



METHODOLOGY

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SDG 13

METERED & MEASURED ENERGY COOKING DEVICES

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SUMMARY

This methodology is applicable to activities that introduce technologies that reduce or avoid greenhouse gas (GHG) emissions from cooking by quantifying emission reductions through the direct measurement of energy or fuel consumed. It applies to end-users in households, communities, and institutions. The methodology relies on metered data or comprehensive fuel sales records to determine activity energy use. This updated version aligns the methodology with the Gold Standard for the Global Goals (GS4GG) Paris Agreement Alignment (PAA) requirements, including standardised approaches to baseline setting, additionality, leakage (including embodied emissions), and the application of the Downward Adjustment Factor (DAF).

Key Methodological components:

- **Direct Measurement through Metered Energy Consumption:** This methodology quantifies emission reductions using direct measurement of energy consumption through Continuously Tracked Energy Consumption (CTEC) systems. Energy use from activity devices is only recorded through device-level meters, digital monitoring systems, or verifiable fuel sales records linked to individual users. Because continuous digital monitoring is utilised, activities under this methodology are structurally exempt from Hawthorne Effect (observer bias) penalty adjustments.
- **Back-Calculated Baseline Energy Consumption:** Baseline emissions are determined by back-calculating the baseline energy required to deliver the same cooking service as the activity device. This approach uses the measured activity energy consumption together with baseline fuel characteristics, efficiencies, or emissions ratios derived from surveys and controlled testing.
- **Continuous Monitoring and Data Completeness Rules:** The activity's energy consumption is monitored continuously. The methodology establishes

data completeness requirements and conservative gap-filling procedures for missing metering data to ensure the integrity of the measured energy consumption dataset.

- **Internalisation of Stove Stacking and Rebound Effects:** Because baseline emissions are derived from the energy service delivered by the activity device, stove stacking and rebound effects are inherently reflected in the metered energy consumption data and therefore do not require separate leakage adjustments.
- **Upstream and Lifecycle Emissions Accounting:** Baseline emission factors incorporate combustion emissions and upstream emissions associated with baseline fuel production and supply chains.
- **Dynamic Baseline Adjustment:** To increase mitigation ambition over time and align with national decarbonization pathways, baseline emissions are adjusted using a fixed Downward Adjustment Factor (DAF) determined using the [GS4GG Methodology Tool 05 - Downward Adjustment Factor Determination](#).

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1 | KEY INFORMATION

1.1.1 | The following table describes the key information for the application of the methodology.

Table 1. Key information

Term	Description
Activity summary	The activity (also referred to as project or project activity) involves the introduction of efficient cooking technologies (e.g., electric cookstoves, EPCs, metered LPG, biogas, advanced pellet gasifier cookstoves utilizing processed fuels, or ethanol stoves) where GHG emission reductions are quantified through direct measurement (metering) of the energy or fuel consumed by every device or assigned individual end-user. The methodology is applicable to end-users in households, communities, institutions, and commercial facilities.
Mitigation type	<input checked="" type="checkbox"/> Emission reduction <input type="checkbox"/> Emission removals
Applicable activity scale	<input checked="" type="checkbox"/> Micro scale (e.g., $\leq 10,000$ tCO _{2e} per year) <input checked="" type="checkbox"/> Small scale (≤ 180 GWh _{th} /yr energy savings) <input checked="" type="checkbox"/> Large scale (> 180 GWh _{th} /yr energy savings)
Sectoral Scope	3. Energy demand
Activity Requirement	Community Services
Activity start date	The date of start of operation of the first unit under the activity.
Crediting Period start date	The start date of the Crediting Period is the date of the start of use of the first device distributed/installed or a maximum of two years prior to the date of activity Design Certification, whichever occurs later.
Crediting period length	<p>The maximum crediting period is five years, renewable twice (total of 15 years).</p> <p>The crediting period shall not exceed the technical lifetime of the activity technology unless measures for replacement and maintenance are in place.</p> <p>For phased distribution, the crediting period start date is the operation start date of the first distributed/installed unit within the activity boundary. Subsequent units generate emission reductions from their respective operations start dates.</p>
Geographical applicability	Global
Limitations	No limitations beyond the applicability criteria.

2| DEFINITIONS

2.1.1 | In addition to the terms and definitions listed in the [Glossary of Gold Standard for the Global Goals, Activity Requirements](#), and the referenced standards and tools, the following definitions shall apply in the context of this methodology:

Table 2. Terms and definitions

TERM	DEFINITION
Artisanal cookstoves	Cookstoves produced by small-scale manufacturing processes that can result in variations in dimensions; generally made by hand by skilled workers, rather than mass-produced in factories.
Batch	The population of cooking devices of the same type commissioned during a specific period (e.g., month or quarter) in a calendar year. The latest date of commissioning of a device within the batch shall be used as the date of commissioning for the entire batch.
Clean Thermal Energy Cooking (CTEC)	A universally applied acronym referring to modern, metered energy cooking devices - cooking devices that record fuel or energy use directly, or through a supplementary meter, with the ability to record the amount of energy or fuel used for cooking over time. Examples include induction cookstoves, electric pressure cookers (EPCs), solar electric cookers, and metered LPG, biogas, and ethanol cookers. This also includes scenarios where fuel sales records (e.g., for pellets, LPG, ethanol) provide a complete accounting of fuel consumed by activity devices.
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.
Controlled Cooking Test (CCT)	A test that measures cookstove performance in comparison to traditional cooking methods when a cook prepares a pre-determined local meal. It is used in this methodology to determine specific energy consumption ratios.
Cooking or heating event	An occurrence in which useful energy is delivered from a cookstove to fulfil a discrete task or set of tasks, such as cooking a meal (which may include multiple dishes) or heating water.

Downward Adjustment Factor (DAF)	<p>A numerical coefficient applied to crediting baselines to ensure the encouragement of ambition by setting crediting baselines below Business-As-Usual (BAU) levels and increasing the ambition of crediting baselines over time.</p> <p>Refer to GS4GG Methodology Tool 05: Downward Adjustment Factor Determination (hereafter GS4GG MT 05), for further details on classification and default DAF.</p>
Stove stacking	<p>The use of multiple stoves or cooking devices concurrently or interchangeably by the same end user. Activity beneficiaries continue to use traditional or other stoves alongside the improved stove, rather than exclusively using a single stove.</p>
Technical life	<p>Average time for which the project technology may continue to be operated in a safe manner and with minimal loss of performance. The technical life shall be as per the manufacturer's specification or independent study report.</p>
Technology	<p>The single or multiple technologies and/or practices applied in the project activity that result in emission reduction. Throughout the methodology, the term 'technology' should be read as including 'practices'.</p>
Wood-to-charcoal conversion factor (WCCF)	<p>A factor expressing the amount of wood required to produce a standard quantity of charcoal. Activity developers shall apply a stratified default approach:</p> <ul style="list-style-type: none"> • Sub-Saharan Africa (SSA) and Least Developed Countries (LDCs): A default WCCF ratio of 6:1 (approx. 17% kiln efficiency) may be applied, reflecting the dominance of traditional earth-mound kilns. • Industrialized or High-Efficiency Regions: A conservative default WCCF ratio of 4:1 (approx. 25% kiln efficiency) shall be applied. • Optional conservative application: Activity developers may apply the conservative default WCCF ratio of 4:1 irrespective of the geographic region, including SSA and LDC contexts. <p>Activity-specific overrides for upstream charcoal emission factors are not permitted.</p>

3| SCOPE, APPLICABILITY, AND ENTRY INTO FORCE

3.1| Scope

3.1.1 | This methodology applies to activities that introduce technologies that reduce or avoid greenhouse gas (GHG) emissions from cooking, where emission reductions are quantified through the direct measurement of the energy or fuel consumed.

- 3.1.2 | The methodology is applicable to end-users in households, communities, institutions, and commercial facilities (e.g., restaurants), provided the device meets the continuous useful energy output limit (<150kW).
- 3.1.3 | This methodology is only applicable to activities utilising a Continuously Tracked Energy Consumption (CTEC) approach. This requires that the energy or fuel used by 100% of the devices within the activity scenario is directly measured (metered) or monitored via comprehensive fuel sales records. Examples of applicable technologies include, but are not restricted to:
- a. Electric cookstoves (including induction, infrared, hot plates, rice cookers) using grid, mini-grid, or off-grid (e.g., solar home system) electricity, equipped with smart metering.
 - b. Electric Pressure Cookers (EPCs) equipped with smart metering.
 - c. Metered LPG, biogas, or bio-ethanol cookstoves (e.g., utilising Pay-As-You-Go systems).
 - d. Stoves and advanced pellet gasifier cookstoves using processed fuels (e.g., pellets) where consumption is tracked via comprehensive, verifiable sales records for all participants.
- 3.1.4 | Activities that rely on representative sampling (e.g., Kitchen Performance Tests) to estimate total activity fuel consumption are not eligible under this methodology and shall apply other applicable methodology (e.g., RECH – formerly TPDDTEC, SMEC).

3.2| Applicability

The methodology is applicable under the following conditions:

3.2.1 | **Technology Specifications and Performance**

- 3.2.1.1 | The activity developer shall choose a technology design that has predictable performance and is proven to be efficient and durable under field conditions.
- 3.2.1.2 | The technology shall have a continuous useful energy output of less than 150kW per unit.
- 3.2.1.3 | For fuel-based activity cookstoves (e.g., LPG, ethanol, biogas, pellet gasifiers), the rated thermal efficiency, determined via standardised laboratory testing (e.g., WBT or ISO 19867-1 or an equivalent national standard), shall be higher than the baseline technology efficiency and at least 40%.

3.2.2 | **Implementation Structure**

- 3.2.2.1 | The activity is implemented by a developer and can include additional activity participants. Individual households and institutions may be represented collectively (e.g., by community organizations) but do not individually act as activity participants.

3.2.3 | **Monitoring Systems and Data Management (CTEC Requirements)**

- 3.2.3.1 | **Requirement for 100% Monitoring:** The activity developer shall implement robust monitoring systems capable of monitoring and recording the fuel or energy consumption of 100% of the distributed activity devices.
- 3.2.3.2 | **Time-Bound Transition for Constrained Contexts:** Recognising that data connectivity and transmission costs present significant, immediate barriers in certain contexts, activities implemented in Least Developed Countries (LDCs), or in host countries where the activity developer can objectively demonstrate prohibitive structural barriers to data connectivity, they are permitted a time-bound flexibility. Under this exemption, the activity developer may utilise the Alternative Continuous Monitoring Approach via a Revolving Representative Sample in lieu of 100% device metering. This flexibility expires on 31 December 2030. For all emission reductions generated after these respective dates, 100% device-level continuous metering shall be mandatory. Activities utilising this exemption shall detail their transition plan in the PDD and strictly adhere to the operational sampling requirements detailed in Section 14.5.
- 3.2.3.3 | For activities implemented in non-LDC host countries, the activity developer may only claim this exemption if they can objectively demonstrate that prohibitive structural, financial, or logistical barriers prevent 100% data connectivity within the specific activity boundary. The activity developer shall substantiate their claim using verifiable, independent evidence or formal financial modelling meeting at least one of the following criteria:
- a. **Prohibitive Financial and Scale Barriers:** The activity developer shall quantitatively demonstrate that the capital or operational costs (CAPEX/OPEX) associated with implementing 100% continuous digital data transmission (e.g., IoT cellular data plans) or the logistical costs of 100% manual data retrieval are demonstrably prohibitive given the volume and geographic dispersion of the devices. This shall be substantiated through an auditable financial assessment (e.g., verifiable third-party vendor quotes for hardware/telemetry, or detailed operational budgets for field-agent logistics) demonstrating that the implementation of 100% metering severely undermines the financial viability of the activity during this transitional period.
 - b. **Network Unavailability or Off-Grid Isolation:** The specific activity boundary lacks reliable cellular (e.g., 2G/3G/4G/NB-IoT) coverage, or suffers from chronic electrification deficits preventing reliable device recharging. This shall be substantiated by authoritative evidence (e.g., official coverage maps from national telecommunications regulators, independent field-signal assessments, or national rural electrification data).
 - c. **Regulatory Restrictions:** Explicit national or regional laws, decrees, or telecommunications regulations legally prohibit the use of necessary IoT radio frequencies, mass data collection, wireless transmission, or cross-border transfer of the necessary telemetry data. This must be substantiated by formal legal citations.

- 3.2.3.4 | **Data Management Infrastructure:** The activity developer shall maintain a comprehensive database and detail the procedures for data logging, transmission, storage, handling of data gaps (following procedures detailed in Section 14), and meter calibration/QA/QC in the Monitoring Plan.
- 3.2.3.5 | **Fuel Sales Tracking:** In the case of cooking devices using specific fuels (e.g., LPG, ethanol, pellets), the comprehensive record of fuel purchased by each customer may be used as the measure of consumption, provided that:
- The fuel delivery system is designed exclusively for use in the activity technology (e.g., specific canisters or connections), AND;
 - The developer implements and documents verifiable safeguards to prevent the diversion of the fuel for alternative (non-activity) uses, AND;
 - The record of fuel purchased can be verifiably linked via a relational database to the exclusive use of the activity device(s) assigned to that user, seamlessly accommodating routine device repair or replacement.
- 3.2.4 | **Baseline Technology Displacement**
- 3.2.4.1 | The activity developer should implement credible incentive mechanism(s) (e.g., trade-ins, buy-backs, usage disincentives) that promote the progressive elimination or decommissioning of the inefficient baseline technologies that are replaced by the project devices. These mechanisms should be implemented as early as possible during the activity, recognising that permanent physical decommissioning of open fires is often unverifiable.
- 3.2.5 | **Fuel and Energy Requirements**
- 3.2.5.1 | **Fossil Fuels (e.g., LPG):** For activities utilising fossil fuels in the activity scenario, only emission reductions from the energy efficiency improvement aspect are eligible. If the activity utilises fossil fuels (e.g., LPG), the Baseline Emission Factor shall be used in place of activity fuel strictly in the calculation of activity emissions. This ensures only efficiency improvements are credited.
- 3.2.5.2 | **Bio-Blending Provision:** If a activity developer introduces verified renewable blended fuels (e.g., BioLPG) into a fossil fuel supply chain, the developer may submit a deviation or design change to account for the physically verified renewable fraction using its actual activity emission factor (EF_p), provided the supply chain tracking meets robust chain-of-custody requirements.
- 3.2.5.3 | **Electricity and Renewable Fuels:** For activities utilising electricity or exclusively renewable fuels (e.g., biogas, bio-ethanol) or renewable energy sources (e.g., solar electric), emissions reductions from both fuel switching and efficiency improvements are eligible.
- 3.2.6 | **Technical life and Replacement**
- 3.2.6.1 | If the expected technical life of the activity technology is shorter than the crediting period, the activity developer shall describe measures to ensure that end-users are provided with replacement technology of comparable

quality at the end of the technical life (by replacement or retrofitting with a performance guarantee). This shall be achieved by either:

- a. Replacing the unit with comparable or better technology; or
- b. Retrofitting essential parts with a performance guarantee.

3.2.6.2 | If neither of the prior conditions can be demonstrated and implemented, no emission reductions can be claimed for the technology after its technical life has ended.

3.2.6.3 | Emission reductions may be claimed for retrofitted/repairs devices during an extended lifetime only if the details of the retrofits/repairs are documented. An extended crediting lifetime beyond the initial manufacturer rating shall be demonstrated through extended commercial warranties, formal guarantees, or continuous longitudinal field monitoring of active cohorts, rather than relying solely on a single static lab durability test.

3.2.7 | **Avoidance of Double Counting**

3.2.7.1 | To avoid double counting or double claiming, the activity developer shall:

- a. Explain the proposed method for distribution of the project stove in the PDD/VPA-DD; AND,
- b. Ensure activity devices are identified with a unique identifier affixed to the device and tracked in the activity database; AND.
- c. Clearly communicate its ownership rights and intention of claiming the emission reductions by contract or clear written assertions in the transaction paperwork to all other activity participants, technology manufacturers, and retailers/fuel suppliers.
- d. Inform and obtain explicit consent from the end-users that they cannot claim emission reductions from the activity. Evidence of transfer shall clearly and unambiguously demonstrate informed consent. Transactional records (whether paper or digital) shall contain a verified assertion, accessible in the local language, explicitly demonstrating that the end-user was informed of the carbon title waiver prior to the execution of the transfer.
- e. Exclude from the project activity any devices¹ already included in any other voluntary market, PACM, or CDM activity/PoA.

3.2.7.2 | **Safe Water Supply (SWS) Overlap:** When a cookstove activity and a safe water supply (SWS) intervention (such as water purification that eliminates the need for boiling) overlap in the same area or households, the activity

¹ The double-counting exclusion applies to the monitored energy service event, not strictly the static piece of hardware. If a physical device is swapped between a GS4GG project and an Article 6 project (e.g., post-repair), the activity developer shall demonstrate via the relational database that the specific fuel consumption/energy data from that device is chronologically partitioned and never claimed in two registries simultaneously.

design shall include measures to prevent double-counting of emission reductions.

- a. The SWS activity shall calculate its baseline fuel consumption for water boiling by assuming the use of efficient devices. Both activities cannot claim the same fuel savings.
- b. To ensure compliance with data privacy regulations, activity developers may utilize GDPR-compliant data-sharing alternatives (e.g., anonymised third-party registry checks) to verify non-duplication across different activity developers.

3.2.7.3 | Overlap with Jurisdictional REDD+ Programs: Where the activity boundary overlaps with an implemented Jurisdictional REDD+ (J-REDD+) programme or a similar national or sub-national scheme for forestry, the activity developer shall demonstrate that the emission reductions are not subject to double issuance risk.

- a. Overlap risk shall be considered immaterial unless the Host Country's Jurisdictional REDD+ FREL/FRL baseline explicitly incorporates and accounts for subsistence household fuelwood consumption as a qualified driver of deforestation. The activity developer shall demonstrate non-overlap using publicly available information by verifying non-overlap against published jurisdictional programme boundaries and FREL/FRL accounting documents. Exhaustive bespoke jurisdictional modelling or formal government letters are not required unless a direct conflict exists.
- b. If a direct conflict exists, the activity developer shall demonstrate that the reductions are not subject to double issuance risk by providing valid documentation for one of the following options:
 - i. **Option 1: Accounting Exclusion:** Documentation demonstrating that the jurisdictional program's Forest Reference Emission Level, Forest Reference Level, or accounting methodology explicitly excludes the specific emission sources (e.g., degradation from wood fuel harvesting) or activity classes (e.g., clean cooking/thermal energy) addressed by the activity; OR
 - ii. **Option 2: Attribution Agreement:** A formal statement, Nesting Agreement, or Letter of No Objection from the relevant authority (or national, sub-national, or regional programme administrator) confirming that the specific emission reductions generated by the project activity are attributed to the activity and will be deducted from (or not claimed by) the jurisdictional programme to prevent double issuance.

3.2.8 | Indoor Air Pollution (IAP) and Safety

3.2.8.1 | Adequate evidence shall be supplied to demonstrate that indoor air pollution (IAP) levels are not worsened compared to the baseline.

- 3.2.8.2 | Furthermore, for activities where the activity moves from outdoor to indoor or where the activity technology reduces ventilation (e.g., changing from a stove with a chimney to an improved stove with no chimney), IAP levels, including PM 2.5 and carbon monoxide (CO) emissions, shall not worsen in the activity compared to the baseline. Standard ISO 19867-1 laboratory test reports (or equivalent WHO tier classifications) demonstrating improved emissions tiers are sufficient to satisfy the IAP safeguard. Bespoke field emissions monitoring is not required unless the activity transitions users to an unventilated technology architecture.
- 3.2.8.3 | For activities introducing specific fuels (e.g., bio-ethanol, LPG, biogas), the activity developer shall demonstrate that the devices are designed, constructed, and operated according to the requirements of relevant national or international safety standards or recognised guidelines.
- 3.2.8.4 | To issue ADALYs, the activity developer may apply the Gold Standard [Methodology to Estimate and Verify ADALYS from Clean Household Air](#). The activities may claim standard observational SDG 3.9.1 impact claims in their monitoring reports based on basic usage and indoor air quality safeguards.

