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TYPE III - OTHER PROJECT ACTIVITIES

Project participants shall apply the general guidelines to SSC CDM methodologies, information on additionality (attachment A to Appendix B) and general guidance on leakage in biomass project activities (attachment C to Appendix B) provided at <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html> *mutatis mutandis*.

III.AV. Low greenhouse gas emitting water purification systems

Technology/measure

1. This methodology comprises introduction of low greenhouse gas emitting water purification systems to achieve water quality defined in a relevant national standard or guideline for drinking water quality.[1]

2. Water purification technologies that involve point-of use (POU) or point-of-entry (POE)[2] treatment systems for residential or institutional applications such as systems installed at a school or a community centre are included. The examples include, but are not limited to water filters (e.g. membrane, activated carbon, ceramic filters), solar energy powered UV (ultraviolet) disinfection devices, photocatalytic disinfection equipment, pasteurization appliances, etc.

3. The methodology is applicable under the following conditions:

(a) Prior to the implementation of the project activity, a public distribution network of safe drinking water does not exist within the total project area and safe drinking water (SDW) if any is produced by the consumers by only using point-of-use or point of entry water purifiers. If during the crediting period SDW is made available in (parts of) a project area through a public distribution network, this methodology can not be applied anymore to this project area (or part of the project area) from that point in time and the emission reductions pertaining to this project area can not be claimed from that point onwards. This condition should be checked annually during the crediting period;

(b) It shall be demonstrated that the application of the project technology/equipment achieves compliance with "protective"[3] performance target as per "Evaluating household water treatment options: Health based targets and microbiological performance specifications" (WHO, 2011) or a comparable national standard or guideline;

[1] In case a national standard/guideline for drinking water quality is not available, the most recent standards/guidelines by the World Health Organization (WHO) or United States Environmental Protection Agency (US-EPA) may be applied.

[2] Point of Use (POU) devices treat only the water intended for direct consumption, typically at a single tap or limited number of taps, while Point of Entry (POE) treatment devices are typically installed to treat all water entering a single home, business, school, or facility (USEPA, 2006).

[3] Protective default performance target is defined by a 2 $\log_{10}$ reduction of bacteria, a 3 $\log_{10}$ reduction of viruses and a 2 $\log_{10}$ reduction of protozoa ("protective"). The reference pathogens shall be C. Jejuni, Cryptosporidium, and rotavirus.

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III.AV. Low greenhouse gas emitting water purification systems (cont)

(c) In cases where the life span of the water treatment technologies is shorter than the crediting period of the project activity, there must be documented measures in place to ensure that end users have access to replacement purification systems of comparable quality.

4. Applicability of this methodology is foreseen in the following types of situations that shall be reassessed at the beginning of each crediting period:

(a) Case 1: Project activities implemented in rural or urban areas[4] of countries with proportion of rural or urban population using an improved drinking-water source equal to or less than 60 % confirmed by one of the three options below:

(i) Proportion of populations using an improved drinking-water source for the most recent year for which data is available from WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation shall be used (<http://www.wssinfo.org/data-estimates/table/>) for this purpose. Definition of improved and unimproved drinking water source shall be as per the information provided by JMP;

(ii) Using official data such as publicly available statistical data from a government agency or an independently commissioned study by an international organization or an university;

(iii) Using survey methods (use 90/10 confidence/precision for sampling);

(b) Case 2: Project activities implemented in areas not included in Case 1.

Boundary

5. The project boundary includes the physical, geographical sites of the low greenhouse gas emitting technologies for water purification installed by the project activity.

Baseline emissions

6. For a simplified and standardized approach it is assumed that fossil fuel or non-renewable biomass (NRB) is used to boil water as means of water purification in the absence of the project activity. The emissions are calculated based on the energy demand for boiling water, and in case of displacement of NRB the baseline emissions are corrected for the fraction of the biomass that can demonstrated to be non renewable. For Case 1, it needs to be demonstrated that all of the purified water produced and monitored during the project period is consumed for drinking purposes only, e.g. establishing the population serviced by the project equipment using surveys or official statistics and based on an average volume of drinking water per person per day estimated using surveys or official data or peer reviewed literature or local expert opinion (a value of 5.5 litres per person per day[5] shall not be exceeded). For Case 2, additional requirements are specified for the quantification of emission reductions.

[4] As per the WHO/UNICEF Joint Monitoring Programme for water supply and sanitation.

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III.AV. Low greenhouse gas emitting water purification systems (cont)

7. The baseline emissions shall be calculated as follows:

$$BE_y = QPW_y * SEC * f_{NRB,y} * EF_{projected\_fossilfuel} * 10^{-9} \quad \textbf{(1)}$$

Where:

BE_y	Baseline emissions during the year *y* in (tCO_2e)
QPW_y	Quantity of purified water in year *y* (litres) For Case 1 the quantity of purified water is the total amount of water treated by the project activity as established per paragraph 6 in year *y*. For Case 2 the quantity of purified water is monitored, and the total amount is subject to a cap derived from the number of total project population for which it can be demonstrated through documentation that the common practice of water purification is or would have been water boiling multiplied by the maximum volume of drinking water per person per day, set at 5.5 litres[5] per person per day
SEC	Specific energy consumption required to boil one litre of water (kJ/L)
$f_{NRB,y}$	Fraction of woody biomass used in the absence of the project activity in year *y* that can be established as non renewable as per the relevant provisions of AMS-I.E "Switch from Non-Renewable Biomass for Thermal Applications by the User". If the displaced fuel is fossil fuel use a default value of 1.0
$EF_{projected\_fossilfuel}$	Emission factor as per AMS-I.E procedures when NRB is displaced or the emission factor of the fossil fuel substituted (tCO_2/TJ)

