

CDM-MP80-A13

Draft small-scale Methodology

AMS-I.E: Switch from non-renewable biomass for thermal applications by the user

Version 10.0

Sectoral scope(s): 01

DRAFT

COVER NOTE

1. Procedural background

1. The work on the revision of the methodology “AMS-I.E: Switch from non-renewable biomass for thermal application by the user”, was carried out in response to two mandates:
 - (a) The mandate from the Executive Board of the CDM (hereinafter referred to as the Board) at its 102nd meeting (EB102 report, para. 46), to revise this methodology to further elaborate requirements to account for stove-stacking; and
 - (b) The mandate from the Board at its 103rd meeting (EB103 report, para. 28) to recommend a revision to this methodology consistent with the recommendations in the concept note "Methodological approaches for calculating emissions reductions from project activities, resulting in the reduced use of non-renewable biomass in households".

2. Purpose

2. The purpose of the draft revised methodology is to address the mandates above.

3. Key issues and proposed solutions

3. The proposed revision is to:
 - (a) Revise the fossil fuel emission factor as per the concept note "Methodological approaches for calculating emissions reductions from project activities, resulting in the reduced use of non-renewable biomass in households";
 - (b) Clarify monitoring requirements;
 - (c) Incorporate the clarifications to previous requests (SSC_749, SSC_756, SSC_746, SSC_759, SSC_739, SSC_744, and SSC_745).

4. Impacts

4. The proposed revision will facilitate the development of CDM project activities/programme of activities promoting clean and energy efficient cook stoves.

5. Subsequent work and timelines

5. The Methodologies Panel (MP), at its 80th meeting, agreed to seek public inputs on the draft revised methodology. If input is received, the input will be taken into account by electronic means when preparing the recommendation to the Board. If no input is received, the MP recommends that the Board approve the revision of the methodology. No further work is envisaged.

6. Recommendations to the Board

6. If no input is received during the call for public input, the MP recommends that the Board adopt this draft revised methodology, to be made effective at the time of the Board's approval. If input is received, this section is not applicable.

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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)	Generation of thermal energy by introducing renewable energy technologies for end users that displace the use of non-renewable biomass. Examples of these technologies include, but are not limited to biogas stoves, solar cookers or passive solar homes
Type of GHG emissions mitigation action	Renewable energy: Displacement of more GHG-intensive, non-renewable biomass-fuelled applications by introducing renewable energy technologies

2. Scope, applicability, and entry into force

2.1. Scope

2. This methodology comprises of activities to displace the use of non-renewable biomass by introducing renewable energy technologies¹. Examples of these technologies include, but are not limited to biogas stoves, bio-ethanol stoves, solar cookers², passive solar homes.
3. Project participants are able to show that non-renewable biomass has been used since 31 December 1989, using survey methods or referring to published literature, official reports or statistics.

2.2. Applicability

4. The methodology is applicable for technologies displacing use of non-renewable biomass by renewable energy.
5. Project participants or coordinating and managing entities shall describe in the PDD/PoA-DD how the double counting of emission reductions has been addressed (e.g. between end users, distributors and producers of stoves).
6. For project activities introducing bio-ethanol cookstoves, project participants or coordinating and managing entities shall demonstrate that the bioethanol cookstoves are designed, constructed and operated to the requirements (e.g. with regard to safety) of a relevant national or local standard or comparable literature. Latest guidelines issued by a relevant national authority or an international organisation may also be used.

¹ Electric cookstove such as induction type cookstoves using the grid electricity are not eligible under this methodology. Project proponents are encouraged to submit a new Type-III small-scale methodology.

² Solar electric cookers using direct current (D.C.) heating element with associated equipment (e.g. solar panel, charge controller, storage battery, balance of systems) is also eligible under this methodology.

7. The CDM-PDD or CDM-PoA-DD/CPA-DD shall explain the proposed method for distribution of project devices including the method to avoid double counting of emission reductions such as unique identifications of product and end-user locations (e.g. programme logo).

Box 1. Non-binding best practice example 1

As per the standard for sampling and surveys for CDM project activities and programme of activities (sampling standard), PPs/CMEs/DOEs shall ensure that samples are randomly selected and are representative of the population.

The listing/recording of information of all end-users is important to meet the requirement above. That is, if ex post monitoring survey conducted to confirm that the devices are still installed and operating is based on sample survey, the sample selection should be on a random basis to ensure results are unbiased estimates of the parameters and each device would have an equal chance to qualify in a sample.

These requirements also enable identification of the devices that are distributed only through the specific CDM project activity under consideration, particularly if multiple projects are underway. Furthermore, in the case of programme of activities (PoAs), the requirements ensure avoidance of double counting within the PoA (the same device belonging to two different CPAs of the same PoA); and double counting in situations external to the PoA (the same household belonging to two different PoAs for the same technology).

Thus, unique identification of product (e.g. programme logo, serial number) and end-user locations (e.g. database of all end-users including their names, addresses, telephone numbers) avoids double counting as well as allows implementation of unbiased and reliable sample schemes.

8. The CDM-PDD or CDM-PoA-DD/CPA-DD shall also explain how the proposed procedures prevent double counting of emission reductions, for example if project stove manufacturers, wholesale providers or others were to claim credit for emission reductions from the project devices.

