Gold Standard for the Global Goals

METHODOLOGY

# METHODOLOGY FOR METERED & MEASURED ENERGY COOKING DEVICES

**SDG 13**

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## SUMMARY

This methodology is applicable to project activities that introduce technologies that reduce or avoid greenhouse gas (GHG) emissions and quantify emission reductions from cooking devices through direct measurement of energy or fuel consumed, in households, communities, and/or institutions such as schools, prisons or hospitals (hereinafter referred as end-users).

This methodology shall be used in conjunction with the GHG Emissions Reduction & Sequestration Product Requirements and projects and programmes applying this methodology may be issued with GSVERs.

## ACKNOWLEDGMENT

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## 1| Definition

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

a. **Continuous useful energy output** – Energy transferred to the contents of a cooking vessel, including the sensible heat that raises the temperature of the contents of the cooking vessel and the latent heat of evaporation of water from the cooking vessel, divided by the time of the operation of the cooking task.

b. **Metered cooking devices** – metered cooking devices are cooking devices for heating and cooking food that either record fuel or energy use directly, or through a supplementary meter with the ability to record amount of energy or fuel used for cooking over a period of time. These may, amongst others, include induction cookstoves, electric pressure cookers, hot plates, rice cookers, solar electric cookers, and metered LPG and ethanol cookers when metered and sold for use in a dedicated device.

c. **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.

# 2| Scope, Applicability, and entry into force

## 2.1 | Scope

2.1.1 | This methodology is applicable to project activities that introduce technologies that reduce or avoid greenhouse gas (GHG) emissions and quantify emission reductions from cooking devices through direct measurement of energy or fuel consumed, in households, communities, and/or institutions such as schools, prisons or hospitals (hereinafter referred as end-users).

2.1.2 | This methodology may be applied by project developers promoting the installation of improved cooking devices, where the actual amount of energy or fuel used in the project scenario is measured directly in real-time for every device or otherwise monitored via measurement. This includes, but is not restricted to:

a. metered electricity cookstove where energy used is measured for each device,

b. metered LPG cookstove where fuel used is measured for each device,

c. Metered biogas stoves,

d. bio-ethanol cookstove where the amount of bio-ethanol purchased for cooking by each customer is recorded with arrangements to ensure the bio-ethanol is used for cooking and to prevent the alternative use of the bio-ethanol.

## 2.2 | Applicability

2.2.1 | The methodology is applicable under the following conditions:

a. Project shall choose a technology design that has predictable performance in that it is proven to be efficient and durable under field conditions; for cookstoves, the rated thermal efficiency shall be at least 40%.

b. The technology shall have continuous useful energy output of less than 150kW per unit, refer to the Definition "continuous useful energy output" section.

c. The project activity is implemented by a project developer and can include additional project participants listed in Appendix 2 of the PDD template. The individual households and institutions may be represented collectively by community organizations, etc., but do not individually act as project participants.

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

e. To avoid double counting or double claiming, the project developer must:

   i. clearly communicate its ownership rights and intention of claiming the emission reductions resulting from the project activity to the following parties by contract or clear written assertions in the transaction paperwork: all other project participants; project technology manufacturers; and retailers of the project technology or the renewable fuel in use; and

   ii. inform and notify the end users that they cannot claim emission reductions from the project or use of devices distributed as part of project activity, and

   iii. exclude from the project activity, cooking devices included in any other voluntary market or CDM project activity/PoA, and strive not to displace the cooking devices of another CDM or voluntary project/PoA. See Section, 3.11 | below, avoidance of double counting or double claiming with other mitigation actions, for details on this demonstration.

f. Under this methodology, emission reductions cannot be claimed for fuel-switch only, so proposed project activities also need to introduce new technologies, i.e. technology switch is a source of emission reductions.

g. For project cooking devices that use fossil fuel, only emissions reductions from efficiency improvement are eligible.

h. For project cooking devices that use grid electricity, emissions reductions from fuel switch and efficiency improvement are eligible.

i. The measured fuel or energy is used to calculate both baseline and project emissions. The project developer must have monitoring systems in place to monitor the fuel or energy consumption by all the project devices under the project to be recorded in a database, which is maintained by the project developer.

## 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. The project shall document the national, regional and local regulatory framework for provision of thermal energy services of the type the project provides in the project boundary (See Section, 3.11 | below).