3.3| Mandatory Compliance and Safeguards

- 3.3.1 | **GS4GG Requirements:** The activity shall adhere to the GS4GG [Principles and Requirements](#), [Safeguarding Principles and Requirements](#), and the [Community Services Activity Requirements](#).
- 3.3.2 | **Regulatory Compliance:** The activity shall not undermine or conflict with any national, sub-national, or local regulations or guidance for thermal energy supply, devices, or fuel/energy supply/use. The activity shall document the relevant regulatory framework within the activity boundary.
- 3.3.3 | **Health and Safety:** Activities shall comply with health and safety requirements at both the organisation level and for end-users, in line with Principle 3 of the [Safeguarding Principles and Requirements](#).
- 3.3.4 | **Contractual Obligation:** The activity developer shall, by means of direct ownership, contractual agreement, or other such arrangement, establish access to the required monitoring data (including metered data streams) and supporting documentation set forth in this methodology and relevant GS4GG standards.

3.4| Entry into force

- 3.4.1 | The date of entry into force is 90 days from the publication date of this methodology.

4| NORMATIVE REFERENCES

- 4.1.1 | The following standards, tools, and guidelines are normative references for the application of this methodology. Activity developers shall apply the latest valid version of these documents.

- 4.1.2 | References to CDM tools are valid until equivalent tools are published under Gold Standard (GS4GG) or the Article 6.4 Mechanism (A6.4)/Paris Agreement Crediting Mechanism (PACM).
- 4.1.2.1 | GS4GG Standards and Requirements
- a. [Principles and Requirements](#)
 - b. [Safeguarding Principles and Requirements](#)
 - c. [Community Services Activity Requirements](#)
- 4.1.2.2 | GS4GG Methodologies, Standards, and Tools
- a. Methodology Standard: [Requirements for Additionality Demonstration](#)
 - b. Methodology Standard: [Requirements for Baseline Determination in Methodologies](#)
 - c. Tool 1 – [Emissions from fossil fuel consumption](#)
 - d. Tool 05: [Downward Adjustment Factor Determination](#)
 - e. Tool 06: [Common Practice Analysis](#)
 - f. Tool - Analysis of lock-in risk [Latest Approved Version]
 - g. Tool - Technical lifetime [Latest Approved Version]
 - h. Requirements and Guidelines: [Cookstove Usage Rate Guidelines](#)
 - i. Methodology: [Methodology for Metered & Measured Energy Cooking Devices](#) (Referenced for scope exclusion)
 - j. [Tool 07 - Digital Stove Monitoring, Analysis and Reporting Tool \(D-SMART\)](#)
- 4.1.2.3 | UNFCCC/A6.4 Tools and Standards:
- a. CDM TOOL33: Default values for the fraction of non-renewable biomass (or subsequent A6.4 tools, such as MoFuSS, as applicable).
 - b. [A6.4-AMT-002: Investment analysis](#)
 - c. A6.4 MEP012-A04: Methodological tool: Fraction of non-renewable biomass [Latest Approved Version]
 - d. A6.4-AMT-006: Determination of the technical lifetime of equipment
 - e. CDM Standard: Sampling and surveys for CDM project activities and programme of activities (or equivalent A6.4/PACM standard).
 - f. A6.4-AMT-007: [Emissions from electricity generation and consumption.](#)
- 4.1.2.4 | Other Sources:
- a. ISO 19867-1: Clean cookstoves and clean cooking solutions - Harmonized laboratory test protocols
 - b. [Kitchen Performance Test \(KPT\) Protocol \(Latest recognized version, e.g., Clean Cooking Alliance protocol\)](#).

- c. Water Boiling Test (WBT) Protocol (Latest recognized version).
- d. Relevant OIML, IEC, or ISO smart-metering guidelines (applicable to CTEC hardware validation).

5| ACTIVITY BOUNDARY AND GHGS SOURCES/SINKS

5.1| Activity boundary

- 5.1.1 | The activity boundary encompasses all anthropogenic sources of GHGs that are under the control of the activity developer, are related to the activity, or are significantly affected by the activity.
- 5.1.2 | The activity developer shall clearly identify the project boundary and fuel production and collection area following the definitions below.
 - 5.1.2.1 | **Physical and Geographical Boundary:** The spatial extent of the activity boundary is the physical, geographical site(s) where the activity technologies are implemented (e.g., households, institutional facilities).
 - 5.1.2.2 | **Fuel and Energy Production/Supply Systems:** The boundary includes the systems associated with energy sourcing and fuel production:
 - a. **Electricity:** Where the project uses electricity, the boundary includes the connected electricity grid and/or the off-grid electricity generation systems (e.g., solar home systems, mini-grids) and the associated transmission and distribution (T&D) system.
 - b. **Processed Fuels:** The boundary includes the production facilities (e.g., ethanol distilleries, LPG processing, biogas digesters; pellet manufacturing plants) and associated transport infrastructure for baseline and project fuels.
 - c. **Woody Biomass:** Where the baseline fuel is woody biomass, the boundary includes the area within which this biomass is grown and collected, and any associated production facilities (e.g., charcoal kilns).
 - d. **New Biomass Feedstock:** In cases where the activity introduces the use of a new biomass feedstock, the boundary includes the area within which this new biomass is produced, collected, and supplied.
- 5.1.3 | **Upstream Emissions (Manufacturing/Transport):** The upstream emissions associated with the manufacture and transport of the devices and metering equipment attributable to the activity (cradle-to-gate) shall be accounted for as Leakage (See Section 9|).
- 5.1.4 | **Target Area:** The target area is the region(s) e.g., village(s) or town(s) where the considered baseline scenario(s) are deemed to be uniform. The target area provides an outer limit to the activity boundary in which the activity has a target population.

5.2| GHG Sources

- 5.2.1 | Emissions can occur during fuel production, energy generation, transport, and consumption (delivery of thermal energy).

5.2.2 | Materiality and Simplification Rules

- a. **Baseline Simplification:** Baseline emissions of CH₄ and N₂O may be omitted for simplification, provided this results in a conservative estimate of emission reductions.
- b. **Activity Emission Completeness:** All activity emissions (CO₂, CH₄, N₂O, and electricity-related emissions) shall be accounted for unless demonstrably negligible. For biomass or fossil-fuel devices utilising auxiliary electrical components (e.g., internal draft fans, digital displays, IoT batteries) where the power consumption is demonstrably negligible, the emissions associated with electricity consumption ($AE_{elec,y}$) may be omitted from accounting.
- c. **Fuel Transportation Emissions:** Activity emissions from the transportation of fuel (e.g., LPG, ethanol, pellets) shall be accounted for if the total transportation distance exceeds 200 km; otherwise, it may be neglected. If baseline transportation emissions are included, activity transportation emissions shall also be included, regardless of distance.
- d. **Device Manufacturing/Transport (Embodied Emissions):** Indirect GHG emissions associated with the production, processing and transport of the activity devices and metering equipment (cradle-to-gate) shall be accounted for as Leakage Emissions (See Section 9|).

5.3| Baseline Emissions

5.3.1 | The following table details the GHGs included in, or excluded from, the baseline scenario(s).

Table 3. 4GHGs included in, or excluded from, the activity

SOURCE	DESCRIPTION	GAS	INCLUDED?	JUSTIFICATION
Delivery of thermal energy	Combustion of fuel (e.g., biomass, fossil fuel) in the baseline technology.	CO ₂	Yes	Major source of emissions. Only CO ₂ from the non-renewable fraction of biomass (fNRB) is included.
		CH ₄	Yes	Important source of emissions from incomplete combustion. May be omitted if conservative (See a).
		N ₂ O	Yes	Can be significant for some fuels. May be omitted if conservative (See a).
		CO ₂	Yes	

Production of fuel, transport of fuel	Emissions associated with production (e.g., charcoal production, LPG refining) and transport of the baseline fuel.	CH ₄	Yes	Important lifecycle emissions.
		N ₂ O	Yes	

5.4| Activity emissions

5.4.1 | The following table details the GHGs included in, or excluded from, the activity scenario(s).

Table 4. Sources of Activity Emissions

SOURCE	DESCRIPTION	GAS	INCLUDED?	JUSTIFICATION
Delivery of thermal energy (Fuel Combustion)	Combustion of fuel in the project scenario (e.g., LPG, ethanol, biogas, pellets).	CO ₂	Yes	Major source of emissions. (Subject to applicability conditions regarding fossil fuels in Section 3.2.5).
		CH ₄	Yes	Shall be included unless negligible (See b).
		N ₂ O	Yes	Shall be included unless negligible (See b).
Electricity Generation and T&D	Emissions associated with the generation and transmission/distribution of electricity used by the activity devices.	CO ₂ e	Yes	Major source of emissions for electric cooking. Accounted for via Grid Emission Factor or off-grid factors and T&D losses. Emissions from negligible auxiliary electricity use may be excluded per Section 5.2.2
Production and transport of fuel	Emissions associated with the production and transport of the fuel used in the activity scenario.	CO ₂	Yes	Important lifecycle emissions. Transport included if >200km (See b).
		CH ₄	Yes	Important lifecycle emissions.
		N ₂ O	Yes	

5.5| Leakage emissions

5.5.1 | Leakage is the net change of GHG emissions occurring outside the activity boundary, attributable to the activity. The following table details the potential sources of leakage emissions that shall be assessed.

Table 5. Sources of Leakage Emissions

SOURCE	DESCRIPTION	GAS	INCLUDED?	JUSTIFICATION
Embodied Emissions (Upstream)	Cradle-to-gate emissions associated with the manufacturing and transport of the activity devices and metering equipment.	CO _{2e}	Yes	Mandatory Inclusion. Shall be accounted for using conservative defaults or verified activity-specific lifecycle assessments (LCA) (See Section 9).
Reuse of Baseline Equipment	The displaced baseline technologies are reused outside the project boundary in place of lower emitting technology.	CO _{2e}	Yes	Potential source of leakage. Assessed via monitoring or default factor (Section 9).
Market Effects (Fuel Availability)	Non-participants switch to the non-renewable biomass or fossil fuels saved by the activity.	CO _{2e}	Yes	Potential source of leakage. Assessed via monitoring or default factor (Section 9).
Market Effects (Adverse Selection)	Promotion of the new technology stimulates adoption by households who commonly used a technology with relatively lower emissions.	CO _{2e}	Yes	Potential source of market leakage. Assessed via monitoring or default factor
Compensation for Lost Co-benefits	The activity population increases overall energy demand	CO _{2e}	NO	These are internal activity effects, not external leakage. Under

(Rebound Effect/Stacking)	due to higher efficiency (Rebound Effect) or retains parallel use of baseline technologies (Stove Stacking).	MECD's 100% CTEC measurement, these behavioural risks are mathematically internalized. Because emission reductions are calculated solely from the directly metered energy delivered exclusively by the activity device, any unmetered energy used via stove stacking naturally results in a lower back-calculated baseline. Rebound is bounded by Baseline Caps (See Sections 7 and 8).
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6| DEMONSTRATION OF ADDITIONALITY

6.1| Requirements

6.1.1 | The activity developer shall demonstrate that the activity would not have occurred in the absence of the incentives provided by the carbon revenues. The demonstration of additionality shall be conducted in accordance with the latest version of the *GS4GG Standard: Requirements for Additionality Demonstration*. Note: The performance-based analysis pathway is not an eligible option under this methodology.

6.2| Additionality Approach Selection

6.2.1 | The activity developer shall demonstrate additionality by conforming to the requirements of one of the options below:

- a. **Positive List (Deemed Additionality):** The activity is deemed additional if it meets the criteria of the positive list of technologies detailed in [Annex 3](#). This methodology-level analysis is valid for a period of five (5) years from the date of publication, justified by the

multi-year update cycles of the underlying international surveys and academic data.

- b. **Activity-Specific Assessment:** If the activity does not qualify for a Positive List of [Annex 3](#) (e.g., large-scale activities, or activities operating in urban centres of middle-income countries), additionality shall be demonstrated through a detailed assessment as described in this section.

6.2.2 | All activities, regardless of the approach selected (Positive List or Activity-Specific Assessment), shall successfully complete the following mandatory analyses: i. Regulatory Surplus Analysis (Section [6.3.1](#)); ii. Lock-In Risk Analysis (Section [6.4.1](#)); and iii. Common Practice Analysis (Section [6.7.1](#)).

6.2.3 | If the Activity-Specific Assessment pathway is used (i.e., the Positive List is not applied), the activity developer shall also complete the Investment Analysis (Section [6.5.1](#)) and/or Barrier Analysis (Section [6.6.1](#)).

6.3| Regulatory Surplus Analysis

6.3.1 | The activity developer shall demonstrate that the emission reductions achieved by the activity are regulatory surplus. This means the activity and its resulting emission reductions are not required by any existing laws, regulations, or mandates (legal requirements), or obligations within the host Country's jurisdiction.

6.3.2 | **Exemptions:** The activity developer may submit credible, authoritative, and up-to-date evidence (e.g., independent market surveys, government implementation reports) demonstrating that the *de facto* market conditions involve systemic non-compliance with the regulation (e.g. widespread continued use of traditional fuels despite formal restrictions), or that a government scheme lacks the operational funding, institutional capacity or enforcement mechanisms to achieve its targets independently of carbon finance. For high-income countries, all legal requirements shall be deemed to be fully enforced, and this *de facto* non-enforcement exemption shall not apply.

6.3.3 | The analysis shall verify that legal requirements do not:

- a. Directly mandate the implementation of the mitigation activity.
- b. Indirectly mandate the implementation of the mitigation activity by requiring a certain technological, performance, or management action, or by preventing alternative scenarios; or
- c. Establish a support scheme (e.g., subsidy programme) designed to achieve a quantitative target for the relevant technologies that would likely result in the same amount of emission reductions if the activity were not implemented.

- 6.3.4 | The assessment shall be conducted at the start of the 1st crediting period² and reassessed at each renewal of the crediting period.
- 6.3.5 | **Host Country Eligibility (Article 6 Negative List Assessment):** The activity developer shall demonstrate that the mitigation activity type is not excluded by the Host Country from participating in carbon market mechanisms. The activity developer shall verify that the project technology (e.g., metered electric cooking) or measure is not included in any publicly available negative list or regulatory exclusion issued by the Host Country.
- 6.3.6 | **Demonstration of Compliance:** Compliance with this requirement shall be demonstrated through one of the following, as applicable, at the time of Validation (including PAA-Alignment Design Change validation for existing projects) and Crediting Period Renewal:
- a. **Official List Review:** A citation of the Host Country's most recent official Article 6 policy framework, decrees, or public eligibility lists (e.g., a "Negative List" or "Ineligible Activity List") published by the Designated National Authority (DNA) or Article 6 Focal Point, confirming the activity is not excluded.
 - b. **Explicit Authorization:** Provision of a Letter of Authorisation (LoA) or No Objection from the Host Country's DNA that explicitly authorises the mitigation activity type or sector.
 - c. **Confirmation of No Exclusion (Default):** In the absence of a published negative list, positive list, or specific regulatory exclusion, the activity developer shall provide a formal declaration confirming that no official communication or regulation has been issued by the Host Country identifying the specific technology as ineligible for carbon crediting.

6.4| Lock-In Risk Analysis

- 6.4.1 | The activity developer shall assess the risk that the activity may lead to a lock-in of GHG emissions, technologies, or carbon-intensive practices inconsistent with the achievement of the host Country's NDC or the long-term goals of the Paris Agreement.
- 6.4.2 | **Assessment Framework and Exemption:** The assessment follows the framework established in the GS4GG Standard: [Requirements for Additionality Demonstration](#):
- a. For decentralised thermal energy technologies (e.g., household cookstoves, small water heaters, residential space heaters) where the technical or operational lifetime is demonstrably less than 10 years, it

² The VVB shall verify the status of the activity against the latest available eligibility criteria published by the Host Country's DNA at the time of Design Certification.

may be assumed that no significant lock-in risk exists, provided the activity aligns with the host country's sustainable energy strategies.

- b. **2030 Sunset Clause:** The validity of the 10-year exemption is limited to projects submitted for Design Certification on or before 31 December 2030.
- c. **Assessment:** Technologies with lifetimes exceeding 10 years, and/or those submitted for Design Certification after the sunset clause, shall undergo an assessment following GS4GG Methodology Tool – Lock in Risk Analysis (latest version).

6.4.3 | **Methodology-Level Determinations and Exemption Conditions:** Based on [GS4GG Standard: Requirements for Additionality Demonstration](#), the following criteria apply to the applicable technologies in Table 3. Activities may be exempted from further activity-level lock-in risk assessment if they meet these specific conditions:

6.4.3.1 | **Full Exemption (Zero-Emission Technologies):** For technologies utilizing 100% renewable energy (e.g., Solar Electric Cookers, Biogas from waste). They pass the Full Assessment as zero-emission technologies fully compatible with net-zero pathways, regardless of lifespan.

6.4.3.2 | **Conditional Exemptions:**

- a. For decentralized technologies where the technical or operational lifetime is demonstrably less than 10 years (e.g., Electric Pressure Cookers - EPCs). Exemption is granted *only if* the activity developer provides verifiable evidence demonstrating the specific model(s) have a technical or operational lifetime of 10 years or less;
- b. For grid-connected electric cookstoves (e.g., induction hobs), which may have lifespans exceeding 10 years. Exemption is granted *only if* the activity developer demonstrates that the activity is consistent with the host country's LT-LEDS and that the national grid is on a credible decarbonization pathway consistent with achieving Net-Zero by 2050;
- c. **High Risk Technologies - Fossil Fuels:** For fossil fuel technologies (e.g., Metered LPG Stoves). These present a high lock-in risk. Exemption is granted *only if* the project demonstrates BOTH of the following (High Burden of Proof):
 - i. The host country's official Long-Term Low-Emission Development Strategy (LT-LEDS) or NDC explicitly identifies the specific fossil fuel (e.g., LPG) as a necessary transitional fuel strategy; AND
 - ii. The activity relies only on existing infrastructure and does not finance or incentivize new, long-lived (>10 year) fossil-fuel infrastructure (e.g., import terminals, storage facilities).

6.4.4 | **Requirements for Full Lock-In Risk Assessment:** If the technology deployed does not meet the criteria for Full or Conditional Exemption listed in 6.4.3 |, the activity developer shall conduct a Lock-In Risk Assessment following GS4GG Methodology Tool – Lock in Risk Analysis.

6.5| Investment/ Financial Analysis

- 6.5.1 | If the activity-specific assessment pathway is used, an Investment Analysis and/or Barrier Analysis shall be conducted.
- 6.5.2 | **Selection of Analysis Type:** The appropriate analysis type depends on the scale and context of the project activity:
- 6.5.2.1 | **Investment Analysis:** Shall be used for i. Large-scale activities or ii. Activities implemented in industrial or large commercial/institutional facilities where standard financial investment appraisal is the norm.
- 6.5.2.2 | **Barrier Analysis:** i. May be used for Micro-scale and Small-scale activities. ii. Activities implemented at individual households or small entities (e.g., schools, small enterprises) that typically do not have access to commercial or public third-party finance, or where non-financial barriers are the primary deterrent.
- 6.5.2.3 | **Combined Analysis:** For Large-scale activities, Barrier Analysis may only be used in combination with investment analysis, with justification provided as to why the investment analysis alone is insufficient.
- 6.5.3 | **Requirements for Investment Analysis:** If Investment Analysis is selected, the activity developer shall conduct a Simple Cost Analysis, Benchmark Analysis, or Investment Comparison Analysis in conformity with the requirements of the [A6.4-AMT-002: Investment analysis](#). The analysis shall demonstrate that:
- a. The activity is not financially viable (e.g., fails to meet the required benchmark or is less attractive than alternatives) without carbon credit revenues; and
 - b. With carbon credit revenues, the activity becomes financially viable or the most attractive option.

