units	SWDS 28	Yes	No	Annual update	Sales or distribution records
Average number of individual project technologies in each project premises	SWDS 32	Yes	No	Annual	Sales or distribution records
Usage rate of the project technology by premises	SWDS 29	Yes	No	Annual	In person or by telephone or messaging (e.g. text, app) adjusted by 0.75, Minimum 30 per technology age group.
Usage time of the project technology by premises	SWDS 30	Yes	No	Annual	Project survey or Interview survey performed by telephone or messaging (e.g. text, app).
Average days the project technology is present for end-	SWDS 31	Yes	No	Annual	Estimated based on sales or distribution records

users in the premises					
Energy consumption for project technology operation	SWDS 34 SWDS 35	Yes	Yes	Annual	If applicable, direct measurements, estimation
Leakage	SWDS 35	Yes	Yes	Once in two year	_

Gold Standard for the Global Goals

METHODOLOGY

DOCUMENT HISTORY

Version	Date	Description
1.0	XX/04/2021	First version

Note that first version of this methodology (this document) replaces the "Annex 3 Application of the methodology to safe water supply project" of Gold Standard methodology "Technologies and Practices to Displace Decentralized Thermal Energy Consumption".

All projects and PoAs/VPAs that have applied Annex 3 for registration before the release of the first version of this methodology shall apply this methodology at the time of project, PoA/VPA renewal of crediting period or earlier, as applicable.