2.3.2 | If the expected technical life of project technology is shorter than the crediting period, the project developer shall describe measures to ensure that 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 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.

2.3.3 | For project activities introducing bio-ethanol cookstoves, project participants 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.

### 2.4 | Entry into force

2.4.1 | The date of entry into force of this methodology is 07 October 2021

## 3| Baseline Methodology

### 3.1 | Project Boundary

3.1.1 | Project developer shall provide clear definitions of project boundary, target area, and fuel production and collection area in line with section 3.1 of the methodology Reduced Emission from Cooking and Heating (RECH) V4.0[1].

### 3.2 | Emissions sources included in the project boundary

3.2.1 | Emissions from fuels can occur during fuel production, transport and combustion.

a. Baseline emissions from any gases marked below may be omitted for simplification.

b. All project emissions from any of the gases marked below must be accounted for, unless demonstrably negligible or not applicable to the individual project.

3.2.2 | Emissions must be well documented and based on project specific or publicly available and verifiable data. If such data is not available (for example in the case of production of a fuel) then care must be taken to ensure a conservative result, either by;

a. omitting those emissions or including an incontrovertibly low estimate when they occur in the baseline; or

b. including an incontrovertibly high estimate when they occur in the project scenario

[1] This methodology is a revised version of and replaces the Technologies and Practices to Displace Decentralized Thermal Energy Consumption (TPDDTEC) v3.1 methodology.

**Table 1: Emissions sources included in or excluded from the project boundary**

| Scenario | Source | Gas | Included | Justification/Explanation |
|---|---|---|---|---|
| Baseline scenario | Delivery of thermal energy | $CO_2$ | Yes | Important source of emissions |
| | | $CH_4$ | Yes | Important source of emissions |
| | | $N_2O$ | Yes | Can be significant for some fuels |
| | Production of fuel, transport of fuel | $CO_2$ | Yes | Important source of emissions |
| | | $CH_4$ | Yes | Important source of emissions |
| | | $N_2O$ | Yes | Can be significant for some fuels |
| Project scenario | Delivery of thermal energy | $CO_2$ | Yes | Important source of emissions |
| | | $CH_4$ | Yes | Important source of emissions |
| | | $N_2O$ | Yes | Can be significant for some fuels |
| | Production of fuel, electricity, transport of fuel | $CO_2$ | Yes | Important source of emissions |
| | | $CH_4$ | Yes | Important source of emissions |
| | | $N_2O$ | Yes | Important source of emissions |

## 3.3 | Demonstration of additionality

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

3.3.2 | To demonstrate additionality prior to achieving Design Certification, the project developer shall conform to the additionality requirements of the most recent version of one of the options below:

a. Applicable GS4GG Activity Requirements;

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

c. CDM Tool 19- Demonstration of additionality of microscale project activities; (not applicable to Gold Standard microscale projects)

d. CDM Tool 21 – Demonstration of additionality of small-scale project activities; (applicable to small-scale projects only)

e. An approved Gold Standard VER additionality tool

## 3.4 | Baseline scenario determination

3.4.1 | In the absence of the project activity, the general baseline scenario would be the use of single or multiple fuels/device combinations for meeting similar thermal energy needs by the representative end users, specifically:

a. In the case the project cooking device uses fossil fuel, the baseline scenario is the efficiency of the baseline cooking device, applying the emission factor of the project fossil fuel.

b. In the case the project cooking device uses grid electricity or exclusively renewable fuels (e.g. bio-ethanol) or renewable energy sources (e.g. solar energy), the baseline is the emissions of kitchens of the same end user type[2] in the project activity country or region using a baseline emission factor that is calculated for the country or region based on the observed fuel and device mix that can be replaced by the project cooking device.

3.4.2 | The specific baseline of fuel/device combination(s) for representative end user groups shall be identified with justifications following section 3.4 & 3.5 of RECH V4.0. and taking into account the restrictions of the two general baselines defined in paragraph 3.4.1 | above.

## 3.5 | Baseline emissions

3.5.1 | A baseline emission factor ($tCO_2e$ per TJ of useful energy) for baseline cooking devices and fuels used in a country or region for representative end user groups is determined using parameters sourced from credible published literature, project-relevant measurement reports, methodology default values, or project specific field tests (see parameters MECD 1 to MECD 4).

