Indicative simplified baseline and monitoring methodologies
for selected small-scale CDM project activity categories

TYPE I - RENEWABLE ENERGY PROJECTS

Project participants shall apply the General Guidelines to SSC CDM Methodologies, and Information on Additionality (Attachment A to Appendix B), provided at <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html> *mutatis mutandis*.

I.K. Solar Cookers for Households

Technology/measure

1. This methodology is for project activities that introduces solar cookers to individual households to be used for household cooking purpose (i.e. meal preparation, water heating and baking for household consumption). The use of the solar cookers will reduce the use of the existing cookstove(s) and displace the consumption of fossil fuels (e.g., Kerosene or LPG) or non-renewable biomass (NRB).

2. The total installed/rated thermal energy generation capacity of the project equipment is equal to or less than 45 MW thermal.[1]

3. Technologies included in this methodology are box cookers with window area of at least 0.2 m^2 and parabolic and panel cookers with an aperture area greater than 1 m^2. Solar cookers shall be demonstrated to be designed and constructed to the requirements of a relevant national or international standard or in accordance with the most recent guidelines issued by a relevant national authority or international organisation.

4. To ensure continued and frequent use of the solar cookers:

   a) Participating households (solar cooker users) are required to pay at least a portion of the cost of the solar cooker;

   b) Participating households shall receive some form of training for appropriate use of the type of solar cooker introduced. This training shall take into account local cooking habits (eg. Types of food prepared, customary mealtimes, etc.).

5. To take into account the expected lifetime of solar cookers, if the selected crediting period is longer than the manufacturer-specified lifetime, then it shall be demonstrated that an ongoing maintenance and replacement program is in place, through which cookers that are no longer functioning, will be repaired or replaced.

[1] For thermal applications, the limit of 45 MWth is the installed/rated capacity of the thermal application equipment or device/s. Refer to the latest version of "General Guidelines to SSC CDM methodologies". The manufacturers' specifications on the installed/rated thermal output may be used. In the absence of manufacturers' specification the installed/rated thermal output shall be determined based on a lab test undertaken by a nationally approved/accredited laboratory or alternatively by a laboratory complying with the requirements of a relevant national or international standard, e.g. ISO/IEC 17025. Relevant national/international standards for testing shall be used.

Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories

I.K. Thermal energy from solar cookers (cont)

Boundary

6. The project boundary includes the solar cookers as well as the conventional cook-stoves used in the participating households. Where woody biomass is used, the collection area of these biomass fuels is included in the project boundary.

Baseline Emissions

7. The baseline emissions are determined as the quantity of fuel(s) used for cooking purposes in the participating households in the absence of the project solar cookers, times the appropriate emission factors for those fuels. In the case of woody biomass, the quantity of biomass fuel is to be multiplied by the *fraction of non-renewable biomass* (f_{NRB}) before multiplying it by the appropriate emission factor for NRB, which is to be determined as per the relevant procedures in AMS-I.E.

The baseline emissions BE_y are calculated as:

$$BE_y = \sum_k \sum_j N_{k,0} * n_{k,y} * FC_{BL,k,j} * NCV_j * EF_{FF,j} \quad \textbf{(1)}$$

Where:

BE_y	Baseline emissions in year *y* (tCO_2)
k	Index for household type or cluster or stratification (e.g. stratified by household size, type of solar cookers introduced etc.)
j	Index for the type of baseline fuel consumed
$N_{k,0}$	Number of households provided with solar cookers prior to year y
$n_{k,y}$	Proportion of households $N_{k,0}$ still using solar cookers in year *y* (fraction)
$FC_{BL,k,j}$	Annual consumption of baseline fuel *j* (mass or volume unit per household for cooking) by household type *k* in the baseline scenario
NCV_j	Net calorific value of the fuel *j* (GJ/mass or volume unit)
$EF_{FF,j}$	CO_2 emission factor of fuel *j* (tCO_2/GJ)

8. Annual household consumption of baseline fuel ($FC_{BL,k,j}$) can be determined using one of the three methods (a), (b) and (c) below:

(a) Ex-post Measurement Campaign: Consumption of baseline fuel ($FC_{BL,k,j}$) is determined in a measurement campaign for a minimum of 15 days per year at a representative sample of targeted users who have solar cookers but do not use them

Indicative simplified baseline and monitoring methodologies
for selected small-scale CDM project activity categories

I.K. Thermal energy from solar cookers (cont)

for the duration of the campaign. The days selected for measurement of fuel consumption shall take into account seasonal and weekday/weekend differences in fuel consumption (if any), or else the data from the measurement campaign shall be extrapolated in order to take into account the seasonal cooking patterns and fuel use. In locations where households use fossil fuels in standard unit weights/dimensions (e.g. honeycomb coal briquettes of 500g/unit), the counting of fossil fuel units used (e.g. number of briquettes) and the unit weight[2] (e.g. unit weight of coal briquette) can be used for the purpose of measurement. Fuel consumption data collected through sample-based measurements shall comply with the 90% confidence interval and 10% margin of error requirement. Households can be stratified into similar groups (*k*) or clusters sampled population (e.g. average income level, household occupancy, diet and cooking habits, climate/temperature zone, plus availability, price and type of fuel used). The latest version of "General Guidelines for Sampling and Surveys for Small-Scale CDM project activities" shall be complied with;

(b) Ex-ante Measurement Campaign: Consumption of baseline fuel ($FC_{BL,k,j}$) is determined in a measurement campaign for a minimum of 90 days at a representative sample of targeted users before the acquisition/installation of the solar cookers. Fuel consumption is monitored using the same procedures and sampling requirements described in Option (a);

(c) A baseline control group of users not supplied with project equipment shall be set up as a control group. Relevant parameters of influence pertaining to the project region shall be defined and the control group shall be set up taking into account these parameters (e.g. average income level, household occupancy, diet and cooking habits, climate/temperature zone, and the availability, price and type of fuel used).[3] Fuel consumption of the control group is monitored throughout the crediting period, for a minimum of 15 days per year, using the same sampling requirements described in Option (a).

