CLEAN DEVELOPMENT MECHANISM

CDM-SSCWG40-A04

Draft Small-scale Methodology

AMS-III.AV: Low greenhouse gas emitting safe drinking water production systems

Version 04.0

Sectoral scope(s): 03

United Nations
Framework Convention on
Climate Change

COVER NOTE

1. Procedural background

1. According to the procedures "Development, revision and clarification of baseline and monitoring methodologies and methodological tools" the Small-Scale Working Group (SSC WG) may propose that the Executive Board of the clean development mechanism (CDM) (hereinafter referred to as the Board) revise an approved methodology.

2. At its 40th meeting the SSC WG recommended that the Board consider the proposal to revise the approved methodology AMS-III.AV "Low greenhouse gas emitting safe drinking water production systems". This proposal has been triggered by the request for clarification: "CLA_SSC_673: Clarification on the definition of point-of-entry treatment systems and their eligibility under AMS-III.AV version 3".

2. Purpose

3. The purpose of this revision is to broaden the applicability of the methodology to water kiosks that treat water using one or more of the following technologies: chlorination, combined flocculant/disinfection powders and solar disinfection.

3. Key issues and proposed solutions

4. The key issue in this proposed revision is the likelihood of recontamination of water after it is delivered in the water kiosks. The proposed solution has been the use of technologies in which the likelihood of recontamination does not exist or is minimal and the implementation of preventive measures for recontamination.

4. Impacts

5. As water kiosks are a compelling business model, project proponents will be benefitted by this revision as this type of projects will be able to use the methodology.

5. Proposed work and timelines

6. The proposed draft revision of the methodology is recommended by the SSC WG to be considered by the Board at its seventy-third meeting.

6. Recommendations to the Board

7. The secretariat recommends that the Board consider the proposal.

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1. Introduction

Table 1. Methodology key elements

Typical project(s)	Project activities that introduce low GHG emitting water purification systems to provide safe drinking water and displace water boiling using non-renewable biomass or fossil fuels
Type of GHG emissions mitigation action	Displacement of a more-GHG-intensive output

2. Scope, applicability, and entry into force

2.1. Scope

1. This methodology comprises introduction of low greenhouse gas emitting water purification systems to provide safe drinking water (SDW). Water purification technologies that involve point-of use (POU) or point-of-entry (POE)[1] 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 ultraviolet (UV) disinfection devices, solar disinfection techniques, photocatalytic disinfection equipment, pasteurization appliances, chemical disinfection methods (e.g. chlorination), combined treatment approaches (e.g. flocculation plus disinfection). The methodology is also applicable to water kiosks[2] that treat water using one or more of the following technologies: chlorination, combined flocculant/disinfection powders and solar disinfection. [3] In case the water kiosk is using solar disinfection, project proponents need to implement measures to prevent recontamination (e.g. disinfecting containers, sealing containers and hygiene trainings).

2.2. Applicability

2. The methodology is applicable under the following conditions:

   (a) Prior to the implementation of the project activity, a public distribution network supplying SDW to the project boundary does not exist. If during the crediting period SDW is made available through a public distribution network, the emission reductions pertaining to the households/buildings supplied by the public system

[1] 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).

[2] Water kiosk is a facility to treat water to be delivered or sold to final consumers in appropriate conditions of sealed storage and/or residual capacity of disinfection, in such a way as to prevent recontamination before the final consumption as drinking water.

[3] According to "A toolkit for monitoring and evaluating household water treatment and safe storage programmes" (WHO – 2012) – Annex A - Summary of HWTS methods, the use of these technologies can provide protection against recontamination.

cannot be claimed from that point onwards. This condition should be checked annually during the crediting period;

(b) It shall be demonstrated based on laboratory testing or official notifications (for example notifications from the national authority on health) that the application of the project technology/equipment achieves compliance either with: (i) at a minimum the performance target as per "Evaluating household water treatment options: Health based targets and microbiological performance specifications" (WHO, 2011); or (ii) an applicable national standard or guideline;

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

3. 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 ~~%~~ per cent 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.