3.5.2 | To determine the baseline emission factor, the following shall be determined:

a. Types of cooking devices and fuels used by target population in the baseline scenario and proportional use of those cooking devices (for example, 50% use of three-stone fire, 10% use of improved biomass cookstove and 40% use of inefficient LPG stove). When multiple devices/fuels are used by the end user in same premises, the proportional use shall be established based on delivered useful energy by different baseline device/fuels combination or following an approach which leads to conservative baseline emissions estimation.

b. Efficiencies of the identified baseline device/fuel combinations.

c. Use of different cooking fuels.

d. Where project devices use fossil fuel, determine and apply the emission factor of the project fuel, to account only emission reductions from efficiency improvement.

3.5.3 | The baseline emissions are calculated by multiplying the useful energy delivered by the project devices with the baseline emissions, with a cap defined in this document.

[2] Same user type refers to the end users with similar socio-economic circumstances and cooking practices

3.5.4 | The baseline emissions factor is determined applying the equation below:

$$EF_b = \sum_k \left( \sum_{i,j} P_{b,i,j} \times EF_{b,i} \times fNRB_{i,y} \right)_k \div \sum_k \left( \sum_{i,j} P_{b,i,j} \times NCV_{b,i} \times \eta_{b,i,j} \right)_k \quad \textit{Eq. 1}$$

Where:

| | | |
|---|---|---|
| $EF_b$ | = | Baseline emissions factor ($tCO_2e$ per TJ of useful energy) |
| $P_{b,i,j}$ | = | Amount of baseline fuel *i* used in device *j* in the baseline (tonnes) |
| $EF_{b,i}$ | = | Emission factor of the baseline fuel *i* ($tCO_2e$/tonne) |
| $fNRB_{i,y}$ | = | Non-renewability status of woody biomass fuel i during year y |
| $NCV_{b,i}$ | = | The net calorific value of the baseline fuel type *i* (TJ/tonne) |
| $\eta_{b,i,j}$ | = | Efficiency of baseline device *j* with fuel i (fraction) |
| *k* | = | Household *k* from the target population, where applicable |
| *j* | = | Baseline devices *j* |
| *i* | = | Baseline fuel *i* |

3.5.5 | When the observed baseline fuel is non-renewable biomass, the amount of fuel is multiplied by the fraction of non-renewable biomass ($fNRB_{i,y}$), as demonstrated in the numerator of equation (1). This is the case also when applying the emission factor of the project fossil fuel in the baseline calculation. The parameter $fNRB_{i,y}$ is excluded from equation 1 when the observed baseline fuel is fossil fuel.

3.5.6 | The baseline emission factor ($EF_b$) value determined as above shall be fixed for the project for the crediting period for the project cooking device type and end user type in the region or country. It shall be reassessed at each crediting period renewal.

3.5.7 | In the case of programmes, once determined, the baseline emission factor can be used by other activities within the programme of the same cooking device and end user types in the same country or region over the crediting period for a period of three years after first activity inclusion, after which it must be updated for new activity inclusion.

3.5.8 | The overall baseline emissions for the project shall be calculated as follows:

$$BE_y = EG_{p,useful,y} \times EF_b \quad \textit{Eq. 2}$$

Where:

| | | |
|---|---|---|
| $BE_y$ | = | Baseline emissions ($tCO_2e$) in the year y |

$EG_{p,useful,y}$ = The amount of useful energy applied in the project in year y (TJ)

$EF_b$ = Baseline emissions factor ($tCO_2e$ per TJ of useful energy)

3.5.9 | Where the project device uses electricity, the total electricity use in the project scenario is monitored and recorded, and the useful project energy in year *y* shall be calculated as follows:

*Eq. 3*

$$EG_{p,useful,y} = \sum_d EG_{p,d,y} \times 0.0036 \times \eta_{p,d,y}$$

Where:

$EG_{p,d,y}$ = The amount of electricity used in the project scenario by device *d* in year *y* (MWh)

0.0036 = Factor to convert MWh to TJ

$\eta_{p,d,y}$ = Energy efficiency of the project device (fraction)

