METHODOLOGY

SIMPLIFIED METHODOLOGY FOR CLEAN AND EFFICIENT COOKSTOVES

SDG 13

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SUMMARY

This methodology ~~is applicable~~applies to projects/activities that introduce technologies ~~and/or practices~~ that reduce or displace no more than 10,000 tCO_2eq per crediting year (i.e., 365 days) ~~of GHG emissions~~ from the thermal energy consumption of household cooking. It is also mandatory for ~~the~~ projects using this methodology to have primary baseline fuel as either wood or charcoal. ~~This methodology is used in conjunction with the **Error! Hyperlink reference not valid.**.~~

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1| Definition

1.1.1 | For the purpose of this methodology, the following definitions apply:

a. **Double counting**: Occurs when the same emission reduction is used more than once to achieve mitigation obligations, as a result of double issuance, double-use, or double-claiming.

b. **Technical life**: Average time for which the project technology may continue to be operated ~~for an extended period~~ in a safe manner and with minimal loss of performance.

c. **Technology**: ~~In this methodology, t~~The single or multiple technologies ~~and/or practices~~ ~~applied~~ installed in the project activity that result in emission reduction.

d. **Batch**: Defined as the population of the cooking devices of the same type commissioned during a certain period ~~of time~~ (~~e.g.~~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.

2| Scope, Applicability, and entry into force

2.1 | Scope

2.1.1 | This methodology ~~is applicable~~applies to the activities that introduce technologies ~~and/or practices~~ that reduce or displace greenhouse gas (GHG) emissions from the thermal energy consumption of household cooking. ~~Throughout the methodology, the term 'technology' should be read as the single or multiple technologies and/or practices applied in the project activity.~~

2.1.2 | Project may involve progressive distribution of technology where implementation of the technology may occur in a gradual manner and adoption can increase over the project's crediting period.

2.2 | Applicability

2.2.1 | The methodology is applicable to the project activity that reduces or displaces no more than 10,000 tCO_2eq per crediting year (i.e., 365 days).

2.2.2 | The project activity that involves baseline stove change or retrofitting of existing baseline stove shall meet the following conditions;

a. the primary baseline fuel used for household cooking is wood or charcoal (i.e., 'primary' means in case of fuel mix situation more than 90% thermal

energy needs are being met with wood or charcoal[1] (Refer to Parameter **SMEC 7~~SMEC 7~~~~SMEC 7~~**); and

b. the baseline stove shall be a conventional cooking device without a grate or a chimney i.e., with no improved combustion air supply or flue gas ventilation for example ~~three~~ three-stone stove, coal pot; and

c. the project stove or retrofitted baseline stove must have a rated efficiency of at least 20% for ~~wood~~ wood-fired stoves and ~~20~~22.5% ~~Or XX%~~ for ~~charcoal~~ charcoal-fired stoves; Refer to Parameter **SMEC 1~~SMEC 1~~~~SMEC 1~~**.

2.2.3 | The project developer must design incentive mechanism(s), which should be effective as ~~fast~~ early as possible, for the elimination of inefficient baseline stoves that are replaced by the project stove and describe the incentive mechanism(s) in the PDD/VPA-DD at the time of validation.

2.2.4 | To avoid ~~double~~ double-counting or double claiming, the project developer must:

a. explain the proposed method for distribution of the project stove in the PDD/VPA-DD; and,

~~a.~~

b. clearly communicate its ownership rights and intention of claiming the emission reductions ~~to the following parties~~ by contract or clear written assertions in the transaction paperwork to~~:~~ all ~~other~~ project participants; project technology manufacturers; and retailers of the project technology or the fuel suppliers (~~See Data/parameter~~ **SMEC 2~~SMEC 2~~~~SMEC 2~~**); and,

c. inform and notify the ~~end~~ end-users[2] that they cannot claim emission reductions from the project (~~See Data/parameter~~ **SMEC 12~~SMEC 12~~~~SMEC 12~~**), and

d. exclude from the project activity, stoves included in any other voluntary market or CDM project activity/~~PoA, and~~PoA and strive not to displace the cooking devices of another CDM or voluntary project/PoA. (~~See Data/parameter~~ **SMEC 3~~SMEC 3~~~~SMEC 3~~**).

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[1] The thermal energy need (in MJ unit) of each energy source for household cooking shall be calculated as *Amount of fuel from each ~~source~~ type of fuel per day (~~which was~~ as determined during baseline survey in k~~K~~g) * Net caloric value (NCV in TJ/Gg)*. In case the energy source is electricity, the thermal energy need is calculated *as Daily cooking time (hours) * Capacity of equipment (kW) * 3.6.*

A fuel is defined as primary baseline fuel if its thermal energy accounts for more than 90% of the total thermal energy from mixed baseline fuel.

[2]

2.2.5 | Adequate evidence is supplied to demonstrate that indoor air pollution (IAP) levels are not worsened compared to the baseline, and greenhouse gases emitted by the project fuel/stove combination. (~~See Data/parameter~~ **SMEC 4~~SMEC 4~~~~SMEC 4~~**).

2.3 | Safeguards

2.3.1 | The project shall not undermine or conflict with any national, sub-national or local regulations or guidance for thermal energy supply or fuel supply or use for household cooking. (~~See Data/Parameter~~ **SMEC 5~~SMEC 5~~~~SMEC 5~~**).

2.3.2 | If the expected technical life of project technology (~~See Data/Parameter~~ **SMEC 6~~SMEC 6~~~~SMEC 6~~**) is shorter than the crediting period, the project developer shall describe measures to ensure that ~~end~~ end-users are provided replacement technology of comparable quality at the end of the technical life, by either replacing with comparable or better technology~~,~~ or retrofitting essential parts with a performance guarantee. If neither of the prior conditions can be demonstrated, no emission reductions can be claimed for the technology after its technical life has ended.

2.4 | Entry into force

2.4.1 | The date of entry into force of this methodology is 08/10/2022.