2.3. Entry into force

9. The date of entry into force is the date of the publication of the EB ### meeting report on DD month YYYY.

2.4. Applicability of sectoral scopes

10. For validation and verification of CDM projects and programme of activities by a designated operational entity (DOE) using this methodology, application of sectoral scope 01 is mandatory and sectoral scopes 13 and 15 are conditional.

3. Normative references

11. Project participants shall apply the “Guideline: General guidelines for SSC CDM methodologies”, “TOOL21: Demonstration of additionality of small-scale project activities” and “TOOL19: Demonstration of additionality of microscale project activities” available at:

<<http://cdm.unfccc.int/Reference/Guidclarif/index.html#meth>> and
<<https://cdm.unfccc.int/Reference/tools/index.html>> mutatis mutandis.

12. This methodology also refers to the latest approved versions of the following approved standards, tools and methodologies:

- (a) “AMS-I.I.: Biogas/biomass thermal applications for households/small users”;
- (b) “AMS-II.G.: Energy efficiency measures in thermal applications of non-renewable biomass”;
- (c) “AMS-III.F.: Avoidance of methane emissions through composting”;
- (d) “AMS-III.G.: Landfill methane recovery”;
- (e) “AMS-III.H.: Methane recovery in wastewater treatment”;
- (f) “AMS-III.BG.: Emission reduction through sustainable charcoal production and consumption”;
- (g) “TOOL03: Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion”;
- (h) “TOOL05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation”;
- (i) “TOOL16: Project and leakage emissions from biomass”;
- (j) “TOOL30: Calculation of the fraction of non-renewable biomass”;
- (k) “Standard: Sampling and surveys for CDM project activities and programme of activities”.

4. Definitions

13. The definitions contained in the Glossary of CDM terms shall apply.

14. The following definition shall also apply:

- (a) **Batch** - is defined as the population of the device of the same type commissioned during a certain period of time (e.g. week or month) in a certain calendar year. To establish the date of commissioning, the Project Participant may opt to group the devices in “batches” and the latest date of commissioning of a device within the batch shall be used as the date of commissioning for the entire batch.

Box 2. Non-binding best practice example 2

Project proponents may define the batch for a period that is shorter than a full year.

However, it should be noted that once batches are defined it would be necessary to calculate the emission reductions separately for each batch of project devices, as denoted by index j in equations of the methodology (e.g. equation 1).

For sample-based surveys, as long as the requirements in the methodology and sampling standard are met, whether or in what way the batches are considered is subject to the discretion of the project participant and survey design (e.g. it depends on the parameter, type of survey method chosen, frequency of survey, data collection method).

5. Baseline methodology**5.1. Project boundary**

15. The project boundary is the physical, geographical site of the use of biomass or the renewable energy.

5.2. Additionality

16. Additionality is demonstrated using one of the options below:

5.2.1. Option 1 (Positive list)

17. Demonstrate ex-ante that the penetration³ of renewable energy based thermal energy technologies (e.g. biogas stoves, solar cookers) is equal to or less than 5 per cent of the technologies/measures providing similar services in the region⁴ in order to be considered as automatically additional.
18. The penetration shall be determined using one of the following options:
 - (a) Official statistics or reports, relevant industry association reports or peer-reviewed literature;
 - (b) Results of a sampling survey conducted by project participants or a third party as per the latest version of "Standard: Sampling and surveys for CDM project activities and programme of activities"; covering technologies/measures providing similar services as the project technology/measure.
19. To determine the penetration using the above paragraph, the most recent data available at the time of submission of the CDM-PDD or CDM-CPA-DD for validation/inclusion,

³ Refers to proportion of stock of functional equipment at the user end, also termed as market saturation.

⁴ Region/Applicable geographical area - should be the entire host country. If the project participants opt to limit the applicable geographical area to a specific geographical area (such as province, region, etc.) within the host country, then they shall provide justification on the essential distinction between the identified specific geographical area and rest of the host country.

shall be used, and the data vintage used shall not include data older than three years prior to: (a) the start date of the CDM project activity; or (b) the start of validation/inclusion, whichever is earlier.

5.2.2. Option 2

20. Demonstrate additionality applying the “TOOL21: Demonstration of additionality of SSC project activities.”

5.2.3. Option 3

21. Demonstrate additionality applying the “TOOL19: Demonstration of additionality of microscale project activities.”

5.3. Baseline emissions

22. It is assumed that in the absence of the project activity, the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs.
23. Baseline emissions would be calculated as:

$$BE_y = B_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossil_fuel} \quad \text{Equation (1)}$$

Where:

BE_y	=	Baseline emissions during the year y in t CO ₂ e
B_y	=	Quantity of woody biomass that is substituted or displaced in tonnes
$f_{NRB,y}$	=	Fraction of woody biomass used in the absence of the project activity in year y that can be established as non-renewable biomass (fNRB) ⁵ The value of fNRB shall be calculated using either of the following two options: (a) Ex ante: the fNRB value is determined once at the validation stage, thus no monitoring and recalculation of the fNRB value during the crediting period is required; ⁶ (b) Ex post: the fNRB, y value is determined for the year “ y ” in the crediting period, requiring the fNRB value to be updated annually, following a consistent calculation procedure throughout the crediting period.
$NCV_{biomass}$	=	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.0156 TJ/tonne)

⁵ Default values endorsed by designated national authorities and approved by the Board are available at <http://cdm.unfccc.int/methodologies/standard_base/index.html>.

