A6.4-MEP015-A01

Draft Mechanism methodology

Cooking energy transitions

Version 01.0

Sectoral scope(s): 01 and 03

United Nations
Framework Convention on
Climate Change

COVER NOTE

1. Procedural background

1. The Supervisory Body of the mechanism established by Article 6, paragraph 4, of the Paris Agreement (the Article 6.4 mechanism), at its fifteenth meeting, approved the 2025 workplan for the Methodological Expert Panel (MEP) and requested the MEP to initiate work on the revision of Clean Development Mechanism (CDM) methodologies, methodological tools, standards, and guidelines, including the methodologies "AMS-II.G.: Energy efficiency measures in thermal applications of non-renewable biomass" and "AMS-I.E: Switch from non-renewable biomass for thermal applications by the user" (hereinafter referred to as "the approved CDM methodologies"). [1]

2. In parallel, the MEP received, on 12 May 2025, a proposed new mechanism methodology, "PMM004: Comprehensive Lowered Emission Assessment and Reporting (CLEAR) methodology for cooking energy transitions" (hereinafter referred to as "PMM004"). A public consultation on PMM004 was conducted from 16 June 2025 to 6 July 2025, during which 16 submissions were received.

3. The MEP at its seventh meeting, noted that the consideration of the proposed new mechanism methodology PMM004, including public comments received on this submission, could potentially be merged with the top-down revisions of the aforementioned approved CDM methodologies and agreed to continue working on the revision of the methodologies at its next meeting.[2]

4. The MEP, in its subsequent meetings, continued considering the proposed PMM004 mechanism methodology to ensure alignment with the requirements of the Article 6.4 mechanism standards and incorporate elements from "AMS-I.E: Switch from non-renewable biomass for thermal applications by the user".

5. The MEP, at its fifteenth meeting, considered a draft version of a mechanism methodology based on the PMM004 submission together with the CDM methodology "AMS-I.E.: Switch from non-renewable biomass for thermal applications by the user". The MEP launched a call for input on this draft methodology.

2. Purpose

6. The purpose of this mechanism methodology is to define the procedures, requirements, and guidelines for developing and monitoring Article 6.4 activities that support cooking energy transitions through the distribution and operation of lower-emission cooking technologies, including improved biomass cookstoves and alternative cooking technologies.

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[1] See https://unfccc.int/sites/default/files/resource/A6.4-SBM015.pdf.

[2] See https://unfccc.int/sites/default/files/resource/MEP007_Meeting_report.pdf.

3. Key issues and proposed solutions

7. The following sub-sections describe the principal methodological elements of the mechanism methodology and compare them with the corresponding provisions of the approved CDM methodology “AMS-I.E.: Switch from non-renewable biomass for thermal applications by the user”.

3.1. Applicability conditions

8. The mechanism methodology applies to Article 6.4 activities that involve transitions to lower-emission household cooking energy solutions. Examples of eligible measures and technologies include the introduction of high-efficiency biomass cookstoves, electric cookstoves, and potentially liquefied petroleum gas (LPG) cookstoves, to replace existing cooking technologies and devices. The applicability conditions are intended to enable standardized methodological approaches, where appropriate, for demonstrating additionality, while maintaining applicability across a broad range of cooking technologies and transition pathways.

9. The mechanism methodology is applicable in both urban and non-urban areas and across a broad range of household contexts. It applies to activities involving cookstove transitions from higher-emission cooking technologies and fuels to eligible lower-emission cooking solutions, including fuel-switching and efficiency-efficiency improvement activities, subject to the applicability conditions.

10. Cookstoves distributed under Article 6.4 activities using this mechanism methodology shall be appropriate to local cooking needs. Ancillary use of project cookstoves for space heating, e.g., during seasonal variations, does not preclude the application of this mechanism methodology, provided that the conditions specified in this mechanism methodology ensure the quantification of emission reductions is based on cookstove use for cooking events.

11. Each project cookstove shall be uniquely identified and be traceable at the household level.

12. Performance characteristics required for the quantification of emission reductions, including thermal efficiency and other technology-specific performance parameters, shall be determined using internationally recognized test methods such as ISO Standard 19867-1:2018 or, where appropriate testing capacity is not available, equivalent nationally accepted standards.

13. The mechanism methodology prescribes the following minimum efficiency thresholds:

    (a) All biomass-burning project cookstoves shall achieve a minimum thermal efficiency of at least 30 per cent;

    (b) All LPG project cookstoves, if included in the methodology, shall achieve a minimum thermal efficiency of at least 50 per cent; and

    (c) For electric cookstoves, activity participants should select stoves with the highest-tier nationally available efficiency rating.

14. The mechanism methodology applies to project-level activities and programmes of activities (PoAs).

15. The mechanism methodology has a different scope of application than the draft mechanism methodology “Energy efficiency measures in household cooking” (version 01.0), which was based on CDM methodology “AMS-II.G.: Energy efficiency measures in thermal applications of non-renewable biomass”. Table 1 outlines the main differences in the applicability conditions between the two methodologies.

