Responses to public comments on AMS-III.AV
"Low greenhouse gas emitting water purification systems"

I. Background

1. The CDM Executive Board (the Board), at its sixtieth meeting, launched a call for public input from 15 April 2011 till 16 May 2011 on the small-scale methodology AMS-III.AV "Low greenhouse gas emitting water purification systems", where specific issues to be covered include, but are not limited to:

(a) Appropriateness of the maximum volume of purified water per person per day set at 5.5 litres in equation (1) of the methodology taking into account the baseline defined in the methodology, i.e. use of fossil fuel or non-renewable biomass for boiling water;

(b) Appropriateness of the threshold proportion of rural population using an improved drinking source specified in paragraph 4 of the methodology.

The Board tasked the Small-Scale Working Group (SSC WG) to consider the inputs at its thirty-second meeting and make recommendations to the Board. During this period, 8 public submissions in total were received from stakeholders.

II. Summary of public comments and responses by the SSC WG

Comments on applicability conditions

2. Applicability conditions - paragraphs 1 and 3[1]: for the evaluation of the performance of Point of use water treatment systems follow *WHO, 2011: Evaluating household water treatment options: Health-based targets and microbiological performance specifications* [6], [7].

Response from the SSC WG: the SSC WG agreed to recommend a reference to the latest WHO guidelines for evaluating the microbiological performance of point of the use water treatment systems.

3. Applicability conditions - paragraph 3 (a): to exclude the applicability condition 3 (a) regarding the existence of a public distribution network of safe drinking water in the project area [4].

Response from the SSC WG: the SSC WG was of the view that if a public distribution system of safe drinking water exists within the project boundary the baseline water boiling practices as a means for water purification may become uncertain. The group agreed to recommend to keep the applicability condition.

4. Applicability conditions - paragraph 3 (c): the applicability condition 3 (c) needs to be deleted as there will not be any more CERs if the project decides not to replace the equipment before the end of the crediting period i.e. the environmental integrity is preserved [4].

Response from the SSC WG: the SSC WG clarified that the rationale behind applicability condition 3 (c) is to ensure that equipment with lifetime shorter than the crediting period will be replaced with comparable one which will provide the same service level, especially considering that in some cases monitoring by sampling is allowed.

[1] With reference to the approved version 1 of the AMS-III.AV contained in Annex 1

5. Applicability conditions - paragraph 4: a clear distinction should be made between access to improved drinking water source and access to safe drinking water[4],[6].

Response from the SSC WG: Methodology includes many simplifications and makes assumptions including the definition of the baseline. The SSC WG is of the opinion therefore, methodology should, to begin with, cover cases where there is relatively higher level of certainty with regard to assumptions made. Access to improved drinking water source is one such criteria. Based on the experience gained a future revision of the methodology could expand the applicability to other cases including the consideration of extent to which safe drinking water is ensured in an improved drinking water source provided.

Comments on appropriateness of the threshold applied and the approach for using the total quality of water purified for ER calculations

6. Appropriateness of the threshold proportion of rural population with an access to improved drinking source - paragraph 4 (a): the proposed threshold of 50% of the rural population should be increased to 60% to cover countries majority of which are LDCs with a well known problem of access to improved drinking water [4], [8].

Response from the SSC WG: the SSC WG agreed to recommend an increase of the threshold on the proportion of population having access to improved drinking water source to 60%.

7. Regarding paragraph 4 (a): the methodology excludes project activities in urban areas, where access to safe water is very critical and there is a great need for household water disinfection e.g. urban slums, hence inclusion of urban areas is suggested [1],[4], [6] and [7].

Response from the SSC WG: the SSC WG agreed to recommend an expansion to include urban areas as well.

Comments on the total quantity of purified water that is creditable under Case 1

8. Lack of cap under case 1: lack of cap under Case 1 is considered non-conservative, hence it is suggested to have an unified cap for both Case 1 and 2 [1], [2], [6] and [7].

Response from the SSC WG: the SSC WG agreed to recommend a cap of 5.5 litres per person per day under Case 1. The proposed value does not limit the amount of the purified water made available to consumers, but justifies the simplified assumption of the methodology that corresponding amount of water would have been boiled.

Comments on the cap of 5.5 lpd

9. Cap for case 2: the cap of 5.5 litres per person per day for Case 2 projects is unreasonable. The same uncapped amount of treated water needs to be allowed to get CERs in all countries and locations where there is a proven lack of access to improved drinking water sources and for which it can be demonstrated through documentation that the common practice of water purification is or would have been water boiling [4].