3| Baseline Methodology

3.1 | Project Boundary

3.1.1 | The project developer must provide clear definitions of project boundary, target area, and fuel production and collection area.

a. The *project boundary* is the physical, geographical site of the baseline and project stoves and fuel collection area.

   i. Where the baseline fuel is woody biomass (including charcoal), the project boundary also includes the area within which this woody biomass is grown and collected.

   ii. For projects using processed fuels, this boundary also includes the baseline and project fuel production (~~e.g.~~e.g., charcoal).

   iii. In cases where the project activity introduces the use of a new biomass feedstock into the project situation, the fuel production and collection area is the area within which this new biomass is produced, ~~collected~~collected, and supplied.

b. The *target area* is the region(s) or town(s) where the considered baseline scenario(s) are deemed to be uniform across political borders. This area could be within a single country, or across multiple adjacent countries. The target area provides an outer limit to the project boundary in which the project has a target population.

3.2 | Demonstration of additionality

3.2.1 | The project developer shall demonstrate that the project could not or would not take place without carbon finance. Possible reasons for the need for carbon finance may be that the initial investment or the on-going marketing, distribution, quality control, manufacturing and maintenance costs are unaffordable for the target population.

3.2.2 | The project developer shall demonstrate additionality by conforming to the additionality requirements of one of the options below,

a. Applicable GS4GG Community Services Activity Requirements;

b. CDM Tool 01 - Tool for the Demonstration and Assessment of Additionality;

c. CDM Tool 21 – Demonstration of additionality of small-scale project activities;

d. An approved Gold Standard VER additionality tool

3.3 | Baseline scenario

3.3.1 | The project developer shall define the baseline scenario as the existing baseline technology~~/practice~~ use and fuel consumption patterns for household cooking provided by the project technology in the population targeted for adopting the new project technology, i.e., "target population".

3.3.2 | All expected baseline scenarios corresponding to project scenarios shall be defined in the project documentation prior to validation and registration review.

3.3.3 | ~~In project, all stoves are installed at the start of the project activity or progressively, the~~The baseline scenario of the project is considered by~~-~~ default fixed till the end of the technical life of the stoves introduced in the project activity or the registered crediting period, whichever occurs earlier. If the project stove is replaced or retrofitted with a stove of similar efficiency prior to the end of crediting period, the same baseline shall be applicable till the end of the technical life of the replaced stoves or the registered crediting period, whichever occurs ~~earlier~~first.

3.4 | Selection and justification of the baseline scenarios

3.4.1 | The selection of the baseline scenario must be adequately described, with all technologies that may be replaced by the project technology considered, such as the presence and usage practices of multiple baseline technologies by the target population ("stove-stacking"). It is not legitimate to compare the project to only the most inefficient technology being used by the target population.

3.4.2 | Project developers must consider distinct baseline scenarios[3] depending on fuel type, baseline technology use patterns and target population.

3.4.3 | A different baseline scenario is not necessarily required for each different technology in the project activity.[4]

3.4.4 | ~~In a project activity where all units are installed at the start of the project, or with gradual technology adoption, t~~The baseline is considered fixed in time during the considered crediting period. It ~~therefore~~, therefore, does not require continuous monitoring or updating.

3.4.5 | In project activities targeting multiple distributed technologies ~~e.g.~~e.g., improved cookstoves and safe water supply, cross-effect between the baseline and project scenarios, including potential leakage. must be accounted for.

3.5 | Project scenario

3.5.1 | A project scenario is the adoption of an efficient stove ~~of renewable fuel~~ by the ~~end~~ end-users to meet the thermal energy requirements for household cooking in the target area. Emission reductions are credited by comparing fuel consumption in the project scenario to the corresponding baseline scenario.

3.6 | Selection and justification of the project scenarios

3.6.1 | When different project technologies are included in a project activity, the project developer must analyse whether multiple project scenarios should be identified.

3.6.2 | The project developer may identify multiple project scenarios given that different types of project stove(s) are installed in the project activity. Also, different project scenarios can be credited against the same baseline scenario if it is deemed applicable.[5]

3.7 | Changes to the baseline and project scenarios

3.7.1 | New baseline and project scenarios can be added to a project during the crediting period, by following the Design Change Requirements. When a new baseline or project scenario is created, the baseline and/or project studies, respectively, must be conducted prior to verification and crediting with respect to the new scenario. Emission reductions cannot be credited for a new project

[3] For example, end users using wood as primary fuel warrant a different baseline scenario from end users cooking predominantly with charcoal. One baseline scenario may represent rural end users, while a second baseline scenario may represent an urban target population.

[4] For example, different improved wood stove models in the project activity could be compared to the same wood stove baseline scenario, and different improved charcoal stove models in the project activity could be compared to the same inefficient charcoal stove baseline scenario.

[5] For example, the same baseline scenario for inefficient stoves could be compared to separate project scenarios for different efficient stove models in the project activity or vice versa.

scenario, or in relation to a new baseline scenario~~,~~ until the respective project studies or baseline studies have been conducted and the request for design change has been approved.

3.8 | Emission reductions

3.8.1 | The emission reductions are calculated for each batch as follows:

$$ER_y = \sum_{0to1}^{xtoy} N_{P,y} \times P_y \times U_{P,y} \times \left(f_{NRB,y} \times EF_{b,fuel,CO2} + EF_{b,fuel,non\_CO2}\right) \times \left(1 - DF_{b,stove,y}\right) - \sum LE_y \quad \textit{Eq. 1}$$

Where:

ER_y	=	Emission reductions for project activity in year y (t CO_2e/yr)
$N_{P,y}$	=	Number of project stoves of each age group operational in the year y
P_y	=	Quantity of baseline fuel that is saved in the year y (tonnes per household in year y)
$U_{P,y}$	=	Usage rate for project stoves in year y, based on adoption rate and ~~drop~~ drop-off rate revealed by usage surveys (fraction)
$f_{NRB,y}$	=	Fraction of biomass that can be established as non-renewable biomass (fraction %)[6].
$EF_{b,fuel,CO2}$	=	CO_2 emission factor of baseline fuel that is substituted or reduced. (tCO_2/ton of fuel)
$EF_{b,fuel,non\_CO2}$	=	Non-CO_2 emission factor of baseline fuel that is substituted or reduced. (tCO_2/ton of fuel)
$DF_{b,stove,y}$	=	Usage of baseline stove during the year y (fraction) in the project scenario
x	=	Age group, from 0 to y – 1
y	=	Year of the crediting period
LE_y	=	Leakage for project scenario p in year y (tCO2e/yr)

