CDM: Recommendation Form for Small Scale Methodologies (version 01)

(To be used for presenting questions/proposals/amendments to the simplified methodologies for small-scale CDM project activity categories)

Date of SSC WG meeting:	19–22 October 2010, SSC WG 28
Title/Subject (give a small title or specify the subject of your submission, maximum 200 characters):	Clarification on the applicability of AMS-II.C to project activities which involve installation of water saving devices
Indicative methodology to which your submission relates (refer the items of Appendix B of the Simplified Modalities and Procedures), if applicable.	AMS-II.C "Demand-side energy efficiency activities for specific technologies"
Name of the authors of the query:	Daniel E. White, George T. Maher, Fernando Villasana Institution: Investment Technology Resources, Inc. DanWhite@itr-inc.org, GeorgeTMaher@itr-inc.org, f.villasana@southpolecarbon.com

Summary of the query:

Please use the space below to summarize the query related to SSC methodologies/categories SSC Modalities and Procedures provide recommendation/analysis of the SSC WG.

Original text from PP:

Our query seeks several clarifications concerning the use of AMS II.C. for a program we are pursuing to supply and install efficient water saving devices in households. Our first project under development aims to distribute efficient showerheads and flow aerators at zero costs to low-income households in the Federal District of Mexico City (Mexico City). In Mexico City nearly all domestic water heaters use either natural gas or LPG.

1. Most generally, please clarify if AMS II.C. would be applicable under Paragraph 1 to small scale demand side energy efficiency activities that reduce greenhouse gases emissions by supplying and installing water saving devices that efficiently reduce domestic use of hot water heated via fossil fuels or electricity.

Replacing inefficient showerheads and faucet fixtures with efficient ones is analogous to replacing incandescent lamps with compact fluorescent lamps (CFLs). CFLs use less electricity to produce equivalent light output but do not change the rated capacity or efficiency of the electricity generation equipment itself. Similarly, by providing hot water more efficiently, water saving devices result in thermal energy savings through reducing the amount of fossil fuels or electricity used in domestic water heaters. By lowering water heater use of fossil fuels or thermally-generated electricity, such projects reduce greenhouse gas and other emissions.

2. Regarding Paragraph 2 of the methodology, which refers to limitations on the output or level of service, we seek clarification that this particular applicability requirement will not hinder water saving projects since this specific technology can reduce baseline hot water flow by up to 40%. Water saving devices are designed to replace, or be affixed unto, an existing water fixture or water pipe and maintain the same functional performance or level of service (in terms of water temperature and comfort) for the purposes of cleaning or washing while reducing the amount of water consumed according to local or international standards. In this sense, the level of service provided by a certified efficient showerhead is equivalent in all aspects to a regular showerhead used in the baseline. This is comparable to the luminous

efficacy (ratio of luminous flux to radiant flux) of lighting systems, where the observable level of service is the perceived power of light (visible spectrum), rather than the total power of light emitted (including infrared, ultraviolet, and visible light).

Furthermore, by increasing efficiency of hot water supply, water saving devices improve water heater performance but do not change the water heater rated capacity.

3. Paragraph 5 discusses the emission baseline for cases where the energy displaced is fossil fuel based, but does not include relevant equations. We would like to request clarification that the equations provided in Paragraph 6 would also be applicable to demand side energy efficiency projects that directly displace fossil fuels. In the equations provided in Paragraphs 6 and 8, "power" can mean the thermal energy equivalent of the baseline devices, which accommodates the particulars of the project specific technology, as it operates similarly to efficient lighting projects.

A project involving water saving devices and fossil fuel water heaters (such as our Mexico City project) would utilize Paragraph 6 and 8 equations by estimating the total amount of hot water consumed in the baseline and project scenarios (which is the thermal energy consumption in year y) and multiplying that times the relevant emission factor, in accordance to the formulae supplied for the case when the energy displaced is electricity.

For illustrative purposes, an example of the equations from Paragraph 6 and 8 applied to an energy efficiency project of water saving devices is provided below.

<u>For Baseline Emissions</u>

$BE_y = E_{BL,y} * EF_{CO2,FF}$

$E_{BL,y} = \sum_i (n_i * p_i * o_i)/ EFF_{WH}$

$E_{BL,y}$ = Energy consumption in the baseline in year *y* (TJ).