Table 1. Comparison of the applicability conditions between the draft methodology “Energy efficiency measures in household cooking” and this draft mechanism methodology

	Draft methodology “Energy efficiency measures in household cooking”	**This draft mechanism methodology “Cooking energy transitions”**
Overall scope	Applicable to efficiency improvements through the use of improved biomass cookstoves using the same primary biomass fuel	Applicable to household cooking energy transitions through improved biomass cookstoves and alternative cooking technologies, including fuel-switching to lower-emission cooking solutions, such as LPG cookstoves (potentially) and electric cookstoves
Target population	Restricted to rural areas where household income levels are demonstrated to be below the applicable poverty threshold	Applicable in both urban and non-urban areas across a broad range of household contexts
Target usage	Limited to household cooking events	Limited to household cooking events
Baseline fuel condition	Applicable only where baseline cooking relies predominantly (>75 per cent) on fuelwood or artisanal charcoal. Fuel switching is not permitted	Applicable to transitions from higher-emission cooking technologies and fuels to eligible lower-emission cooking solutions, including efficiency improvement and fuel-switching activities
Baseline determination	Baseline determined using a representative pre-activity survey of the target population, supported by standardized useful energy benchmarks and Kitchen Performance Tests (KPTs) to quantify baseline fuel consumption	Baseline determined using representative pre-activity surveys together with three alternate methods for baseline quantification. Kitchen Performance Tests (KPTs) are used to quantify baseline fuel or energy consumption. For activities with monitored energy consumption, either a comparison of baseline and activity KPTs, or Controlled Cooking Tests (CCTs) to determine the relative specific energy consumption of baseline and project cooking technologies, are used to enable the estimation of

	Draft methodology "Energy efficiency measures in household cooking"	**This draft mechanism methodology "Cooking energy transitions"**
		baseline energy consumption from monitored activity energy use.
Technology type	Limited to improved biomass cookstoves	Applicable to improved biomass cookstoves and alternative cooking technologies (e.g., electric cookstoves and, potentially, LPG cookstoves)
Minimum efficiency	Requires differentiated minimum thermal efficiency thresholds for biomass cookstoves (20, 25 or 30 per cent, depending on the stove type), supported by mandatory ISO or equivalent testing	Requires technology-specific minimum efficiency thresholds: biomass cookstoves shall achieve a minimum thermal efficiency of at least 30 per cent; technology-specific requirements apply to other cooking technologies (e.g., LPG and electric cookstoves)
Additionality approach	Applies a standardized performance-based additionality approach	Provides two additionality pathways: (i) a simplified standardized approach for eligible activities; or (ii) a comprehensive activity-specific demonstration
Fuel consistency	Requires the primary fuel type to remain unchanged between baseline and [project] scenarios	Explicitly permits fuel-switching where eligible under the mechanism methodology
Cookstove lifetime	Requires the project cookstove lifetime to be documented; generally expected to be no more than 10 years	Requires the project cookstove lifetime to be documented in accordance with technology-specific requirements
User needs / suitability	Requires demonstration that project cookstoves meet local cooking needs	Requires demonstration that project cooking technologies meet local cooking needs
Identification and tracking	Requires unique identifiers for project cookstoves linked to households and measures to prevent double counting	Requires unique identifiers for project cookstoves linked to households and measures to prevent double counting
Replacements/ repairs	Permits replacement or repair of failed project cookstoves, subject to appropriate documentation and monitoring	Requires malfunctioning project cookstoves to be repaired or replaced with comparable or better technologies, or to be excluded from emission reduction claims. Requires a documented repair and replacement plan and cookstove-level tracking
Scale of application	Applicable to Article 6.4 projects and PoAs	Applicable to Article 6.4 projects and PoAs

	Draft methodology "Energy efficiency measures in household cooking"	**This draft mechanism methodology "Cooking energy transitions"**
Combination with other methodologies	Applicable only as a standalone methodology, unless combination with another methodology is explicitly permitted	Applicable only as a standalone methodology, or in combination with "Energy efficiency measures in household cooking" where different baseline scenarios are included under one Article 6.4 activity, for example in a PoA
Project Scale	No explicit limitation on project scale	No explicit limitation on project scale
Historical biomass use requirement	None	None
Reversal risk	Includes reversal risk provisions where biomass-related emission reductions are claimed	Includes reversal risk provisions where biomass-related emission reductions are claimed. Reversal risk provisions do not apply to project emissions from non-biomass transition pathways

3.2. Activity boundary

16. The activity boundary encompasses: (i) the physical and geographical locations where activity cooking technologies are distributed and operated; and (ii) the locations where the cooking fuels or energy carriers used in the baseline and activity scenarios are produced, generated, processed, or supplied.

17. The geographical locations of the Article 6.4 activity is different from the location where the cooking fuels are collected and produced; in other words, the fuels are sourced from a location different than the kitchens where the project cookstoves are used by households.

18. Within this boundary, emissions sources include fuel combustion for cooking (CO_2, CH_4, N_2O), upstream emissions associated with the production of cooking fuels, and emissions associated with electricity generation, where applicable. These emissions are accounted for in both the baseline and activity scenarios. Emissions from fuel and energy transport are excluded where such exclusion results in a conservative estimate of emission reductions.