3.8.2 | Quantity of baseline fuel saved (P_y) is estimated for each project stove type individually as follows:

$$P_y = B_{b,y} \times \left(1 - {}^{\eta_b}/_{\eta_{p,y}}\right) \quad \textit{Eq. 2}$$

Where:

P_y	=	Quantity of baseline fuel saved in the year y (tonnes per household in year y)

[6] Default values endorsed by designated national authorities and approved by the Board are available at https://cdm.unfccc.int/DNA/fNRB/index.html

$B_{b,y}$	=	Quantity of baseline fuel consumed in baseline scenario during year y (tonnes per household per year)
η_b	=	Efficiency of the baseline stove being replaced (fraction)
$\eta_{p,y}$	=	Efficiency of project stove in year y (fraction)

3.8.3 | Quantity of fuel consumed in the baseline ($B_{b,y}$) is estimated as an average annual consumption of baseline fuel per household (tonnes/year) for each baseline scenario following one of the options (See ~~data/parameter~~ **SMEC 10~~SMEC 10~~~~SMEC 10~~**);

a. Default values (i.e., minimum service level), or

b. Historical data, or

c. Sample surveys, or

d. Standardised baselines.

3.8.4 | The baseline stove efficiency (η_b) is determined measured/estimated as per the measurement procedure outlined ~~in data/parameter~~under **SMEC 11~~SMEC 11~~~~SMEC 11~~**.

3.8.5 | The project stove efficiency ($\eta_{p,y}$) is determined measured/estimated as per the measurement procedure outlined ~~in data/parameter~~under **SMEC 15~~SMEC 15~~~~SMEC 15~~**. The calculation in ~~the~~ equation 2, above assumes that there is only one project device per household. Considering that multiple project stoves can be used in the project household, the weighted average efficiency of project stoves shall be used in case multiple project stoves are in use in the project household.

3.8.6 | The loss in efficiency of each type of the project stove due to ageing shall be accounted for during the monitoring period. Refer to ~~See data/parameter~~ **SMEC 15~~SMEC 15~~~~SMEC 15~~**

3.8.7 | Usage of baseline stove during ($DF_{b,stove,y}$) in project scenario shall be accounted for during the monitoring period (Refer to ~~See data/parameter~~ **SMEC 17~~SMEC 17~~~~SMEC 17~~**).

3.8.8 | The project stove usage rate ($U_{P,y}$) (Refer to ~~See data/parameter~~ **SMEC 16~~SMEC 16~~~~SMEC 16~~**)~~.~~ is monitored as per the usage survey requirement detailed in Section 4.1 |~~4.1 |~~~~4.1~~, below.

3.9 | Leakage emissions

3.9.1 | The project activities applying this methodology Leakage emissions[7] (LE_y) related to non-renewable biomass saved by the project activity is not considered. In this case, the value for "$\sum LE_y$ " in equation 1 shall be equal to "0".

3.9.2 | The Programme of A~~a~~ctivities (PoA) applying this methodology shall apply the adjustment factor of 0.95 to emission reductions to account for approximate leakage emissions for each VPA. In this case, the term "$- \sum LE_y$ " in equation 1, changes to "$\times$ 0.95".

3.9.3 | When applicable, leakage risks that are deemed very low can be ignored as long as the case for their insignificance is substantiated.

3.10 |General requirements for data and information sources

3.11 |Data and parameters not monitored

Parameter ID	SMEC 1
Data/Parameter:	Project technology description
Data unit:	NA
Description:	The detailed description of the project stove or retrofitted baseline stove shall include as a minimum: • Manufacturer/rRetrofitting entity name, • product name (if applicable), • technology type, • capacity characteristics, • rated thermal efficiency Any performance certifications from the nNational Sstandards body or certification body recognised by the national standards body also shall be provided.
Source of data:	Any of the following sources shall be used: • Manufacturer specifications • Certifications by a national standards body or an appropriate certification party recognised by a national standards body • Commercial guarantee • Technical reports from the installer • For stoves built on-site at the end end-user location, reports of Standard WBT[7] by stove manufacturer or installer or independent authorized testing body. Professional opinion or expert opinion is not accepted as a source for this parameter.
~~Measurement procedures (if any):~~	–
Any comment	For any technical information not available at the time of validation, VVB shall include a FAR in the validation report. Project developer shall provide this information to the verifying VVB before completion of the verification report.

[7] https://cleancooking.org/research-evidence-learning/standards-testing/protocols/

	No issuance shall be requested for project technologies for which the project technology details are not verified by the verifying VVB prior to completion of the verification report.

Parameter ID	**SMEC 2**
Data/Parameter:	Avoidance of double counting or double claiming among project participants
Data unit:	NA
Description:	Evidence of avoidance of double counting or double claiming with other parties directly involved with the project or programme.
Source of data:	Written assertions with the project developer of the ownership rights and intention of selling the emission reductions resulting from the project activity directed at or signed with all the applicable parties of the following: • all other project participants; • project technology producers; and • retailers of the project technology or the renewable fuel.
~~Measurement procedures (if any):~~	–
Any comment:	If any of the written assertions are not available at the validation stage, the validating VVB shall include a FAR for verifying VVB. In all cases, the written assertions shall be provided and verified before the first verification.

Parameter ID	**SMEC 3**
Data/Parameter:	Avoidance of double counting or double claiming with other mitigation actions
Data unit:	NA
Description:	Review and analysis of mitigation actions in other voluntary markets or UNFCCC/compliance mechanisms
Source of data:	Using publicly available information from Gold Standard and other voluntary standards, at a minimum Verra and any recognized national or regional standards in the project location, and UNFCCC CDM/future mechanism project & PoA/VPA database: a. identify and list any mitigation actions of similar technology, ~~i.e.~~i.e., that provide the same kind of output and use the same kind of equipment or conversion process, operating in overlapping spatial boundaries of the project activity.

	b. Undertake at the time of design review, VPA inclusion review and at design change review when project/VPA boundary changes after design/inclusion review. If one or more are identified: i. describe the practices that will be implemented to ensure that the programme or project activity quantifies emission reductions only from the technology it has implemented, ii. describe the practices to avoid that the programme or project activity implementation displaces technology of other mitigation actions, and iii. design a monitoring approach and method to discount emission reductions in case the programme or project activity is found to displace or operate alongside another mitigation action.
~~Measurement procedures (if any):~~	-
Any comment:	VVB shall validate the publicly available information and summarise the findings and opinion in the validation and/or verification report, as applicable.