6.6| Barrier Analysis (optional alternative)

- 6.6.1 | For Micro-scale and Small-scale activities, a Barrier Analysis may be used to demonstrate that significant barriers (e.g., high cost of metering technology, complexity of data management infrastructure, technological access, or institutional barriers) would prevent the implementation of the activity in the absence of carbon finance. At least one barrier shall be substantiated with verifiable evidence.

6.7| Common Practice Analysis:

- 6.7.1 | All activities, including those on the Positive List, shall evaluate common practice in accordance with the [GS4GG Methodology Tool: Common Practice Analysis \(MT400-06\)](#).
- 6.7.2 | The activity developer shall assess the market penetration of equivalent technologies (i.e., those providing a similar or better level of service with comparable or improved efficiency and fuel types) in the applicable geographic area, applying the following mandatory parameters:

- a. **Assessment Approach and Indicator (P):** The Stock-Based Approach (assessing cumulative diffusion) shall be applied using a Count-based indicator (number of households/facilities).
- b. **Data Vintage:** Data utilized shall be the most recent authoritative data available and shall not be older than five years prior to the submission of the PDD for Validation.
- c. **Applicable Geographical Area (AGA):** The AGA shall be the Host Country. Sub-national or district-level AGA assessment (e.g., defining the boundary at the district or similar administrative level) is permissible if justified by localised market conditions or infrastructure divides between urban, peri-urban, and rural areas, or if the activity developer can justify that the target demographic's market conditions, access, and affordability differ materially from national averages.
- d. **Target Market Size (P_{all}):** Shall be defined strictly on technical applicability and regulatory boundaries. Socioeconomic segmentation is permitted if affordability is a rigorously justified primary structural barrier defining the accessible market.
- e. **Similar Activities (P_{sim}) & Attribute Matrix:** Similarity shall be defined using the Attribute Matrix below. Factors related to scale (capacity/output), market conditions, policy incentives, or investment costs shall not be used as differentiating attributes. Activities substantially supported by international climate finance, ODA, or previously registered carbon market schemes shall be explicitly excluded from P_{sim} .

Table 6. Attribute Matrix

Attribute	Description	Required for Similarity (Yes/No)
Primary Energy Source	Electricity (Grid or Off-grid), Specific Fuel (e.g., LPG, Ethanol, Biogas).	Yes
Technology Principle	Electric resistance or induction heating.	Yes
Efficiency Requirement	Meets the minimum efficiency requirement ($\geq 40\%$) or applicable local Minimum Energy Performance Standards (MEPS).	Yes
Exclusion of Carbon Finance	Technologies distributed, subsidised, or maintained via voluntary or compliance carbon market mechanisms shall be explicitly excluded from the count when calculating the	Yes

	common practice penetration rate.	
Application	Used as a primary device for cooking.	Yes
Metering/CTEC	Technology incorporates metering or CTEC.	No (Metering is a monitoring approach, not an inherent attribute of the technology class providing the service).

6.7.3 | Using the Stock-Based Approach, a uniform Common Practice Threshold (F_{max}) of 25% shall be applied across all regions and technology types.

6.7.4 | If the calculated Common Practice Factor $F = \frac{P_{sim}}{P_{all}}$ is $\geq F_{max}$, the activity is common practice and not additional.

6.8| Ongoing Financial need

6.8.1 | At renewal of the crediting period, the additionality of the activity shall be reassessed in line with Gold Standard requirements.

6.8.2 | **Positive List Exemption:** Activities that qualified for and remain eligible under a recognized GS4GG Positive List (Deemed Additionality) are exempt from the Ongoing Financial Need (OFN) demonstration at crediting period renewal.

6.8.3 | **Demonstration of OFN³:** For all other activities (those that transition from earlier versions or apply Activity-Specific Assessments), the developer shall demonstrate Ongoing Financial Need (OFN). This involves providing evidence (e.g. an updated financial analysis or funding assessment) that the activity still requires income from carbon credits to remain operational and sustainable in the renewed period.

7| BASELINE SCENARIO

7.1| Baseline Determination (Stepwise Approach)

7.1.1 | The crediting baseline emissions (BE_y) shall be determined following the stepwise approach mandated by the GS4GG Standard: [Requirements for Baseline Determination in Methodologies](#):

³ Impact of Methodology Updates: Reductions in crediting volume resulting directly from mandatory methodology updates (e.g., the application of the Downward Adjustment Factor or revised fNRB rules) shall be recognized as a valid quantitative justification for demonstrating Ongoing Financial Need.

- a. Step 1: Selection and Justification of the Baseline Approach (Section [7.2|](#)).
- b. Step 2: Application of the selected approach prior to downward adjustment (Section [7.3|](#)).
- c. Step 3: Application of the Downward Adjustment (Uncertainty and Ambition) (Section [7.3.9.3 |](#)).
- d. Step 4: Identification of a conservative Business-as-Usual (BAU) baseline (Section [7.5|](#)).
- e. Step 5: Comparison and selection of the final Crediting Baseline (*BE_y*) (Section [7.6|](#)).

7.2| Step 1: Selection and Justification of the Baseline Approach

7.2.1 | This methodology utilizes approach (c) from paragraph 5.6.2 of the Methodology Standard - [Requirements for Baseline Determination in Methodologies](#): *An approach based on existing actual or historical emissions, adjusted downwards.*

7.2.2 | Justification for the Baseline Approach

7.2.2.1 | The selection of approach (c) is justified as follows:

- a. **Appropriateness to Activity Context:** Emissions savings from decentralised thermal energy projects are highly dependent on site-specific factors (e.g., user behaviour, fuel characteristics, climate). The methodology determines the baseline emissions by back calculating the historical emissions required to deliver the equivalent energy service provided by the activity, based on the project's metered energy consumption.
- b. **Ensuring Conservativeness (Downward Adjustment):** The calculated emission reductions are adjusted downwards by:
 - i. Applying statistical conservativeness (e.g., 90/10 rule) to account for measurement and sampling uncertainty (Section [7.4|](#)).
 - ii. Applying the Downward Adjustment Factor (DAF) to encourage ambition over time (Section [7.4.4 |](#)).

7.3| Step 2: Application of the Selected Approach (Prior to Downward Adjustment)

7.3.1 | **Identification and Justification of the Baseline Scenario**

7.3.1.1 | The baseline scenario is the mix of technologies and fuels that would be used by the target population in the absence of the activity. The selection shall account for all technologies that may be replaced by the activity, including "stove-stacking".

- 7.3.1.2 | The specific baseline scenario(s) shall be identified through a Baseline Scenario Survey, determining the types of devices and fuels used, and their proportional use ($Prop_{i,j}$).
- 7.3.1.3 | The baseline scenario and the derived Baseline Emission Factor (EF_b) are fixed for the 5-year crediting period. In the event of a contradiction regarding baseline reassessment schedules, the requirements of this methodology shall explicitly supersede the exemptions provided in the overarching *Community Services Activity (CSA) Requirements*.
- 7.3.1.4 | Activity developers shall identify distinct baseline scenarios (b) when the activity targets populations with significantly different fuel consumption patterns or baseline technologies (e.g., rural users predominantly using wood vs. urban users predominantly using charcoal).
- 7.3.1.5 | When the activity includes different technology types, the developer shall analyse whether these technologies relate to different baseline scenarios. Multiple activity scenarios (p) can be credited against the same baseline scenario if applicable.
- 7.3.1.6 | The identification and description of the baseline scenario shall be informed by a statistically representative Baseline Scenario Survey (BSS) of the target population (See MECD 1).
- 7.3.1.7 | **Metric for Proportions:** When determining the proportions ($Prop_{i,j}$), the metric used may be the proportion of total useful energy delivered, fuel mass, purchased volumes, or "cooking events" for each fuel/device combination, provided the chosen proxy is transparently documented and consistently mathematically applied.
- 7.3.2 | **Household-Level Baseline Pathway (Alternative Approach)**
- 7.3.2.1 | Activities that collect validated, comprehensive household-level baseline data (via individual baseline surveys) for 100% of participants at onboarding are permitted to compute household-specific baseline emission factors ($EF_{b,h}$) and calculate baseline emissions at the individual level prior to aggregation. These individual emission factors reflect real differences in fuel stacking, household size, and technology profiles.
- 7.3.2.2 | **Exemption:** Activities utilising this comprehensive household-level pathway are explicitly exempt from the Population Consistency Check described in Section [7.3.3](#), as the baseline survey population and the activity population are identical by definition.
- 7.3.3 | **Consistency Check between Baseline Scenario and Activity Households**
- 7.3.3.1 | For activities utilising an aggregated, population-wide baseline scenario, the activity developer shall verify that the fuel mix and household characteristics determined for the baseline scenario (via the Baseline Scenario Survey) are representative of the actual households recruited into the activity.
- 7.3.3.2 | **Standardized Retrospective Survey:** This assessment shall be carried out using retrospective questions asked of actual activity households

regarding their cooking practices. To eliminate long-term recall bias, this consistency check survey shall be conducted at the time of onboarding/enrolment, or within a maximum of 30 days post-installation. The recall period shall strictly assess the typical cooking habits during the 30 days prior to receiving the activity technology.

7.3.3.3 | A material discrepancy occurs if the comparison reveals a non-conservative baseline. This is defined as:

- a. The actual proportion of cooking events (or relevant proxy) using the primary high emitting fuel type is lower than the baseline scenario estimate, AND this difference results in higher ex-ante baseline emissions; AND/OR
- b. The average household size measured during the first activity usage survey is greater than the baseline scenario estimate. (See MECD 18).

7.3.3.4 | **Resolutions (Hybrid / Threshold Approach):** Where a material discrepancy occurs, the activity developer shall resolve it by applying the following threshold-based approach:

- a. **Cluster Separations:** Activity developers may utilise cluster separations (e.g., stratifying the population strictly by primary single-fuel users vs. mixed-fuel users) to resolve apparent discrepancies and improve demographic matching prior to applying adjustments. Any cluster separations utilised shall be based on objective stratifications explicitly defined ex-ante.
- b. **Deviations below the Validity Threshold ($\leq 20\%$):** If the absolute deviation between the baseline fuel mix estimate and the retrospective survey is 20% or less, the activity developer shall apply a conservative mathematical adjustment to the baseline emission calculations. The proportions ($Prop_{i,j}$) shall be adjusted to match the observed, lower emitting baseline emissions profile of the household.
- c. **Deviations exceeding the Validity Threshold ($> 20\%$):** If the absolute deviation exceeds 20%, the shift is deemed a fundamental divergence from the target demographic. The original Baseline Scenario is statistically invalid for that specific cohort, and the activity developer shall formally redefine the baseline scenario for the affected component via a new Baseline Scenario Survey.
- d. **Adjust Household Size:** If the activity household size (HS_p) is greater than the baseline estimate, the HS_p value used for Capping calculations (MECD 18) shall be conservatively lowered to the baseline estimate.
- e. **Prohibition on Exclusion:** Activity developers shall not arbitrarily exclude non-conforming, lower-emitting households from the emission reduction calculations solely to artificially force compliance with an aggressive baseline.

7.3.4 | **Cross-Effects**

7.3.4.1 | In activities targeting multiple distributed technologies (e.g., improved cookstoves and safe water supply), cross-effects shall be accounted for. The baseline scenario shall be defined such that baseline fuel use is divided appropriately between the technologies without double counting.

7.3.5 | **Suppressed Demand Assessment**

7.3.5.1 | Suppressed demand occurs when the pre-activity energy consumption is below the level required to meet basic human needs due to constraints such as poverty or lack of access to fuel.

- a. **Accounting Approach:** This methodology utilises a back-calculation approach based on the actual metered energy consumption of the activities devices (CTEC). This inherently accounts for the alleviation of suppressed demand, as increased usage of the activity device (compared to the historical baseline) results in a higher back-calculated baseline emission level.
- b. **Requirement for Caps:** To ensure realistic consumption pattern and prevent the overestimation of baseline emissions, the back-calculated baseline consumption shall be subject to standardized caps (See Section [7.4.2 |](#)).

7.3.6 | **Overview of Calculation Approaches**

7.3.6.1 | The activity developer shall select the appropriate calculation approach:

- a. **Method 1: Useful Energy Approach:** Applicable when the thermal efficiency (η) of both baseline and project devices can be reliably determined (e.g., via WBT/ISO 19867-1). For baseline technologies where formal laboratory testing is unfeasible or highly variable (e.g., traditional three-stone fires), the Activity Developer is not required to conduct primary testing. Credible published literature or recognised methodology defaults (e.g., 15% for traditional fuelwood stoves, 20% for traditional charcoal) are permissible.
- b. **Method 2: Specific Consumption Approach (CCT):** Applicable to any activity technology where the activity developer chooses to determine performance via Controlled cooking Tests (CCTs) (e.g., Electric Pressure Cookers, induction, infrared or specialised biomass stoves). This approach uses Controlled Cooking Tests (CCTs) to determine the ratio of specific energy consumption (SC).
- c. **Method 3: Emissions Ratio Approach (KPT):** Determination of baseline and project emissions ratios (tCO_{2e} per TJ of activity energy) via Kitchen Performance Tests (KPTs), scaled by total metered activity consumption.

7.3.7 | **Determination of the Baseline Emission Factor (EF_b)**

7.3.7.1 | The methodology utilizes total Baseline Emission Factors (EF_b), which account for combustion emissions (CO₂, CH₄, N₂O) and upstream lifecycle emissions (UEF). Upstream Emission Factors shall be sourced from [Annex 2](#) (MECD 20).

7.3.7.2 | **Method 1: Baseline Emission Factor (Useful Energy):** If $Prop_{useful,i,j}$ represents the proportion of total useful energy delivered, the equation shall be applied as follows to ensure correct dimensional balancing:

$$EF_{b,useful} = \text{Eq. 1}$$

Where:

- $EF_{b,useful}$ = Baseline emissions factor (Unadjusted) (tCO₂e per TJ of useful energy)
- $Prop_{useful,i,j}$ = Proportion of total useful cooking energy delivered using fuel i in device j in the baseline scenario (fraction).
(Note: If proportions were gathered via fuel mass or volume, they shall be mathematically converted to the proportion of useful energy prior to applying this equation).
- EF_{b,i,CO_2} = CO₂ emission factor (combustion) for baseline fuel i (tCO₂/TJ)
- $fNRB_{i,y}$ = Fraction of non-renewable biomass for fuel i in year y (fraction; fNRB=1 for fossil fuels)
- $EF_{b,i,non-CO_2}$ = Non-CO₂ (CH₄ and N₂O) emission factor (combustion) for baseline fuel i (tCO₂e/TJ)
- $UEF_{b,i}$ = Upstream Emission Factor for baseline fuel i (tCO₂e/TJ)
- $\eta_{b,i,j}$ = Efficiency of baseline device j with fuel i (Unadjusted Mean) (fraction)
- i = Index for baseline fuel type
- j = Index for baseline device type

7.3.7.3 | Method 2 & 3: Baseline Emission Factor (Input Energy)

$$EF_{b,input} = \sum_{i,j} \left(Prop_{i,j} \times \left(EF_{b,i,CO_2} \times fNRB_{i,y} + EF_{b,i,non-CO_2} + UEF_{b,i} \right) \right) \quad \text{Eq. 2}$$

Where:

- $EF_{b,input}$ = Baseline emissions factor (tCO₂e per TJ of energy input)
- $Prop_{i,j}$ = Proportion of total input energy performed using fuel i in device j in the baseline scenario (fraction)
- EF_{b,i,CO_2} = CO₂ emission factor (combustion) for baseline fuel i (tCO₂/TJ)
- $fNRB_{i,y}$ = The fraction of non-renewable biomass ($fNRB_{i,y}$) shall be determined using the latest version of approved standardised tools (e.g., MoFuSS, or approved A6.4 tools).

- $EF_{b,i,non-CO2}$ = Non-CO₂ (CH₄ and N₂O) emission factor (combustion) for baseline fuel i (tCO₂e/TJ)
- $UEF_{b,i}$ = Upstream Emission Factor for baseline fuel i (tCO₂e/TJ)
- i = Index for baseline fuel type
- j = Index for baseline device type

7.3.8 | Determination of Performance Metrics (Method 1, 2 & 3)

7.3.8.1 | **Method 1 (WBT):** Requires baseline efficiency (η_b) and activity efficiency (η_p) (See MECD 2, 10).

7.3.8.2 | **Method 2 (CCT):** The Specific Consumption (SC) of the baseline (SC_b) and activity (SC_p) devices shall be determined through a statistically representative Controlled Cooking Test (CCT) campaign. (See MECD 3, 11). If the activity device replaces multiple baseline devices, SC_b shall be the weighted average. The CCT campaign shall adhere to standardised protocols (e.g., Clean Cooking Alliance CCT Protocol) and meet the following:

- a. The CCT shall utilise a "standard meal" representative of the local cooking practices, ingredients, and portion sizes.
- b. Tests shall be conducted using local fuels, pots, and performed by local cooks.
- c. The CCT design shall ensure that the cooking tasks evaluated can be effectively performed by both the baseline and the activity devices (e.g., recognising limitations of EPCs).
- d. It is strongly recommended that CCTs are conducted by an independent third-party entity.

7.3.8.3 | **Method -3 (KPT):** Requires Baseline KPT (B-KPT) and Activity KPT (P-KPT) conducted on a representative sample to derive emissions ratios (See MECD 21, 22, 23).

7.3.9 | **Calculation of Unadjusted Baseline Emissions ($BE_{unadj,y}$)**

7.3.9.1 | **Method 1 Calculation**

$$BE_{unadj,y} = EG_{p,useful,y} \times EF_{b,useful} \tag{Eq. 3}$$

Where:

- $BE_{unadj,y}$ = Unadjusted baseline emission in year y (tCO₂e/yr)
- $EG_{p,useful,y}$ = Useful energy delivered by the project devices in year y (Unadjusted) (TJ/yr)
- $EF_{b,useful}$ = Baseline emissions factor (Unadjusted) (tCO₂e per TJ of useful energy)

7.3.9.2 | **Method 2 Calculation**

$$BE_{unadj,y} = EG_{p,input,y} \times \left(\frac{SC_{b,mean}}{SC_{p,mean}} \right) \times EF_{b,input} \tag{Eq. 44}$$

Where:

- $BE_{unadj,y}$ = Unadjusted baseline emission in year y (tCO₂e/yr)
- $EG_{p,input,y}$ = Total metered input energy consumed by the project devices in year y (TJ/yr)
- $SC_{b,mean}$ = Mean Specific Consumption of the baseline device(s) from CCTs (e.g., MJ/kg food)
- $SC_{p,mean}$ = Mean Specific Consumption of the activity device from CCTs (e.g., MJ/kg food)
- $EF_{b,input}$ = Baseline emissions factor (tCO₂e per TJ of energy input)

7.3.9.3 | **Method 3 Calculation:** This approach calculates the unadjusted Baseline Emissions Ratio ($ER_{b,unadj}$), representing the total baseline emissions (combustion + upstream) per unit of activity energy consumed, derived from KPTs.

$$ER_{b,unadj} = \frac{\sum_i (EC_{b,KPT,i} \times (fNRB_i \times EF_{b,i,CO_2} + EF_{b,i,non-CO_2} + UEF_{b,i}))}{EC_{p,KPT,project}} \quad \text{Eq. 5}$$

Where:

- $ER_{unadj,y}$ = Unadjusted Baseline Emissions Ratio (tCO₂e baseline emissions per TJ activity energy input)
- $EC_{b,KPT,i}$ = Energy consumption of baseline fuel *i* derived from B-KPT (TJ)
- $fNRB_i$ = Fraction of non-renewable biomass for fuel *i* (fraction)
- EF_{b,i,CO_2} = CO₂ emission factor for baseline fuel *i* (tCO₂/TJ)
- $EF_{b,i,non-CO_2}$ = Non-CO₂ emission factor for baseline fuel *i* (tCO₂e/TJ)
- $UEF_{b,i}$ = Upstream Emission Factor for baseline fuel *i* (tCO₂e/TJ)
- $EC_{p,KPT,projec}$ = Energy consumption of the project fuel/device only, derived from P-KPT (TJ)
- i* = Index for baseline fuel type

$$BE_{unadj,y} = EG_{p,input,y} \times ER_{b,unadj} \quad \text{Eq. 6}$$

Where:

- $BE_{unadj,y}$ = Unadjusted baseline emissions in year y (tCO₂e/yr)
- $EG_{p,input,y}$ = Total metered input energy consumed by the project devices in year y (TJ/yr)
- $ER_{b,unadj}$ = Unadjusted Baseline Emissions Ratio (tCO₂e/TJ)

7.4| Step 3: Application of the Downward Adjustment

7.4.1 | Adjustment for Uncertainty

7.4.1.1 | Uncertainty in parameters derived from sampling or testing (Efficiencies η or Specific Consumption SC or KPT results) shall be addressed using the "90/10 Rule" (90% confidence, 10% precision) to ensure the baseline is conservative.