9. For determining the emission factors for fossil fuels, reliable local or national data shall be used. IPCC default values shall be used only when country or project specific data are documented to be either not available or not reliable. For NRB, the emission factor should be selected as per AMS-1.E.

Project Emissions

10. The project emissions are determined as the quantity of fuel(s) used for cooking tasks in the participating households once the solar cookers have been introduced and are being used in these households, times the appropriate emission factor for those fuels. In the case of woody

[2] If the unit weight is not uniform in the project area (i.e. various sizes and weights of briquettes are likely to be available in a project area with multiple manufacturers), the specific unit weights shall be applied.

[3] Alternatively sampling design can adopt a conservative approach to account for these issues.

Indicative simplified baseline and monitoring methodologies
for selected small-scale CDM project activity categories

I.K. Thermal energy from solar cookers (cont)

biomass, the quantity of biomass fuel is to be multiplied by the fraction of non-renewable biomass (fNRB) before multiplying it by the appropriate emission factor for NRB, which is to be determined as per the relevant procedures in AMS-I.E..

11. Project emissions from continued use of fuel *j* are calculated by:

$$PE_y = \sum_k \sum_j N_{k,0} * n_{k,y} * FC_{PJ,k,j} * NCV_j * EF_{FF,j} \quad \textbf{(2)}$$

Where:

PE_y	Project emissions in year *y* (tCO_2)
$FC_{PJ,k,j}$	Annual consumption of baseline fuel *j* (mass or volume unit per household for cooking) by household type *k* in the project scenario

12. $FC_{PJ,k,j}$ is determined in a measurement campaign for a minimum of 30 days per year (to take into account weather variations on solar cooking use) at a representative sample of targeted users. Measurement procedures shall follow those described in para 8(a).

13. For solar cookers equipped with a solar tracking system that consumes electricity, CO_2 emissions from electricity consumption shall be accounted for as project emissions using the latest version of "Tool to calculate baseline, project and/or leakage emissions from electricity consumption". The electricity use of auxiliary loads may be calculated based on the rated power consumption rate and conservatively estimated auxiliary load run-time(s).

Leakage

14. If the solar cookers introduced by the project activity are transferred from outside the project boundary, leakage is to be considered.

15. Leakage related to the non-renewable woody biomass saved by the project activity shall be assessed according to the requirements provided in AMS-I.E.

Emission Reductions

16. Emission reductions are calculated based on the reduced quantity of fuel consumption. Emission reductions, ER_y are determined as:

$$ER_y = BE_y - PE_y - LE_y \quad \textbf{(3)}$$

Where:

ER_y	Emission reductions in year *y* (tCO_2)
BE_y	Baseline emissions in year *y* (tCO_2)

Indicative simplified baseline and monitoring methodologies
for selected small-scale CDM project activity categories

I.K. Thermal energy from solar cookers (cont)

PE_y Project emissions in year y (tCO_2)

LE_y Leakage in year y (tCO_2)

Monitoring

17. A serial number shall be placed on each solar cooker in order to track the solar cookers. A list of all users and the corresponding serial numbers of their solar cooker(s), the date that households have acquired and begun using their solar cooker(s), along with a record of training that users have received, shall be kept. This list should also include the details on which the sampling practices are designed.

18. Monitoring shall include an on-site check of all solar cookers or a representative sample thereof, on either an annual or biennial basis to ensure that they are still operating or are replaced by an equivalent in service solar cooker. In any given year, emission reductions can only be claimed for households with solar cookers that are demonstrated to be operational and in-use.

19. When biennial inspection is chosen, the inspections can be done in years 3, 5, 7, etc. and the results of such inspections can be applied to crediting years 3 and 4, 5 and 6 and 7 etc. A statistically valid sample of the residences where the cookers are in use can be used to determine the percentage of systems operating. Such sampling shall take into consideration occupancy and demographic differences, as per the relevant requirement for sampling in the "General Guidelines for sampling and surveys for SSC project activities".

20. When biennial inspection is chosen, a 95% confidence interval and 5% margin of error shall be achieved for the sampling parameter. If annual inspection is chosen, then a 90% confidence interval and 10% margin of error shall be achieved.

21. Relevant parameters shall be monitored as indicated in the Table below. The applicable requirements specified in the "General Guidelines to SSC CDM methodologies" (e.g. calibration requirements, sampling requirements) are also an integral part of the monitoring guidelines specified below and therefore shall be referred to by the project participants.

Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories

I.K. Thermal energy from solar cookers (cont)

Table 1: Parameters for monitoring during the crediting period

No.	Parameter	Description	Unit	Monitoring/ recording frequency	Measurement methods and procedures
1	$N_{k,0}$	Number of households provided with solar cookers in year y		As per paragraph 17	As per paragraph 17
2	$n_{k,y}$	Proportion of $N_{k,0}$ still using solar cooker in year y (fraction)		As per paragraph 18	As per paragraph 18
4	$FC_{BL,k,j}$	Annual consumption of baseline fossil fuel *j*	Physical units, mass or volume	As per paragraph 8	As per paragraph 8
5	$FC_{PJ,k,j}$	Annual consumption of fossil fuel type *j* by household *k*	Physical units, mass or volume	As per paragraph 12	As per paragraph 12

Project activity under a programme of activities

If the NRB that would have been used in the baseline are to be replaced by the solar cookers, the relevant requirement for PoA in AMS-I.E shall be followed.

- - - -