CLEAN DEVELOPMENT MECHANISM

CDM-SSCWG39-A10

Draft Small-scale Methodology

SSC-II.R: Energy efficiency space heating measures for residential buildings

Version 01.0

Sectoral scope(s): 03

United Nations
Framework Convention on
Climate Change

COVER NOTE

1. Procedural background

1. The SSC WG agreed not to continue the work on the top-down revisions of the methodologies "*AMS-II.E: Waste energy recovery (gas/heat/pressure) projects*" and "*AMS-III.AE: Energy efficiency and renewable energy measures in new residential buildings*", which was part of the on-going work on revising methodologies top-down, as mandated by the Board in the SSC WG workplan 2012. Instead, the SSC WG prepared a new methodology top-down for space heating in residential buildings, with an option to focus on rural areas subject to further interaction with stakeholders. In this context, the SSC WG recommended the Board to launch a call for public input on the draft new methodology.

2. Purpose

2. The purpose of the proposed new draft methodology is to improve existing regulation.

3. Key issues and proposed solutions

3. Not applicable (call for public input).

4. Impacts

4. Not applicable (call for public input).

5. Proposed work and timelines

5. The draft new methodology is recommended by the SSC WG to be considered by the Board at its seventieth meeting. After receiving public input on the document the SSC WG will continue work on the draft new methodology at its next meeting (SSC WG 40) in 2013.

6. Recommendations to the Board

6. The SSC WG recommends that the Board launch a call for public input on the draft new methodology .

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1. Introduction

1. The following table describes the key elements of the methodology:

Table 1. Methodology key elements

Typical project(s)	Energy efficiency and fuel switching measures implemented within residential buildings to improve the space heating.
Type of GHG emissions mitigation action	Energy efficiency and fuel switching measures

2. Scope, applicability, and entry into force

2.1. Scope

2. This methodology is applicable to energy efficiency and fuel switching measures implemented within residential buildings. Activities applicable to this methodology include those that are intended to reduce emissions associated with space heating, such as:

   (a) Improving building insulation;

   (b) Enhancing glazing of windows;

   (c) Improving efficiency of heating equipment and/or systems, including stoves that may or may not be also used for cooking purpose.

2.2. Applicability

3. This methodology is also applicable if fuel-switching results from implementation of the energy efficiency measures, for example fuel-switching from non-renewable biomass (NRB) to renewable fuel due to the introduction of higher efficiency space heating equipment (e.g. stoves or furnaces).

4. The methodology is only applicable to technology/measures implemented in existing residential buildings.

5. If the energy efficiency measures result in displacement of non-renewable biomass, project participants shall document in a project design document (PDD) that non-renewable biomass has been used since 31 December 1989, using survey methods or referring to published literature, official reports or statistics.

6. This methodology is applicable to project activities where it is possible to directly measure and record the energy use within the project boundary (e.g. electricity and/or fossil fuel and/or non-renewable biomass consumption). The metric for non-renewable biomass consumption is weight of the non-renewable biomass.

7. This methodology is applicable to project activities where the impact of the measures implemented (improvements in energy efficiency) by the project activity can be clearly distinguished from changes in energy use due to other variables not influenced by the project activity (signal to noise ratio).

8. The PDD shall document how the potential for double counting of emission reductions, for example due to equipment manufacturers or others claiming credit for emission reduction for project activities, are avoided.

9. The aggregate energy savings of a single project activity shall not exceed the equivalent of 60 GWh per year.

2.3. Entry into force

10. The date of entry into force is the date of the publication of the EB 70 meeting report on the 23 November 2012.

3. Normative references

11. Project participants shall apply the "*General guidelines for SSC CDM methodologies"*, "*Guidelines on the demonstration of additionality of small-scale project activities*" (previously known as Attachment A of Appendix B), abbreviations and "*General guidance on leakage in biomass project activities"* , provided at <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html>.

4. Definitions

12. The definitions contained in the "*Glossary of CDM terms*" shall apply.

5. Baseline methodology

5.1. Project boundary

13. The project boundary is the physical, geographical site of the building(s).

5.2. Baseline emissions

14. Baseline emissions shall be determined while taking into account possible interactive effects among different technologies/measures undertaken in the project activities, wherein the principle for considering interactive effect provided in the "*Guidelines for the consideration of interactive effects for the application of multiple CDM methodologies for a programme of activities*" may be followed.