19. Relevant greenhouse gas reservoirs for both the baseline and activity scenarios include above-ground woody biomass in the landscape where biomass fuels are used in the baseline and/or activity scenarios, as this is assumed to be the primary source of harvested biomass. Therefore, CO_2 emission reductions resulting from reduced biomass consumption affect a greenhouse gas reservoir subject to reversal risk by maintaining higher biomass stocks as compared to the baseline and are addressed accordingly in this mechanism methodology. Biochar and potential removals associated with biochar produced from gasifier stoves are not quantified and, therefore, biochar has been excluded as a greenhouse gas reservoir. This is a conservative approach. Reductions in

CH_4 and N_2O emissions from biomass combustion, and emission reductions associated with non-biomass cooking energy transition pathways, are not subject to reversal risk.

20. The geographical scope of the activity boundary related to cooking fuels and energy carriers is defined using subnational, national, or multi-national delineations based on the source and supply chains of the cooking fuels or energy carriers used in the baseline and activity scenarios, consistent with parameters specified in the related methodological tools that are also under development. Activity participants shall clearly specify separately both:

    (a) The cooking technology deployment areas, using geospatial data (e.g., KML); and

    (b) The locations where cooking fuels or energy are produced, processed, or supplied.

3.3. Demonstration of additionality

21. The mechanism methodology provides two options for demonstrating additionality:

    (a) **Option 1: Simplified demonstration of additionality**; and

    (b) **Option 2**: **Comprehensive demonstration of additionality**.

22. **Option 1** provides a simplified demonstration of additionality based on meeting specified eligibility criteria. **Option 2** provides a comprehensive demonstration of additionality, which may be applied where the Article 6.4 activity does not meet the eligibility criteria listed for **Option 1**.

23. Irrespective of the additionality option selected, the mechanism methodology requires activity participants to demonstrate additionality by conducting a regulatory analysis, whereby they review current legal requirements and confirm that applicable laws and regulations (e.g., environmental, energy, or building legislation) do not require the implementation of the Article 6.4 activity, directly or indirectly. As part of this analysis, activity participants shall also identify and evaluate any government subsidies or public support schemes related to clean cooking. The presence of such subsidies shall not automatically render an activity ineligible. However, where such support exists, activity participants shall demonstrate, in accordance with the **Option 2**: **Comprehensive demonstration of additionality**, that the activity would not be implemented in the absence of Article 6.4 mechanism revenue.

24. The mechanism methodology addresses lock-in risk, investment analysis, and common practice differently, depending on the applicable additionality pathway. For Article 6.4 activities applying **Option 1: Simplified demonstration of additionality**, the mechanism methodology standardizes the assessment of lock-in risk, investment analysis, and common practice at the level of the mechanism methodology. The simplified approach is supported by empirical evidence and predefined eligibility criteria that identify activity types with a high likelihood of additionality, thereby avoiding the need for activity-specific assessments of these elements. For Article 6.4 activities applying **Option 2: Comprehensive demonstration of additionality**, activity participants shall demonstrate additionality through activity-specific assessments of lock-in risk, investment analysis, and common practice in accordance with the requirements of the applicable methodological tools.

3.4. Identification of the baseline scenario

25. The mechanism methodology provides requirements for describing the pre-activity scenario in accordance with paragraph 10 of version 01.0 of the “Standard: Setting the baseline in mechanism methodologies” (A6.4-STAN-METH-004) (hereinafter referred to as “Baseline Standard”), which represents the conditions prevailing prior to the implementation of the Article 6.4 activity and is established through a representative pre-activity survey of the target population. [3] The survey shall identify key parameters, including existing cooking technologies, cooking fuels or energy carriers and their relative use, and household characteristics.

26. The survey results used to identify the pre-activity scenario shall be cross-checked against recent and credible external data sources. Where discrepancies arise, the more conservative values shall be applied, as appropriate, in accordance with the hierarchy of data sources provided in the mechanism methodology. The survey shall also inform the design of the monitoring approach and may be used to demonstrate that the selected Article 6.4 activity cooking technologies are appropriate for local cooking needs.[4]

3.5. Calculation of the unadjusted baseline scenario

27. Baseline emissions, prior to the application of the downward adjustment, are calculated by quantifying the amount of baseline cooking fuel or energy utilized by user households, expressed in TJ per person per year. For all baseline emission methods, the historical emissions approach is utilized.

28. For biomass-based activity scenarios, baseline fuel consumption is measured on a sampling basis using Kitchen Performance Test (KPT) campaigns, and the resulting baseline fuel or energy consumption is scaled to the household level using the average household size and is further adjusted to reflect observed participation in the Article 6.4 activity through the use of the project cookstove. Baseline emissions are then calculated by applying the relevant point-of-use and upstream emission factors specified in this mechanism methodology.