*d* = Project device *d*

3.5.10 | Where the project device uses fuel (e.g. bio-ethanol, LPG), the total fuel use in the project scenario is monitored and recorded, and the useful project energy is calculated as follows:

$$EG_{p,useful,y} = \sum_d P_{p,d,y} \times NCV_{p,i} \times \eta_{p,d,y}$$ *Eq. 4*

Where:

$P_{p,d,y}$ = The amount of fuel used in the project in by device *d* in year *y*, considering cap (mass or volume unit)

$NCV_{p,i}$ = The net calorific value of the fuel *i* used in the project scenario in year *y*

$\eta_{p,d,y}$ = Energy efficiency of the project device, *d* in year *y* (fraction)

*d* = Project device *d*

## 3.6 | Project emissions

3.6.1 | The project device is assumed to provide the same or similar useful energy service that would have been delivered by the baseline fuel(s) and device(s). Using the project device, the units of useful energy delivered to end-user displace the same amount of useful energy in the baseline. The total quantity of baseline fuel displaced is higher than the monitored amount used in the project, as the baseline devices are less efficient.

3.6.2 | Where project devices use renewable energy, such as solar energy, there are no project emissions. In the case of bio-ethanol or other biomass-derived fuels, the project emissions associated with production and transport of fuel must be evaluated.

3.6.3 | Furthermore, for other energy or fuel sources, project emissions associated with fuel or energy consumption must be calculated. The following sources of project emissions shall be considered, as applicable:

a. Project emissions associated with electricity use in the project scenario: $CO_2$ emission factor from electricity consumption by the project activity shall be determined using the latest version of CDM tool "TOOL05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation".

b. Project emissions associated with the use of fossil fuel in the project scenario: $CO_2$ emissions factor from fossil fuel consumption by the project activity shall be determined using the latest version of CDM tool "TOOL03: Tool to calculate project or leakage CO2 emissions from fossil fuel combustion".

c. Project emissions from transportation of fuel/biomass shall be accounted if the transportation distance (including both long-distance and home delivery transport) is more than 200 km; otherwise they can be neglected.

3.6.4 | Project emissions ($PE_y$) shall be calculated as follows:

a. Where the project device uses electric energy, the project emissions in year y are then calculated using the following equation:

$$PE_y = \sum_d EG_{p,d,y} \times EF_{el,y} \times \left(1 + TDL_{j,y}\right) \qquad \textit{Eq. 5}$$

Where:

| | | |
|---|---|---|
| $PE_y$ | = | Project emissions in year *y* ($tCO_2$) |
| $EG_{p,d,y}$ | = | The amount of energy used in the project scenario by device *d* in year *y* (MWh) |
| $EF_{el,y}$ | = | The emissions factor of the electricity system ($tCO_2e$/MWh) |
| $TDL_{j,y}$ | = | Average technical transmission and distribution losses for providing electricity to source *j* in year *y*. |

b. Where the project device uses fossil fuels, the project emissions in year y are then calculated using the following equation:

$$PE_y = \sum_d P_{p,d,y} \times NCV_{p,i} \times EF_{p,i} \qquad \textit{Eq. 6}$$

Where:

| | | |
|---|---|---|
| $PE_y$ | = | Project emissions in year *y* ($tCO_2$) |
| $P_{p,d,y}$ | = | The amount of fuel used in the project in by device *d* in year *y* (mass or volume unit) |
| $NCV_{p,i}$ | = | The net calorific value of the fuel *i* used in the project scenario in year *y* |
| $EF_{p,i}$ | = | The emissions factor of the project fuel *i* ($tCO_2e$ per TJ) |

## 3.7 | Leakage emissions

3.7.1 | Leakage emissions, $LE_y$, shall be determined as per Section 3.11 of RECH V4.0.

## 3.8 | Emission reductions

3.8.1 | The emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y \qquad \textit{Eq. 7}$$

Where:

| | | |
|---|---|---|
| $ER_y$ | = | Emission reductions in year y (t CO2e/yr) |
| $BE_y$ | = | Baseline emissions in year y (t CO2e/yr) |
| $PE_y$ | = | Project emissions in year y (t CO2/yr) |
| $LE_y$ | = | Leakage emissions in year y (t CO2/yr) |

## 3.9 | Changes required for methodology implementation in 2nd and 3rd crediting periods

3.9.1 | When the project developers apply for crediting period renewal, the baseline emission factor ($EF_b$) must be reassessed, in addition to other relevant methodological parameters as per the latest version of the methodology available at the time submission of renewal of crediting period and GS4GG crediting period renewal requirements.