⁶ The ex ante value may not be changed until the end of the crediting period, even if the default national value applied previously as endorsed by the DNA at the time of validation may have expired before the end the crediting period.

$EF_{projected_fossil\ fuel}$ = Emission factor for the substitution of non-renewable woody biomass by similar consumers. Use default regional⁷ values in the table below 63.7 t CO₂/TJ⁸ or calculate using Equation (3)

Table 2. Default regional values of the fossil fuel emission factor (CO₂ and non-CO₂ GHG emissions)

	Fossil fuel emission factor (t CO ₂ e/TJ) incl. CH ₄ and N ₂ O emissions
Arab States	63.9
East Asia and the Pacific	85.7
Europe and Central Asia	57.8
Latin America and the Caribbean	68.6
South Asia	64.4
Sub-Saharan Africa	73.2

24. As an alternative to the use of the default value for the fossil fuel emission factor, project participants may estimate the fossil fuel emission factor⁹ for their project or PoA by determining x_j (a fraction representing fuel type j (that would be expected/assumed to be used) in the region/country or project area for cooking)

$EF_{projected_fossil\ fuel}$

Equation (2)

$$= \sum_j \{x_j \times (EF_{FF,j,CO_2} + EF_{FF,j,CH_4} \times GWP_{CH_4} + EF_{FF,j,N_2O} \times GWP_{N_2O})\}$$

⁷ Refer to the definition of “developing regions” provided by United Nations (<http://hdr.undp.org/en/content/developing-regions>).

⁸ This value represents the emission factor of the substitution fuels likely to be used by similar users, on a weighted average basis. The value is calculated, based on the global average ratio of cooking fuels (the normalized ratio of kerosene and liquefied petroleum gas (LPG) excluding coal), i.e. 9 per cent for kerosene (71.5 t CO₂/TJ) and 91 per cent for LPG (63.0 t CO₂/TJ).

⁹ The use of electricity should be considered in the equation with its share and using grid emission factor. If the share of electricity or fossil fuel is less than 5%, it may be disregarded for calculation of the fuel emission factor.

Where:

x_j	=	Percentage share of fossil fuel use ¹⁰ (a fraction representing the share of fossil fuel type j in total fossil fuel (that would be expected/assumed to be) used in the region/country or project area for cooking)
EF_{FF,j,CO_2}	=	CO ₂ emission factor for the fossil fuel j projected to be used for substitution of non-renewable woody biomass by similar consumers. Use a value in the table 3 below (t CO ₂ /TJ)
EF_{FF,j,CH_4}	=	CH ₄ emission factor for the fossil fuel j projected to be used for substitution of non-renewable woody biomass by similar consumers. Use a value in the table 3 below (t CH ₄ /TJ)
EF_{FF,j,N_2O}	=	N ₂ O emission factor for the fossil fuel j projected to be used for substitution of non-renewable woody biomass by similar consumers. Use a value in the table 3 below (t N ₂ O/TJ)
GWP_{CH_4}	=	Global Warming Potential of CH ₄ valid for the commitment period
GWP_{N_2O}	=	Global Warming Potential of N ₂ O valid for the commitment period

Table 3. Default emission factors (kg of GHG per TJ on a Net Calorific Basis)

Fuel	Default CO ₂ Emission Factor	Default CH ₄ Emission Factor	Default N ₂ O Emission Factor
Kerosene	71,900	10	0.6
Liquefied Petroleum Gases (LPG)	63,100	5	0.1
Coal	94,600	300	1.5

Source: Table 2.5, Chapter 2, 2006 IPCC Guidelines for National Greenhouse Gas Inventories25. B_y is determined by using one of the following options:

- (a) Calculated as the product of the number of households multiplied by the estimate of average annual consumption of woody biomass per household that is displaced by the project activity (tonnes/household/year);

$$B_y = N_{HH} \times (BC_{BL,HH,y} - BC_{PJ,HH,y}) \quad \text{Equation (3)}$$

Where:

N_{HH}	=	Number of households in the project activity, number
$BC_{BL,HH,y}$	=	Average annual consumption of woody biomass per household before the start of the project activity, tonnes/household/year

¹⁰ For example, percentage share of kerosene, LPG and coal in total fossil fuel used in the country X is 10%, 70% and 20%, then the parameter value for x_j should be 0.1, 0.7 and 0.2 respectively.

$BC_{PJ,HH,y}$ = If it is found that pre-project devices were not completely displaced but continue to be used to some extent, average annual consumption of woody biomass per household in the pre-project devices during the project activity, tonnes/household/year

- (b) Calculated as the product of the number of persons served per household multiplied by the number of households and the estimate of average annual consumption of woody biomass per person that is displaced by the project activity (tonnes/person/year);

$$B_y = N_{HH} \times N_{p,HH} \times (BC_{BL,PP,y} - BC_{PJ,PP,y}) \quad \text{Equation (4)}$$

Where:

$N_{p,HH}$ = Average number of persons served per household, number

$BC_{BL,PP,y}$ = Average annual consumption of woody biomass per person before the start of the project activity, tonnes/person/year

$BC_{PJ,PP,y}$ = If it is found that pre-project devices were not completely displaced but continue to be used to some extent, average annual consumption of woody biomass per person in the pre-project devices during the project activity, tonnes/person/year

