CDM – SSC WG

Twenty-fourth meeting
Report
Annex 8
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Sectoral Scope: xx
EB xx

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TYPE I - RENEWABLE ENERGY PROJECTS

Project participants shall apply the general guidance to the small-scale 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*.

I.x.   Solar thermal domestic water heating systems

Technology/measure

1.   This category comprises installation of solar thermal water heating systems used for domestic hot water production (SDHW systems) in residential or commercial facilities. Such systems would displace electricity or fossil fuel that would have been used to directly heat water.

2.   Project activities that are new construction and those that involve retrofitting or modifying an existing facility for solar thermal domestic hot water production are included in this category.

3.   To qualify as a small-scale project, the total output of the new, modified or retrofitted system shall not exceed a peak production capacity limit of 45 MW thermal. If the system uses fossil fuel and/or electricity for the back-up production of hot water, the capacity of the entire system, including the back-up water heating systems, shall not exceed the limit of 45 MW thermal.

Boundary

4.   The physical, geographical site of the solar thermal water system delineates the project boundary. The boundary also extends to the facility consuming the heated water generated by the system.

Baseline Emissions

5.   Baseline emissions are the fossil fuel and/or electricity consumption of the technology that would have been used in the absence of the project activity multiplied by an emission factor for the electricity or fossil fuel displaced. For calculating the emission factor for displaced fossil fuels, reliable local or national data shall be used. IPCC default values shall be used only when country or project specific data are not available or demonstrably difficult to obtain. For calculating the emission factor for displaced electricity an annual emission factor shall be calculated in accordance with the provisions in AMS-I.D (tCO_2/MWh).

6.   The baseline system for retrofitted or modified project SDHW systems is the system that existed immediately prior to the project activity. For greenfield projects the baseline system (and fuel source, e.g., fossil fuel or electricity) assumed to be used for domestic water heating is one that is demonstrated to be typical of new construction in the region of the project activity at the time of the project activity. The Combined Tool to Identify the Baseline Scenario and Demonstrate Additionality can be used to determine the baseline system for greenfield projects.

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Project Emissions

7.   Project emissions are the fossil fuel and/or electricity consumption of the project SDHW system (including backup water heating systems and auxiliaries) multiplied by an emission factor for the electricity or fossil fuel. For calculating the emission factor for displaced fossil fuels, reliable local or national data shall be used. IPCC default values shall be used only when country or project specific data are not available or demonstrably difficult to obtain. For calculating the emission factor for displaced electricity an annual emission factor shall be calculated in accordance with the provisions in AMS-I.D (tCO_2/MWh).

Emission reductions

8.   Emission reductions are equal to the difference between baseline and project fossil fuel and/or electricity consumption multiplied by an emission factor for the electricity or fossil fuel displaced. Such reductions shall be calculated on an annual basis.

9.   The difference between baseline and project fossil fuel and/or electricity consumption is calculated using one of the four following methods:

(a)   Computer Simulation Method:

(i)   An approved[1] computer simulation model of *(a) the existing baseline system, or the baseline system that would have been installed in the absence of the project activity, and (b) the project system* is used to calculate baseline energy use and project system energy use, including any energy consumed by backup water heating systems in the SDHW project case and any energy consumed for SDHW system fluid pumping in the SDHW project case;

(ii)   Model input parameters shall include (a) characteristics of the baseline system including the fossil fuel or electricity input capacity, water heating system efficiency, and storage tank size and insulation, (b) temperature of water entering the water heating system (e.g., ground water temperature) and average annual hot water consumption, in litres per day[2], as determined during the crediting period, and (c) characteristics of the project system including solar collector technical and thermal performance ratings[3], collector orientation, back-up system characteristics, pumping system characteristics, and storage tank size and insulation;

(iii)   The computer simulation shall be used to calculate the difference between baseline and project fossil fuel and/or electricity consumption on an annual

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[1] Pre-approved computer simulation programs include A, B, C…. Use of other programs shall be approved by DOE using the following criteria X, Y and Z.

[2] Water consumption per day shall be assumed to follow a typical daily, per hour water, consumption pattern typical for the facility where the SDHW system is installed.

[3] See the Solar Rating and Certification Corporation certification, rating, and labeling program for solar collectors and complete solar water heating systems.

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basis using actual solar insolation data collected within or very near the project boundary;

(iv)   If more than one SDHW system is installed as part of this project the temperature of water entering the water heating systems and average daily hot water consumption can be determined from a statistically valid sample of the systems installed with consideration of occupancy and demographics differences. Other model input parameters must be based on each individual system's characteristics;

(v)   Savings determined from the computer simulation can only be applied to systems that are demonstrated, on a bi-annual basis during the crediting period, to be operational and complying with manufacturer required maintenance procedures.

(b)   <u>System Metering Method</u>:

(i)   Energy content (flow rate and temperature) of useful hot water delivered by the project SDHW system to the end uses within the boundary is sub-metered, and recorded on an hourly and annual basis, and used to calculate the equivalent amount of energy that would have been consumed in the baseline system (fossil fuel or electricity) to heat an equivalent amount of useful hot water;

(ii)   Fossil fuel and/or electricity use of project SDHW system is also sub-metered and recorded on an hourly and annual basis, including energy use for back up water heating and internal SDHW system fluid pumping;

(iii)   The difference between baseline and project fossil fuel and/or electricity consumption is calculated as energy content of useful project hot water delivered by project SDHW system divided by the efficiency of the baseline system less any fossil fuel and/or electricity consumption of the project system for water heating and internal system fluid pumping;

(iv)   This method ignores energy savings associated with water storage losses in baseline;

(v)   If more than one SDHW system is installed as part of this project, the energy savings from all of the systems can be determined from a statistically valid sample of the systems installed. Savings determined from the sample can only be applied to systems that are demonstrated, on a bi-annual basis during the crediting period, to be operational and complying with manufacturer required maintenance procedures.