## 3.10 | General requirements for data and information sources

3.10.1 | In the following tables of data and parameters monitored and not monitored, there are cases where a variety of source documents or studies may be applied to determine a parameter, or to cross-check a parameter.

3.10.2 | When multiple sources are available and fulfill the requirements for defining or cross-checking a parameter, the most relevant source should be chosen. Criteria for relevance include geographical (e.g., more specific to the project boundary location), temporal (e.g., more recent), and others. The VVB shall assess the relevance of the source applied compared to the other sources available. While conservativeness is a guiding principle for selecting data, the source applied to define or cross-check the parameter may not be the most conservative, if it can be shown to be the most relevant. Two hypothetical examples follow to illustrate these requirements.

a. A national study from last year shows that average household size is 4, whereas a municipal study from the year before shows that the average household size in the rural areas where the project is implemented is 5. In this case, it is more relevant to apply the household size of 5 in the calculations.

b. The annual report of the Ministry of Education shows that the average number of students per rural elementary school is 60, whereas the records of the rural elementary school that participates in the project show that the average attendance was 40 students. In this case, it is more relevant to apply the number of students as 40 for the school in the calculations.

3.10.3 |When sampling or surveys are utilized to define parameters, the sampling and surveys must be undertaken with reference values from other relevant data sources in mind, and project-specific survey and sampling results are expected to correlate with results from other relevant data sources. Where project specific results differ from relevant data sources in a way that is statistically significant, and the difference leads to less conservative results in the emission reduction calculations, then the project must provide justification for the differences. Further, the project may be required to substitute more conservative results from other data sources if the justification is not accepted by the VVB or certifier.

## 3.11 |Data and parameters not monitored

| **Data/parameter ID** | MECD 1 |
|---|---|
| Data / Parameter: | $P_{b,i,j}$ |
| Data unit: | Tonne/ year-device, Tonne/trial-device, Tonne/day-device |
| Description: | Amount of baseline fuel i used in device j in the baseline |
| Source of data: | The baseline fuel and device types and proportions and baseline device performance may be taken from:<br>- Sampling campaign using Standard Water Boiling Test,<br>- Credible published literature for project region,<br>- Studies by academia, NGOs or multilateral institutions, or<br>- Official government publications or statistics.<br><br>Source applied must not be more than 3 years old.<br>When sampling is used, follow Section 4.4 "General requirements for sampling" of RECH V4.0 methodology. |
| Any comment: | The parameter is used to calculate baseline emissions factor.<br><br>In the case of a **project activity**, the baseline fuel use value for the project cooking device type and end user type in the region or country is fixed for the project for |

| | |
|---|---|
| | the crediting period. It shall be reassessed at each crediting period renewal.<br><br>In the case of **programmes**, the baseline fuel use value for the project cooking device type and end user type in the region or country may be applied to new VPAs for a period of three years after its approval, after which it must be updated. |

| **Data/parameter ID** | MECD 2 |
|---|---|
| Data / Parameter: | $NCV_{b,i}$ |
| Data unit: | Terrajoules (TJ)/tonne of fuel |
| Description: | The net calorific value of the baseline fuel type i |
| Source of data: | - IPCC default data,<br>- project-relevant measurement reports, or project specific field tests.<br><br>If either project-specific or project-relevant results are used, these must be cross-checked with IPCC defaults and differences shall be justified using evidence. |
| Any comment: | The parameter is used to calculate baseline emissions factor. |

| **Data/parameter ID** | MECD 3 |
|---|---|
| Data / Parameter: | $EF_{b,i}$ |
| Data unit: | $tCO_2e$/tonne |
| Description: | The emission factor of baseline fuel *i* |
| Source of data: | IPCC default value converted by applying $NCV_{b,i}$ |
| Any comment: | The parameter is used to calculate baseline emissions factor. |

| **Data/parameter ID** | MECD 4 |
|---|---|
| Data / Parameter: | $\eta_{b,i,j}$ |
| Data unit: | Fraction |
| Description: | Energy efficiency of baseline device *j* with fuel *i* |
| Source of data: | Determined from<br>- Standard Water Boiling Tests,<br>- Credible published literature for project region, |