29. Further, the extent of project cookstove usage is determined based on the proportion of user households. As a transitional measure, the proportion of user households may be determined through surveys. Where usage is determined exclusively through surveys, conservative caps of 90 per cent or 58 per cent shall be applied, depending on whether customer support measures are provided in accordance with the mechanism methodology. Alternatively, usage may be determined using Stove Use Monitors (SUMs) installed on all project cookstoves or on a representative sample of user households. Where usage is determined using SUMs, the survey-based caps shall not apply. The MEP recommends a transition to measuring project cookstove usage, as this direct measurement provides a higher level of accuracy and confidence than survey-based approaches, thereby responding to well-founded criticisms of earlier clean cooking methodologies. The MEP has included a transition date in the mechanism methodology of 01 January 2028. The transitional period for switching to SUM-determined usage will

3 See https://unfccc.int/sites/default/files/resource/A6.4-STAN-METH-004.pdf.

4 For example, the survey may demonstrate that local cooking practices or household preferences support the selection of the proposed activity cooking technologies.

ensure that the requirements do not apply retroactively to transitioning projects and that activity participants have sufficient time to adapt their monitoring practices.

30. For Article 6.4 activities with monitored energy consumption, the mechanism methodology introduces Controlled Cooking Tests (CCTs) as a one approach for determining the relative specific energy consumption of baseline and activity cooking technologies under representative local cooking conditions. CCT-derived energy consumption ratios are used to estimate displaced baseline energy consumption from monitored activity energy use.

31. A second method for Article 6.4 activities with monitored energy consumption utilizes KPTs as an approach for determining baseline and activity energy use and associated emissions and compares these to use of the project cookstove energy to derive emission quotients. These emission quotients are then scaled by the measured activity energy use to estimate baseline and activity emissions.

3.6. Application of the downward adjustment

3.6.1. Calendar year of the start of the first crediting period

32. For the calendar year in which the first crediting period begins, the methodology proposes two options to determine the downward-adjusted baseline emissions. One approach is based on the Baseline Standard paragraph 64(a) methods. An alternate approach based on the Standard: Setting the baseline in mechanism methodologies" (A6.4-STAN-METH-004) ("the Baseline Standard") paragraph 64(b), applies a conservative adjustment based on the lower bound of the uncertainty interval of the baseline energy consumption, reflecting a previous observation from the development of draft methodology "Energy efficiency measures in household cooking" that found baseline energy use accounting for over 80 percent of variance in emission reductions in a Monte Carlo simulation. This adjustment is compared with a minimum baseline derived from the Baseline Standard equation (2). The lower of these values is adopted as the downward-adjusted baseline for the first calendar year and establishes the initial downward adjustment to be applied in subsequent years. The MEP is considering which of these two is more appropriate for this mechanism methodology and seeks stakeholder input on this issue.

3.6.2. Subsequent years

33. The downward adjustment in subsequent years applies a one per cent reduction per year, %, which corresponds to the minimum value in the Baseline Standard, following the relative downward adjustment approach originally developed in the renewable energy methodology.

3.7. Identification of conservative business-as-usual baseline and calculation of business-as-usual emissions

34. The mechanism methodology considers the conservative BAU scenario to be the same as the baseline scenario, reflecting the continuation of existing cooking practices in the absence of the Article 6.4 activity. The mechanism methodology requires that the crediting baseline remain below the conservative BAU baseline, thereby ensuring that credited emission reductions are not overstated.

3.8. Comparison of the downward adjusted baseline and the conservative business-as-usual baseline

35. The conservative BAU scenario is deemed to be the same as the baseline scenario. Therefore, the conservative BAU emissions will always be higher than the downward-adjusted baseline emissions, except for the calendar year of the start date of the first crediting period. For that year, a discount factor is applied to the adjusted baseline emissions to ensure they remain below the BAU baseline. Therefore, there is no need to calculate or compare the conservative BAU emissions in subsequent years.

3.9. Activity emissions

3.9.1. Energy consumption

36. Article 6.4 activity emissions are determined using one of two monitoring approaches, depending on the characteristics of the Article 6.4 activity. For Article 6.4 activities with monitored energy consumption, all activity fuel or energy consumption is monitored using fuel or energy measurement methods. In the case of the emissions quotient method, these measurements are multiplied by the emissions quotients to estimate activity emissions. For Article 6.4 activities without monitored energy consumption, activity fuel consumption is determined through Kitchen Performance Tests (KPTs) conducted on a representative sample of user households, together with the provisions of this mechanism methodology relating to user households.

37. Article 6.4 activity emissions are calculated on an energy basis. Where activity fuel consumption is measured in mass or volumetric units, the measurements shall be converted to energy units using the applicable net calorific values before the relevant greenhouse gas emission factors are applied.

3.9.2. Hawthorne effect adjustment

38. Only for Article 6.4 activities without monitored energy consumption, to account for the potential Hawthorne effect, the mechanism methodology provides two approaches. Activity participants may either:

(a) Determine activity fuel consumption using KPTs and usage surveys only, in which case credited emission reductions shall be conservatively capped at 75 per cent of the KPT-based estimate; or

(b) Complement KPTs and usage surveys with SUMs, using the ratio of project cookstove usage during the KPT to that measured during the month before or after the KPT to derive an activity-specific Hawthorne Effect adjustment factor.

39. Under option (b), SUMs shall be installed on all project cookstoves included in the KPT sample. This approach provides activity-specific adjustment for changes in user behaviour associated with monitoring, whereas option (a) applies a conservative default adjustment where SUMs are not used. Only the SUMs option would be permitted starting in 2028.