15. One of the following options may be used for determining the baseline energy consumption:

    (a) Use of a **"Baseline Measurement Campaign"** carried out prior to or in parallel with the implementation of the project activity. In doing so, the campaign must include direct measurements and recording of the energy use within the project boundary. In addition, the baseline measurement campaign must provide sufficient information, such that the impact of the measures implemented by the project activity can be clearly distinguished from changes in energy use, due to other variables not influenced by the project activity (signal to noise ratio). For example, in case of a project activity distributing energy efficient stove for spacing heating (with or without cooking) in rural households to reduce energy

consumption and space heating, a baseline measurement campaign should consist of:

(i) Measuring energy use of the baseline stoves (e.g. fossil fuel and biomass, renewable and non-renewable);

(ii) Measuring independent variables that determine energy use, such as ambient temperatures and occupancy;

(iii) Measuring the energy use and independent variables: (a) for a period of time sufficient to capture the range of independent variables expected to be encountered during the crediting period, which may require measurement during multiple seasons; and (b) for a census or randomly selected sample of representative residences (either participating in the program or eligible for participating in the program) in compliance with the "*Standard for sampling and surveys for CDM project activities and programme of activities*".

The baseline measurement campaign energy use data and the independent variable data are used to define a relationship between baseline energy use/emissions and the independent variables, for example regression analysis to determine an equation. During the crediting period, the same independent variables are monitored and used for calculating the baseline energy use/emissions for the values of the independent variables experienced during the crediting period. If, during the crediting period, conditions are such that the value(s) of the independent variables fall outside of the range of value(s) encountered during the baseline campaign, then either: (a) additional analysis is required to conservatively demonstrate that the relationship between baseline energy use/emissions and the independent variables (as defined using data collected during the baseline campaign) is still valid; or (b) a new baseline measurement campaign must be conducted; or (c) emissions reductions cannot be claimed during periods of time when the value(s) of the independent variables fall outside of the range of value(s) encountered during the baseline campaign. The project proponent may also wish to refer to the "*Tool to determine the baseline efficiency of thermal or electric energy generation systems*" for further guidance.

(b) Use of a treatment group versus control group study

The following terms are introduced for the purpose of this option:

(i) **Random assignment** - each household in the study population is randomly assigned to either the control group or the treatment group based on a random probability, as opposed to being assigned to one group or the other based on some characteristic of the household (e.g. location, energy use, or willingness to sign up for the program). Random assignment creates a control group that is statistically identical to the subject treatment group, in both observable and unobservable characteristics, such that any difference in outcomes between the two groups can be attributed to the treatment with a high degree of validity (i.e. that the savings estimates are unbiased and precise);

(ii) **Control group** - the group of households that are assigned not to receive the treatment. The treatment group is compared to this group. Depending on the study design, households in the control group may be denied treatment; may receive the treatment after a specified delay period; or may be allowed to receive the treatment if requested;

(iii) **Treatment group** - the group of program participant households that are assigned to receive the treatment.

Under this option, throughout the crediting period, energy used (for each fuel type) of the subject heating system (e.g. stoves/heaters) is measured for a census or representative sample (in compliance with the "*Standard for sampling and surveys for CDM project activities and programme of activities*") of the residences participating in the project (treatment group) and compared with energy use (for each fuel type) of a control group of non-participating residences (control group). The difference in energy use between the participating residences and the control group residences is used to determine energy savings and emission reductions. Appropriate statistical analysis shall be conducted on the obtained data, based on the study design chosen, in order to achieve unbiased, reliable and conservative estimates of energy savings and emission reductions.

16. Each energy form in the emission baseline is multiplied by its emission factor. For the electricity displaced, the emission factor is calculated in accordance with provisions under the "*Tool to calculate the emission factor for an electricity system*". For fossil fuels, the IPCC default values for emission coefficients may be used. For non-renewable biomass (NRB), the quantity of NRB used, emission factor used for NRB, and the baseline emission calculation are determined by following "*AMS-II.G: Energy efficiency measures in thermal applications of non-renewable biomass*".

5.2.1. Baseline emissions under suppressed demand scenario

17. A suppressed demand scenario (a minimum living standard of adequate space heating and indoor air temperatures is not met prior to project implementation) is deemed to exist, in case one of the following conditions are observed:

(a) The electrification rate (in case of rural buildings) is below 20%;

(b) Animal dung is one of the fuel commonly used in the project area;

(c) The project activity is in Least Developed Countries (LDCs) or Small Island Developing States (SIDs);

(d) The conditions applicable for special underdeveloped zone (SUZ) provided in the "*Guidelines for demonstrating additionality of microscale project activities".*

18. The suppressed demand multiplier is calculated as:

$$SD_{factor} = \left(T_{ia,avg\ w/oSD} - T_{oa,avg}\right)/\left(T_{ia,avg\ w/SD} - T_{oa,avg}\right) \quad \text{Equation (1)}$$