Parameter ID	**SMEC 4**
Data/Parameter:	Indoor air pollution (IAP) levels of the project technology
Data unit:	NA
Description:	Demonstration that Indoor air pollution (IAP) levels are not worsened in the project scenario compared to the baseline, including PM 2.5 and carbon monoxide (CO) emissions.
Source of data:	For the description of the IAP level of the project technology, any of the following sources shall be used: • certification resulting from ~~of~~ a manufacturer's test, • report of field testing of the technology, • report of lab testing of the technology, or • results of modelling of the technology's operation under field conditions. • For stoves built on-site at the ~~end~~ end-user location, existing reports of lab or field testing of similar technology. For the IAP level of the baseline scenario, the any of the following sources shall be used: • certification resulting from ~~of~~ a manufacturer's test, • report of field testing of the technology, • report of lab testing of the technology,

	• results of modelling of the technology's operation under field conditions, or • Expert opinion For both project and baseline technologies, if none of these are available, references from published literature or report by independent agencies may be used as evidence, provided it is not more than 5 years old.
~~Measurement procedures (if any):~~	~~-~~
Any comment:	-

Parameter ID	**SMEC 5**
Data/Parameter:	Regulatory framework for provision of thermal energy services
Data unit:	NA
Description:	Evidence that the project does not undermine or conflict with any national, sub-national or local regulations or guidance for thermal energy supply/devices or fuel supply or use for household cooking
Source of data:	List and provide a summary of any national, sub-national and local regulations or guidance for the provision of thermal energy services/devices of the type the project provides in the project boundary. Describe how the project complies with the regulatory framework.
~~Measurement procedures (if any):~~	~~-~~
Any comment:	Undertake at the start of each crediting period.

Parameter ID	**SMEC 6**
Data/Parameter:	Expected technical life of project stove
Data unit:	Operating hours (~~e.g.~~e.g., "5,500 hours") or time period (~~e.g.~~e.g., "five years")
Description:	The expected technical life of an individual project technology shall be defined in the PDD/PoA-DD/VPA-DD.
Source of data:	Fixed and recorded at the time of registration or distribution. Any of the following sources shall be used: • Manufacturer specifications • Certification by a national standards body or an appropriate certification party recognised by a national standards body

	• Commercial guarantee or Guarantee from the installer • For stoves built on-site at the ~~end~~ end-user location, field reports, which comply with the general requirements for sampling (Section 4.3 ~~|4.3 |4.4~~), of average technical life of the same stove type operated under similar conditions (socioeconomic and cultural). Simulation modelling may be applied together with such field reports to estimate the average technical life. Professional opinion or expert opinion is not accepted as a source for this parameter.
~~Measurement procedures (if any):~~	~~-~~
Any comment:	If the expected technical life of project technology is shorter than the crediting period, describe measures to ensure that ~~end~~ end-users are provided replacement technology of comparable or higher quality at the end of the technical life, by either • replacing with comparable or better technology, or • retrofitting essential parts with a performance guarantee. The project shall ensure that the units are replaced or retrofitted at the end of their technical life within a crediting period to continue claiming emission reductions. However, a new project or programme cannot be registered for replacement/retrofitted project stoves. If project devices are retrofitted/repaired before or at the end of the device's estimated technical life, emission reductions may be claimed for these devices during the extended lifetime only if the details of the retrofits/repairs undertaken (~~e.g.~~e.g., parts replaced, specifications followed, the personnel conducting the repairs and date of retrofitting) on each device are documented and in addition, one of the following options is implemented: a. Extended lifetime is demonstrated through a warranty from the original manufacturer, or a guarantee from a company with demonstrated experience in cookstove repair that assures the performance of the stove in its entirety comparable to the original device including with regard to efficiency, ~~safety~~safety, and indoor emissions; or b. Extended lifetime or the durability of the retrofitted device is demonstrated through a durability test performed according to requirements in ISO 19867-1 for durability or a comparable national standard. Certification by a relevant national standards body or an appropriate

	certifying agent recognized by that body may be supplied based on sample tests specified by the standard applied.

Parameter ID	**SMEC 7**
Data/Parameter:	Baseline scenario survey results
Data unit:	NA
Description:	Report of the results of the baseline scenario survey
Source of data:	The report presents the results of the Baseline Scenario Survey, relevant for the baseline scenario definition.
Measurement procedures (if any):	Undertake at the start of the first crediting period. The survey should be conducted following a simple random sampling approach and the minimum sample size should be determined as per the guidelines below; i. Project target population < 300: Minimum sample size 30 ii. Project target population 300 to 1000: Minimum sample size 10% of group size iii. Project target population > 1000 Minimum sample size 100 A sample survey questionnaire (survey format A) is provided in Annex A for information to be collected through surveys.
Any comment:	-

Parameter ID	**SMEC 8**
Data/Parameter:	$EF_{b,fuel,CO2}$
Data unit:	tCO_2/tonne of fuel
Description:	CO_2 emission factor arising from use of fuel in baseline scenario
Source of data:	**Methodology default** i. Wood, 1.747 tCO_2/tonnes; ii. Charcoal (combustion only), 3.304 tCO_2/tonnes; iii. Charcoal (combustion and production), 4.874 tCO_2/tonnes; IPCC default values, table 1.4 of chapter 1 of Vol. 2, 2006 IPCC Guidelines for National Greenhouse Gas Inventories When emissions from fuel production, transport, and similar are included to determine a project-specific emission factor, then the following shall apply as well: • The project boundary must include these processes • Avoidance of double counting considerations must cover all steps in the project boundary

	• The determination of the specific emissions from these sources is fully documented and evidenced in the PDD These provisions may be applied to include the actual GHG emissions happening upstream in charcoal production in the charcoal emission factor; however, emission factors higher than the methodology cap are not permitted.
~~Measurement procedures (if any):~~	
Any comment:	-