8. Specific energy consumption required to boil one litre of water is to be calculated as follows:

$$SEC = \left[WH * (T_f - T_i) + 0.01 * WHE \right] / n_{wb} \quad \textbf{(2)}$$

Where:

WH	Specific heat of water (kJ/L ^oC) Use a default value of 4.186 kJ/L ^0C
T_f	Final temperature (^oC) Use a default value of 100 °C[6]

[5] Based on WHO recommendations (Domestic Water Quantity, Service Level and Health, Table 2: Volumes of water required for hydration, WHO 2003).

[6] Boiling point of water at standard conditions.

T_i	Initial temperature of water (°C) Use annual Average ambient temperature;[7] or Use a default value of 20 °C
WHE	Latent heat of water evaporation (kJ/L) Use a default value of 2260 kJ/L The latent heat required to boil one litre of water for five minutes is assumed to be equivalent to latent heat for the evaporation of 1% of the water volume (WHO recommends a minimum duration of five minutes of water boiling)[8]
η_{wb}	Efficiency of the water boiling systems being replaced Use one of the options below: (1) The efficiency of the water boiling system shall be established using representative sampling methods or based on referenced literature values (fraction), use weighted average values if more than one type of systems are encountered; (2) 0.10 default value may be optionally used if the replaced system or the system that would have been used is a three stone fire or a conventional system for woody biomass lacking improved combustion air supply mechanism and flue gas ventilation system i.e. without a grate as well as a chimney; for the rest of the systems using woody biomass 0.2 default value may be optionally used; (3) 0.5 default value may be used if the replaced system or the system that would have been used is a fossil fuel combusting system

Project emissions

9. If the operation of the project water purification system involves consumption of fossil fuels and/or electricity, project emissions[9] include:

[7] Ambient temperature data must be from globally accepted data sources, e.g. data published by the National Aeronautics and Space Administration (NASA) or the National Renewable Energy Laboratory (NREL). Data can be used only if they are for a location that can be demonstrated to be representative of the project location.

[8] WHO guidelines for Emergency Treatment of drinking water at point of the use <http://www.searo.who.int/LinkFiles/List_of_Guidelines_for_Health_Emergency_Emergency_treatment_of_drinking_water.pdf>.

[9] Calculations of the project emissions may also be limited to the quantity of purified water used for the baseline calculations as per paragraph 6.

- CO_2 emissions from on-site consumption of fossil fuels due to the project activity shall be calculated using the latest version of the tool "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion";
- CO_2 emissions from electricity consumption by the project activity using the latest version of the tool "Tool to calculate baseline, project and/or leakage emissions from electricity consumption".

Leakage emissions

10. Where relevant leakage relating to the non-renewable woody biomass shall be assessed as per the relevant procedures of AMS-I.E.

Monitoring

11. Monitoring shall consist of checking of all appliances or a representative sample thereof, at least once every two years (biennial) to ensure that they are still operating or are replaced by an equivalent in service appliance as per the relevant sampling requirements of AMS-I.E.

12. The quantity of purified water in year *y* shall be monitored as per the following options:

(a) On continuous basis or a representative sample thereof;

(b) Derived from the capacity of the equipment established by manufacturers' specifications and the number of functional project appliances as per paragraph 11.

13. Monitoring shall include annual check if a public distribution network is installed.

14. For Case 2 in paragraph 4 (b), as indicated in equation (1), an *ex ante* survey is required to establish:

(a) The proportion of total population for which the common practice of water boiling is or would have been water boiling;

(b) Average volume of drinking water per person per day based on baseline campaign (survey with 90/10 confidence/precision level) subject to a cap of 5.5 litres per person per day.

15. Further for Case 2 in paragraph 4 (b), survey is done at least once every two years (biennial) to check the number of persons supplied with purified water from each of the functional project appliances.

16. The water quality monitoring on sample basis as per paragraph 3 (b).

17. The total fuel and electricity consumption in year *y* shall be monitored as per the relevant provisions of the tool "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" and the tool "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" respectively.

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Project activity under a Programme of Activities

18. The use of this methodology in a project of activity under a programme of activities is legitimate if the leakage is estimated and accounted for as per the relevant provisions of AMS-I.E under the section for Programme of Activities.

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History of the document

Version	Date	Nature of revision
02	EB 62, Annex 11 15 July 2011	The revision: • Includes guidance on the procedures for project equipment testing and monitoring provisions; • Increases the threshold of rural or urban population with access to improved drinking source to 60%; and • Applies a cap of 5.5 litres per person per day to all project activities.
01	EB 60, Annex 19 15 April 2011	Initial adoption.
Decision Class: Regulatory **Document Type**: Standard **Business Function**: Methodology		