| | |
|---|---|
| | - Studies by academia, NGOs or multilateral institutions,<br>- Official government publications or statistics, or<br><br>- The following default values may be applied:<br>  - Three-stone fire or a conventional system for woody biomass lacking improved combustion air supply mechanism and flue gas ventilation system, that is without either a grate or a chimney: default efficiency 10%.<br>  - Other conventional systems using woody biomass: default efficiency 20%<br>  - Improved cookstoves: manufacturer specification, or if not available, default efficiency 30%<br>  - Fossil fuel combusting system: manufacturer specification, if available.<br><br>When sampling is used, follow Section 4.4 "General requirements for sampling" of RECH V4.0 methodology. |
| Any comment: | The parameter is used to determine the baseline emission factor. |

# 4| Monitoring methodology

## 4.1 | Monitoring data and information requirements

4.1.1 | The project developers shall keep a record of all the fuel or energy that is consumed by the devices under the project.

4.1.2 | During project implementation, the exact number of project devices and their corresponding fuel or energy consumption will be monitored as part of the monitoring plan.

## 4.2 | Data and parameters monitored

| **Data/parameter ID** | MECD 5 |
|---|---|
| Data / Parameter: | $\eta_{p,d,y}$ |
| Data unit: | Fraction |
| Description: | Thermal efficiency of the project device |
| Source of data: | Any of the following sources shall be used:<br><br>- Manufacturer specifications<br>- Third-party certification by a qualified entity<br>- Commercial guarantee<br>- Technical reports from the installer |
| Monitoring frequency: | Annual, or a default schedule of linear decrease in |

| | |
|---|---|
| | efficiency down to the terminal efficiency (efficiency at end of technical life), which must be demonstrated to be 40% or higher, may be applied through the technical life span of the project device |
| QA/QC procedures: | |
| Any comment: | This parameter is used in the determination of useful energy |

| **Data/parameter ID** | MECD 6 |
|---|---|
| Data / Parameter: | $EG_{p,d,y}$ |
| Data unit: | MWh |
| Description: | The amount of energy used in the project scenario by device *d* in year *y* (MWh) |
| Source of data: | Direct measurement. Remote monitoring methods may be applied.<br><br>When sampling is used, follow Section 4.4 "General requirements for sampling" of RECHV4.0 methodology. |
| Monitoring frequency: | Continuous |
| QA/QC procedures: | Measurement using credible and calibrated equipment<br><br>Data logger measuring the electricity consumption of the electric cooking appliance(s) shall be in conformity with industry standard and calibrated according to relevant national requirements.<br><br>Compare result to the reference value of 1 kWh per capita per day. If the project energy use is more per capita than the reference value, then the project energy use shall be further substantiated by independent third-party studies about cooking technologies and fuel/energy use that are specific to the project region, including but not limited to government publications, peer-reviewed literature, third party assessments (for example – UN and similar organizations) and/or official data or statistics. If the results cannot be further substantiated, then apply 1 kWh per capita as a cap on the electricity consumption as applied in equation 3. Equation 5 should continue to use the real monitored value. |
| Any comment: | This parameter is monitored during project implementation when the project device uses electricity |

| **Data/parameter ID** | MECD 7 |
|---|---|
| Data / Parameter: | $EF_{el,y}$ |
| Data unit: | $tCO_2e/MWh$ |
| Description: | The emissions factor of the project electricity system in year *y* |
| Source of data: | Determined using CDM tool TOOL05 (Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation) |
| Monitoring frequency: | Annually, or fixed ex-ante for devices connected to a national interconnected system. |
| QA/QC procedures: | Using credible data for the electricity system<br>In case the electricity system is a mini-grid introduced by the project, mini-grids powered by fossil-fuel engines are not eligible, with the exception of renewable mini-grids with back-up engines that are used for no more than 10% of operating hours in the year.<br>Where back-up fossil-fuel engine(s) are used, use the monitored fuel amount to estimate the number of operating hours during the monitoring period, and compare this to the total number of operating hours of the mini-grid for the same period. If the use of the engine surpasses 10% of operating hours, then determine the number of days in which the backup technology was used to operate the mini-grid for more than 10% of total operating hours during the day. The project devices are ineligible for crediting on the days when the use of back-up technology was more than the 10% threshold. |
| Any comment: | This parameter is monitored where the energy consumed by the project devices is electrical and directly measured during project implementation |