3.9.3. User households

40. Only for Article 6.4 activities without monitored energy consumption, user households are households participating in the Article 6.4 activity with a functioning project cookstove

that is used, on average, for at least five cooking events per week during a given monitoring period (or a higher threshold specified by the Article 6.4 activity in its monitoring plan and applied consistently throughout the crediting period). Stove usage may be determined using the monitoring approaches prescribed in the mechanism methodology, including SUMs, where applicable. Emission reductions are quantified only for user households that satisfy the applicable usage threshold.

3.9.4. Fraction of non-renewable biomass

41. The mechanism methodology requires the use of fraction of non-renewable biomass (fNRB) values contained in the "Methodological Tool: Fraction of non-renewable biomass" (A6.4-AMT-009) and specifies the requirements for selecting the fNRB value at the sub-national, national, or multi-national level for each biomass fuel. [5]

3.9.5. Wood to charcoal conversion

42. Based on the latest scientific evidence, the mechanism methodology applies upstream emission factors for artisanal charcoal derived from a wood-to-charcoal conversion ratio of 5:1, where activity participants demonstrate that this value is conservative, i.e., that the charcoal used is artisanal charcoal.

3.10. Leakage

43. The mechanism methodology includes provisions to identify and address potential leakage associated with Article 6.4 activities. The mechanism methodology draws on the evidence summarized in Appendix 10 to demonstrate that several commonly cited leakage pathways are expected to be immaterial or are already accounted for elsewhere in the accounting framework. In particular, continued use of baseline cookstoves is quantified directly as activity emissions rather than leakage; the transfer of baseline equipment is not expected to result in material leakage; and reductions in biomass consumption are not expected to cause significant market leakage through increased consumption by neighbouring households. Embodied emissions from the project cookstoves materials, manufacture and transport to the Article 6.4 activity are estimated.

3.11. Non-permanence provisions

44. A subset of the emission reductions affects greenhouse gas (GHG) reservoirs that are subject to reversal risk. Specifically, reversal risk applies to the GHG reservoirs identified in Table 1 of this mechanism methodology and section 10.2.

45. The mechanism methodology applies an alternative approach to address non-permanence risks in accordance with paragraph 13 of version 01.0 of the "Standard: Addressing non-permanence and reversals in mechanism methodologies" (A6.4-STAN-METH-007). This approach is justified on the basis that activity participants do not have control over the relevant GHG reservoirs, that these reservoirs are geographically distinct from the locations where project cookstoves are deployed under the Article 6.4 activity (i.e., not located in the households), and that observed changes in the reservoirs cannot be directly attributed to the Article 6.4 activity. Accordingly, the mechanism methodology exempts activity participants from the requirements relating to monitoring, reporting, and

[5] See https://unfccc.int/process-and-meetings/the-paris-agreement/article-6/article-64-pacm/mechanism-process/methodologies/a64-amt-009.

managing reversals, including during the crediting period and any post-crediting monitoring period.

46. Potential reversal risks are conservatively quantified using a 100-year risk assessment and the applicable risk assessment tool and are addressed through contributions to the Reversal Risk Buffer Pool Account, where the corresponding A6.4ERs are immediately cancelled. This approach ensures that potential future reversals are fully addressed. Furthermore, it avoids moral hazard because activity participants neither control the relevant carbon reservoirs nor have any incentive to increase reversal risks, and their interests are aligned with reducing biomass consumption and associated emissions. These provisions provide a practical and risk-based approach to addressing non-permanence.

3.12. Emission reductions

47. The overarching equation for calculating net GHG emission reductions is provided in section **11** of this mechanism methodology. This section also reproduces the equation from the "Standard: Addressing non-permanence and reversals in mechanism methodologies" (A6.4-STAN-METH-007) to enable activity participants to calculate, for information and transparency purposes, the eligible A6.4ERs after accounting for deductions associated with the Reversal Risk Buffer Pool Account, the share of proceeds (SOP), and overall mitigation in global emissions (OMGE), in accordance with the "Procedure: Article 6.4 mechanism registry" (A6.4-PROC-REGS-001). [6,7,8]

3.13. Uncertainty

48. Uncertainty is addressed through the use of conservative default emission factors and other standardized parameters; requirements for representative monitoring and data collection; conservative calculations of baseline energy consumption; application of the Article 6.4 downward adjustment to the baseline; comparison of the downward-adjusted baseline with the conservative BAU baseline; and other conservative methodological provisions. Furthermore, the MEP is considering ways to ensure that uncertainty in the emission reductions is appropriately accounted for, for example by including comprehensive provisions in the mechanism methodology, or requiring Article 6.4 activities to undertake uncertainty propagation, and requests stakeholder inputs on this issue.

3.14. Monitoring, data and parameters

49. The mechanism methodology establishes monitoring requirements for the critical parameters of the Article 6.4 activity. Section **14** describes the monitoring schedule for usage surveys, KPTs, CCTs, and SUMs and prescribes additional requirements, including consideration of seasonality.