Parameter ID	**SMEC 9**
Data/Parameter:	$EF_{b,fuel,non\_CO2}$
Data unit:	tCO_2/tonne of fuel
Description:	Non-CO_2 emission factor arising from use of fuel in baseline scenario
Source of data:	**Methodology default:**

Fuel type	IPCC AR4 GWP tCO_2/tonne of fuel	IPCC AR5 GWP tCO_2/tonne of fuel
i. Wood	0.136	0.148
ii. Charcoal (combustion only)	0.156	0.173
iii. Charcoal (combustion and production);	1.188	1.322

IPCC default values, Table 2.9 of Chapter 2 of Vol. 2, 2006 IPCC Guidelines for National Greenhouse Gas Inventories

~~Measurement procedures (if any):~~	-
Any comment:	NA

Parameter ID	**SMEC 10**
Data/Parameter:	$B_{b,y}$
Data unit:	Tonnes fuel per household per year
Description:	Annual quantity of primary baseline fuel consumed in the baseline scenario for household cooking

Source of data:	Use one of the following options: **a. Default values (i.e., Minimum Service Level):** i. Wood; 0.5 tonnes per capita per year ii. Charcoal; 0.13 tonnes per capita per year The default per capita fuel consumption values shall be multiplied ~~with~~ by the average number of persons served per household. The average number per household is established ex-ante prior to project implementation using one of the following sources; i. Baseline surveys or ii. Official government publications or statistics, or iii. Credible published literature for project region, or iv. Studies by academia, ~~NGOs~~NGOs, or multilateral institutions. When a baseline survey is used, follow ~~the~~ Section 4.3 ~~4.3~~ for sampling requirements. When other sources listed above ~~is~~ are applied, the date of publication must not be more than 3 years old. The value applied shall be cross-checked against at least one other source on the list, above. For cross-check purposes, sources applied may be up to 5 years old. Further, cross-check with older sources may be used provided they provide conservative results. In cases, where a fuel mix situation exists in the baseline scenario, the default baseline fuel values for primary fuel shall be adjusted by multiplying ~~with~~ by 0.9. **b. Historical data:** The baseline fuel consumption values may be derived based on historical data. Source applied must not be more than 3 years old. The project proponents shall make sure that historical data is relevant to the target population and appropriately justified. Values that are applied in the calculation shall be documented and if more than one value is found to be appropriate, a conservative value among the appropriate values shall be used. To support documentation that the appropriate, conservative value(s) have been applied, the project developer shall transparently list and describe the sources of values considered (~~e.g.~~e.g., peer-reviewed literature, test results, official reports/statistics). Original

	sources should be referenced using a standard method of referencing rather than quoting a secondary publication that refers to the sources. When more than one source is used to aggregate the data to derive the value, the sources used should be clearly indicated. The project developer shall provide justification as to why the values selected, and their sources, are appropriate, ~~applicable~~applicable, and conservative. The VVB shall determine whether the sources listed by the project developer are comprehensive and, based on their review and analysis as well as professional judgment, confirm whether the sources selected are appropriate and conservative based on suitability of the data vintage, the relevance of the source to the baseline scenario, project target population, among other criteria. c. **Sample surveys:** The project developer may determine the baseline fuel consumption values based on sample surveys carried out amongst the ~~end~~ end-users. The sample surveys should be conducted prior to the start of implementation of the project activity or must be conducted prior to 1st verification. In the latter case, the project may be submitted for design review with ex-ante emission reductions estimated based on proxy baseline fuel consumption values. Sampling standard shall be used for determining the sample size to achieve 90/10 confidence/precision levels. If the sample size calculation returns a value of less than 30 samples, a minimum sample size of 30 shall be chosen for each baseline scenario. d. **Standardised baselines:** Country or ~~region specific~~region-specific values approved through the "Procedure for development, revision, clarification and update of standardized baselines," which are available at https://cdm.unfccc.int/methodologies/standard_base/index.html The Standardised values must be valid at the time of submission of the project for validation to VVB.
~~Measurement procedures (if any):~~	-
Any comment:	This parameter shall be determined ex-ante and at each renewal of crediting period

Parameter ID	SMEC 11
Data/Parameter:	η_b
Data unit:	Fraction
Description:	Efficiency of the baseline stove
Source of data:	The efficiency of baseline stove(s) shall be established following any of the below options: a. **Default values:** The following default values may be applied for this parameter and for cases when it is not possible to conduct efficiency tests. • 0.1 for a three-stone fire using wood (not charcoal), or a conventional device with no improved combustion air supply or flue gas ventilation, that is without a grate or a chimney. • 0.2 for other types of devices (applicable to the charcoal stove). b. **Sample testing:** The baseline stove efficiency may be established based on a water boiling test (WBT) conducted on randomly selected sample stoves following. The WBT shall be carried out in accordance with national standards (if available) or international standards or guidelines (e.g., the WBT Protocol[89] or ISO 19867-1 listed by Clean Cooking Alliance and available at: https://cleancookingalliance.org/research-evidence-learning/standards-testing/protocols/) At a minimum, a sample test on three stoves with three tests shall be conducted for each baseline stove type. The test shall be carried out by a recognised certification body. c. **Published ~~third~~ third-party reference:** The baseline stove(s) efficiency may be applied from; - Credible published literature, or - Studies by academia, ~~NGOs~~NGOs, or multilateral institutions, - Official government publications or statistics,

[8] The project developer may conduct only the first two phases of the stove tests: cold-start high-power phase and hot-start high-power phase (not including the simmer phase) for calculation of the high-power thermal efficiency.

[9] The guidance provided in the WBT protocol may be followed for calibration of testing equipment.

	Source applied must not be more than 3 years old and shall be relevant to the project region and baseline technology.
~~Measurement procedure (if any):~~	
Any comment:	-

4| Monitoring methodology

4.1 | Monitoring data and information requirements

4.1.1 | Following data shall be monitored and recorded during the project crediting period

a. **Total sales or dissemination record:** The project developer must maintain an accurate and complete sales record throughout the crediting period. The record should be backed up electronically. The required data for each project stove includes:

i. Date of installation

ii. Geographic area of sale

iii. Model/type of project stove(s) sold

iv. Quantity of project stove sold

v. Unique identifications of the product (e.g., serial number) and/or end-user locations (GPS coordinates)

vi. Name, telephone number (if available) and address

- Required for all bulk purchasers, i.e., retailers;
- Required for all ~~end~~ end-users, ~~e.g.~~e.g., households

b. **Project database:** The project database lists all the project stoves that have been sold or distributed or installed or retrofitted and have not surpassed their technical life. It is derived from the total sales record and must be maintained continuously.