7.4.1.2 | Method 1: Adjustment of Baseline Efficiency ($\eta_{b,i,j}$)

- a. If the 90/10 Rule is NOT met for the baseline efficiency ($\eta_{b,i,j}$): The Upper Bound of the 90% confidence interval ($\eta_{b,UB90}$) shall be used. (Higher baseline efficiency results in a lower, more conservative $EF_{b,useful}$). Note: Adjustment for Activity Efficiency η_p is addressed in Section [8.3.2](#) |

7.4.1.3 | Method 2: Adjustment of Specific Consumption (SC) Ratio

- a. The uncertainty associated with the ratio (SC_b/SC_p) derived from CCT results shall be addressed. The "minimum 50 samples" requirement and 90/10 precision target shall apply to the overall aggregated parameter ratio ($R_{SC,stat}$), derived from the complete CCT campaign design across all paired observations, not individually per meal type or stove iteration.
- b. The Statistically Adjusted SC Ratio ($R_{SC,stat}$) is determined as follows:
 - i. If the 90/10 Rule is met for the ratio: The Mean value of the ratio shall be used.
 - ii. If the 90/10 Rule is NOT met: The Lower Bound of the one-sided 90% confidence interval of the ratio shall be used to ensure a conservative baseline. (Eq. 5)

$$R_{SC,stat} = LowerBound_{90\%} \left(\frac{SC_b}{SC_p} \right) \quad Eq.7$$

Where:

$R_{SC,stat}$ = Statistically Adjusted Specific Consumption Ratio (unitless)

SC_b = Specific Consumption of the baseline device(s)

SC_p = Specific Consumption of the project device

$LowerBound_{90\%}$ = The lower bound of the one-sided 90% confidence interval of the ratio.

7.4.1.4 | Method 3: KPT results

- a. The uncertainty associated with the B-KPT results ($EC_{b,KPT,i}$) shall be addressed.
 - i. If 90/10 is met: The Mean value shall be used.

- ii. If 90/10 is NOT met: The Lower Bound ($EC_{b,KPT,LB90}$) shall be used in Eq. 5 to calculate the adjusted $ER_{b,unadj}$. Note: Adjustment for P-KPT is addressed in Section [8.3.3](#)

7.4.2 | Adjustment for Conservativeness (Capping of Back-Calculated Baseline)

7.4.2.1 | To ensure the back-calculated baseline consumption remains conservative, it shall be capped based on established per-capita consumption thresholds. The default methodological caps apply strictly to domestic household users. For commercial and institutional applications (e.g., schools, restaurants), the Activity Developer shall define, justify, and validate appropriate, sector-specific consumption caps in the PDD based on observed operational patterns and scale.

7.4.2.2 | Determination of Back-Calculated Baseline Input Energy

($EG_{b,back-calc,y}$): This is the total input energy that would have been consumed in the baseline scenario to meet the satisfied demand level of the project scenario, incorporating the uncertainty adjustments.

a. Method 1:

$$EG_{b,back-calc,y} = EG_{p,usefuel,y,adj} / \eta_{b,adj,weighted} \quad \text{Eq.85}$$

Where:

$EG_{b,back-calc,y}$ = Back-Calculated Baseline Input Energy in year y (TJ/yr)

$EG_{p,usefuel,y,adj}$ = Uncertainty-Adjusted Useful energy delivered by the project devices in year y (TJ/yr)

$\eta_{b,adj,weighted}$ = Weighted average baseline efficiency adjusted for uncertainty, derived from the denominator of Eq. 1 using $\eta_{b,UB90}$ if required.

b. Method 2:

$$EG_{b,back-calc,y} = EG_{p,input,y} \times R_{SC,stat} \quad \text{Eq.9}$$

Where:

$EG_{b,back-calc,y}$ = Back-Calculated Baseline Input Energy in year y (TJ/yr)

$EG_{p,input,y}$ = Total metered input energy consumed by the project devices in year y (TJ/yr)

$R_{SC,stat}$ = Statistically Adjusted Specific Consumption Ratio (unitless)

c. Method 3

$$EG_{b,back-calc,y} = EG_{p,input,y} \times ER_{b,unadj} / EF_{b,input} \quad \text{Eq.10}$$

Where:

$EG_{b,back-calc,y}$	=	Back-Calculated Baseline Input Energy in year y (TJ/yr)
$EG_{p,input,y}$	=	Total metered input energy consumed by the project devices in year y (TJ/yr)
$ER_{b,unadj}$	=	Unadjusted Baseline Emissions Ratio (tCO ₂ e/TJ)
$EF_{b,input}$	=	Baseline emissions factor (tCO ₂ e per TJ of energy input)

7.4.2.3 | **Application of Caps:** The $EG_{b,back-calc,y}$ shall be compared against the caps (P_{CAP}). The total number of users ($N_{users,y}$) is calculated based on the monitored average household size (HS_p) and the number of operational devices (See MECD 18, Section 14.3|).

$$EG_{b,adj} = MIN \left(EG_{b,back-calc,y}, (P_{CAP} \times N_{users,y}) \right) \quad \text{Eq.11}$$

Where:

$EG_{b,adj}$	=	Adjusted Baseline Input Energy (Capped) in year y (TJ/yr)
$EG_{b,back-calc,y}$	=	Back-Calculated Baseline Input Energy in year y (TJ/yr)
P_{CAP}	=	Per-capita baseline consumption cap (TJ/person/year)
$N_{users,y}$	=	Total number of users in the project activity in year y (persons)

7.4.2.4 | **Cap Values (P_{CAP}).and Thresholds:** The caps are defined in energy equivalent terms (TJ Input Energy/person/year).

- a. Primary Fuelwood Users ($\geq 75\%$ wood in baseline):
 - i. Threshold value: 0.0117 TJ/person/year (Equivalent to approx. 0.75 tonne wood).
 - ii. Cap value (P_{CAP}): 0.0195 TJ/person/year (Equivalent to approx. 1.25 tonnes wood).
- b. Primary Charcoal Users or Mixed/Other Baselines:
 - i. Threshold value: 0.00383 TJ/person/year (Equivalent to approx. 0.13 tonnes charcoal).
 - ii. Cap Value (P_{CAP}): 0.0064 TJ/person/year (Equivalent to approx. 0.22 tonnes charcoal).

7.4.2.5 | **Justification Requirement:** If the back-calculated value ($EG_{b,back-calc,y}$) exceeds the *Threshold* but is below the *Cap*, the activity developer shall provide robust, context-specific justification in the PDD/VPA-DD explaining

why the higher baseline is realistic (e.g., high energy-intensive cooking practices, high fuel abundance).

7.4.3 | Calculation of Uncertainty-Adjusted Baseline Emissions ($BE_{unc,y}$)

7.4.3.1 | $BE_{unc,y}$ is calculated using the uncertainty-adjusted parameters ($\eta_{b,adj}$ or $R_{SC,stat}$).

a. **Method 1:** (Calculated using $EF_{b,useful}$ derived from $\eta_{b,adj}$)

$$BE_{unc,y} = EG_{p,useful,y,adj} \times EF_{b,useful,adj} \quad \text{Eq. 12}$$

Where:

- $BE_{unc,y}$ = Baseline Emissions adjusted for uncertainty in year y (tCO₂e/yr)
- $EG_{p,useful,y,adj}$ = Uncertainty-Adjusted Useful energy delivered by the project devices in year y (TJ/yr)
- $EF_{b,useful,adj}$ = Uncertainty-Adjusted Baseline emissions factor (tCO₂e per TJ of useful energy)

b. **Method 2:**

$$BE_{unc,y} = EG_{p,input,y} \times R_{SC,stat} \times EF_{b,input} \quad \text{Eq.13}$$

Where:

- $BE_{unc,y}$ = Baseline Emissions adjusted for uncertainty in year y (tCO₂e/yr)
- $EG_{p,input,y}$ = Total metered input energy consumed by the project devices in year y (TJ/yr)
- $R_{SC,stat}$ = Statistically Adjusted Specific Consumption Ratio (unitless)
- $EF_{b,input}$ = Baseline emissions factor (tCO₂e per TJ of energy input)

c. **Method 3:**

$$BE_{unc,y} = EG_{b,adj} \times EF_{b,input} \quad \text{Eq.14}$$

Where:

- $BE_{unc,y}$ = Baseline Emissions adjusted for uncertainty in year y (tCO₂e/yr)
- $EG_{b,adj}$ = Adjusted Baseline Input Energy (Capped) in year y (TJ/yr)
- $EF_{b,input}$ = Baseline emissions factor (tCO₂e per TJ of energy input)

7.4.4 | Adjustment For Ambition (DAF)

7.4.4.1 | The applicable DAF ($DAF_{NetZero}$) shall be applied to the Uncertainty-Adjusted Baseline Emissions to encourage ambition over time. This factor shall be

sourced from the [GS4GG Tool 05](#). The Downward Adjustment Factor is a fixed percentage reduction and applied uniformly to the baseline emissions annually. It does not compound mathematically year-over-year.

7.4.4.2 | Calculation of Downward Adjusted Baseline Emissions ($BE_{adj,y}$)

$$BE_{adj,y} = BE_{unc,y} \times (1 - DAF_{NetZero}) \quad \text{Eq. 15}$$

Where:

- $BE_{adj,y}$ = Downward Adjusted Baseline Emissions in year y (tCO₂e/yr)
- $BE_{unc,y}$ = Baseline Emissions adjusted for uncertainty in year y (tCO₂e/yr)
- $DAF_{NetZero}$ = Downward Adjustment Factor for Net Zero alignment (fraction)

7.5| Step 4: Identification and Calculation of the Conservative BAU Scenario

7.5.1 | The conservative Business-as-Usual (BAU) scenario accounts for uncertainty but excludes the Adjustment for Ambition (DAF).

$$BAU_y = BE_{unc,y} \quad \text{Eq. 16}$$

Where:

- BAU_y = Conservative Business-as-Usual emissions in year y (tCO₂e/yr)
- $BE_{unc,y}$ = Baseline Emissions adjusted for uncertainty in year y (tCO₂e/yr)

7.6| Step 5: Comparison and Selection of the Crediting Baseline (BE_y)

7.6.1 | The final Crediting Baseline (BE_y) shall be the lower value between the Downward Adjusted Emission Reductions ($BE_{adj,y}$) and the Conservative BAU (BAU_y).

$$BE_y = \text{MIN}(BE_{adj,y}, BAU_y) \quad \text{Eq. 17}$$

Where:

- BE_y = Crediting Baseline Emissions in year y (tCO₂e/yr)
- $BE_{adj,y}$ = Downward Adjusted Baseline Emissions in year y (tCO₂e/yr)
- BAU_y = Conservative Business-as-Usual emissions in year y (tCO₂e/yr)

7.7| Quantification of the Difference between BAU and Crediting Baseline

- 7.7.1 | As required by the Methodology Standard: Requirements for Baseline Determination in Methodologies, the difference between the Conservative BAU emissions (BAU_y) and the final Crediting Baseline Emissions (BE_y) shall be quantified and reported transparently in the Monitoring Report. For transparency and VVB auditing, the emission reduction calculation sheets shall explicitly display the step-by-step mathematical flow: Unadjusted Emissions, Uncertainty-Adjusted Emissions, and the final Crediting Baseline.
- 7.7.2 | This difference represents the emissions excluded from crediting due to the application of the Downward Adjustment Factor (DAF) for ambition.

$$\Delta_y = BAU_y - BE_y > 0 \quad \text{Eq. 186}$$

Where:

- Δ_y = Emissions excluded from the crediting baseline due to ambition adjustment (DAF) in year y
- BAU_y = Conservative Business-as-Usual emissions in year y
- BE_y = Crediting Baseline Emissions in year y

8| ACTIVITY EMISSIONS

8.1| Identification of the Activity Scenario

- 8.1.1 | The activity scenario (project scenario) is defined by the adoption of the activity technology and the resulting fuel consumption patterns of the end-users within the target population.
- 8.1.2 | When different project technologies are included in an activity, the activity developer shall analyse whether multiple activity scenarios (p) should be identified.
- 8.1.3 | Activity technologies with similar design and performance characteristics may be included under a single activity scenario. Similarity is defined as technologies based on the same fundamental technology (e.g., combustion principle) whose respective thermal efficiencies or specific consumptions do not differ by more than +/-5% in absolute terms from the design implemented most frequently.
- 8.1.4 | Technologies with significantly different performance characteristics (differing by more than +/-5%) shall be treated as independent activity scenarios and monitored and calculated separately.

8.2| Calculation of Total Activity Emissions

- 8.2.1 | Activity emissions (AE_y) are all anthropogenic emissions of GHGs occurring within the activity boundary attributable to the activity, calculated based on the total metered energy or fuel consumption.

- 8.2.2 | **Internalisation of Stove Stacking and Rebound Effect⁴:** This methodology mathematically internalized and distinguishes between the "stove stacking" (the continued parallel use of baseline or alternative technologies alongside the project device) and "rebound effect" (increased overall energy demand due to higher efficiency or lower cooking costs).
- 8.2.3 | The baseline is exclusively back-calculated from the metered energy delivered by the activity device, any unmetered cooking (e.g., stacking with traditional stoves) naturally bypasses the meter, resulting in a proportionally lower baseline calculation. Thus, stacking automatically self-corrects the crediting without the need for separate external leakage deductions. Rebound effects are strictly bounded by the absolute Baseline Caps (P_{CAP}) (See Section [7.4.2 I](#)).

8.3| Determination of Activity Energy Consumption

8.3.1 | Determination of Activity Input Energy ($EG_{p,input,y}$)

- 8.3.1.1 | The total input energy consumed by the activity ($EG_{p,input,y}$) is the sum of the metered consumption of 100% of the devices (d) operating during the monitoring period (y).

$$EG_{p,input,y} = \sum_d EG_{p,d,y} \text{ (or } \sum_u EG_{p,u,y} \text{)} \quad \text{Eq. 19}$$

Where:

$EG_{p,input,y}$ = Total input energy consumed by the project activity in year y (TJ/yr or MWh/yr)

$EG_{p,d,y}$ = Metered consumption of device d (or user u) in year y (TJ or MWh)

d = Index for project device (or u for user)

- 8.3.1.2 | Procedures for handling data gaps in the metered data shall follow the requirements detailed in Section 14.
- 8.3.1.3 | **Mass-to-Energy Conversion for Fuel Sales:** Where comprehensive fuel sales records are utilized in lieu of direct device energy metering (e.g., LPG, ethanol, pellets), the input energy per user/device ($EG_{p,d,y}$) shall be calculated as the total mass of fuel sold to the user (e.g., in tonnes)

⁴ The methodology calculates baseline emissions based strictly on the useful energy service physically delivered and directly metered by the project device (back-calculation), any unmetered continued use of baseline technologies (stacking) or compensation for lost co-benefits (rebound effect) bypasses the project meter. This naturally results in a lower metered volume for the project device, which automatically yields a proportionately lower back-calculated baseline emission level. Consequently, these behavioural effects are inherently and mathematically internalized.

multiplied by the specific Net Calorific Value (NCV) of that fuel (e.g., in TJ/tonne).

8.3.2 | **Determination of Useful Energy Delivered ($EG_{p,useful,y}$) (Method 1 Only)**

8.3.2.1 | For Method 1 calculations, the useful energy delivered is calculated based on the metered input energy and the project device efficiency ($\eta_{p,d}$).

$$EG_{p,useful,y} = \sum_d (EG_{p,d,y} \times \eta_{p,d}) \quad \text{Eq.20}$$

Where:

- $EG_{p,useful,y}$ = Useful energy delivered by the project devices in year y (TJ/yr)
- $EG_{p,d,y}$ = Metered consumption of device d in year y (TJ)
Appropriate unit conversions, e.g., 0.0036 for MWh to TJ, shall be applied
- $\eta_{p,d}$ = Efficiency of project device d (fraction)
- d = Index for activity device

8.3.2.2 | **Adjustment for Uncertainty (Activity Efficiency):** To ensure conservativeness in the baseline calculation (which relies on $EG_{p,useful,y}$), the efficiency ($\eta_{p,d}$) shall be adjusted if the 90/10 precision is not met in laboratory testing (WBT/ISO 19867-1). The Lower Bound of the 90% confidence interval ($\eta_{p,LB90}$) shall be used.

8.3.3 | **Determination of Activity Emissions ratio ($ER_{p,adj}$) (Method 3 Only)**

8.3.3.1 | The Activity Emissions Quotient (ER_p) represents the total activity scenario emissions (combustion + upstream, including any stacking) per unit of activity energy consumed, derived from the P-KPT.

$$ER_p = \frac{\sum_i (EC_{p,KPT,j} \times (fNRRB_j \times EF_{p,j,CO2} + EF_{p,j,non-CO2} + UEF_{p,j}))}{EC_{p,KPT,project}} \quad \text{Eq.21}$$

Where:

- ER_p = Activity Emissions Quotient (tCO₂e activity emissions per TJ activity energy input)
- $EC_{p,KPT,j}$ = Energy consumption of any fuel j used in the project household derived from P-KPT (TJ)
- $fNRRB_j$ = Fraction of non-renewable biomass for fuel j (fraction)
- $EF_{p,j,CO2}$ = CO₂ emission factor for activity fuel j (tCO₂/TJ)
- $EF_{p,j,non-CO2}$ = Non-CO₂ emission factor for activity fuel j (tCO₂e/TJ)
- $UEF_{p,j}$ = Upstream emission factor for activity fuel j (tCO₂e/TJ)

$EC_{p,KPT,project}$ = Energy consumption of the activity fuel/device only, derived from P-KPT (TJ)

j = Index for activity scenario fuel type (including activity fuel and stacking fuels)

8.3.3.2 | **Adjustment for Uncertainty (P-KPT):** The uncertainty associated with the P-KPT results ($EC_{p,KPT,j}$) shall be addressed.

a. If 90/10 is met: The Mean value shall be used.

b. If 90/10 is NOT met: The Upper Bound ($EC_{p,KPT,UB90}$) shall be used in the numerator of Eq. 21 above to calculate the adjusted $ER_{p,adj}$ ensuring activity emissions are not underestimated.

8.4| Calculation of Activity emissions (AE_y)

8.4.1 | Uncertainty Adjustment (Meter Accuracy)

8.4.1.1 | As the activity consumption is based on a census (100% metering), statistical sampling adjustments are not applicable.