50. Section 15 of the mechanism methodology identifies the data and parameters that are fixed and are not required to be monitored during the crediting period. These include key

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[6] See https://unfccc.int/sites/default/files/resource/A6.4-STAN-METH-007.pdf.

[7] Share of Proceeds for Adaptation Account (SoP Account): Receives A6.4ERs in accordance with paragraph 58 of the Article 6.4 rules, modalities and procedures (RMPs).

[8] See https://unfccc.int/sites/default/files/resource/A6.4-PROC-REGS-001.pdf.

data and parameters such as the technical lifetime of the project cookstoves, thermal efficiency and other technology-specific performance parameters, fNRB, applicable emission factors (including upstream emission factors and, where applicable, electricity-related emission factors), net calorific values, and other parameters used in the calculation of baseline and activity emissions that shall be determined ex-ante.

51. Section 16 of this mechanism methodology identifies the data and parameters that shall be monitored during the crediting period, including the procedures for their monitoring and measurement. These include, as applicable, project cookstove distribution and operational status, user household characteristics, cookstove usage determined through SUMs or other approved monitoring approaches, fuel or energy consumption (including monitored energy consumption, where applicable), KPTs, CCTs, monitoring surveys, and other parameters necessary for the quantification of baseline emissions, activity emissions, leakage, and emission reductions.

52. Appendix 5 to Appendix 9 provide requirements and guidance relating to stove testing, survey design, sampling approaches, and data quality assurance, aligned with the "Methodological Tool: Sampling and surveys" (hereinafter referred to as the Sampling and surveys tool), which is under development.

3.15. Avoidance of double counting

53. The mechanism methodology includes provisions to ensure the avoidance of double counting of emission reductions from Article 6.4 activities. Activity participants shall demonstrate, in each monitoring report, that emission reductions from the Article 6.4 activity are not claimed in other environmental markets or accounting frameworks, except in relation to non-GHG outcomes, such as air quality or social benefits. In addition, activity participants shall demonstrate that the Article 6.4 activity and its baseline scenario do not overlap with mandatory domestic mitigation schemes or, where such overlap exists, that the emission reductions are not used to meet obligations under those schemes or are excluded from crediting. Participation in frameworks that formally integrate the Article 6.4 mechanism does not constitute double counting. The mechanism methodology also includes specific provisions to prevent double counting with jurisdictional REDD+ programmes and other fuelwood- or charcoal-related carbon crediting activities, including clean drinking water projects, where relevant. Furthermore, activity participants shall obtain explicit consent of user households confirming that emission reductions are attributed solely to the Article 6.4 activity and are not claimed under any other carbon crediting programme.

3.16. Alignment with NDCs, LT-LEDS, and long-term goals of the Paris Agreement

54. Activity participants shall provide the designated operational entity (DOE) with confirmation from the designated national authority (DNA) of the host Party that the DNA has assessed the consistency of the Article 6.4 activity with paragraph 40(c) of decision 3/CMA.3 and paragraph 27(a) as part of the host Party’s approval.

4. Impacts

55. The approval of this mechanism methodology will enable:

(a) The development of new Article 6.4 activities that reduce emissions from the cooking sector through the use of alternative cooking technologies and improved cookstoves; and

(b) The continuation of those eligible CDM activities for improved cookstoves that fall within the scope of this mechanism methodology.

5. Subsequent work and timelines

56. The MEP agreed to continue working on the mechanism methodology to consider expanding it to other technologies such as bioethanol, biomass-based pellets, biogas and bio-digestor technologies once the work on “Methodological tool: Emissions from fossil fuel combustion” and “Methodological tool: Emissions from Biomass” is concluded. The MEP will consider stakeholders’ input and recommend an updated draft mechanism methodology for consideration by the Supervisory Body.

6. Recommendations to the Supervisory Body

57. Not applicable (document is published for a call for public input).

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1. Introduction

1.1. Scope

1. This mechanism methodology applies to Article 6.4 activities, including Article 6.4 projects and programme of activities (PoAs), jointly referred to as "Article 6.4 activities", that comprise cooking energy transitions and meet the performance and applicability criteria set out in this mechanism methodology. Examples of applicable technologies and measures include the introduction of high-efficiency biomass cookstoves, electric cookstoves[, or liquified petroleum gas (LPG) cookstoves] to replace existing cooking technologies and devices.

2. Article 6.4 emission reductions (A6.4ERs) issued under this mechanism methodology represent emission reductions. A subset of these emission reductions is subject to reversal risk.

1.2. Entry into force and validity

3. This mechanism methodology enters into force on DD Month YYYY.

4. This mechanism methodology remains valid for five years, until DD Month YYYY, unless an earlier date applies if this mechanism methodology is revised or withdrawn in accordance with the "Procedure: Development, revision and clarification of methodologies and methodological tools" (A6.4-PROC-METH-001).[1]

1.3. Applicability of sectoral scopes

5. Designated operational entities validating and verifying Article 6.4 activities that use this mechanism methodology shall apply sectoral scopes 1 and 3.

2. Definitions

2.1. General terms

6. The following general terms apply to this mechanism methodology:

(a) "Shall" is used to indicate requirements that must be followed;

(b) "Should" is used to indicate that, among several options, one course of action is recommended as particularly suitable; and

(c) "May" is used to indicate what is permitted.