Within the database, project stoves are labelled, at a minimum, with their corresponding project scenario 'p' and their date of sale/ dissemination.

Technologies aged beyond their technical life, and not replaced or retrofitted, are removed from the project ~~database~~database, and no longer credited under the project.

c. **Ongoing Monitoring Studies:** Monitoring shall consist of checking ~~of~~ a representative sample, once every year (annually) to estimate the number of project stoves that are still operating by carrying out the usage survey as per the requirements outlined for ~~See~~ data/parameters **SMEC 16**~~**SMEC 16**~~~~**SMEC 16**~~.

d. Where replacements are made, monitoring shall also ensure that the efficiency of the new cookstove is similar to the appliances being replaced.

e. The project must also monitor the use of baseline stoves in the project activity.

f. The project must also monitor the physical conditions of the cookstoves. Survey format B can be used for carrying out monitoring surveys.

g. Cross-VPA sampling is not allowed across groups larger than 10 VPAs. The requirements described here apply both when sampling is applied to a single VPA and to permissible cross-VPA sampling. For guidance, project developers may refer to the latest version of the CDM Guidelines for sampling and surveys for CDM project activities and programmes of activities for the type of sampling approach (simple random, cluster, stratified etc.) applicable to their project context.

4.1.2 | Relevant parameters shall be monitored and recorded during the crediting period as indicated in section 4.2 below.

4.2 | Data and parameters monitored

Parameter ID	**SMEC 12**
Data/Parameter:	Avoidance of double counting or double claiming among project technology ~~end~~ end-users
Data unit:	NA
Description:	Evidence of avoidance of double counting or double claiming with project technology ~~end~~ end-users
Source of data/ ~~Measurement procedures (if any):~~	Evidence of informing / notification of ~~end~~ end-users, such as: • leaflets distributed with the warranty card of the product alerting end-users to the waiving of their carbon rights in exchange for discount pricing of the improved technology below its true cost, • carbon title waiver forms signed by ~~end~~ end-users, etc.
Measurement procedures (if any):	-
Monitoring frequency:	Monitored whenever project technology is sold or otherwise disseminated
QA/QC procedures:	-
Any comment:	The validating and/or verifying VVB shall ~~cross~~ cross-check the evidence on a sample basis and discuss it with end-users as appropriate.

Parameter ID	**SMEC 13**
Data/Parameter:	$f_{NRB,y}$
Data unit:	percentage
Description:	Fractional non-renewability status of woody biomass fuel during year y

Source of data:/	As per the "TOOL30: Calculation of the fraction of non-renewable biomass"
Measurement procedures (if any):	One of the below options, with the option defined and fixed at the project design certification stage: a. Determined ex-ante and fixed for a given crediting period (if it is fixed ex-ante, then include $f_{NRB,y}$ in the "data and parameters fixed ~~ex-~~ ex-ante" section of the PDD), or b. Updated biennially or c. Updated at each monitoring and verification
Monitoring frequency:	As per the options selected
QA/QC procedures:	Requirements of the CDM TOOL30: Calculation of the fraction of non-renewable biomass
Any comment:	Project developers applying for a renewal of the crediting period must reassess the fNRB based on the most recent information available.

Parameter ID	**SMEC 14**
Data/Parameter:	$N_{P,y}$
Data unit:	Number of project stove credited (units)
Description:	Cookstove in the project database for project scenario p through year y
Source of data:	Project Database
Measurement procedures (if any):	-
Monitoring frequency:	Continuous
QA/QC procedures:	Transparent data analysis and reporting
Any comment:	The project database is arranged based on the project scenario and batch to create the project database and if applicable shall exclude the stoves that have completed the technical life if not replaced/retrofitted before the end of life.

Parameter ID	**SMEC 15**
Data/Parameter:	$\eta_{p,y}$ and Rated efficiency of project stove
Data unit:	Fraction
Description:	Efficiency of project stove in year y ($\eta_{p,y}$) and rated efficiency of project stove

Source of data:	-
Measurement procedure (if any):	The initial efficiency of the project stove shall be measured/estimated as per any of the following options: a. The efficiency of the project cookstoves shall be based on certification by a national standards body or an appropriate certifying agent recognized by that body. b. Alternatively, manufacturer specifications on efficiency based on the water boiling test (WBT) may be used. The WBT shall be carried out in accordance with national standards (if available) or international standards or guidelines (e.g., the WBT Protocol[10],[11] or ISO 19867-1 listed by Clean Cooking Alliance and available at: https://cleancookingalliance.org/research-evidence-learning/standards-testing/protocols/) For (a) and (b) above, the sampling test of stoves by such certification bodies/agents or manufacturers shall be conducted following a 90/10 precision in accordance with the "Standard for sampling and surveys for CDM project activities and programme of activities". c. The following simplified approach may be used, when the efficient cookstoves are produced by a manufacturer with a recognized management system in place (~~e.g.~~e.g., ISO certification) to ensure that the individual equipment produced does not vary beyond the range of acceptance limits (~~e.g.~~e.g., characteristics such as materials, critical dimensions): i. Conduct a sample test on three stoves with three tests conducted for each project stove. The test can be carried out by project developer ~~by~~ themselves or stove manufacturers; ii. If the standard deviation of the nine test results indicated above is very small and the 90/10 precision requirement is met (in this case, the value of the t-distribution for 90 per cent confidence shall be used instead of the Z value), the efficiency determined is

[10] The project developer may conduct only the first two phases of the stove tests: cold-start high-power phase and hot-start high-power phase (not including the simmer phase) for calculation of the high-power thermal efficiency.

[11] The guidance provided in the WBT protocol may be followed for calibration of testing equipment.

acceptable, otherwise more sample tests would be required until 90/10 precision is met.