| **Data/parameter ID** | MECD 8 |
|---|---|
| Data / Parameter: | $TDL_{j,y}$ |
| Data unit: | Fraction |
| Description: | Average technical transmission and distribution losses for providing electricity to source j in year y. |
| Source of data: | Determined as per the CDM tool TOOL05, paragraph 7.2 (Data/parameters monitored, table 3), |
| Monitoring frequency: | Once per monitoring period |
| QA/QC procedures: | Using credible data for the electricity system or default value |

| | |
|---|---|
| Any comment: | This parameter is monitored where the energy consumed by the project devices is electrical and is directly measured during project implementation. |

| **Data/parameter ID** | MECD 9 |
|---|---|
| Data / Parameter: | $fNRB_{i,y}$ |
| Data unit: | Fraction non-renewability |
| Description: | Non-renewability status of woody biomass fuel i during year y |
| Source of data: | Applicable NRB assessment following the RECHV4.0 methodology |
| Monitoring frequency: | Following the requirements of the main methodology, use the latest version of the CDM TOOL30. |
| QA/QC procedures: | Use of latest version of the CDM TOOL30: Calculation of the fraction of non-renewable biomass |
| Any comment: | As applicable, NRB assessment may be used for multiple scenarios where woody biomass is used |

| **Data/parameter ID** | MECD 10 |
|---|---|
| Data / Parameter: | $P_{p,d,y}$ |
| Data unit: | mass or volume unit |
| Description: | The amount of fuel used in the project in by device d in year y |
| Source of data: | Direct measurement by metering or at sales, either on a device basis or cluster-of-devices basis. Remote monitoring methods may be applied.<br>When sampling is used, follow Section 4.4 "General requirements for sampling" of RECH V4.0 methodology. |
| Monitoring frequency: | Continuously, aggregated monthly |
| QA/QC procedures: | Measurement using credible and calibrated equipment with mechanisms that ensure alternative use of the measured fuel is not possible.<br>Measuring device shall be in conformity with industry standard and calibrated according to relevant national requirements.<br>Compare result to the reference value of 0.0045 GJ per capita per day. If the project energy use is more than the |

| | |
|---|---|
| | reference value, then the project energy use shall be further substantiated by independent third-party studies about cooking technologies and fuel/energy use that are specific to the project region, including but not limited to government publications, peer-reviewed literature, third party assessments (for example – UN and similar organizations) and/or official data or statistics. If the results cannot be further substantiated, then apply the reference value as a cap on the fuel consumption (on equivalent terms) as applied in equation 4. Equation 6 should continue to use the real monitored value. |
| Any comment: | In case direct metering is not applied, then the fuel purchases, which are summarised on a monthly basis, are automatically captured on a continuous basis.<br>Measurement may occur cluster-wise where project-specific retailers can clearly be assigned to customers and alternative uses are obviously excluded (if, for example, a new fuel is introduced specifically for project devices). |

| **Data/parameter ID** | MECD 11 |
|---|---|
| Data / Parameter: | $LE_y$ |
| Data unit: | $tCO_2e$ per year |
| Description: | Leakage in project scenario in year y |
| Source of data: | Follow requirements of Section 3.11 of RECH V4.0, i.e.,<br>Option 1: Apply a discount value of 0.95 to the emission reductions to approximate leakage emissions, or<br>Option 2: Evaluate leakage following the procedure described there. |
| Monitoring frequency: | Follow requirements of RECH V4.0 |
| QA/QC procedures: | Transparent data analysis and reporting |
| Any comment: | - |

## 4.3 | Baseline scenario survey

4.3.1 | The baseline scenario shall be conducted following the section 4.3 of RECH V4.0, and it may be based either on external sources or the baseline scenario survey, which provides critical information on target population characteristics, baseline technology use, fuel consumption, leakage, and sustainable development indicators.

### 4.4 | General requirements for sampling approach

4.4.1 | The sampling approach shall be in line with the section 4.4 of RECH V4.0.

## DOCUMENT HISTORY

| Version | Date | Description |
|---|---|---|
| 1.0 | 05/10/2021 | First version |