- (c) Calculated as the product of the number of persons served per institution¹¹ multiplied by the number of institutions and the estimate of average annual consumption of woody biomass per person that is displaced by the project activity (tonnes/person/year);

$$B_y = \sum_{i=1}^i N_{p,I,y,i} \times N_{I,i} \times (BC_{BL,PP,y} - BC_{BJ,PP,y}) \quad \text{Equation (5)}$$

Where:

$N_{p,I,y,i}$ = Average number of persons served per institution in year y , number

$N_{I,i}$ = Number of institutions type i prior to project implementation, number

- (d) Calculated from the thermal energy generated in the project activity as:

$$B_y = \sum_{i=1}^n HG_{p,y} \div (NCV_{biomass} \times \eta_{old,i}) \quad \text{Equation (6)}$$

Where:

$HG_{p,y}$ = Quantity of thermal energy generated by the new renewable energy technology in the project in year y (TJ)

$\eta_{old,i}$ = Efficiency of pre - project device per type of device i

¹¹ Institutions such as schools, prisons and hospitals.

26. Where charcoal is used as the fuel by baseline (old) or project (new) devices, the quantity of woody biomass shall be determined by using a default wood to charcoal conversion factor of 6 kg of firewood (wet basis) per kg of charcoal (dry basis).¹² Alternatively, credible local conversion factors determined from a field study or literature may be applied.

5.4. Project emissions

27. The project emissions (PE_y) from cultivation, use and processing of biomass shall be calculated using the latest version of “TOOL16: Project and leakage emissions from biomass”. In doing so, the following sources of project emissions shall be considered as applicable, bearing in mind that some sources may be only relevant for specific fuels (e.g. production of bioethanol):
- (a) CO₂ emissions from on-site consumption of fossil fuels due to the project activity, calculated using the latest version of “TOOL03: Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion”, including the consumption of fossil fuels for any processing of feedstock;
 - (b) CO₂ emissions from electricity consumption by the project activity using the latest version of “TOOL05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation”, including the consumption of electricity for any processing of feedstock;
 - (c) Methane emission from solid waste disposal or waste water calculated as per provisions in AMS-III.G. (landfill); AMS-III.F. (composting) and AMS-III.H. (waste water treatment) in cases where the waste is disposed in anaerobic conditions;
 - (d) Project emissions related to cultivation of feedstock are calculated using the latest version of the tool “TOOL16: Project and leakage emissions from biomass”;
 - (e) Project emissions from transportation are estimated using the latest version of the tool “TOOL12: Project and leakage emissions from transportation of freight,” if the transportation distance is more than 200 km; otherwise they can be neglected.

5.5. Leakage emissions

28. Leakage emissions (LE_y) shall be calculated using the latest version of “TOOL16: Project and leakage emissions from biomass”.
29. Leakage emissions (related to the non-renewable woody biomass saved by the project activity) shall be assessed based on ex post surveys of users and the areas from which this woody biomass is sourced (using 90/30 precision for a selection of samples). The following potential source of leakage shall be considered: The use/diversion of non-renewable woody biomass saved under the project activity by non-project households/users that previously used renewable energy sources. If this leakage assessment quantifies an increase in the use of non-renewable woody biomass used by

¹² Refer to: <<http://www.ipcc-nggip.iges.or.jp/public/gl/guidelin/ch1ref3.pdf>>. The term ‘wet basis’ assumes that the wood is ‘air-dried’ as is specified in the IPCC default table.

the non-project households/users that is attributable to the project activity, then B_y is adjusted to account for the quantified leakage. Alternatively, B_y is multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.

30. Project activities switching from baseline device using firewood to efficient project device using charcoal or switching from firewood to processed biomass (briquette, pellets, and woodchips) shall take into account the leakage effects related to the charcoal or processed biomass production.
31. A default value of 0.030 t CH₄/t charcoal may be used in accordance with “AMS-III.BG.: Emission reduction through sustainable charcoal production and consumption.”

5.6. Emission reductions

32. Emission reductions are to be estimated based on the equation below.

$$ER_y = BE_y - PE_y - LE_y \quad \text{Equation (7)}$$

Where:

ER_y = Emission reductions in year y , tonnes CO₂eq

5.7. Data and parameters not monitored

33. In addition to the parameters listed in the tables below, the provisions on data and parameters not monitored in the tools referred to in this methodology apply.

Data / Parameter table 1.

Data / Parameter:	x_j
Data unit:	Fraction
Description:	Percentage share of fossil fuel use (a fraction representing the share of fossil fuel type j in total fossil fuel (that would be expected/assumed to be) used in the region/country or project area for cooking)
Source of data:	Published literature, official reports or statistics, surveys.
Measurement procedures (if any):	-
Any comment:	-

Data / Parameter table 2.

Data / Parameter:	B_y
Data unit:	tonnes/year
Description:	Quantity of woody biomass that is substituted or displaced
Source of data:	-
Measurement procedures (if any):	Calculated using one of the following options:

	<p>(a) Calculated as the product of the number of households multiplied by the estimate of average annual consumption of woody biomass per household displaced by the project activity (tonnes/household/year);</p> <p>(b) Calculated as the product of the number of households multiplied by the number of persons served per household and the estimate of average annual consumption of woody biomass per person displaced by the project activity (tonnes/person/year);</p> <p>(c) Calculated as the product of the number of institutions multiplied by the number of persons served per institution and the estimate of average annual consumption of woody biomass per person displaced by the project activity (tonnes/person/year);</p> <p>(d) Calculated from the thermal energy generated in the project activity</p>
Any comment:	-

Data / Parameter table 2.