8.4.1.2 | Uncertainty related to measurement (meter accuracy) shall be addressed. If the Maximum Permissible Error (MPE) of the metering equipment (as defined by relevant recognized international standards, e.g., OIML, IEC, or ISO smart-metering guidelines) exceeds 2.5%, the total metered consumption ($EG_{p,input,y}$) shall be adjusted upwards by the MPE percentage to ensure activity emissions are not underestimated. If $MPE \leq 2.5\%$, no adjustment is required.

8.4.1.3 | **Exemption for Fuel Sales:** Activities relying exclusively on comprehensive digital fuel sales records (where no physical stove-level meter exists) are exempt from physical hardware meter MPE adjustments, provided the point-of-sale database integrity is robustly validated.

8.4.2 | Calculation of Activity Emissions (AE_y) – Method 1 & 2

8.4.2.1 | Activity emissions are calculated based on the metered input energy and the total Activity Emission Factors ($EF_{p,input}$), which include combustion and upstream emissions.

$$EF_{p,input} = \sum_j (Share_j \times (EF_{p,j,CO_2} \times fNRB_{p,j,y} + EF_{p,j,non-CO_2} + UEF_{p,j})) \quad \text{Eq.22}$$

Where:

$EF_{p,input}$ = Activity Emissions factor (tCO₂e per TJ of energy input)

$Share_j$ = Proportion of energy input contributed by fuel j in the activity device (Fraction).

EF_{p,j,CO_2} = CO₂ emission factor for activity fuel j (tCO₂e/TJ)

$fNRB_{p,j,y}$ = Fraction of non-renewable biomass for fuel j in year y (fraction)

- $EF_{p,j,non-CO2}$ = Non-CO₂ emission factor for activity fuel j (tCO₂e/TJ)
- $UEF_{p,j}$ = Upstream emission factor for activity fuel j (tCO₂e/TJ)
- j = Index for activity scenario fuel type

$$AE_y = (EG_{p,input,fuel,y,adj} \times EF_{p,input}) + AE_{elec,y} \quad \text{Eq.23}$$

Where:

- AE_y = Activity Emissions in year y (tCO₂e/yr)
- $EG_{p,input,fuel,y,adj}$ = Adjusted metered input energy (from non-electric fuel) consumed by the project devices in year y (TJ/yr)
- $EF_{p,input}$ = Activity emissions factor (tCO₂e per TJ of energy input)
- $AE_{elec,y}$ = Activity Emissions from electricity consumption in year y (tCO₂e/yr)

8.4.3 | Fossil Fuel Efficiency Constraint & Bio-Blending

8.4.3.1 | If the activity utilises fossil fuels (e.g., LPG), the Baseline Emission Factor ($EF_{b,input}$) shall be used in place of $EF_{p,input}$ strictly in the calculation of Activity Emissions in Eq. 23, as per Applicability condition 3.2.5.1. This ensures that emission reductions are credited exclusively for energy efficiency improvements, and not for the fossil-fuel switch itself.

8.4.3.2 | **Bio-Blending Provision:** If an activity developer introduces verified renewable blended fuels (e.g., BioLPG) into a fossil fuel supply chain, the developer may submit a deviation or design change to account for the physically verified renewable fraction using its actual activity emission factor ($EF_{p,input}$), provided the supply chain tracking meets robust, auditable chain-of-custody requirements.

8.4.4 | Emissions from Electricity Consumption ($AE_{elec,y}$)

8.4.4.1 | Emissions shall be determined using the latest version Article 6.4 Methodological Tool "[Emissions from electricity generation and consumption](#)" (A6.4-AMT-007) or approved standardized grid/off-grid emission factors.

$$AE_{elec,y} = \sum_d EG_{p,d,y,adj} \times EF_{el,y} \times (1 + TDL_y) \quad \text{Eq. 24}$$

Where:

- $EG_{p,d,y,adj}$ = Adjusted metered electricity consumption (MWh)
- $EF_{el,y}$ = Emission factor (tCO₂e/MWh)
- TDL_y = Transmission and distribution losses (fraction)
- d = Index for project scenario fuel type

8.4.5 | **Method 3** : Activity emissions are calculated by scaling the adjusted Project Emissions Quotient ($ER_{p,adj}$) by the total metered project consumption.

$$AE_y = (EG_{p,input,y,adj} \times ER_{p,adj}) + AE_{elec,KPT,y} \quad \text{Eq. 25}$$

Where:

$EG_{p,input,y,adj}$	=	Adjusted metered input energy consumed by the project devices in year y (TJ/yr)
$ER_{p,adj}$	=	Uncertainty-Adjusted Activity Emissions Quotient (tCO ₂ e/TJ)
$AE_{elec,KPT,y}$	=	Activity Emissions from electricity consumption captured during KPT not part of CTEC measurement (tCO ₂ e/yr)

9| LEAKAGE EMISSIONS

9.1| Identification of leakage emission sources

9.1.1 | Leakage (LE_y) refers to the net change of GHG emissions occurring outside the activity boundary attributable to the activity.

9.1.2 | This methodology identifies two mandatory sources:

- Embodied Emissions (Upstream) (Section [9.2|](#)).
- Market and Behavioural Leakage (Section [9.3|](#)).

$$LE_y = LE_{Embodied,y} + LE_{Market,y} \quad \text{Eq. 26}$$

Where:

LE_y	=	Total Leakage Emissions in year y (tCO ₂ e/yr)
$LE_{Embodied,y}$	=	Leakage due to embodied emissions in year y (tCO ₂ e/yr)
$LE_{Market,y}$	=	Leakage due to market and behavioural effects in year y (tCO ₂ e/yr)

9.2| Embodied Emissions ($LE_{Embodied,y}$)

9.2.1 | In compliance with cradle-to-gate assessment requirements, embodied emissions associated with the manufacturing and transport of the project devices shall be accounted for (See Section [5.4|](#)).

9.2.2 | Calculation and Amortisation of Embodied Emissions

9.2.2.1 | To simplify the assessment and ensure conservativeness, a standardised default deduction shall be applied. A mandatory, deduction of 17.0 kg CO₂e per device (0.017 tCO₂e/device) shall be applied to account for the cradle-to-gate embodied emissions for all decentralised thermal energy technologies covered by this methodology.

9.2.2.2 | Alternatively, the activity developer may conduct their own lifecycle assessment (LCA) to determine an activity-specific embodied emission factor. Any custom LCA shall strictly conform to recognised international standards (e.g., ISO 14040/14044) to ensure cradle-to-gate boundary completeness and is subject to rigorous VVB validation.

9.2.2.3 | The activity developer shall apply one of two pathways for the deduction of embodied emissions, contingent upon the verifiable technical lifetime of the activity device (as established via manufacturer specifications, standardised testing, or commercial guarantees in Parameter MECD 1):

- a. **Short-Lived Technologies (Technical Lifetime < 5 years):** For temporary transitional devices or less durable appliances, the total default (or LCA – verified) embodied emissions shall be deducted entirely upfront from the credits issued during the first monitoring period for that specific unit.

$$LE_{Embodied,y} = N_{disseminated,y} \times EM_{EF} \quad \text{Eq. 7}$$

Where,

$LE_{Embodied,y}$ = Leakage due to embodied emissions in year y (tCO₂e/yr)

$N_{disseminated,y}$ = Number of new project technology units disseminated in year y

EM_{EF} = Embodied emission factor per device (0.017 tCO₂e/unit default, or activity specific technology embodied emission factor value) (tCO₂e/unit)

- b. **Durable Technologies (Technical Lifetime ≥ 5 years):** To preserve project financial viability for high-quality, durable appliances (e.g., EPCs, induction cookers, metered biogas), the total default embodied emissions shall be annualised (distributed evenly) over the duration of the First Crediting Period (5 years). This annual deduction shall be applied to the cumulative cohort of disseminated devices for exactly five full years from their respective dates of commissioning, regardless of whether individual units break or drop out of the active operational fleet. The annual deduction per operational unit is:

$$LE_{Embodied,y} = N_{disseminated,y} \times \left(\frac{EM_{EF}}{5} \right) \quad \text{Eq. 8}$$

Where,

$LE_{Embodied,y}$ = Leakage due to embodied emissions in year y (tCO₂e/yr)

$N_{disseminated,y}$ = Number of new activity technology units disseminated in year y

EM_{EF} = Embodied emission factor per device (0.017 tCO₂e/unit default, or activity specific

technology embodied emission factor value)
 (tCO₂e/unit)

5 = Duration of 1st crediting period over which
 emissions are amortized (years)

- c. **Mandatory True-Up Provision:** If a project utilising approach 2 ceases verification or permanently terminates prior to the completion of the 5-year First Crediting Period, the activity developer shall conduct a true-up calculation at the final issuance event. Any remaining unamortised embodied emissions for the entire historically disseminated device fleet shall be deducted in full, from the final issuance request to prevent unpaid carbon debt.

9.3| Market and Behavioural Leakage ($LE_{Market,y}$)

9.3.1 | This category addresses potential leakage sources such as the reuse of baseline equipment outside the boundary, market effects on fuel availability, adverse technology selection, and impacts on other mitigation activities (See Table 6, Section [5.5](#)).

9.3.2 | **Assessment Options:** The activity developer shall determine Market Leakage ($LE_{Market,y}$) following one of the two options below. The chosen option shall be documented in the PDD/VPA-DD.

9.3.2.1 | **Option 1: Justification of Negligible Leakage (De Minimis):** The activity developer may justify the application of $LE_{Market,y} = 0$, only if the following condition is verifiably demonstrated to the satisfaction of the VVB:

- a. **Condition 1 (Addressing Equipment Transfer):** The activity documentation provides a credible, evidence-based justification that the transfer and reuse of functional baseline equipment outside the activity boundary is negligible or does not result in significant negative leakage. This shall be supported by the implementation of effective baseline stove displacement mechanisms (See Section [3.2.4](#)) and monitoring data (e.g., usage surveys).
- b. **Option 2: Application of Conservative (Default):** If the conditions for Option 1 cannot be verifiably met, a conservative default deduction of 2% shall be applied to the preliminary emission reductions. A default adjustment factor of 0.98 (2% deduction) shall be applied to the preliminary emissions reductions

$$LE_{Market,y} = (BE_y - AE_y) \times 0.02 \quad \text{Eq. 29}$$

Where,

- $LE_{Market,y}$ = Leakage due to market and behavioural effects in year y (tCO₂e/yr)
- BE_y = Crediting Baseline Emissions in year y (tCO₂e/yr)
- AE_y = Activity Emissions in year y (tCO₂e/yr)
- 0.02 = Default market leakage deduction factor (2%)

10| NET GHG EMISSION REDUCTIONS

10.1| Calculation of net GHG emission reductions

10.1.1 | The Net Emission Reductions (ER_y) are the final result of the quantification process. They are calculated based on the Leakage assessment option selected in Section 9.

$$ER_y = BE_y - AE_y - LE_y \quad \text{Eq. 30}$$

Where:

- ER_y = Net emission reductions during the monitoring period y due to the activity (tCO_{2e})
- BE_y = Crediting Baseline emissions in the monitoring period y (tCO_{2e})
- AE_y = Activity emissions in the monitoring period y (tCO_{2e})
- LE_y = Leakage emissions in the monitoring period y (tCO_{2e})

11| MEETING METHODOLOGICAL PRINCIPLES

11.1| Encouraging ambition over time

11.1.1 | The methodology ensures the encouragement of ambition over time through the following mandatory mechanisms:

- a. **Downward Adjustment Factor (DAF):** The application of the DAF factor ensures that the crediting baseline (BE_y) is systematically lowered annually, based on the host country's long-term Net-Zero trajectory or the established Ambition Floor.
- b. **Baseline Reassessment:** The baseline scenario, the Baseline Emission Factor (EF_b), and associated parameters (e.g., baseline technology efficiency, fuel mix) shall be reassessed at each renewal of the crediting period (Section 17|).
- c. **Dynamic Performance Monitoring:** The requirement for biennial updates of project performance parameters (Efficiency η_p or Specific Consumption SC_p) ensures that any degradation in technology performance over time is captured accurately (Section [14.3|](#)).

11.2| Equitable sharing of mitigation benefits

11.2.1 | The methodology promotes the equitable sharing of benefits by operating under the [GS4GG Community Services Activity \(CSA\)](#) Requirements. Adherence to the GS4GG [Safeguarding Principles & Requirements](#) and mandatory [Stakeholder Consultation Requirements](#) ensures end-user rights and interests of local stakeholders are protected.

11.2.2 | The activity itself provides direct co-benefits to households, including improved health through reduced Indoor Air Pollution (IAP) (supported by the

requirement that IAP is not worsened, Section [3.2.8 |](#)) and time or monetary savings related to fuel acquisition.

11.3| Avoidance of double counting

11.3.1 | The methodology includes explicit requirements (Section [3.2.7 |](#)) to mitigate the risk of double counting (double issuance, double use, and double claiming). This includes mandatory contractual ownership assertions, explicit end-user informed consent regarding carbon waivers, unique database tracking for all devices (Section [14|](#)), and registry-level checks against overlapping Safe Water Supply (SWS) activities and Jurisdictional REDD+ programs. To accommodate comprehensive fuel sales models, tracking may be conducted at the unique end-user/customer account level, provided double counting is securely prevented.

11.4| Aligning with NDC and LT-LEDS

11.4.1 | The methodology ensures alignment with the host country's Nationally Determined Contributions (NDCs) and Long-Term Low-Emission Development Strategies (LT-LEDS):

11.4.1.1 | **DAF Alignment:** The DAF (Section [7.4.4 |](#)) is explicitly derived from the host country's national Net-Zero targets. This ensures that the baseline trajectory is consistent with the national long-term decarbonization pathway.

11.4.1.2 | **Activity Relevance:** Efficient cooking and the reduction of non-renewable biomass consumption are key mitigation strategies included in the NDCs of many developing countries.

11.4.1.3 | **Avoidance of Lock-In:** The Lock-In Risk Analysis (Section [6.4|](#)) assesses the compatibility of the technology (e.g., LPG, grid-electric) with long-term decarbonization pathways and ensures the activity does not create infrastructural dependencies that inhibit the transition to lower-emission alternatives.

11.5| Encouraging Broad Participation

11.5.1 | The methodology encourages broad participation through flexibility and scalability:

11.5.1.1 | **Scalability:** Applicable to Micro, Small, and Large-scale activities across household, institutional, commercial, and industrial sectors.

11.5.1.2 | **Standardisation:** Utilises standardized approaches for complex parameters (e.g., fNRB, Leakage options) to reduce transaction costs while maintaining rigor.

11.5.1.3 | **Programmatic Approach:** Highly suitable for aggregation under Programmes of Activities (PoA) (Section [16|](#))

11.6| Including Data Sources, Accounting for Uncertainty, and Monitoring

- 11.6.1 | The methodology ensures robustness in data use, uncertainty management, and monitoring:
- 11.6.1.1 | **Data Sources:** The methodology mandates the highest quality data for activity emissions by requiring 100% metering (CTEC). Baseline parameters rely on standardised tools (fNRB, EFs) and statistically rigorous testing (CCT/WBT).
- 11.6.1.2 | **Accounting for Uncertainty:** Uncertainty is explicitly addressed (Section 12.3.1 |). a. Uncertainty in activity consumption is managed through meter accuracy requirements and adjustments if thresholds are exceeded (Section 8.3.2.2 |). b. Uncertainty in parameters derived from testing (CCT/WBT) is managed by mandatory statistical conservatism (90/10 rule, use of Lower/Upper bounds) (Section [7.4.4 |](#)).
- 11.6.1.3 | **Monitoring:** A rigorous monitoring plan focused on data management, meter maintenance, and periodic updates of performance parameters is required (Section 14|).

11.7| Taking into Account Policies, Measures, and Relevant Circumstances

- 11.7.1 | The methodology accounts for relevant policies and circumstances:
- 11.7.1.1 | **Policies and Measures (Regulatory Surplus):** The mandatory Regulatory Analysis (Section [6.3|](#)) ensures that the activity is surplus to existing laws and regulations.
- 11.7.1.2 | **Policies and Measures (Ambition):** The DAF ensures the baseline trajectory accounts for the ambition reflected in national policies (Net-Zero targets).
- 11.7.1.3 | **Relevant Circumstances:** The determination of the baseline scenario is based on actual local circumstances. The B-KPT captures the specific cooking practices, fuel types, and consumption patterns relevant to the target population.

12| REVERSALS

12.1| Assessment of Reversal Risks

- 12.1.1 | The activity generates GHG emission reductions by avoiding the combustion of non-renewable biomass, thereby relieving pressure on existing carbon stocks in the relevant greenhouse gas reservoirs (forests and woodlands). The methodology does not generate credits for quantified carbon stock sequestered or its avoided loss.
- 12.1.2 | While the avoidance of the specific combustion event is immediate and permanent, the biomass stocks preserved by the activity remain subject to potential future depletion due to natural disturbances (e.g., fires, pests) or anthropogenic drivers (e.g., land clearance).

12.1.3 | In the context of decentralized thermal energy service activities, the activity developer operates the technology distribution and data management infrastructure but possesses no legal control, land tenure, or management authority over the physical greenhouse gas reservoir (the forest or land area). Consequently, the activity is formally classified under the "No Control" exemption regarding the carbon reservoir. Non-permanence buffer pool deductions are therefore fundamentally inappropriate for activities applying this methodology and shall not be required.

12.2| Mitigation and Management of Reversal Risks (Alternative Approach)

12.2.1 | Pursuant to the "No Control" status of the activity developer over the reservoir, this methodology applies an alternative approach to address non-permanence risk through dynamic monitoring replacing the requirement for Reversal Risk Buffer Pools.

12.2.2 | The non-permanence risk to the biomass reservoir shall be mitigated and managed through the mandatory periodic updating of the Fraction of Non-Renewable Biomass (fNRB) parameter and the baseline fuel scenario, subject to the following safeguards at the time of crediting period renewal (Section [17|](#)):

- a. **Dynamic fNRB Updating:** The fNRB parameter shall be periodically updated utilizing the latest versions of approved standardized science-based tools (e.g., MoFuSS or A6.4 fNRB Tool – default values) to accurately reflect the current physical reality of the biomass reservoir. The updated fNRB value shall be applied to the subsequent crediting period. If the updated fNRB value decreases, the lower value shall be applied without further justification. If the updated fNRB value increases, the activity developer shall justify the continued use of the higher value by demonstrating that users still source wood from the same area.
- b. **Catastrophic Disturbance & Biomass Availability Check:** The activity developer shall conduct a qualitative assessment of the biomass supply area using available evidence (e.g., satellite imagery, government forestry reports) to identify if Catastrophic Disturbance Events (e.g., severe wildfires or rapid mass land-use conversion to agriculture or urbanization) has effectively depleted the historic biomass reservoir, OR if the updated fNRB calculates a mathematically higher fraction of non-renewability than the previous crediting period, the Baseline Fuel Scenario (Section [7.3.1 |](#)) shall be formally re-evaluated.
- c. **Baseline Validation:** If the assessment confirms that the historic woody biomass resource is no longer physically available or accessible to the target population due to severe depletion, the activity developer shall empirically demonstrate (via an updated baseline survey) the actual alternative fuels the population has been forced to adopt (e.g.,

renewable agricultural residues, dung, or fossil fuels). The baseline scenario shall be formally updated to reflect these alternative fuels, thereby organically adjusting the crediting baseline to match post-disturbance realities and preventing over-crediting for non-existent resources.

12.3| Addressing Reversals

12.3.1 | Because the mitigation outcome is generated via avoidance (not sequestration), and the risk of macro-level non-permanence is addressed ex-ante for future crediting periods via the dynamic updating of the fNRB and baseline fuel scenario, retrospective cancellation of credits or contributions to a Reversal Risk Buffer Pool are not required.

13| UNCERTAINTY QUANTIFICATION

13.1| Approach to Uncertainty Management

13.1.1 | The methodology quantifies uncertainty to ensure conservative Net GHG Emission Reductions. The CTEC approach reduces uncertainty related to activity consumption, focusing uncertainty management on measurement accuracy and parameters derived from sampling/testing.