The loss in project stove efficiency shall be accounted for following any of the below options. The option should be identified and fixed ~~ex~~ ex-ante for the entire crediting period in the PDD at the time of design certification.

a. A default schedule of linear decrease in efficiency up to the terminal efficiency assumed as 20 percent for ~~wood~~ wood-fired project stoves and 22.5 percent for charcoal project stoves shall be applied through the technical life of the project stove[12]; or
b. Manufacturer of project cookstoves shall confirm with technical justification based on certification by a national standards body or an appropriate certifying agent recognized by that body that no decrease in efficiency of project device is envisaged during the crediting period; or

[12] For example, where the technical life of project wood-fired stove is five years and project stove ~~has~~have an efficiency of 30 percent at commissioning. The underlying assumptions for this option are:

- The stove efficiency decreases linearly over time, ~~i.e.~~i.e., at a constant rate which is equal to the difference between the initial and final efficiencies divided by the lifespan of the project device.
- The final value after the end of the life span will be 20%.

That means linear decrease in efficiency from 30 percent to terminal efficiency of 20 percent should be applied through the life span of 5 years the project stove. If fixed efficiency drop is applied on an annual basis, this would be 2 percent decrease in efficiency every year ~~(i.e.~~(i.e., 30% in year 1, 28% in year 2 and 22% on year 5).

~~However~~However, it is more accurate and conservative to consider a drop in efficiency throughout any given year of the crediting period as below:

- The decay of efficiency starts on day 1 of the operation, therefore the average efficiency of year 1 does not equal the initial efficiency; rather, it is the average of efficiency on day 1 and day 365 ~~i.e.~~i.e., the average efficiency of a given year is applied for the entire year, calculated as the mid-value between the efficiency values at the start and end of that year.
- Efficiency at any other point in the year can be linearly interpolated. This means, applicable value for stoves that operated throughout year 1 (~~i.e.~~i.e., day 1 to day 365 from the start date of the crediting period) will be the average of 30 percent on day 1 and 28 percent on day 365, ~~i.e.~~i.e., 29 per cent.
- If some stoves have operated only for the part of the year 1 owing to the time required for distribution, then a daily drop in efficiency of 2/ 365 ~~i.e.~~i.e.,0.005 may be considered for the weighted average estimations (~~i.e.~~i.e., efficiency values of 29% in year 1, 27% in year 2 and 21% on year 5 are applied).

	c. Determine[13] the rate of efficiency drop for a representative sample of the first batch of project cookstove type in year y and assume that the same rate of loss in efficiency applies to all other batches. In other words, it may be assumed that the degradation of efficiency measured in a representative sample of the first batch of each type of project stove ~~apply~~ applies to all subsequent batches. The efficiency of the project stove in the first batch has to be monitored annually through representative samples and this rate of loss in efficiency may be applied correspondingly to all batches. The project participants shall describe in the PDD the measures taken to ensure that all batches receive the same level of quality control in the production, and maintenance/replacements during the crediting period, as the first batch. Monitoring reports shall describe the number of actions taken for maintenance and replacements to all batches separately; ~~d.~~ Determine the loss in efficiency annually from a representative sample of each batch and use the actual loss rate that is measured. ~~e.~~d.
Monitoring frequency:	a. Recorded at the time of commissioning/distribution; and b. Adjusted for the loss of efficiency during the monitoring period annually
QA/QC procedures:	-
Any comment:	Supporting documentation (~~e.g.~~e.g., certificate issued by a third party or test results) that needs to be presented to the validating and/or verifying VVB.

Parameter ID	**SMEC 16**
Data/Parameter:	$U_{P,y}$
Data unit:	Percentage
Description:	Usage rate in project scenario p during year y
Source of data:	Annual monitoring data
Measurement procedures (if any):	Usage rate is an estimate of the fraction of project stoves that are in use to exclude stoves that may not be adopted or may be disposed of and potentially replaced by a baseline stove again. A

[13] For Example, for the representative sample of Batch 1, if the efficiency of a new project cookstove is 30% and at the end of Year 1, the efficiency is monitored to be 29%; the loss rate is (30%-29%)/1=1%. Then this 1% loss rate is to be assumed to be applicable for all the stoves in the first batch and subsequent batches for first year of operation.

usage rate assessment of each project stove age-group[14] is required annually. The usage survey/monitoring shall be conducted at least within 6 months before the end of monitoring period.

There are three levels to the Usage Monitoring Requirements, each increasing in rigour and maximum claimable usage rates. In order to apply a higher level of usage rate, all of the Monitoring Requirements from the levels beneath must be followed. For example, if a project claims upto 90%, the monitoring requirements provided for both the 'mandatory' and 'good practice' levels shall be complied with. The three levels and their applicability ~~is~~are summarised in the t~~T~~able below;

Level	Applicability	Claimable usage rate	Requirements
Mandatory	Mandatory	Up-to maximum 75%	• Define use and nonuse • ~~In~~ In-person household usage survey • Verification of accuracy of results
Good practice	Optional	Upto maximum 90%	• Field team training and supervision • End--user training and ~~follow~~ follow-ups • Awareness campaign
Best practice	Optional	Above 90%	• Continuous use monitoring

For detailed guidelines and requirements, refer to Requirements and Guidelines: Usage Rate Monitoring

[14] The usage survey determines the usage proportion for each age cohort of technologies being credited for each project scenario p. The age cohorts in the survey are established as follows:

- Participants in a usage survey with technologies in the first year of use (age0-1) must have technologies that have been in use on average at least 0.5 years or longer.
- Participants in a usage survey with technologies in the second year of use (age1-2) must be conducted with technologies that have been in use on average at least 1.5 years, and so on.

Since the parameter of interest is the usage proportion for each age cohort, the sample size is defined for each age cohort must be minimum of 30 samples for project technologies of each age cohort being credited, except where the age cohort comprises fewer than 30 units, in which case all units shall be sampled.