2.2. Methodological terms and definitions

7. The following methodological terms and definitions apply to this mechanism methodology:

(a) **Artisanal cookstoves:** cookstoves produced by small-scale manufacturing pro cesses with no insulation or thermal envelope that can result in large variations in dimensions and performance across units. They are generally made by hand by

[1] See https://unfccc.int/sites/default/files/resource/A6.4-PROC-METH-001.pdf.

skilled workers, rather than mass-produced in factories, and use solid biomass as the primary fuel;

(b) **Artisanal charcoal:** a biomass fuel that is a black substance made up mostly of carbon and has higher energy density than wood. Artisanal charcoal is produced using traditional, small-scale methods, which typically involve stacking wood and covering it with earth. A fraction of the wood is burned, which initiates pyrolysis, a thermo-chemical process that drives off moisture and volatile compounds at high temperatures in the absence of oxygen, leaving behind charcoal. This technique has been used since the Bronze Age and contrasts with more modern techniques;

(c) **Best practice:** evidence-based approaches recommended throughout this methodology, based on expert judgement and published literature and other credible sources;

(d) **Cooking event:** an occurrence in which useful energy is delivered from a cookstove to perform a discrete task or set of tasks, such as cooking a meal, preparing beverages, or heating water;

(e) **Controlled Cooking Test (CCT):** a test that measures cookstove performance relative to traditional cooking methods by having a cook prepare a pre-determined local meal, which may include multiple dishes. It is designed to assess cookstove performance under controlled conditions using context-specific fuels, pots, and cooking practices;

(f) **Cooking energy transition:** the shift from one or more cooking fuel and technology combinations to another. In the context of this mechanism methodology, the term refers specifically to the transition from higher-emission cooking fuels and technologies to cleaner and/or more efficient alternatives that result in greenhouse gas (GHG) emission reductions;

(g) **Displacement:** the discontinuation of the use of existing cooking technologies and fuels used in the pre-activity scenario due to the introduction of project cookstoves;

(h) **Fraction of Non-Renewable Biomass (fNRB):** the proportion of harvested biomass that exceeds the natural rate of regeneration of the landscape during a given period;

(i) **[Gasifier stoves**: an advanced biomass stove that uses a process called gasification to convert solid fuels—such as sticks and twigs—into a combustible "wood gas" (syngas). By separating solid fuel breakdown from gas combustion, it burns much cleaner and more efficiently than open fires.]

Question 1: Stakeholders are requested to provide input on the proposed inclusion of gasifier stoves for households under this methodology, considering concerns related to their safety for household use, difficulties in managing tar, etc.

(j) **Harvested biomass:** above-ground woody biomass collected or cut from living trees for use as fuelwood or for conversion to charcoal for use as fuel;

(k) **Hawthorne effect:** the impact on user behaviour (such as changes in the use of cooking technologies or fuels) resulting from awareness of being observed during monitoring or measurement activities, leading to a deviation from typical usage patterns;

(l) **Household:** an individual residential unit and all individuals living together and sharing cooking facilities and energy resources within that dwelling as their usual place of residence;

(m) **Kitchen Performance Test (KPT):** a field–based procedure used to quantify fuel consumption under typical household and cookstove usage conditions. It involves daily measurements of the amount of fuel used over several days in the user household's kitchen;

(n) **Monitored energy consumption:** the measurement of activity fuel or energy consumption directly in all activity households through built-in or external data loggers (also known as metering) or through fuel sales records. Commonly metered fuels and technologies include electric cookstoves [and liquefied petroleum gas (LPG)];

(o) **Off-grid renewable energy**: renewable electricity generated without a physical connection to the national or regional electricity system, for example, by community- or household-level solar, micro-hydro, or wind installations;

(p) **Project cookstoves:** all cookstoves introduced by the Article 6.4 activity and used by user households to replace or reduce the use of existing cookstoves;

(q) **Sampling based energy consumption:** periodic measurement of a sample of project cookstoves energy consumption;

(r) **Stove stacking:** use of multiple cooking technologies and/or fuels within a user household;

(s) **Stove Use Monitor (SUM):** a device that quantifies cookstove usage through the direct measurement of physical or chemical parameters (e.g., temperature,) of cookstoves that are related to the number of cooking events. SUMs do not measure fuel or energy consumption;

(t) **Third-party entity:** an entity that has no affiliation with the activity participants and no financial stake in the Article 6.4 activity that applies this mechanism methodology;

(u) **Useful energy:** the thermal energy effectively delivered by a cookstove to perform cooking events, excluding all conversion and transfer losses;

(v) **User household:** an Article 6.4 activity household with a functioning project cookstove that is used, on average, for at least five cooking events per week during a given monitoring period. The Article 6.4 activity may choose a higher threshold to define a user household, and the threshold for user household shall be specified in the monitoring plan and applied consistently to the entire crediting period;

(w) **Usage:** the frequency of cooking events using the project cookstove; and

(x) **Wood-to-charcoal conversion factor:** the amount of wood required to produce a given quantity of charcoal, expressed as the ratio of the mass of air-dry wood input to the mass of charcoal output.