13.1.1.1 | **Standardisation and Defaults:** Uncertainty for non-measured parameters (e.g., NCV, EFs, Embodied Emissions Leakage) is managed using conservative IPCC defaults or approved standardised tools. For fNRB, uncertainty is managed through conservativeness built into the approved tools (See [14.2|](#)).

13.1.1.2 | **Statistical Conservativeness (Sampling/Testing):** Uncertainty for parameters derived from sampling or laboratory testing (e.g., Efficiency η , Specific Consumption SC or KPT results) is managed by mandatory statistical adjustments if the 90/10 precision targets are not met (Section [7.4|](#)). This involves using the appropriate Lower or Upper Bound of the 90% CI to ensure a conservative outcome.

13.2| Sources of Uncertainty and Mitigation

13.2.1 | Key uncertainty sources and their mandated mitigation measures are summarized in the following table.

Table 7. Key uncertainty sources and mitigation measures

Source of Uncertainty	Parameter(s) Affected	Mitigation Measure(s)
Measurement Uncertainty (Meter Accuracy)	$EG_{p,input,y}$ (Metered Consumption)	a. Mandatory meter calibration and maintenance protocols (Section 14.4).

		<ul style="list-style-type: none"> b. Mandatory upward adjustment of consumption if MPE > 2.5% (based on recognized international standards e.g., OIML, IEC, or ISO) (Section 8.4.1). c. Exemption: Activities relying exclusively on comprehensive digital fuel sales records are exempt from physical hardware meter MPE adjustments (Section 8.4.1).
Data Transmission and Gaps	$EG_{p,input,y}$ (Metered Consumption)	<ul style="list-style-type: none"> a. Robust data management systems (Section 14.1). b. Conservative procedures for handling data gaps (Section 14.4).
Sampling/Testing Uncertainty (CCT/WBT/KPT)	η (Efficiency) SC (Specific Consumption) EC_{KPT} (KPT Energy)	<ul style="list-style-type: none"> a. Robust sampling/testing requirements (Section 14.5). b. Mandatory application of statistical conservatism (Lower/Upper Bounds) if 90/10 precision is not met (Section 7.4.1 & 8.3.3).
Parameter Uncertainty (Defaults)	fNRB, NCV, EFs, Leakage	<ul style="list-style-type: none"> a. Standardization and Conservativeness: Mandatory use of approved standardized tools (e.g., MoFuSS for fNRB) or conservative IPCC/methodology default values.
Behavioural Uncertainty (Stacking/Rebound)	Activity Emissions (AE_y)	<ul style="list-style-type: none"> a. Methodological Design (Internalisation): The methodology inherently internalises stacking/rebound by back-calculating the baseline based only on the metered energy service delivered by the project device (Section 8.2.2).

14 | MONITORING METHODOLOGY

14.1 | Requirements

14.1.1 | The activity developer shall develop and implement a Monitoring Plan detailing the procedures for data collection, management, and quality control, focusing on the CTEC system.

14.1.2 | Core Monitoring Activities and Frequency:

- a. **Metered Data Collection (CTEC):** Continuous tracking and recording.
- b. **Baseline Scenario Survey:** Conducted ex-ante; fixed for the 5-year crediting period.

- c. **Controlled Cooking Test (CCT) / Efficiency Testing (WBT/ISO 19867-1):** Conducted ex-ante (Baseline and Activity). Re-tested biennially (every 2 years) for activity parameters to account for degradation.
- d. **Meter Maintenance/Calibration Records:** Continuous tracking.

14.1.3 | **Activity Database:** The activity developer shall maintain a comprehensive electronic database. This database shall include, at a minimum:

- a. Unique identification number for each unit/user and associated meter. For activities utilizing 100% comprehensive fuel sales records, tracking may be conducted at the end-user/customer account level. So long as the database demonstrates that the customer maintained continuous access to a functional, equivalent project device throughout the monitoring period, individual stove hardware serial numbers do not need to be strictly hard-linked to individual fuel purchase receipts.
- b. Technology model/type (p) and Date of commissioning.
- c. Geolocation and contact information of the end-user. To strictly comply with the General Data Protection Regulation (GDPR) and regional data privacy laws, GPS data shall only be collected to the extent permitted by law. The activity developer shall maintain secure relational data for VVB validation, but shall not submit full, unredacted household-level GPS coordinates in public documentation. Where legal constraints apply, geographic tracking and public database logging shall be recorded at the lowest legally permissible administrative unit, provided that unique device identifiers (e.g., serial numbers, digital IDs) and relational mapping data are robustly maintained and available for VVB verification to securely prevent double counting.
- d. Corresponding baseline scenario (b).
- e. The complete time-series metered consumption data for each device or customer account. While raw time-series data shall be securely retained by the activity developer and made available upon request, the VVB is not required to manually audit the entire raw dataset. The VVB shall validate the data aggregation scripts/algorithms and audit the consolidated project database summaries (via spot-checking) to verify compliance.
- f. Records of meter maintenance, calibration, and any data gaps, as applicable.

14.1.4 | **Dormant and Multiple Devices:**

- a. Devices confirmed as dormant or no longer in use via tracking telemetry shall naturally be excluded from the crediting calculation (recording zero consumption).
- b. Multiple project stoves operating in a single household are permitted, provided their combined metered usage is aggregated against that single household's methodological baseline cap.

14.2| Data and parameters not monitored:

14.2.1 | The following parameters are determined ex-ante and remain fixed for the duration of the crediting period, unless otherwise noted. (Note: In parameter IDs and variables, the subscript "p" denotes the "activity scenario" to maintain structural consistency with legacy carbon accounting formulas).

Parameter ID	MECD 1
Data/parameter:	Activity technology description, specifications, and safeguards
Description	Detailed description of the activity technology, including manufacturer, model, continuous useful energy output (<150kW), expected technical life, rated thermal efficiency (if applicable), safety standard compliance, and Indoor Air Pollution (IAP) assessment.
Data unit:	%, kW, Years, N/A
Purpose of data:	<input checked="" type="checkbox"/> Baseline emissions <input checked="" type="checkbox"/> Activity emissions <input checked="" type="checkbox"/> Applicability
Value(s) applied:	To be determined at activity level
Source of data:	<input checked="" type="checkbox"/> Measured <input checked="" type="checkbox"/> Other source Manufacturer specifications, standardised laboratory test reports (WBT or ISO 19867-1), safety certifications, commercial guarantees, IAP test reports/literature.
Choice of data or measurement methods and procedures:	<ol style="list-style-type: none"> Efficiency (Fuel-based): WBT or ISO 19867-1 required to verify $\geq 40\%$ efficiency (Section 3.2.1). A single accredited ISO 19867-1 (or equivalent national standard) laboratory test is sufficient to establish the ex-ante rated thermal efficiency for a specific mass-manufactured activity device model. mass lab-test sampling is not required. However, for artisanal or locally fabricated cookstoves, at least three randomly selected samples of each model shall be tested to ensure representative performance and average these samples shall be used. Technical Life: Verifiable evidence from manufacturer or standards body (Section 3.2.6). Safety: Evidence of compliance with relevant standards for specific fuels (e.g., LPG, ethanol) (Section 3.2.8.3). IAP: Evidence (reports, modelling, or recent literature) demonstrating IAP (PM 2.5 and CO) is not worsened compared to the baseline (Section 3.2.8). Standard ISO 19867-1 emissions tiers are sufficient to satisfy this requirement.
Treatment of uncertainty	N/A
Comments:	Used to verify applicability criteria, inform Lock-in Risk analysis (Section 6.4), and group similar technologies (Section 8.1.3).

Parameter ID	MECD 2
Data/parameter:	Regulatory framework and E-waste plan
Description	Evidence of compliance with national/local regulations for thermal energy/fuel supply and use. Documented E-waste management plan for electronic appliances.
Data unit:	Fraction
Purpose of data:	<input checked="" type="checkbox"/> Applicability
Value(s) applied:	To be determined by activity developer
Source of data:	<input type="checkbox"/> Measured <input checked="" type="checkbox"/> Other source
Choice of data or measurement methods and procedures:	<ol style="list-style-type: none"> Regulatory: Identify and demonstrate compliance with all applicable regulations (Section 3.3.1). E-waste: Documented plan covering collection, repair/refurbishment, recycling, and safe disposal consistent with national regulations and GS Principle 9.5.
Treatment of uncertainty	N/A
Comments:	Used for Regulatory Surplus Analysis (Section 6.3.1) and mandatory safeguards.

Parameter ID	MECD 3
Data/parameter:	$Prop_{i,j}$ (Baseline Fuel/Device Proportions)
Description	Proportion of total useful energy, fuel mass, purchased volume, or cooking events performed using fuel i in device j in the baseline scenario.
Data unit:	Fraction (%)
Purpose of data:	<input checked="" type="checkbox"/> Baseline emissions
Value(s) applied:	To be determined by activity developer
Source of data:	<input checked="" type="checkbox"/> Measured <input type="checkbox"/> Other source Baseline Scenario Survey (BSS) of the target population.
Choice of data or measurement methods and procedures:	<ul style="list-style-type: none"> Initial estimate: BSS of the target population. The metric used may be the proportion of cooking events, fuel mass, or useful energy, provided it is transparently documented and consistently mathematically applied Verification: The value applied shall be verified via the mandatory Consistency Check (Section 7.3.2.1) using retrospective data (MECD 21). If a material discrepancy is found, adjustments shall be made cumulatively or other conservative corrective actions applied (Section 7.3.2.1). Exemption: Activities calculating emission reductions using comprehensive individual household-level baselines for

	100% of participants (Section 7.3.2) are exempt from population-level Consistency Check adjustments.
Treatment of uncertainty	The BSS shall meet the 90/10 precision requirement. Uncertainty is primarily managed through the Consistency Check and subsequent conservative adjustments.
Comments:	Used in the calculation of the Baseline Emission Factor (EF_b) (Eq. 1 and 2). Fixed for the crediting period.

Parameter ID	MECD 4
Data/parameter:	$\eta_{b,i,j}$ Baseline Efficiency – Method 1
Description	Thermal efficiency of baseline device j with fuel i .
Data unit:	Fraction (%)
Purpose of data:	<input checked="" type="checkbox"/> Baseline emissions
Value(s) applied:	To be determined at activity level. The value used (Mean or UB_{90}) depends on statistical precision (See Section 7.4.1.1).
Source of data:	<input checked="" type="checkbox"/> Measured <input checked="" type="checkbox"/> Other source <ol style="list-style-type: none"> Laboratory testing (WBT or ISO 19867-1). Credible published literature. Methodology defaults (e.g., 15% for traditional fuelwood stoves).
Choice of data or measurement methods and procedures:	Determined ex-ante. Required only for Method <ol style="list-style-type: none"> Laboratory testing is preferred over defaults. However, for baseline technologies where formal laboratory testing is unfeasible or highly variable (e.g., traditional three-stone fires), credible published literature or recognised methodology defaults are fully permissible. Testing shall adhere to standardised protocols.
Treatment of uncertainty	Managed via statistical conservatism (Section 7.4.1.1). If 90/10 precision is not met in testing, the Upper Bound ($\eta_{b,UB90}$) shall be used to ensure a conservative baseline (lower $EF_{b,useful}$).
Comments:	Used in the calculation of $EF_{b,useful}$ (Eq. 1). Fixed for the crediting period.

Parameter ID	MECD 5
Data/parameter:	SC_b (Baseline Specific Consumption – Method 2)
Description	Specific energy consumption used in the baseline scenario (weighted average if multiple baseline devices)
Data unit:	MJ/kg food (or appropriate CCT unit)
Purpose of data:	<input checked="" type="checkbox"/> Baseline emissions

Value(s) applied:	To be determined at activity level. Used to determine the SC Ratio ($R_{SC,stat}$) (See Section 7.4.1.3).
Source of data:	<input checked="" type="checkbox"/> Measured 1. Controlled Cooking Test (CCT) campaign.
Choice of data or measurement methods and procedures:	Determined ex-ante via a statistically representative CCT campaign (Section 7.3.5.1). The CCT shall adhere to standardised protocols (e.g., CCA CCT Protocol), utilize a representative "standard meal," and ensure tasks are comparable between baseline and activity devices. Independent third-party testing is strongly recommended.
Treatment of uncertainty	Managed via the uncertainty adjustment of the SC Ratio ($R_{SC,stat}$) (Section 7.4.1.3). The 90/10 precision requirement applies to the overall aggregated ratio derived from the complete CCT campaign. If 90/10 precision is not met for the ratio (SC_b/SC_p), the Lower Bound of the ratio is used.
Comments:	Required only for Method 2. Fixed for the crediting period.

Parameter ID	MECD 6
Data/parameter:	$EC_{b,KPT,i}$ (Baseline Energy Consumption – Method 3)
Description	Energy consumption of baseline fuel i derived from Baseline Kitchen Performance Test (B-KPT).
Data unit:	TJ/(person*year) or equivalent unit.
Purpose of data:	<input checked="" type="checkbox"/> Baseline emissions
Value(s) applied:	To be determined at activity level. The value used (Mean or LB90) depends on statistical precision (See Section 7.4.1.3).
Source of data:	<input checked="" type="checkbox"/> Measured 1. Statistically representative B-KPT campaign.
Choice of data or measurement methods and procedures:	Determined ex-ante. Required only for Method 3. The B-KPT shall adhere to standardised KPT protocols (e.g., CCA KPT Protocol).
Treatment of uncertainty	Managed via statistical conservatism (Section 7.4.1.3). If 90/10 precision is not met, the Lower Bound ($EC_{b,KPT,LB90}$) shall be used to ensure a conservative baseline.
Comments:	Used in the calculation of the Baseline Emissions Ratio ($ER_{b,unadj}$) (Eq. 5). Fixed for the crediting period.

Parameter ID	MECD 7
Data/parameter:	$NCV_{b,i}$ and $NCV_{p,i}$ (Net Calorific Values)
Description	The net calorific value of the fuels used in the baseline (b) and project (p) scenarios.
Data unit:	TJ/tonne (or appropriate unit)
Purpose of data:	<input checked="" type="checkbox"/> Baseline emissions <input checked="" type="checkbox"/> Activity emissions
Value(s) applied:	Defaults (e.g., Wood: 0.0156 TJ/ton; Charcoal: 0.0295 TJ/ton). See IPCC for others.
Source of data:	<input checked="" type="checkbox"/> Measured <input checked="" type="checkbox"/> Other Sources IPCC defaults (latest applicable guidelines – Refer to Annex 2). Activity-specific testing allowed for non-standard fuels.
Choice of data or measurement methods and procedures:	Hierarchy: 1. IPCC defaults. 2. Activity-specific testing by accredited third party entity. 3. Official national/regional data if demonstrably more conservative. If activity-specific values are used, they shall be cross-checked with IPCC defaults and justified.
Treatment of uncertainty	Managed by using conservative defaults or validated testing.
Comments:	Fixed for the crediting period.

Parameter ID	MECD 8
Data/parameter:	EF_{b,i,CO_2} , EF_{p,j,CO_2} , $EF_{b,i,non-CO_2}$, $EF_{p,j,non-CO_2}$
Description	CO ₂ and Non-CO ₂ (CH ₄ and N ₂ O, weighted by GWP) emission factors arising from fuel combustion in the baseline (b) and project (p) scenarios. For Charcoal, the EF_{CO_2} and EF_{non-CO_2} represent the Total Lifecycle Emissions (combustion + upstream kiln production) derived from the mass-balance WCCF to ensure fNRB is applied accurately to the entire mass of wood harvested. The applicable WCCF shall strictly follow the geographical requirements defined in Section 2 (6:1 for SSA & LDCs, and 4:1 elsewhere).
Data unit:	tCO ₂ /TJ (CO ₂); tCO ₂ e/TJ (Non-CO ₂)
Purpose of data:	<input checked="" type="checkbox"/> Baseline emissions <input checked="" type="checkbox"/> Activity emissions
Value(s) applied:	Defaults (Refer to Annex 2)
Source of data:	<input checked="" type="checkbox"/> Other sources IPCC defaults and mass-balance derivations. Refer to Annex 2
Choice of data or measurement	Standard IPCC defaults shall be applied. If activity-specific factors are used, they shall be rigorously justified, documented, and validated.

methods and procedures:	Note: If the project utilises fossil fuels, the baseline emission factor (EF_b) shall be used in place of EF_p for activity emissions calculation (Section 8.4.3.1) to ensure only efficiency improvements are credited.
Treatment of uncertainty	Managed by using conservative defaults.
Comments:	Fixed for the crediting period.

Parameter ID	MECD 9
Data/parameter:	$UEF_{b,i}$ and $UEF_{p,i}$ (Upstream Emission Factors)
Description	Upstream lifecycle emissions (production, processing, transport) associated with fuels used in the baseline (b) and project (p) scenarios.
Data unit:	tCO ₂ e/TJ
Purpose of data:	<input checked="" type="checkbox"/> Baseline emissions <input checked="" type="checkbox"/> Activity emissions
Value(s) applied:	Sourced from Annex 2 of the MECD methodology.
Source of data:	<input checked="" type="checkbox"/> Other source Methodology defaults (Annex 2).
Choice of data or measurement methods and procedures:	Apply the default values provided in Annex 2 corresponding to the specific fuel type. Note: For Charcoal, UEF is set to zero in Annex 2 because the upstream kiln emissions are structurally integrated into the primary EFCO ₂ and EFnon-CO ₂ factors (MECD 8) to ensure proper mathematical application of fNRB.
Treatment of uncertainty	Managed by using standardized, conservative defaults.
Comments:	Mandatory inclusion for calculating total Baseline (EF_b) and Activity (EF_p) emission factors. Fixed for the crediting period.

Parameter ID	MECD 10
Data/parameter:	$EF_{el,y}$ (Electricity Emission Factor)
Description	Emission factor for the electricity system (grid or off-grid) used by the activity devices.
Data unit:	tCO ₂ e/MWh
Purpose of data:	<input checked="" type="checkbox"/> Activity emissions
Value(s) applied:	To be determined at activity level.
Source of data:	<input checked="" type="checkbox"/> Other source

	Latest version of A6.4-AMT-007, approved standardised grid emission factors (e.g., IFI TWG), or approved off-grid emission factors.
Choice of data or measurement methods and procedures:	Determined following the procedures of the selected tool (e.g., Combined Margin for grid electricity). The source and calculation shall be transparently documented. The value is typically fixed ex-ante unless the selected tool requires periodic updates.
Treatment of uncertainty	Managed through the conservativeness of the approved tools or standardized factors.
Comments:	Used in the calculation of $AE_{elec,y}$ (Eq. 17).

Parameter ID	MECD 11
Data/parameter:	TDL_y (Transmission and Distribution Losses)
Description	Average technical transmission and distribution losses for providing electricity.
Data unit:	Fraction (%)
Purpose of data:	<input checked="" type="checkbox"/> Activity emissions
Value(s) applied:	To be determined at activity level.
Source of data:	<input checked="" type="checkbox"/> Other source Official data from the national grid operator, international sources (e.g., World Bank, IEA), or A6.4-AMT-007 defaults.
Choice of data or measurement methods and procedures:	Determined based on the hierarchy defined in the selected tool (e.g., A6.4-AMT-007) or using the most relevant official statistics. The value is typically fixed ex-ante. If national data is unavailable, a conservative default value of 10% may be applied.
Treatment of uncertainty	Managed by using official data or conservative defaults.
Comments:	Used in the calculation of $AE_{elec,y}$ (Eq. 17).