Where:

SD_{factor} = Suppressed Demand Factor, unitless, may not be greater than 1.20

$T_{ia,avg\ w/oSD}$ = Average Indoor Air Temperature in Project Scenario during heating season when space heating systems are used in the project residences during the crediting period, ^{o}C

$T_{oa,avg}$ = Average Outside Air Temperature, during crediting period and during heating season when space heating systems are used, ^{o}C

$T_{ia,avg\ w/SD}$ = Average Indoor Air Temperature in the pre-project scenario during heating season when space heating systems are used in either: (a) the pre-project residences during the prior three years (baseline measurement campaign approach); or (b) in the control group residences during the crediting period (treatment group versus control group study approach), ^{o}C

19. One of the following approaches can be used to make a suppressed demand correction with the suppressed demand multiplier:

    (a) In the case that a Baseline Measurement Campaign is used to define baseline energy consumption, the baseline suppressed demand multiplier is multiplied times the baseline energy consumption to determine a suppressed demand corrected baseline energy consumption;

    (b) In the case that a Treatment Group versus Control Group Study approach is used to determine energy savings, the baseline suppressed demand multiplier is multiplied times the control group energy consumption to determine a suppressed demand corrected baseline energy consumption.

5.3. Project emissions

20. Each energy type and its quantity consumed in the project activities shall be monitored. Project emissions shall be determined by multiplying the quantity of the energy consumed by its emission factor. For the electricity displaced, the emission factor is calculated in accordance with provisions under "*Tool to calculate the emission factor for an electricity system*". For fossil fuels, the IPCC default values for emission coefficients may be used. For non-renewable biomass (NRB), the quantity of NRB used, emission factor used for NRB, and the project emission calculation are determined by following AMS-II.G "Energy efficiency measures in thermal applications of non-renewable biomass".

5.4. Leakage

21. If the energy efficiency technology is equipment transferred from another activity or if the existing equipment is transferred to another activity, leakage is to be considered.

22. Leakage relating to the non-renewable woody biomass shall be assessed as per the relevant procedures of "*AMS-I.E: Switch from Non-Renewable Biomass for Thermal Applications by the User*".

5.5. Emission reductions

23. Emission reductions are the difference between baseline emissions and project emissions by subtracting the emissions due to leakage.

6. Monitoring methodology

24. In case of introduction of new appliances, monitoring shall consist of checking of all appliances or a representative sample thereof, at least once every two years (biennial) to determine if they are still operating or are replaced by an equivalent in service appliance.

25. A statistically valid sample of the locations where the systems are deployed, with consideration, in the sampling design, of occupancy and demographics differences can be used to determine parameter values used to determine emission reductions, as per the relevant requirements for sampling in the "*Standard for sampling and surveys for CDM project activities and programme of activities*". When biennial inspection is chosen a 95% confidence interval and a 10% margin of error requirement shall be achieved for the sampling parameter. On the other hand when the project proponent chooses to inspect annually, a 90% confidence interval and a 10% margin of error requirement shall be achieved for the sampled parameters. In cases where survey results indicate that 90/10 precision or 95/10 precision is not achieved, the lower bound of a 90% or 95% confidence interval of the parameter value may be chosen as an alternative to repeating the survey efforts to achieve the 90/10 or 95/10 precision.

26. Monitoring shall consist of energy consumption and other data (e.g. indoor and outdoor air temperatures). In case sampling method is used, the relevant requirements for sampling in the "*Standard for sampling and surveys for CDM project activities and programme of activities*" shall be followed.

27. Annual quantity of biomass used during the project. Relevant monitoring procedure provided in AMS-II.G shall be followed.

6.1. Project activity under a programme of activities

The following conditions apply for use of this methodology in a project activity under a programme of activities:

28. Leakage emissions resulting from fuel extraction, processing, liquefaction, transportation, re-gasification and distribution of fossil fuels outside of the project boundary shall be considered, as per the guidance provided in the leakage section of "*ACM0009: Consolidated baseline and monitoring methodology for fuel switching from coal or petroleum fuel to natural gas*". In case leakage emissions in the baseline situation are higher than leakage emissions in the project situation, leakage emissions will be set to zero.

29. In case the project activity involves the replacement of equipment, and the leakage effect of the use of the replaced equipment in another activity is neglected because the replaced equipment is scrapped, an independent monitoring of scrapping of replaced equipment needs to be implemented. The monitoring should include a check if the number of project activity equipment distributed by the project and the number of scrapped equipment correspond with each other. For this purpose scrapped equipment

should be stored until such correspondence has been checked. The scrapping of replaced equipment should be documented and independently verified.

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Document information

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