2.3. Entry into force

4. Not applicable.

3. Normative references

5. Project participants shall apply the "General guidelines for SSC CDM methodologies", "Guidelines on the demonstration of additionality of small-scale project activities"(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. ~~"General guidelines for SSC CDM methodologies", general guidelines to small-scale (SSC) clean development mechanism (CDM) methodologies, general~~

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

~~guidance on leakage in biomass project activities (attachment C to Appendix B) and the "Guidelines on the demonstrating of additionality of SSC project activities" provided at <http://cdm.unfccc.int/Reference/Guidclarif/index.html#meth> mutatis mutandis~~.

6. This methodology also refers to the latest approved versions of the following tools:

   (a) "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion";

   (b) "Tool to calculate baseline, project and/or leakage emissions from electricity consumption".

4. Definitions

7. The definitions contained in the Glossary of CDM terms shall apply.

8. The definitions of Point of Use (POU), Point of Entry (POE) and Water kiosk provided in paragraph 1 and its footnotes shall apply.

5. Baseline methodology

5.1. Project boundary

9. The project boundary includes the physical, geographical sites of the low greenhouse gas emitting technologies for water purification installed by the project activity and the household/institutional buildings where the consumers of safe water provided by the systems are located.

5.2. Baseline emissions

10. 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 be demonstrated to be non-renewable. Only purified water consumed for drinking purposes can be used in the baseline calculation.

11. The baseline emissions shall be calculated as follows:

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

Where:

BE_y	=	Baseline emissions during the year *y* in (t CO_2e)
QPW_y	=	Quantity of purified water in year *y* (litres). The quantity of purified water is the total amount of water treated by the project activity in year *y.* It should be directly monitored; alternatively, it should be based on: (a) the population serviced by the project equipment, estimated using surveys; and (b) 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, total project population needs to be adjusted for the fraction of the population serviced by the project equipment at households/buildings for which it can be demonstrated through documentation or survey that the practice of water purification would have been water boiling
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. If a mixture of woody biomass and fossil fuels is used in the absence of the project activity, a weighted average value (e.g. based on energy content of fuels consumed) should be used
$EF_{projected\_fossilfuel}$	=	Emission factor as per AMS-I.E procedures when NRB is displaced or the emission factor of the fossil fuel substituted (t CO_2/TJ)

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

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

Where:

WH	=	Specific heat of water (kJ/L ^oC). Use a default value of 4.186 kJ/L ^oC
T_f	=	Final temperature (^oC). Use a default value of 100 °C[6]
T_i	=	Initial temperature of water (°C). Use annual average ambient temperature;[7] or use a default value of 20 °C

[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.

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]

n_{wb} = Efficiency of the water boiling systems being replaced. Use one of the options below:

(a) 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;

(b) 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.~~ that is 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;

(c) 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

5.3. Leakage

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

5.4. Project activity emissions

14. 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.~~ for example 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 11 ~~6.~~

(a) 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";

(b) 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".

6. Monitoring methodology

15. 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.

16. The quantity of purified water in year *y* shall be monitored[10] 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 15~~0~~.

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

18. As indicated in paragraph 3 and in equation (1), an ex-ante survey is required to establish where applicable:

(a) Population serviced by the project equipment;

(b) The average volume of drinking water per person per day;

(c) Proportions of NRB and fossil fuel.

19. Further for Case 2 in paragraph 3:

(a) An ex ante survey is to be carried out to determine the proportion of total population attended by the project that is serviced at households/buildings where water boiling would have been the purification practice;

(b) A 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.

20. The safe drinking water quality is monitored on sample basis as per paragraph 2(b).

21. 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.

[10] Quantity calculated under paragraph 11 ~~6~~, equation (1) will serve as a cap.

6.1. Project activity under a programme of activities

22. 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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Document information

Version	*Date*	*Description*
04.0	3 May 2013	SSC WG 40, Annex 4 To be considered at EB 73. The proposed draft revision: (a) Broadens the applicability of the methodology to water kiosks that treat water using one or more of the following technologies: chlorination, combined flocculant/disinfection powders and solar disinfection.
03.0	13 September 2012	EB 69, Annex 22 The revision: (a) Includes project technologies that comply with WHO's Interim performance target on household water treatment or applicable national standards/guidelines.
02	15 July 2011	EB 62, Annex 1 The revision: (a) Includes guidance on the procedures for project equipment testing and monitoring provisions; (b) Increases the threshold of rural or urban population with access to improved drinking source to 60 per cent; and (c) Applies a cap of 5.5 litres per person per day to all project activities.
01	15 April 2011	EB 60, Annex 19 Initial adoption.

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