Parameter ID	MECD 12
Data/parameter:	P_{CAP} (Baseline Consumption Caps)
Description	Maximum allowable per-capita baseline energy consumption, used to cap the back-calculated baseline (Section 7.4.2).
Data unit:	TJ Input Energy/person/year
Purpose of data:	<input checked="" type="checkbox"/> Baseline emissions
Value(s) applied:	Primary Fuelwood Users: Cap 0.0195 TJ/p/yr (Threshold: 0.0117). Primary Charcoal/Mixed/Other: Cap 0.0064 TJ/p/yr (Threshold: 0.00383)

Source of data:	<input checked="" type="checkbox"/> Other source Methodology Default (Section 7.4.2.3).
Choice of data or measurement methods and procedures:	Apply the relevant cap based on the baseline scenario fuel mix. If the back-calculated baseline exceeds the Threshold, robust justification is required. These default caps apply strictly to domestic households. For commercial/institutional applications, the Activity Developer shall define and validate appropriate, sector-specific caps in the PDD.
Treatment of uncertainty	N/A (This parameter enforces conservativeness).
Comments:	Ensures conservativeness of the back-calculated baseline. The empirical rationale and peer-reviewed literature supporting these specific volumetric limits are detailed in the MECD Supplementary Information (SI) document.

Parameter ID	MECD 13
Data/parameter:	$DAF_{NetZero}$ (Downward Adjustment Factor)
Description	Factor applied to baseline emissions to encourage ambition over time, aligned with the host country's Net-Zero trajectory or the Ambition Floor.
Data unit:	Fraction (%)
Purpose of data:	<input checked="" type="checkbox"/> Baseline emissions
Value(s) applied:	Sourced from GS4GG Tool.
Source of data:	<input checked="" type="checkbox"/> Other source GS4GG Methodology Tool: DAF Determination.
Choice of data or measurement methods and procedures:	Determined following the procedures of the DAF Tool, based on the host country context and the project start date. It is applied as a fixed percentage reduction throughout the crediting period and does not compound mathematically.
Treatment of uncertainty	N/A (Standardised Tool).
Comments:	Mandatory application as per Section 7.4.4 . Fixed for the crediting period.

14.3| Data and parameters monitored

Parameter ID	MECD 14
Data/parameter:	$EG_{p,d,y}$ (Metered Energy/Fuel Consumption - CTEC)
Description:	Total input energy or fuel consumed by each project device (d) or end user (u) during the monitoring period (y).

Data unit:	MWh or kWh (Electricity); tonnes or kg (Fuel); TJ (Calculated)	
Purpose of data:	<input checked="" type="checkbox"/> Baseline emissions <input checked="" type="checkbox"/> Activity emissions	
Measurement and updating frequency	Continuous measurement (CTEC). Aggregated and reported per monitoring period.	
Measurement methods and procedures:	<p>Measured for 100% of the project devices or active customer accounts (unless utilising the transitional Alternative Continuous Monitoring Approach via a Revolving Representative Sample in Section 3.2.3) using:</p> <ol style="list-style-type: none"> Meters: Built-in or external data loggers (smart meters, PayGo systems). Fuel Sales Records: Comprehensive, verifiable records (e.g., LPG, ethanol, pellets), provided safeguards against fuel diversion are implemented (Section 3.2.3.3). <p>Mass-to-Energy Conversion: For fuel sales models, the total input energy ($EG_{p,u,y}$) shall be explicitly calculated as the total mass of fuel sold (tonnes) multiplied by the specific Net Calorific Value (NCV) prior to aggregation.</p> <p>Procedures for handling data gaps must follow Section 14.4 .</p>	
Entity/person responsible for the measurement:	CME/Activity Developer or designated data management entity/fuel supplier.	
Measuring instrument(s):	Type of instrument	N/A
	Accuracy class	N/A
	Calibration requirements	N/A
	Location	N/A
QA/QC procedures:	Implementation of the Data Management Plan (Section 14.4). Regular data validation checks (outlier detection, consistency). VVB verification of the data management system and data integrity.	
Treatment of uncertainty	If MPE of metering equipment exceeds 2.5%, the total metered consumption shall be adjusted upwards by the MPE percentage (Section 8.4.1). Activities relying exclusively on digital fuel sales are exempt from physical hardware MPE adjustments.	
Comments:	This is the core parameter of the CTEC methodology.	

Parameter ID	MECD 15	
Data/parameter:	$\eta_{p,d}$ (Activity Efficiency – Method 1)	
Description:	Thermal efficiency of the project device d .	
Data unit:	Fraction (%)	
Purpose of data:	<input checked="" type="checkbox"/> Baseline emissions	
Measurement and updating frequency	Determined ex-ante. Re-tested biennially (every 2 years) to account for potential degradation.	
Measurement methods and procedures:	Standardised laboratory testing (WBT or ISO 19867-1). Biennial re-testing should be conducted on a representative sample of operational devices. To account for degradation, sampling shall be stratified by chronological age cohorts OR by cumulative fuel consumption cohorts.	
Entity/person responsible for the measurement:	Independent authorised testing body / CME/Activity Developer.	
Measuring instrument(s):	Type of instrument	Standardized laboratory testing equipment (scales, thermometers, etc.).
	Accuracy class	N/A
	Calibration requirements	Calibration as per the relevant standard
	Location	N/A
QA/QC procedures:	Adherence to WBT or ISO 19867-1 protocols. Transparency in sampling methodology (cohort representation).	
Treatment of uncertainty	Managed via statistical conservatism (Section 8.3.3.2). If 90/10 precision is not met, the Lower Bound ($\eta_{p,LB90}$) shall be used to ensure a conservative baseline calculation (lower $EG_{p,useful,y}$).	
Comments:	This is the core parameter of the CTEC methodology.	

Parameter ID	MECD 16	
Data/parameter:	SC_p (Activity Specific Consumption – Method 2)	
Description:	Specific energy consumption used in the activity scenario.	
Data unit:	MJ/kg food (or appropriate CCT unit)	
Purpose of data:	<input checked="" type="checkbox"/> Baseline emissions	

Measurement and updating frequency	Determined ex-ante. Re-tested biennially (every 2 years) to account for potential degradation or changes in cooking practices. Biennial re-testing should verify current cooking practices with the device and be conducted on a representative sample stratified by age (cohorts).	
Measurement methods and procedures:	Statistically representative Controlled Cooking Test (CCT) campaign (Section 7.3.8.2). Testing shall be conducted on a representative sample stratified by chronological age cohorts OR by cumulative consumption cohorts.	
Entity/person responsible for the measurement:	Independent authorised testing body / CME/Activity Developer.	
Measuring instrument(s):	Type of instrument	Standardized laboratory testing equipment (scales, thermometers, etc.).
	Accuracy class	N/A
	Calibration requirements	Calibration according to standardized CCT protocols.
	Location	N/A
QA/QC procedures:	Adherence to standardised CCT protocols.	
Treatment of uncertainty	Managed via the uncertainty adjustment of the SC Ratio ($R_{SC,stat}$) (Section 7.4.1.3). The 90/10 precision target applies to the overall aggregated ratio parameter. If 90/10 precision is not met for the ratio (SC_b/SC_p), the Lower Bound of the ratio is used.	
Comments:	Required only for Method 2 calculations.	

Parameter ID	MECD 17
Data/parameter:	$EC_{p,KPT,project}$ (Activity Energy Consumption – Method 3)
Description:	Energy consumption of any fuel j used in the activity household (including activity device and stacking stoves) derived from activity KPT (P-KPT).
Data unit:	TJ/(person*year) or equivalent unit.
Purpose of data:	<input checked="" type="checkbox"/> Activity emissions
Measurement and updating frequency	Biennial (every 2 years).

Measurement methods and procedures:	Statistically representative P-KPT campaign. The P-KPT measures total relevant fuel consumption in the activity scenario. Sampling shall be stratified across technology ages (cohorts).	
Entity/person responsible for the measurement:	CME/Activity Developer/Third party.	
Measuring instrument(s):	Type of instrument	Weighing scales, moisture meters, energy meters (as applicable).
	Accuracy class	N/A
	Calibration requirements	Calibration according to KPT protocols.
	Location	N/A
QA/QC procedures:	Adherence to standardized KPT protocols. Compliance with sampling requirements (Section 14.5).	
Treatment of uncertainty	Managed via statistical conservatism (Section 8.3.3.2). If 90/10 precision is not met, the Upper Bound ($EC_{p,KPT,UB90}$) shall be used to ensure activity emissions are not underestimated.	
Comments:	Required only for Method 3. Used to calculate the Activity Emissions Quotient (ER_p) (Eq. 18).	

Parameter ID	MECD 18
Data/parameter:	$fNRB_{i,y}$ (Fraction of Non-Renewable Biomass)
Description:	Fraction of biomass used that is established as non-renewable.
Data unit:	Fraction (%).
Purpose of data:	<input checked="" type="checkbox"/> Baseline emissions <input checked="" type="checkbox"/> Activity emissions
Measurement and updating frequency	To align with the Reversal Risk mitigation approach (Section 12.2), it is recommended that this parameter be updated biennially (every 2 years) using dynamic tools (e.g., MoFuSS) to capture changes in forest cover. At a minimum, it shall be updated at the renewal of the crediting period.
Measurement methods and procedures:	Determined using the latest version of approved standardised tools (e.g., MoFuSS, or approved A6.4 tools). The update is subject to the qualitative Catastrophic Disturbance Check and Baseline Validation Rule (Section 12.2.2). Safeguard Rule: If the updated fNRB value decreases, the lower value shall be applied without further justification. If the updated fNRB value mathematically increases, the activity developer shall justify the continued use of the higher value by demonstrating that users still source wood from the same area.

Entity/person responsible for the measurement:	CME/Activity Developer/Third party.	
Measuring instrument(s):	Type of instrument	N/A
	Accuracy class	N/A
	Calibration requirements	N/A
	Location	N/A
QA/QC procedures:	Adherence to the requirements of the selected standardised tool. Transparency in data sources and assumptions. VVB validation of the methodology and input data.	
Treatment of uncertainty	Managed through the conservativeness built into the standardised tools or validated project-specific assessment.	
Comments:	Crucial parameter when the baseline or activity involves biomass.	

Parameter ID	MECD 19	
Data/parameter:	HS_p (Activity Household Size)	
Description:	Average number of individuals per household in the activity scenario.	
Data unit:	Number (persons)	
Purpose of data:	<input checked="" type="checkbox"/> Baseline emissions	
Measurement and updating frequency	The exact household size shall be recorded for 100% of end-users during initial onboarding/enrolment. Ongoing verification of the average household size for a given vintage cohort (used in aggregated baseline cap calculations) shall be conducted annually via a statistically representative usage survey.	
Measurement methods and procedures:	Collected during enrolment and updated via annual surveys or direct communication with end-users. Activities applying the " Household-Level Baseline Pathway" pathway (Section 7.3.2.1) shall use the specific HS_p value collected for each individual customer without population averaging.	
Entity/person responsible for the measurement:	CME/Activity Developer/Third party.	
Measuring instrument(s):	Type of instrument	N/A

	Accuracy class	N/A
	Calibration requirements	N/A
	Location	N/A
QA/QC procedures:	Cross-checked during the Consistency Check (Section 7.3.2). If HS_p is greater than the baseline estimate (HS_b), the HS_p value used for Capping calculations shall be conservatively adjusted.	
Treatment of uncertainty	If sampling is used, 90/10 precision should be targeted.	
Comments:	Used to calculate the total number of users ($N_{users,y}$) for the application of Baseline Caps (Section 7.4.2).	

Parameter ID	MECD 20	
Data/parameter:	$N_{disseminated,y}$ (Number of new units disseminated)	
Description:	Number of new activity technology units disseminated during the monitoring period y .	
Data unit:	Number (units)	
Purpose of data:	<input checked="" type="checkbox"/> Leakage emissions	
Measurement and updating frequency	Continuous (Sales/Distribution Records). Aggregated per monitoring period.	
Measurement methods and procedures:	<p>Tracked via the activity database. Includes unique identifier, model, date of commissioning, geolocation, and end-user information for every unit.</p> <p>Privacy Compliance: To comply with data privacy regulations, exact GPS coordinates are optional if restricted by law, provided alternative location descriptors (e.g., village, ward, point-of-sale district) are used alongside unique product identifiers to ensure traceability.</p> <p>For activities utilising comprehensive fuel sales models, tracking may be conducted robustly at the end-user/customer account level rather than being hard-linked to a static hardware serial number, provided it is demonstrated the customer-maintained access to a functional activity device.</p>	
Entity/person responsible for the measurement:	CME/Activity Developer/Third party.	
Measuring instrument(s):	Type of instrument	N/A

	Accuracy class	N/A
	Calibration requirements	N/A
	Location	N/A
QA/QC procedures:	Maintenance of a complete, accurate, and electronically backed-up sales/distribution record. VVB verification of the records and cross-checking against other evidence (e.g., end-user agreements, transaction records) to ensure uniqueness and avoid double counting.	
Treatment of uncertainty	N/A.	
Comments:	Used to calculate Embodied Emissions Leakage ($LE_{Embodied,y}$) (Eq. 27/28).	

Parameter ID	MECD 21	
Data/parameter:	Consistency Check Data (Retrospective Baseline)	
Description:	Retrospective assessment of the baseline cooking practices (fuel mix proportions and household size) of the actual enrolled activity households immediately prior to joining the activity.	
Data unit:	Fraction (Fuel proportions); Number (Household size)	
Purpose of data:	<input checked="" type="checkbox"/> Baseline emissions	
Measurement and updating frequency	Survey of enrolled activity participants. Once per household. To eliminate long-term recall bias, this survey must be conducted strictly at the time of onboarding/enrolment, or within a maximum of 30 days post-installation. Aggregated results reported per monitoring period.	
Measurement methods and procedures:	A standardised survey module asking participants to recall their cooking practices (proportion of cooking events per fuel/device) and household size. The recall period shall strictly assess the typical cooking habits during the 30 days immediately prior to receiving the activity technology.	
Entity/person responsible for the measurement:	CME/activity developer/Third party	
Measuring instrument(s):	Type of instrument	N/A
	Accuracy class	N/A

	Calibration requirements	N/A
	Location	N/A
QA/QC procedures:	The results are compared against the ex-ante Baseline Scenario (MECD 1) following the procedures in Section 7.3.1 . to identify material discrepancies. Survey design should attempt to minimise recall bias.	
Treatment of uncertainty	Survey design should attempt to minimize recall bias. Uncertainty is managed by requiring conservative resolution if discrepancies are found.	
Comments:	Mandatory to verify that the ex-ante baseline scenario is representative of the actual project participants. Activities utilising comprehensive individual household-level baselines mapped at onboarding are explicitly exempt from this population-level parameter.	

Parameter ID	MECD 22	
Data/parameter:	Meter Performance and QA/QC records	
Description:	Records of meter maintenance, calibration, malfunction, replacement, and data transmission integrity.	
Data unit:	N/A	
Purpose of data:	<input checked="" type="checkbox"/> Activity emissions	
Measurement and updating frequency	Continuous tracking and recording. Reported per monitoring period.	
Measurement methods and procedures:	Implementation of the QA/QC and Data Management plan (Section 14.4). Logging of all maintenance activities, calibration certificates, and incident reports related to the CTEC system. Activities relying exclusively on comprehensive digital fuel sales records are exempt from physical hardware meter QA/QC. Instead, QA/QC shall explicitly focus on validating the point-of-sale software, data aggregation algorithms, anti- tampering safeguards and database integrity.	
Entity/person responsible for the measurement:	CME/Activity Developer/Technical staff.	
Measuring instrument(s):	Type of instrument	N/A
	Accuracy class	N/A

	Calibration requirements	Calibration equipment as specified by meter manufacturer.
	Location	N/A
QA/QC procedures:	<p>VVB verification of the records to ensure compliance with the Monitoring Plan and meter accuracy requirements (MPE documentation). Systematic procedures for identifying and addressing meter malfunctions.</p> <p>The data processing algorithms used to convert raw telemetry into final energy consumption metrics (TJ/kWh) shall be fully documented and subject to VVB validation.</p>	
Treatment of uncertainty	<p>Ensures the reliability of the CTEC data (MECD 14) and informs any necessary adjustments for meter inaccuracy (Section 8.3.3.2).</p>	
Comments:	<p>Critical for maintaining the integrity of the CTEC approach.</p>	

14.4| QA/QC and Data Management

14.4.1 | Meter Accuracy and Calibration

14.4.1.1 | All metering equipment (electricity meters, gas flow meters, digital scales) shall conform to relevant recognized national or international accuracy standards (e.g., OIML, IEC, or ISO smart-metering guidelines).

14.4.1.2 | The activity developer shall maintain records of the Maximum Permissible Error (MPE) for all metering equipment.

14.4.1.3 | A calibration and maintenance plan shall be established and implemented according to the manufacturer's recommendations or relevant national requirements to ensure the accuracy of measurements throughout the crediting period. Records of calibration shall be maintained. Activities relying exclusively on comprehensive digital fuel sales records are exempt from physical hardware meter calibration requirements, provided the point-of-sale software, customer database, and safeguards against fuel diversion and data tampering are robustly validated by the VVB.

14.4.2 | Data Validation and Integrity

14.4.2.1 | The CTEC data management system shall include automated checks to identify outliers, errors, or potential tampering.

14.4.2.2 | Procedures for cross-verifying transmitted data against locally logged data (if applicable) shall be established.

14.4.2.3 | Algorithm Validation: The data processing algorithms or software scripts used to convert raw meter telemetry (e.g., electrical current, time-series pulses, fuel mass) into final energy consumption metrics (TJ/kWh) shall be fully documented, transparent, and subject to VVB validation.

14.4.3 | Handling of Data Gaps

14.4.3.1 | The following procedures shall be applied when metered data for a specific device (d) is missing due to technical failures (e.g., meter malfunction, transmission error):

- a. **Gaps < 50%:** If the missing data constitutes less than 50% of the possible data for that device during the monitoring period, the activity developer may use the 25th percentile of the available tracked energy consumption for that specific device as a conservative replacement for the missing data.
- b. **Gaps ≥ 50%:** If 50% or more of the possible CTEC data for a monitoring period is missing for a specific device, that device shall be excluded from the emission reduction calculations for that monitoring period.
- c. **Revolving Sample Exception:** If the activity is legally utilising the Alternative Continuous Monitoring Approach (revolving sample) under Section 3.2.3, the gap-filling procedures above shall not apply. Instead, if a sampled device fails to transmit data for a period exceeding 30 consecutive days, it shall be conservatively treated as non-operational (zero usage), and a replacement device shall be randomly selected to maintain statistical precision.

14.5| Sampling requirements

14.5.1 | **Activity Consumption Monitoring (CTEC):** Sampling is generally not permitted for determining total activity energy consumption ($EG_{p,input,y}$). A 100% census (metering) is mandatory, except where activities explicitly qualify for the time-bound Alternative Continuous Monitoring Approach via a Revolving Representative Sample (Section [3.2.3 |](#)), which expires on 31 December 2030.

14.5.2 | **Alternative Continuous Monitoring Approach (Revolving Sample)**
Where an activity explicitly qualifies for the transitional exemption (Section 3.2.3), the activity developer shall conduct continuous monitoring on a revolving, representative sample of the total active activity device population. The activity developer shall document the following concrete elements in the PDD/Monitoring Plan and ensure strict adherence throughout the crediting period:

- a. **Transition Plan Requirement:** The activity developer shall include a formal transition plan in the PDD detailing the technological and financial roadmap to achieve 100% metering prior to the expiration date (Year 2030).
- b. **Sample Size and Precision:** The sample size shall be calculated in accordance with the latest overarching standard for sampling and surveys to achieve a minimum 90/10 confidence/precision level and 95/10 for large-scale activities for monitored usage parameters. However, to ensure robust representativeness, the mandatory sample size for the continuously monitored cohort shall be the greater of either the statistically calculated sample size OR 5% of the total active activity device population—whichever leads to a higher sample size. The calculation shall conservatively oversample to account for expected device attrition, data transmission failures, and non-response rates.