Data / Parameter:	$f_{NRB,y}$
Data unit:	-
Description:	Fraction of woody biomass saved by the project activity during year y that can be established as non-renewable biomass
Source of data:	-
Measurement procedures (if any):	As per "TOOL30: Calculation of the fraction of non-renewable biomass"
Any comment:	-

Data / Parameter table 3.

Data / Parameter:	N_{HH}
Data unit:	number
Description:	Number of households in the project activity in year y
Source of data:	-
Measurement procedures (if any):	Established ex ante prior to start of the project activity
Any comment:	-

Data / Parameter table 4.

Data / Parameter:	$BC_{BL,HH,y}$
Data unit:	tonnes/household/year
Description:	Average annual consumption of woody biomass per household before the start of the project activity
Source of data:	-

Measurement procedures (if any):	Determined ex ante using one of the following options and remains fixed during the crediting period : (a) $N_{p,HH}$ times $BC_{BL,PP,y}$; or (b) Historical data or a sample survey conducted as per the latest version of the “Standard: Sampling and surveys for CDM project activities and programme of activities;” or (c) Country or region specific values approved through the “procedure for development, revision, clarification and update of standardized baselines”, which are available on the CDM website http://cdm.unfccc.int/methodologies/standard_base/index.html
Any comment:	-

Data / Parameter table 5.

Data / Parameter:	$N_{p,HH}$
Data unit:	number
Description:	Average number of persons served per household prior to project implementation
Source of data:	Established ex ante prior to project implementation based on records of households served by the project
Measurement procedures (if any):	-
Any comment:	-

Data / Parameter table 6.

Data / Parameter:	$BC_{BL,PP,y}$
Data unit:	tonnes/person/year
Description:	Average annual consumption of woody biomass per person before the start of the project activity
Source of data:	-
Measurement procedures (if any):	Determined ex ante using one of the following options and remains fixed during the crediting period : (a) A default value of 0.5 tonnes/person per year ¹³ ; (b) Historical data or a sample survey conducted as per the latest version of the “Standard: Sampling and surveys for CDM project activities and programme of activities;” (c) Country or region specific values approved through the “procedure for development, revision, clarification and update of standardized baselines,” which are available on the CDM website http://cdm.unfccc.int/methodologies/standard_base/index.html
Any comment:	-

¹³ Refer to “Annex 5 - Information note on the rationale for default factors used in AMS-I.E. and AMS-II.G.” of the SSC WG 42 meeting report.

6. Monitoring methodology

34. ~~The project participants shall maintain a record for the date of commissioning of project devices of each type *i*.~~

During project activity implementation, the following distribution data are to be recorded:

(a) Number of pieces of new devices distributed under the project activity, identified by the type of devices and the date of commissioning (See Data / Parameter table 7 and 8);

(b) Data to unambiguously identify the recipient of the new devices distributed under the project activity (e.g. name, address, phone number).

35. Relevant parameters shall be monitored and recorded during the crediting period as indicated in section 6.1 below. The applicable requirements specified in the “General guidelines for SSC CDM methodologies” are also an integral part of the monitoring guidelines specified below and therefore shall be followed by the project participants.

36. In order to assess the leakages, monitoring shall include data on the amount of woody biomass saved under the project activity that is used by non-project households/users (who previously used renewable energy sources). Other data on non-renewable woody biomass use required for leakage assessment shall also be collected.

37. Monitoring should confirm the displacement or substitution of the non-renewable woody biomass at each location. ~~In the case of appliances switching to renewable biomass the quantity of renewable biomass used shall be monitored. For this, project proponents may apply the “Standard: Sampling and surveys for CDM project activities and programme of activities.”~~

6.1. Data and parameters monitored

Data / Parameter table 7.

Data / Parameter:	Date of commissioning of project device of type <i>i</i>
Data unit:	Date
Description:	Actual date of commissioning of the project device.
Source of data:	Internal records
Measurement procedures (if any):	-
Monitoring frequency:	Fixed and recorded at the time of commissioning/distribution
QA/QC procedures:	-
Any comment:	-

Data / Parameter table 8.

Data / Parameter:	Date of commissioning of batch j
Data unit:	Date
Description:	To establish the date of commissioning, the Project Participant may opt to group the devices in “batches” and the latest date of commissioning of a device within the batch shall be used as the date of commissioning for the entire batch
Source of data:	Internal records
Measurement procedures (if any):	
Monitoring frequency:	Fixed and recorded at the time of commissioning/distribution of the last project device in the batch
QA/QC procedures:	-
Any comment:	To be reported in the monitoring report

Data / Parameter table 9.

Data / Parameter:	$NCV_{biomass}$
Data unit:	TJ/tonne
Description:	Net calorific value of the non-renewable woody biomass, briquettes or charcoal used in project devices
Source of data:	-
Measurement procedures (if any):	IPCC default for wood fuel, 0.0156 TJ/tonne, based on the gross weight of the wood that is ‘air-dried’ may be used if fuel used in project device is also woody biomass. If fuel used in the project device is charcoal, 0.029 TJ/tonne may be used. If briquette is used as project fuel, NCV shall be measured annually
Monitoring frequency:	Yearly
QA/QC procedures:	-
Any comment:	-

Data / Parameter table 10.