	Should there be a conflict in the requirements provided in this methodology and Requirements and Guidelines: Usage Rate Monitoring, the requirements of this methodology supersede. For the purpose of this methodology; **a. Usage survey:** An in-person usage survey shall be conducted in a randomly selected minimum of 30 households per each age group. The usage survey may be combined with other annual monitoring activities as long as the minimum sample size requirement i.e., 30 households per each age group is complied with. The usage rate estimated for a particular age group may be applied to the stove of the same age group in subsequent years[15] of the crediting period. **b. Continuous monitoring:** The Project technology use may be monitored in randomly selected representative sample households with temperature-sensing data loggers known as Continuous Stove Monitors (CSMs)[16] or other advanced monitoring devices which can log the operation of the project stove i.e., recording the situation of the project stove being used or not during any day 'd' of the measurement campaign, in order to determine usage rate. In such cases, how the monitored data will be used to confirm the user or non-user shall be described in the PDD at the time of validation. The continuous use monitoring shall be conducted for a minimum of 30 households for at least 90 days, with at least 30 samples for project stove of each age being credited.
Monitoring frequency:	Annual
QA/QC procedures:	Transparent data analysis and reporting
Any comment:	A usage parameter is derived for each age group of projects cookstove being credited.

[15] For example, if only stoves in the first year of use (age 0-1) are being credited (as part of 1st issuance request), a usage parameter must be established for age-group 0-1, through a usage survey for stove age0-1. If cookstoves of age-group 0-1 and age-group 1-2 are being credited (as part of 2nd request for issuance), usage parameter must be established for age-group 1-2 only through usage survey and the usage rate established for stoves age group 0-1 can be applied from the previous monitoring period. If cookstoves of age 0-1 and age 1-2 are being credited (as part of first request for issuance), usage parameter must be established for age-group 0 -1 and 1-2, respectively through usage survey.

[16] CSM is a generic term for devices that monitor and log stove usage time, usually through tracking stove temperature.

Parameter ID	SMEC 17
Data/Parameter:	$DF_{b,stove,y}$
Data unit:	Fraction
Description:	Adjustment factor to account for the baseline stove use in project scenario p during the year y
Source of data:	Monitoring surveys
Measurement procedures (if any):	-
Monitoring frequency:	At minimum once in two ~~year~~years
QA/QC procedures:	Transparent data analysis and reporting
Any comment:	The discount factor for baseline-stove use may be determined based on the number of meals cooked using the baseline stove. The required information shall be captured through sample surveys carried out following a random sampling approach for each age~~-~~group of the project stove. ~~Minimum~~ A minimum ~~number of~~ sample size shall be selected following the guidelines provided in ~~section 4.2, option b~~parameter **SMEC 7~~SMEC 7~~**. Please refer to the survey format B, Annex A for sample questions to capture this information.

4.3 | General requirements for sampling

4.3.1 | For guidance, project developers may refer to the valid version of the "Guidelines for sampling and surveys for CDM project activities and programmes of activities" for the type of sampling approach (simple random, cluster, stratified etc.) applicable to their project context.

ANNEX ~~1~~1 : MONITORING SCHEDULE

Stage	General details	Relevant parameter ID	Update/monitoring frequency	Source/remarks
At registration (for some parameters information can be provided before 1st verification)	Indoor air pollution (IAP) levels of the project technology	SMEC 4	Ex-ante	Manufacturer's results, field/lab test results, modelling results of technologies' operation, existing field/lab test reports, expert opinion (baseline scenario only) or literature published by independent agencies (in case none of the above are available)
	Regulatory framework for the provision of thermal energy services	SMEC 5	Ex-ante or update at CP renewal	A summary of any national, sub-national and local regulations or guidance for the provision of thermal energy services/devices of the type the project provides in the project boundary
	Expected technical life of project stove	SMEC 6	Ex-ante or update at each monitoring and verification	Manufacturer's specifications, certification by a national standards body or an appropriate certification party recognised by a national standards body, commercial guarantee/guarantee from the installer or field reports
	Baseline scenario survey results	SMEC 7	Ex-ante	Baseline study
	Annual quantity of primary baseline fuel consumed in the baseline scenario	SMEC 10	Ex-ante or update at CP renewal	Default values, historical data, sample surveys or

	for household cooking ($B_{b,y}$)			standardised baselines
	Efficiency of the baseline stove (η_b)	SMEC 11	Ex-ante or update at each monitoring and verification	Default values, Water Boiling Tests of stove samples or published ~~third~~ third-party references
	Fractional non-renewability status of woody biomass fuel during year y ($f_{NRB,y}$)	SMEC 13	Ex-ante and fix for a given CP or update biennially or update at each monitoring and verification	As per the "TOOL30: Calculation of the fraction of non-renewable biomass"
At verification	Cookstove in the project database for project scenario p through year y ($N_{p,y}$)	SMEC 14	Continuous (after registration)	Project database
	Efficiency of project stove in year y ($\eta_{p,y}$) and rated efficiency of project stove	SMEC 15	Update at each monitoring and verification	Certification by a national standards body/ an appropriate certifying agent recognized by that body, manufacturer's specifications on efficiency based on WBT, simplified approach for efficiency determination (only when stoves are produced by a manufacturer with a recognized management system in place) or determined based on a suitable approach to calculate the loss in project stove efficiency
	Usage rate in project scenario p during year y	SMEC 16	Update at each monitoring and verification	Usage surveys
	Adjustment factor to account for the baseline stove	SMEC 17	Update biennially or update at each	Monitoring surveys

	use in project scenario p during the year y		monitoring and verification	

ANNEX ~~2:~~2 : SURVEY TEMPLATE

The survey template has been provided ~~as a separate survey~~ under the related resources and within the Templates ~~/tool~~ section~~document~~.

Gold Standard for the Global Goals

METHODOLOGY

DOCUMENT HISTORY

Version	Date	Description
32.0	~~dd/mm/yyyy~~July~~June~~ 2022	• Alignment with currently updated methodologies (TPDDTEC, SDWS) • Scope expansion of SMEC methodology to the improved charcoal stoves projects~~Synchronizing with currently developed methodologies (TPDDTEC, SDWS) in terms of definitions, and documents templates as well as expanding the scope of SMEC methodology for also covering the improved charcoal stoves projects~~~~First version~~
2.0	April 2022–	• Version for consultation. Not formally published.
1.1	March 2020	• Correction in the testing protocol for determination of project stove efficiency • Correction in emission reduction calculation equation • Update of the value of the ex-ante parameter "NonCO2 emission factor arising from use of ~~fire wood~~firewood in baseline scenario" • Other miscellaneous edits
1.0	Feb 2013	First version