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     (c)   <u>Control Group Method</u>:

         (i)   This method is applicable to large numbers of similar project SDHW systems installed in similar residences with similar occupancy and occupant demographics;

         (ii)   The energy used for heating domestic water in the baseline is determined for a statistically valid control group of residences without solar water heating systems. The energy used for heating domestic water in the project case is determined for a statistically valid sample of residences with project SDHW systems;

         (iii)   Such energy use is determined by sub-metering the fossil fuel or electricity input, and recording on an hourly basis, used for domestic water heating and internal system fluid pumping. The difference between baseline and project fossil fuel and/or electricity consumption is calculated as water heating energy consumption of the average baseline control group residence less the water heating energy consumption of the average project residence times the number of operating project SDHW systems. Number of SDHW operating is as demonstrated, on a bi-annual basis during the crediting period, to be those that are operational and complying with manufacturer required maintenance procedures.

     (d)   <u>Deemed Savings Value Method</u>:

         (i)   This method is applicable to large numbers of similar SDHW systems installed in similar residences with similar occupancy and occupant demographics;

         (ii)   Deemed savings from the following table are used as annual kWh or KJ savings of electricity or thermal energy, respectively, associated with each system that is demonstrated, on a bi-annual basis during the crediting period, to be operational and complying with manufacturer required maintenance procedures;

Table 1: Deemed Savings Values, kWh or KJ per system per year

tbd	*tbd*	*tbd*	*tbd*
tbd	*tbd*	*tbd*	*tbd*
tbd	*tbd*	*tbd*	*tbd*
tbd	*tbd*	*tbd*	*tbd*
tbd	*tbd*	*tbd*	*tbd*
tbd	*tbd*	*tbd*	*tbd*
tbd	*tbd*	*tbd*	*tbd*

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> (iii)   Systems must also comply with the following criteria in order to use the deemed savings values in Table 2[4]:
>
> > 1.   Criteria A
> >
> > 2.   Criteria B
> >
> > 3.   Criteria C

10.   Displaced electricity can include technical grid losses (transmission and distribution) for the grid serving the locations where the project SDHW systems are installed. This value shall not include non-technical losses such as commercial losses (e.g., theft/pilferage). The average annual technical grid losses shall be determined using recent, accurate and reliable data available for the host country. This value can be determined from recent data published either by a national utility or an official governmental body. Reliability of the data used (e.g., appropriateness, accuracy/uncertainty, especially exclusion of non technical grid losses) shall be established and documented by the project participant. A default value of 0.1 shall be used for average annual technical grid losses, if no recent data are available or the data cannot be regarded accurate and reliable.

Leakage

11.   If the project equipment is transferred from another activity, leakage is to be considered.

Monitoring and Sampling

12.   At time of installation all SDHW systems shall be inspected for proper operation in compliance with manufacturer specifications.

13.   Bi-annual (every other year) inspections shall be made of at least a sample of systems to confirm their continued operation. Emission reductions shall only be applied to the percentage of systems found to be in operation and to have been complying with manufacturer specific maintenance requirements. Compliance with such requirements shall be via inspection of systems and review of maintenance records.

14.   Metering of required parameters shall be with calibrated instrumentation per the general guidance for SSC methodologies. All data collected shall be recorded at least hourly. Temperature and flow measurements shall be done with equipment that has an Instrument System Error no greater than 1% and 5%, respectively.

15.   Sub-metering of energy consumption for water heating or fluid pumping shall be with devices that measures only the energy consumption associated with the project SDHW or baseline systems. Totalizing amperage meters can be used for electricity consumption and totalizing flow meters for fossil fuel consumption (e.g. for propane, fuel oil, or natural gas). Meters used for

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[4] This criteria will be minimum requirements in order for the deemed savings values to be applicable, such as size of collector or storage system, rated capacity of system, etc.

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determining energy consumption shall be done with equipment that has an Instrument System Error no greater than 1%.

16.   Any sampling conducted as part of this methodology shall meet the following requirements:

- The sampling size is determined by minimum 90% confidence interval and the 10% maximum error margin.

- Sampling must be statistically robust and relevant i.e., the survey has a random distribution and is representative of target population (demographics, occupancy, location, etc.).

- The method to select the sample population is random.

Project Activity Under a Programme of Activities

17.   For a programme of activities, if the computer simulation method is used, the computer model must be calibrated using data (energy use, weather data, residence characteristics) collected during the same years that the model is calibrated. The model shall meet the specifications of and be calibrated per the requirements of ASHRAE[5] Guideline 14-2002, Measurement of Energy and Demand Savings, Whole Building Calibrated Simulation Performance Path[6].

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[5] American Society of Heating, Ventilating, and Air Conditioning Engineers, Atlanta, Georgia, USA.
[6] Or current version or equivalent guideline.