Data / Parameter:	$f_{NRB,y}$
Data unit:	-
Description:	Fraction of woody biomass saved by the project activity during year y that can be established as non-renewable biomass
Source of data:	-
Measurement procedures (if any):	As per “TOOL30: Calculation of the fraction of non-renewable biomass”
Monitoring frequency:	Yearly, if project proponents opt for annual monitoring instead of fixing the value ex ante at the beginning of each crediting period
QA/QC procedures:	-
Any comment:	-

Data / Parameter table 11.

Data / Parameter:	$BC_{PJ,HH,y}$
Data unit:	tonnes/household/year
Description:	Average annual consumption of woody biomass per household in the pre-project devices during the project activity, if it is found that pre-project devices were not completely displaced but continue to be used to some extent
Source of data:	Surveys
Measurement procedures (if any):	Monitoring shall consist of estimation of all project devices or a representative sample thereof, at least once every two years (biennial)
Monitoring frequency:	At least once every two years (biennial)
QA/QC procedures:	-
Any comment:	

Data / Parameter table 12.

Data / Parameter:	$BC_{PJ,PP,y}$
Data unit:	tonnes/person/year
Description:	Average annual consumption of woody biomass per person in the pre-project devices during the project activity, if it is found that pre-project devices were not completely displaced but continue to be used to some extent
Source of data:	Surveys
Measurement procedures (if any):	Monitoring shall consist of estimation of all project devices or a representative sample thereof, at least once every two years (biennial)
Monitoring frequency:	At least once every two years (biennial)
QA/QC procedures:	-
Any comment:	

Data / Parameter table 13

Data / Parameter:	$N_{p,I,y,i}$
Data unit:	number
Description:	Average number of persons served per institution
Source of data:	-
Measurement procedures (if any):	Average number of persons served per institution shall be based on survey undertaken as per "Standard: Sampling and surveys for CDM project activities and programme of activities". This parameter shall be monitored every year. If the monitoring period is shorter or longer than one year, the result may be extrapolated for the monitoring period
Monitoring frequency:	Monitored annually ex post
QA/QC procedures:	-
Any comment:	-

Data / Parameter table 14

Data / Parameter:	$HG_{p,y}$
Data unit:	TJ
Description:	Quantity of thermal energy generated by the new renewable energy technology in the project in year y
Source of data:	-
Measurement procedures (if any):	<p>For a biogas digester, it shall be monitored as per the requirements stipulated in the Table 1 of "AMS-I.I.: Biogas/biomass thermal applications for households/small users". Alternatively, project proponents may use a default biogas generation value of $0.13 \text{ Nm}^3 \cdot \text{m}^{-3} \cdot \text{day}^{-1}$ (i.e. volume of biogas generated in normal conditions of temperature and pressure per unit useful volume of the digester per day) for regions/countries where annual average ambient temperature is higher than 20°C.</p> <p>For the case of ethanol cookstoves, the related requirements from AMS-I.I. for determining thermal energy generated in the case of processed renewable biomass (refer to paragraph 13 of the methodology version 4.0) may be adopted. The preferred approach to determine the thermal energy output of the stoves would be through monitoring the amount of ethanol used for cooking by the households (if required, on a sample basis), the NCV and density of the ethanol, and the efficiency of the project stoves determined according to the requirements of AMS-II.G.: Energy efficiency measures in thermal applications of non-renewable biomass for $\eta_{\text{new},i,j}$. The manufacturers rated thermal capacity of the stoves and the monitored utilization hours entails uncertainties since e.g. stoves may be operating at partial capacity. Therefore, for this option, it may be necessary to determine the average capacity utilization of stoves through surveys.</p>
Monitoring frequency:	Yearly
QA/QC procedures:	-
Any comment:	In case Option (d) in paragraph 0 above is chosen for baseline calculations

Data / Parameter table 15

Data / Parameter:	$\eta_{\text{old},i}$
Data unit:	<p>(i) Default 0.1 or 0.2 (please see details below);</p> <p>(ii) Establish prior to start of implementation based on survey</p>
Description:	Efficiency of pre-project device
Source of data:	-
Measurement procedures (if any):	Efficiency of pre - project device, which is a three-stone fire using firewood (not charcoal), or a conventional device with no improved combustion air supply or flue gas ventilation, that is without a grate or a chimney; for other types of devices, a default value of 0.2 may be optionally used. Use weighted average values (taking the amount of woody biomass consumed by each device as the weighting factor) if more than one type of device is being replaced

Monitoring frequency:	Fixed for each individual household when included in the project activity database
QA/QC procedures:	-
Any comment:	In case Option (d) in paragraph 0 above is chosen for baseline calculations

6.2. Representative sampling methods

38. 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: Sampling and surveys for CDM project activities and programme of activities”. When biennial inspection is chosen a 95 per cent confidence interval and a 10 per cent 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 per cent confidence interval and a 10 per cent 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 per cent or 95 per cent 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.

6.3. Project activity under a programme of activities

39. The use of this methodology in a project activity under a programme of activities (PoA) is legitimate if the following leakages are estimated and accounted for, if required, on a sample basis using a 90/30 precision for the selection of samples, and accounted for:
- (a) Use of non-renewable woody biomass saved under the project activity to justify the baseline of other CDM project activities can also be a potential source of leakage. If this leakage assessment quantifies a portion of non-renewable woody biomass saved under the project activity that is then used as the baseline of other CDM project activities, then B_y is adjusted to account for the quantified leakage;
 - (b) Increase in the use of non-renewable woody biomass outside the project boundary to create non-renewable woody biomass baselines can also be a potential source of leakage. If this leakage assessment quantifies an increase in the use of non-renewable woody biomass outside the project boundary, then B_y is adjusted to account for the quantified leakage;
 - (c) As an alternative to subparagraphs (a) and (b), B_y can be multiplied by a net to gross adjustment factor of 0.95¹⁴ to account for leakages, in which case surveys are not required.