- c. **Dynamic Resizing for Progressive Implementation:** For activities where devices are installed progressively over time, the sample size and sampling frame shall not remain static. The activity developer shall dynamically recalculate and update the sample size and stratification framework at least annually (or prior to each verification event) to reflect the total active population at that time. Newly deployed batches shall be proportionally integrated into the continuously monitored sample to maintain strict representativeness and ensure the minimum statistical precision and 5% threshold rules are continuously maintained for the growing total population.
- d. **Stratification and Representativeness:** The sample shall be selected using stratified random sampling. The stratification shall accurately represent all geographical distributions, baseline fuel types, user typologies, and all device vintages/batches present in the active fleet. The selection process shall be auditable and demonstrably random; manual selection of devices by the developer is strictly prohibited.
- e. **Revolving Cohort Mechanism (Anti-Bias):** To prevent user observer bias (the Hawthorne effect) and accurately capture long-term device degradation, the sampled group shall not remain static. The activity developer shall implement a revolving cohort mechanism, whereby a minimum of 20% of the continuously monitored sample cohort is randomly rotated out and replaced on an annual basis.
- f. **Management Across Programmes of Activities (PoAs):** Where this sampling approach is applied across a PoA, the Coordinating/Managing Entity (CME) may implement a centralised cross-VPA sample, subject to the following strict conditions:
 - i. **Homogeneity:** The CME shall demonstrate that the grouped VPAs are homogeneous regarding technology types, user demographics, and baseline fuels.
 - ii. **Group Size Limit:** Consistent with Section [16.31](#), cross-VPA sampling for the revolving cohort is not permitted across groups larger than 10 VPAs, unless specific justification for homogeneity across a larger group is validated by the VVB.
 - iii. **VPA-Level Stratification:** The centralised sample shall be explicitly stratified at the VPA level to ensure proportional representation, preventing any single VPA from being over- or under-sampled.
 - iv. **Precision Target:** The required confidence/precision target (90/10 or 95/10) shall be met at the aggregated group level.
- g. **Data Gaps and Extrapolation Rules:** Data collected from this revolving sample shall be extrapolated only to the surviving, active fleet of devices (adjusted by separate survival rate assessments). If a device within the active revolving sample fails to transmit data for a

period exceeding 30 consecutive days, the developer shall conservatively treat it as non-operational for that period (resulting in zero usage credited for those days). A replacement device shall subsequently be randomly selected to maintain the required statistical precision.

14.5.3 | Requirements for Testing (CCT and WBT/Efficiency)

14.5.3.1 | Sampling is used to determine the efficiency (η) or Specific Consumption (SC) of the baseline and project technologies.

- a. **Precision Requirements (90/10 Rule):** All parameters derived from sampling or testing (η_b , η_p , SC_b , SC_p , and the ratio Rsc) shall aim to meet the 90/10 rule (90% confidence interval and 10% precision).
- b. **Statistical Conservativeness:** If the 90/10 precision target is not achieved, the parameter value used in the calculations shall be the conservative bound of the 90% confidence interval (Lower or Upper Bound, as defined in Sections [7.4.1 |](#) and [8.3.2.2 |](#)).
- c. **Sample Size and Selection:** The sampling plan shall ensure the selected samples are representative of the technology models being deployed or present in the baseline. For CCTs, the sample shall also be representative of the cooking practices and meals of the target population. A minimum of 50 samples is required. The "minimum 50 samples" requirement and the 90/10 precision target shall apply to the overall aggregated parameter derived from the complete CCT campaign design (paired observations across all tested meals), not individually per meal type or specific stove iteration
- d. **Degradation Accounting:** When updating project efficiency (η_p) or Specific Consumption (SC_p) biennially, the sampling shall ensure that the results are representative of the average performance of the operational technology population, accounting for potential degradation over. To account for this degradation, developers may stratify the sample by chronological age cohorts (e.g., Year 1, Year 2) OR by cumulative consumption cohorts (e.g., 0-500kg fuel used, 501-1000kg fuel used), provided the correlation between utilization and degradation is statistically justified and auditable.

15| MONITORING REQUIREMENTS FOR ACTIVITIES WITH REVERSAL RISKS

15.1| Exemption from Continuous Reversal Monitoring

15.1.1 | As established in Section [12.1|](#) of this methodology, decentralised thermal energy activities generate mitigation outcomes via the avoidance of emissions (not sequestration) and operate under the "No Control" exemption regarding the physical biomass reservoir. Consequently, the physical reversal of credited mitigation outcomes is structurally impossible. The activity developer

is exempt from continuous Reversal Risk monitoring requirements and is not required to contribute to or monitor a Reversal Risk Buffer Pool.

15.2| Dynamic Baseline Management

15.2.1 | The risk of macro-level non-permanence (depletion of the baseline carbon stock) is managed structurally rather than through continuous ex-post monitoring. The monitoring of reversal risks is integrated into the mandatory periodic update of $fNRB_y$ parameter. The activity developer shall update this parameter at the frequency defined in the Monitoring Plan (MECD 18) and Section 17, and conduct the required Catastrophic Disturbance Check, ensuring that any loss of biomass stock is reflected in the updated baseline assessment. No separate, continuous monitoring of carbon stocks by the activity developer is required.

16| APPLICATION TO PROGRAMME OF ACTIVITIES

16.1.1 | This methodology is applicable to a Programme of Activities (PoA), including Component Project Activities (CPAs) and Voluntary Project Activities (VPAs).

16.2| General Requirements

16.2.1 | The PoA shall comply with the latest version of the GS4GG *Principles and Requirements* and the relevant requirements governing the implementation of PoAs.

16.2.2 | The Coordinating/Managing Entity (CME) shall be responsible for the implementation of the Monitoring Plan and the management of the centralised CTEC database across all CPAs/VPAs.

16.3| Baseline and Additionality Demonstration

16.3.1 | **Additionality:** Additionality shall be demonstrated at the PoA level. The CME shall define clear eligibility criteria for the inclusion of CPAs/VPAs, ensuring that each included activity meets the additionality requirements established in Section 6 (including Regulatory Surplus, Lock-In Risk, and Common Practice).

16.3.2 | **Baseline Determination:** The CME may define distinct baseline scenarios applicable to different geographical regions or user groups within the PoA boundary, provided homogeneity within each group is demonstrated.

16.3.2.1 | **Sharing of Baseline Emission Factor (EF_b):** A Baseline Emission Factor ($EF_{b,useful}$ or $EF_{b,input}$), once determined for a specific technology/end-user type and region, may be used by subsequent CPAs/VPAs within the same PoA that share the same characteristics.

16.3.2.2 | **Validity Period for Shared EF_b :**

- a. The determined EF_b can be applied to new CPAs/VPAs for a maximum period of three years after the inclusion of the first CPA/VPA that established that EF_b . After this period, the EF_b shall be updated (requiring a new Baseline Scenario Survey and potentially new CCT/WBTs) for any new CPAs/VPAs being included.

- b. For CPAs/VPAs already included, the EF_b remains fixed for the duration of their 5-year crediting period.

16.3.3 | Monitoring and Quantification

16.3.3.1 | **Activity Consumption Monitoring (CTEC):** The requirement for 100% metering (CTEC) or comprehensive digital fuel sales tracking applies to all devices across all CPAs/VPAs. Sampling across CPAs/VPAs is not permitted for determining activity energy consumption. The CME shall aggregate the metered data from all activities. Except where CPAs/VPAs explicitly qualify for the time-bound Alternative Continuous Monitoring Approach via a Revolving Representative Sample (as defined in Section [3.2.3 |](#)). CPAs/VPAs utilising this flexibility shall transition to 100% metering by 31 December 2030.

16.3.3.2 | Performance Testing (CCT/WBT)

- a. The biennial monitoring of project performance parameters (Efficiency η_p or Specific Consumption SC_p) shall be conducted using a sampling approach that is representative of the entire VPA/PoA.
- b. The CME may implement a centralised sampling strategy across the CPAs/VPAs, provided the sampling plan ensures representativeness (e.g., stratification by technology model, age cohorts, and geography) and meets the 90/10 precision requirements at the PoA level (Section [16.3.3 |](#)). A cross-VPA sampling is not allowed across groups larger than 10 VPAs, unless specific justification for homogeneity across a larger group is provided and validated by the VVB.

17 | RENEWAL OF CREDITING PERIOD

17.1 | Crediting Period Renewal Requirements

- 17.1.1 | The activity developer may apply for the renewal of the crediting period (maximum two renewals) by complying with the GS4GG requirements for crediting period renewal valid at the time of the request.
- 17.1.2 | At the time of renewal, the activity developer shall ensure that the activity conforms to the latest valid version of this methodology and all referenced tools and standards.

17.2 | Reassessment of the Baseline Scenario

- 17.2.1 | The activity developer shall conduct a comprehensive reassessment of the baseline scenario to ensure it remains a credible representation of the conditions that would likely occur in the absence of the activity during the renewed crediting period. In the event of a contradiction regarding baseline reassessment schedules, the specific requirements of this methodology shall explicitly supersede any exemptions provided in the overarching Community Services Activity (CSA) Requirements.
- 17.2.2 | This requires conducting a new Baseline Scenario Survey to determine the current mix of technologies and fuels ($Prop_{i,j}$) used by the target population,

accounting for any market changes, technological advancements, or policy developments since the previous crediting period.

17.3| Update of Baseline Parameters

17.3.1 | All parameters used to calculate the Crediting Baseline shall be updated using the latest data and methodological versions available at the time of renewal.

17.3.1.1 | **Update of the Baseline Emission Factor (EF_b):** The EF_b ($EF_{b,useful}$ or $EF_{b,input}$) shall be recalculated based on:

- a. The updated baseline scenario proportions ($Prop_{i,j}$) (Section [17.2|](#)).
- b. Updated assessments of baseline technology efficiency (η_b) or Specific Consumption (SC_b), potentially requiring new WBTs or CCTs if significant changes in baseline technology stock are observed.
- c. The latest default values for NCVs and Emission Factors (EF).

17.3.1.2 | **Update of fNRB:** The fraction of non-renewable biomass (fNRB) shall be updated using the latest valid version of the approved standardised tools. This update shall apply the Significance Assessment (Section [12.2|](#)).

- a. **Baseline Validation Rule (Reversal Safeguard):** If the updated fNRB value decreases, the lower value shall be applied without further justification. In the event of confirmed biomass depletion or if the updated fNRB calculates a mathematically higher fraction of non-renewability than the previous crediting period, the Baseline Validation Rule (Section [12.2.2|](#)) applies. The activity developer shall empirically demonstrate that the target population is still actively sourcing and utilising the specific woody biomass resource from the same area before applying the higher fNRB. If the resource is no longer physically accessible due to severe depletion, the baseline fuel mix shall be formally updated to reflect the actual alternative fuels the population has been forced to adopt.

17.3.2 | **Update of DAF:** The Downward Adjustment Factor ($DAF_{NetZero}$) shall be applied based on the values corresponding to the calendar years of the renewed crediting period.

17.4| Reassessment of Additionality

17.4.1 | The additionality of the activity shall be reassessed (Section [6|](#)).

17.4.1.1 | **Ongoing Financial Need (Mandatory):**

- a. **Positive List Exemption:** Activities that originally qualified for and remain eligible under a recognized GS4GG Positive List (Deemed Additionality) are explicitly exempt from the Ongoing Financial Need (OFN) demonstration at crediting period renewal.
- b. **Demonstration of OFN:** For all other activities, the activity developer shall provide evidence (e.g., an updated financial analysis or funding assessment) demonstrating that the activity still requires income from carbon credits to remain operational and sustainable in the renewed

period, including covering the ongoing costs of the CTEC infrastructure and data management.

- c. **OFN Justification:** Reductions in projected crediting volume resulting directly from the transition to updated methodology requirements (e.g., mandatory application of the DAF, revised fNRB rules) or the increased operational costs of maintaining 100% CTEC infrastructure shall be recognized as a valid quantitative justification for demonstrating Ongoing Financial Need.

17.4.1.2 | **Regulatory Surplus Analysis:** An updated analysis confirming the activity remains surplus to any new laws or regulations (Section [6.3](#)).

17.4.1.3 | **Common Practice Analysis:** An updated assessment of the market penetration of the project technologies (Section [6.7](#)).

Annex -1 MONITORING SCHEDULE AND REQUIREMENTS

Activity	Description / Key Parameters	Frequency and Timing	Applicability (Method)
EX-ANTE (BASELINE DETERMINATION)			
Baseline Scenario Survey (BSS)	Identify the mix of technologies and fuels used by the target population. Key Parameter: <i>Propi,j</i> (MECD 3)	Once. Ex-ante (prior to Validation or First Verification). Fixed for the 5-year crediting period.	All Methods
Baseline Performance Testing	Determine the efficiency or consumption characteristics of the baseline technologies.	Once. Ex-ante. Fixed for the 5-year crediting period.	Method 1 (WBT/ISO) Method 2 (CCT) Method 3 (B-KPT)
Activity Performance Testing (Initial)	Determine the initial efficiency or consumption characteristics of the activity technologies.	Once. Ex-ante.	Method 1 (WBT/ISO) Method 2 (CCT) Method 3 (P-KPT)
fNRB Determination (Initial)	Determine the fraction of non-renewable biomass. Key Parameter: <i>fNRBi,y</i> (MECD 18)	Once. Ex-ante (unless the biennial update option is selected).	All Methods (if biomass is used)
CONTINUOUS MONITORING (CTEC)			
CTEC Data Collection	Direct measurement (metering or comprehensive fuel sales records) of energy/fuel consumption for 100% of activity devices (or approved alternative revolving sample). Key Parameter: <i>EGp,d,y</i> (MECD 14)	Continuous. Data logged continuously and aggregated per monitoring period.	All Methods

Database Management and Sales Records	Tracking of device distribution, commissioning dates, unique identifiers, and end-user data. Key Parameter: $Nd_{disseminated,y}$ (MECD 20)	Continuous. Updated throughout the monitoring period.	All Methods
Meter Maintenance and QA/QC	Tracking of meter calibration, maintenance, malfunctions, and data transmission integrity. Key Parameter: Meter QA/QC records (MECD 22)	Continuous. Records maintained throughout the monitoring period.	All Methods
PERIODIC MONITORING			
Consistency Check (Retrospective Survey)	Verify that the ex-ante baseline scenario is representative of the actual enrolled households (Section 7.3.3). Key Parameter: Consistency Check Data (MECD 21)	Once per household. Conducted during the first monitoring interaction or survey following enrolment.	All Methods
Usage and Demographic Monitoring	Update the average household size for baseline capping calculations. Key Parameter: HS_p (MECD 19)	Annual.	All Methods
Activity Performance Monitoring (Ongoing)	Update the efficiency or consumption characteristics of the activity technologies to account for degradation or changes in use.	Biennial (Every 2 years). Testing should be conducted at the end of the monitoring period for which verification is sought.	Method 1 (WBT/ISO) Method 2 (CCT) Method 3 (P-KPT)

fNRB Update (Dynamic Reassessment)	Update the fraction of non-renewable biomass to reflect current biomass stocks and address reversal risk (Section 12). Key Parameter: fNRBy (MECD 18)	Biennial (Recommended Biennial; Mandatory at Renewal).	All Methods (if biomass is used)
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CREDITING PERIOD RENEWAL

Baseline Reassessment	Full reassessment of the baseline scenario, fuel mix, and technology performance.	Every 5 years. At the renewal of the crediting period.	All Methods
Additionality Reassessment	Reassessment of additionality, including Ongoing Financial Need.	Every 5 years.	All Methods

Annex -2 STANDARDISED PARAMETERS AND DEFAULTS

This Annex provides standardised default values derived from the latest IPCC guidelines, strict mass-balance derivations, and relevant scientific literature (including CLEAR methodology defaults) to ensure robustness and consistency.

A2.1 | Net Calorific Values (NCVs)

Table A2.1. Default NCVs

Fuel Type	NCV (TJ/tonne)	Source/Notes
Fuelwood (Air-dried)	0.0156	Standard assumption (20% moisture content).
Crop Residues	0.0150	IPCC 2006
Animal Dung	0.0139	IPCC 2006
Charcoal	0.0295	IPCC 2006
Kerosene	0.0438	IPCC 2006
LPG (Liquified Petroleum Gas)	0.0473	IPCC 2006
Coal (Sub-bituminous)	0.0210	IPCC 2006
Ethanol (Bio-ethanol)	0.0268	Assumes 95% ethanol, 5% water.

A2.2 | Combustion Emission Factors (CO₂ and Non-CO₂)

Table A2.2. Default Combustion Emission Factors

Fuel Type	EF _{CO2} (tCO ₂ /TJ)	EF _{non-CO2} (tCO _{2e} /TJ) (CH ₄ + N ₂ O)	Notes on Non-CO ₂
Fuelwood	112.0	9.46	Based on typical inefficient biomass combustion.
Crop Residues	109.9	6.67	-
Animal Dung	109.2	4.36	-
Charcoal (LMIC default – 6:1 WCCF)	355.36	89.68	Total Lifecycle (Downstream Combustion + Upstream Kiln). Mandatory Default for Sub-Saharan Africa (SSA) and LMICs (approx. 17% kiln efficiency).

Charcoal (Default – 4:1 WCCF)	236.91	61.74	Total Lifecycle (Downstream Combustion + Upstream Kiln). Mandatory Default non LMIC (approx. 25% kiln efficiency) or for developers voluntarily seeking CCP label alignment.
Crop Residue	109.9	6.67	-
Animal dung	109.2	4.36	-
Kerosene	71.5	0.14	-
LPG	63.0	0.08	-
Coal (Sub-bituminous)	96.1	1.96	-
Ethanol	68.9	0.11	-
Biogas	54.5	0.13	Assumes 60% CH ₄ content.

(Note: GWPs used for non-CO₂ calculations are based on IPCC AR5 values: CH₄=28, N₂O=265).

A2.3 | Upstream Emission Factors (UEF)

These factors account for emissions during fuel production, processing, and transport.

Table A2.3. Default Upstream Emission Factors

Fuel Type	UEF (tCO ₂ e/TJ)	Source/Notes (Based on CLEAR/LCA data)
Fuelwood / Crop Residues / Dung	0.0	Assumed negligible for locally collected biomass.
Charcoal	0.0	Set to zero here to prevent double-counting. Upstream kiln emissions (CH ₄ , N ₂ O, and CO ₂) are strictly integrated into the primary Emission Factors in Table A2.2 to ensure fNRB applies correctly to all upstream wood harvested.
Kerosene	14.0	Lifecycle emissions (extraction, refining, transport).
LPG	14.0	Lifecycle emissions (extraction, refining, transport).
Coal	10.0	Lifecycle emissions (mining, transport).
Ethanol (Bio-ethanol)	[Variable]	Shall be calculated based on feedstock and production process. Cannot be assumed zero unless derived from waste streams with full lifecycle accounting.
Biogas	0.0	Assumed negligible if sourced from waste/manure on-site.

A2.4 | Default Baseline Technology Efficiencies (η_b)

If laboratory testing of baseline devices is not feasible or subject to extreme field variability, the following conservative defaults shall be used as permissible alternatives for Method 1 calculations.

Table A2.4. Default Baseline Efficiencies

Baseline Technology	Fuel	Default Efficiency (η_b)
Three-stone fire or equivalent basic stove	Fuelwood	15%
Traditional metal stove (e.g., Coal Pot)	Charcoal	25%

Annex -3 METHODOLOGY-LEVEL ADDITIONALITY AND BARRIER ANALYSIS FOR DECENTRALISED ENERGY ACTIVITIES

Refer to Annex - 4 of [Reduced emissions from cooking and heating](#).

DOCUMENT INFORMATION

VERSION	DATE	DESCRIPTION
2.0	05/05/2026	Updated to align with Paris Agreement.
1.2	13/12/2022	Revision to address the typo error for parameter MECD 8
1.1	25/10/2022	Provide detail guidance for EPC stove and some editorials
1.0	05/10/2021	First version

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