EF_{CO2} = Emission factor for fossil fuels (tCO_2/TJ). IPCC default.

p_i = Power (thermal energy) of the devices of the group of "i" baseline devices (e.g., 40W incandescent bulb, 5hp motor). In the case of a retrofit activity, "power" is the weighted average of the devices replaced.

o_i = Average annual operating hours of the devices of the group of "i" baseline devices.

n_i = Number of devices of the group of "i" devices replaced, for which the project energy efficient equipment is operating during the year.

EFF_{WH} = Default thermal efficiency for domestic water heaters as per host country ratings.

Where energy p_i of the devices is calculated as follows:

$p_i = W_{BL,i} * \Delta T_i * Cp$

W_{BLi} = Baseline Water flow at fixture i (litres/hour).

ΔT_i = Differential temperature between incoming cold water temperature and hot water temperature at point of use (fixture) *i*.

Cp = Specific heat of water.

<u>For Project Emissions:</u>

$PE_y = E_{PJ,y} * EF_{CO2,FF}$

$E_{PJ,y} = \sum_i (n_i * p_i * o_i)/ EFF_{WH}$

$E_{PJ,y}$ = Energy consumption in the project activity in year *y* (TJ). This shall be determined *ex post* based on monitored values.

Where energy p_i of the devices is calculated as follows:

$p_i = W_{PJ,i} * \Delta T_i * Cp$

p_i = Power (thermal energy) of the devices of the group of "i" water saving devices (e.g., efficient showerheads).

$W_{PJ,i}$ = Water flow at fixture i (litres/hour) after installation of water saving devices.

4. In the monitoring section of the methodology, we would like to request clarification that Paragraph 12 also would be applicable to demand side energy efficiency projects that displace fossil fuels. More specifically, whether the term "power" also references "thermal energy", for which records of a representative sample of the replaced devices will be provided to a DOE for physical verification.

Recommendation by the SSC WG:

Please use the space below to provide amendments/change (in your expert view, if necessary).

Please refer to paragraph 25 of the meeting report of the SSC WG 28 <http://cdm.unfccc.int/Panels/ssc_wg>.

Answer to authors of query by the SSC WG:

Please use the space below to provide answer to the authors of the above query.

The small-scale working group of the CDM Executive Board would like to thank the author for the submission.

The SSC WG applauds the query author for pursuing the project indicated. However, AMS-II.C is not applicable to this project. The fundamental issue is not the lack of applicable equations, but that AMS-II.C is designed for projects that do not reduce level of service, but provide the same level of service more efficiently. This is indicated in paragraph 2 of the methodology with a specific example of no reductions in water flow. This paragraph is a fundamental part of AMS-II.C and the SSC WG agreed not to recommend its removal. The group also unfortunately do not agree with the query author that devices that reduce water flow rates result in a "…level of service ….equivalent in all aspects to a regular showerhead used in the baseline."

Therefore, the group agreed to recommend the query author to submit a new methodology for onsite water heating energy reductions following the procedure on submission and consideration of a proposed new small scale methodology <http://cdm.unfccc.int/Reference/Procedures/methSSC_proc03.pdf>. The author might want to consider the use of a range of stipulated fossil fuel or electricity savings values for specific water heater applications. Such a methodology must also consider code and standard requirements with respect to water flow restriction devices in the baseline, the potential for removal or manipulation of such devices by consumers who are not satisfied with the devices, whether a program involves direct installation versus just distribution of such devices, and changes in use patterns by consumers of the water flow devices (e.g. longer showers) which are associated with lower flow rates (and thus changes in service levels). Such a methodology may also take into consideration reductions in offsite energy consumption associated with water pumping and water treatment by central utility systems. Such a consideration could perhaps utilize a "water system emission factor", similar in concept to the Grid Emission Factor defined in AMS-I.D "Grid connected renewable electricity generation".

Alternatively, the author may wish to consider implementing more comprehensive measures and to consider using AMS III.AE "Energy efficiency and renewable energy measures in new residential buildings", which would require modifications to include fossil fuel energy use reductions.

Signed by the Chair, Mr. Peer Stiansen
Date: 22/10/2010

Signed by the Vice-Chair, Mr. Hugh Sealy
Date: 22/10/2010

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