¹⁴ Paragraph 29 and paragraph 39 of the methodology allow the use of a net to gross adjustment factor of 0.95 in lieu of conducting a survey to account for leakage emissions. In the case of a CPA opting to apply the adjustment factor, the adjustment factor is only applied once i.e. either paragraph 29 or paragraph 39 (c) is applied. Also, the adjustment factor does not need to be applied twice for option (a) and (b).

40. The following further conditions apply for the fNRB value applied in a component project activity (CPA) of a PoA. The choice between (a) conduct own studies to determine the local fNRB value¹⁵ as per ~~“As per~~ “TOOL30: Calculation of the fraction of non-renewable biomass” and then apply those values in the CPAs; and (b) use default national values approved by the Board (see footnote 1)^{16,17}; shall be made ex ante. A switch from national value i.e. choice (b) to local values i.e. choice (a) is permitted, under the condition that the selected approach is consistently applied to all CPAs¹⁸.
41. If the generic CPA consists solely of units that qualify as “microscale CDM units” as defined in the “TOOL19: Demonstration of additionality of microscale project activities”, the conditions to ensure that CPAs that will be included meet the small-scale or microscale thresholds and remain within those thresholds throughout the crediting period of the CPAs are not required.

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¹⁵ If the project boundary covers the entire country, then it is permitted that studies be conducted at the national level to determine the fNRB value under option (a) as mentioned under paragraph 40 of this methodology.

¹⁶ In the absence of a national value, the default globally applicable fNRB value of 0.3 may be treated as national value.

¹⁷ After registration of a PoA that applies the default conservative value of 0.30, if a national value is approved by the Board, CMEs may request a post-registration change to use that national value.

¹⁸ The determination of fNRB of all CPAs under the PoA shall follow the option that is defined by the PoA-DD. This includes new CPAs to be included to the POA and the approach has to be consistent amongst all CPAs. The new fNRB value should be calculated as per Tool 30 and the value obtained by correctly applying the tool may be applied irrespective of whether it is lower, equal or higher than the default value mentioned in the Tool.

Appendix. Non-binding survey questionnaire

1. Survey format A: Baseline fuel consumption pattern

1.1. General information¹

Title of project activity/CPA/PoA	
Name of Surveyor	
Date of survey	mm/dd/yyyy
Period of measurements (for consumption rate)	mm/dd/yyyy to mm/dd/yyyy

1.2. Household profile

Name (Household representative)	
Household size (total number of people)	
- Adult	
- Children	
Address	
Phone number (if available)	

1.3. Stove description prior to the project implementation

(mark x with type of stove used)²

"A three-stone fire, or a conventional system with no improved combustion air supply or flue gas ventilation system, i.e. Without a grate or chimney".	
Any other type of stove	

1.4. Household fuel consumption pattern prior to the project implementation³

How many meals did you prepare last week or last month?	Meals/week or month
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¹ Selection of households should be based on a sampling plan.

² An "X" shall be filled in in one of the two alternatives. If the stoves does not have a chimney or a grate, then "X" should be filled out for "Any other type of stoves." Such a stove would then be considered an improved cookstove.

³ In many cases, the end-user might not be able to provide information on quantity of cooking fuel in terms units mentioned above. In many places the volume of firewood (e.g. the volume capacity and level of filling of the transporting/storage room) is measured, not its weight. This very much depends on the local practice of measurement. The project participants should include such local measurement unit in the questionnaire. In some cases, the measurement unit could also be in terms of money spent on purchasing the fuel. Therefore, the project participant shall provide further guidelines for how the conversion of these reported values to required units (mass or volume) should be carried out (e.g. If a household uses a bag of charcoal every 10 days, then the monthly average can be calculated if the weight (or volume and bulk density) of the full bag can be determined).

1.4.1. Fuel use for cooking

	Yes/No	Quantity of usage	Unit
Charcoal			kg/month or year
Wood			kg/month or year
LPG			kg or Cylinders/month or year
Kerosene			Litres/month or year
Coal			kg/month or year
Electricity			kWh/month or year
Other fuels (explain)			

2. Survey format B: Project survey**2.1. General information⁴**

Title of project activity/CPA/PoA	
Name of Surveyor	
Date of survey	mm/dd/yyyy
Period of measurements (for consumption rate)	mm/dd/yyyy to mm/dd/yyyy

2.2. Household profile

Name (Household representative)	
Household size (total number of people)	
- Adult	
- Children	
Address	
Phone number (if available)	

2.3. Household fuel consumption pattern post the project implementation

Cooking device	
Model name/number	
Unique ID	
Date of installation	mm/dd/yyyy
Do you use the project cookstove? (Physically check the stove). ⁵	Yes/No
- If yes, have you used the stove regularly since you installed it? ⁶	Yes/No
- If yes, is your stove in good condition? ⁷	Yes/No
- If no, why did you stop using the stove?	

⁴ Selection of households should be based on a sampling plan.