10. Cap for case 2: instead of having a cap on the quantity of purified water per person per day it should be allowed to use international or national minimum public health standard, reference surveys and studies (e.g. an increase to 20 litres was suggested) [3].

Response from the SSC WG: taking into account that the simplified baseline approach of the methodology comprises water boiling, the SSC WG agreed that an inclusion of higher volumes of purified water may require different baseline identification for the incremental quantity of purified water.

11. Appropriateness of 5.5 litres per person per day: a cap of 3 litres per day per person to be used for all water purification projects has been proposed [2].

Response from the SSC WG: the SSC WG agreed to have an unified cap of 5.5 litres per person per day both for Case 2 and Case 1(see paragraph 8) based on WHO recommendations (Domestic Water Quantity, Service Level and Health, Table 2: Volumes of water required for hydration, WHO 2003).

Comments on monitoring section

12. Monitoring of the project population: in the current version of the methodology, the total project population shall be established using survey methods. Since transaction costs increase with the amount of surveys to be conducted, we would suggest the following approach: the project population is determined once via surveys at the time of the water purifiers distribution [7].

Response from the SSC WG: the SSC WG agreed to clarify the monitoring requirements with respect to the information required e*x ante.*

Comments on default values for NRB, cook stove efficiency and leakage emissions

13. Procedures for establishing cook stoves efficiencies and fuels used: for cook stoves using fossil fuel a default energy efficiency of 0.5 is proposed [7].

14. Inclusion of default value for cook stoves efficiency under Case 1: as an example , ηwb could be set at 0.25 for Case 1 (based on Word Bank efficient cook stove programs) and this value can be revisited by the small-scale every three to five years [4].

Response from the SSC WG: the SSC WG agreed to recommend the inclusion of the proposed default value for efficiency of the cook stoves using fossil fuels.

15. Default values for parameter *f NRB, y:* It is proposed to develop and provide country/region specific default values for the fraction of non-renewable biomass [7].

16. Default values for parameter f NRB, y: For simplifying and broadening of this methodology, as well as of the other methodologies involving the substitute of non-renewable woody biomass, it is suggested to introduce a default value of f NRB, y =100% for all countries where a consistent declining trend in forest and other wooded land area and in carbon stock can be demonstrated based on the latest FRA data from FAO[4].

17. Leakage emissions: Leakage needs to be deleted, a hydro project for example does not need to confirm that an equal amount of electricity to that it produced has been reduced from fossil fuel power plants [4].

Response from the SSC WG: the above issues 13 -17 need to be addressed under AMS-I.E and the work is ongoing.

List of respondents :

[1] - Anja Kollmuss, South Pole Carbon Asset Management; Nicolas Müller, Perspectives; Randall Spalding‐Fecher, Pöyry Management Consulting;

[2] - CDM watch;

[3] - Evan A. Thomas, Ph.D., P.E. Executive Vice President, Manna Energy Limited;

[4] - International Emissions Trading Association and Project Developer Forum;

[5] - Matt Thomas, CO2balance.com;

[6] - Regula Meierhofer & Monika Tobler; Eawag/Sandec (Swiss Federal Institute for Aquatic Science and Technology; Department of Water and Sanitation in Developing Countries);

[7] - Sophie Tison, South Pole Carbon Asset Management Ltd. ; Christoph Sutter, South Pole Carbon Asset Management Ltd.;

[8] - Zhao-jing Li; Beijing Wenhu Economic Consult Centre.

Annex I

III.AV. Low greenhouse gas emitting water purification systems - version 1

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 guidelines for drinking water quality.[2]

2. Water purification technologies that involve point-of use (POU) or point-of-entry[3] 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. sand, 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 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 drinking water quality specified in a relevant national standards or guidelines;[1]

(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 areas[4] of countries with proportion of rural population using an improved drinking-water source equal to or less than 50% 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.

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

[3] 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).

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

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 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 a mean 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 is assumed that all of the purified water produced and monitored during the project period is consumed for drinking purposes. For case 2, additional requirements are specified for the quantification of emission reductions.

7. The baseline emissions shall be calculated as follows:

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

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 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)

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

$f_{NRB,y}$	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 ^{o}C)
	Use a default value of 4.186 kJ/L ^{0}C
T_f	Final temperature (^{o}C)
	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
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]

[6] Boiling point of water at standard conditions.

[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>.

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

Project emissions

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

- 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 the total project population in year *y* shall be established using survey methods.

15. The water quality monitoring on sample basis as per paragraph 1.

16. 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.

Project activity under a Programme of Activities

17. 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.