⁵ The question is to determine if the cookstove is currently in use, i.e. to address the parameter of "usage factor." Physical checks to verify the usage may be done by checking the conditions of stoves, e.g. warm to touch, ashes in grate, and soot on stove.

⁶ The question is to determine if the cookstove has been continuously used.

⁷ The project proponent may rephrase the question keeping in mind the objective i.e. whether or not the project cookstove is in usable condition. If the project cookstove is not in usable condition, the PP shall exclude such stoves from project database of the whole crediting year and subsequent years. The PP may include such stoves again on replacing them with new cookstoves of similar efficiency.

- How many meals did you prepare using project cookstove last week or last month?	Meals/week or month
Do you use your traditional (baseline) cookstove also?	Yes/No
- If yes, how many meals did you prepare using traditional (baseline) cookstove last week or last month? ⁸	Meals/week or month
Do you use any other stove? (ICS etc.) ⁹	Yes/No
If yes, list the types and number of other non-project stoves	
How many times a week do you use the non-project stoves?	
How much do you spend on fuel for cooking/type of cooking device in a week/month?	

2.3.1. Fuel use for cooking¹⁰

	Yes/No	Quantity of usage	Unit	Money spent on fuel/month/year
Charcoal			kg/month or year	
Wood			kg/month or year	
LPG			kg or Cylinders/month or year	
Kerosene			Liters/month or year	
Coal			kg/month or year	
Electricity			kWh/month or year	
Other fuels (explain)				

⁸ The question is to determine if the baseline stove is being used to account for project emissions.

⁹ The question is to cross-check if the project cookstove is used for all cooking requirements. It may also detect the situation where a household is taking part in more than one project activity, avoiding double-counting.

¹⁰ In many cases, the end-user might not be able to provide information on quantity of cooking fuel in terms units mentioned above. In many places the volume of firewood (e.g. the volume capacity and level of filling of the transporting/storage room) is measured, not its weight. This very much depends on the local practice of measurement. The project participants should include such local measurement unit in the questionnaire. In some cases, the measurement unit could also be in terms of money. Therefore, the project participant shall provide further guidelines for how the conversion of these reported values to required units (mass or volume) should be carried out (e.g. If a household uses a bag of charcoal every 10 days, then the monthly average can be calculated if the weight (or volume and bulk density) of the full bag can be determined).

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
10.0	9 October 2019	<p>MP80, Annex 13</p> <p>A call for input will be issued for this draft document.</p> <p>If no public input is received, this draft document will be considered by the Board at a future meeting.</p> <p>Revision to:</p> <ul style="list-style-type: none"> • The fossil fuel emission factor as per the concept note "Methodological approaches for calculating emissions reductions from project activities, resulting in the reduced use of non-renewable biomass in households" (CDM-MP80-A16); • Clarify monitoring requirements; • Incorporate the responses to clarification requests: SSC_749, SSC_756, SSC_746, SSC_759, SSC_739, SSC_744, and SSC_745.
09.0	31 August 2018	<p>EB 100, Annex 10</p> <p>Revision to include simplified provision for automatic additionality (if market penetration is less than or equal to 5 percent).</p>
08.0	1 November 2017	<p>EB 97, Annex 10</p> <p>Revision to:</p> <ul style="list-style-type: none"> • Allow inclusion of bio-ethanol for cookstoves; • Include an example survey form; • Refer to the "TOOL30: Calculation of the fraction of non-renewable biomass".
07.0	22 July 2016	<p>EB 90, Annex 12</p> <p>Revision to:</p> <ul style="list-style-type: none"> • Include the default values for baseline fuel wood consumption per person; • Include the procedures to quantify baseline woody biomass consumption for the entire household and; • Introduce the monitoring table.
06.0	28 November 2014	<p>EB 81, Annex 25</p> <p>The revision:</p> <ul style="list-style-type: none"> • Introduces the "TOOL16: Project and leakage emissions from biomass", streamlines biomass cultivation procedures across small and large scale methodologies; • Removes restrictions for application in a PoA.
05.0	20 July 2012	<p>EB 68, Annex 22</p> <p>Includes:</p> <ul style="list-style-type: none"> • A reference to the available country specific default values for

<i>Version</i>	<i>Date</i>	<i>Description</i>
		fNRB;
		<ul style="list-style-type: none"> A default biogas generation rate for regions/countries where annual average ambient temperature is higher than 20°C; and
		Specifies:
		<ul style="list-style-type: none"> The requirements of using national or local fNRB values for CPAs under a PoA.
04.0	15 April 2011	EB 60, Annex 20
		Requirements for leakage estimation simplified, default net gross adjustment factor is included as an option to account for any leakages, emission factor for the projected fossil fuel revised, more options for sampling and survey included.
03.0	17 September 2010	EB 56, Annex 17
		To expand the applicability to renewable energy water treatment technologies.
02.0	26 March 2010	EB 53, Annex 18
		To include the changes below which are consistent with the changes to AMS-II.G. approved by the Board at its fifty-first meeting:
		<ul style="list-style-type: none"> Further clarification on the eligible technology/measures; Default efficiency factors for baseline cookstoves; Procedures for sampling; Revised procedures for quantity of woody biomass that can be considered as non-renewable; and Clarifications as to which leakage requirements are appropriate for projects versus PoAs.
01.0	1 February 2008	EB 37, Annex 6
		Initial adoption.
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Business Function: Methodology		
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