8. Furthermore, the terms in the "Glossary: Article 6.4 mechanism terms" (A6.4-GLOS-GOV-001) and the definitions and terms in the methodological tools referred to in section 3 shall apply to this mechanism methodology.

3. Normative and informative references

9. The following normative documents are indispensable for the application of this mechanism methodology:

(a) “Methodological tool: Common practice analysis” (A6.4-AMT-001) (hereinafter referred to as the “Common practice tool”);[2]

(b) “Methodological tool: Investment analysis” (A6.4-AMT-002) (hereinafter referred to as the “Investment analysis tool”);[3]

(c) “Methodological tool: Determination of the technical lifetime of equipment” (A6.4-AMT-006) (hereinafter referred to as the “Technical lifetime tool”);[4]

(d) “Methodological tool: Emissions from electricity generation and consumption” (A6.4-AMT-007) (hereinafter referred to as the “Electricity emission factor tool”);[5]

(e) “Methodological tool: Analysis of lock-in risk” (A6.4-AMT-008) (hereinafter referred to as the “Lock-in risk tool”);[6]

(f) “Methodological tool: Fraction of non-renewable biomass” (A6.4-AMT-009) (hereinafter referred to as the “fNRB tool”);[7]

(g) [“Methodological tool: Sampling and surveys” (A6.4-AMT-XXXX) (hereinafter referred to as “Sampling and surveys tool”);[8]

(h) “Methodological tool: Reversal risk assessment” (A6.4-AMT-XXXX) (hereinafter referred to as the “Reversal risk assessment tool”);[9]

(i) “Mechanism methodology: Energy efficiency measures in household cooking” (A6.4-AMM-00X);[10]]

(j) Intergovernmental Panel on Climate Change (2019). 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories; [11] and

2 See https://unfccc.int/sites/default/files/resource/A6.4-AMT-001-v01.0.pdf.

3 See https://unfccc.int/sites/default/files/resource/A6.4-AMT-002-v01.0.pdf.

4 See https://unfccc.int/sites/default/files/resource/A6.4-AMT-006-v01.0.pdf.

5 See https://unfccc.int/sites/default/files/resource/A6.4-AMT-007-v01.0.pdf.

6 See https://unfccc.int/sites/default/files/resource/A6.4-AMT-008-v01.0.pdf.

7 See https://unfccc.int/sites/default/files/resource/A6.4-AMT-009-v01.0.pdf.

8 This methodological tool is still under development and has not yet been approved by the Supervisory Body. The mechanism methodology will be revised, as necessary, to reflect any changes to the methodological tool before its adoption.

9 Ibid.

10 This mechanism methodology is still under development and has not yet been approved by the Supervisory Body. This mechanism methodology will be revised, as necessary, to reflect any changes made to the referenced mechanism methodology before its adoption.

11 See https://www.ipcc.ch/report/2019-refinement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories/.

(k) Intergovernmental Panel on Climate Change (2006). 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

4. Applicability

4.1. Applicability conditions

10. This mechanism methodology is applicable to Article 6.4 projects and Article 6.4 programme of activities (PoA) jointly referred as Article 6.4 activities. The mechanism methodology is not applicable to activities implemented at other scales (e.g., policies or sectoral approaches).

11. This mechanism methodology is applicable to Article 6.4 activities involving the introduction of high-efficiency biomass cookstoves, [including gasifier stoves], electric cookstoves [or liquefied petroleum gas (LPG) cookstoves] to replace existing cooking stoves. The methodology may be applied where one or a combination of the following conditions are met, depending upon the project cookstove type(s) distributed under the Article 6.4 activity:

(a) User households have primarily used fuelwood in the pre-activity scenario and the Article 6.4 activity involves the distribution and operation of fuelwood or charcoal cookstoves that reduce greenhouse gas emissions through increased thermal efficiency relative to the baseline scenario and that are located:

(i) In non-urban areas, according to the relevant national or sub-national government classification;[12]

(ii) In countries where rural electrification is below 50 per cent [and LPG distribution networks are not present]; and

(iii) In areas that do not otherwise fulfil the applicability conditions of paragraphs 12 to 13(f) in version 1.0 of [Mechanism methodology: Energy efficiency measures in household cooking (A6.4-AMM-00X)]. [13]

(b) User households have primarily used artisanal charcoal in the pre-activity scenario and the Article 6.4 activity involves the distribution and operation of charcoal cookstoves that reduce GHG emissions through increased thermal efficiency and that are located:

(i) In urban or non-urban areas, according to the relevant national or sub-national government classification;[14] and

(ii) In areas that do not otherwise fulfil the applicability conditions of paragraphs 12 to 13(f) in version 1.0 of [Mechanism methodology: Energy efficiency measures in household cooking (A6.4-AMM-00X)].

[12] For example, where the government has established criteria for classifying urban areas, the Article 6.4 activity shall be implemented outside those areas.

[13] The referenced mechanism methodology is under development and has not yet been approved by the Supervisory Body. This mechanism methodology will be revised, as necessary, to reflect any changes made to the referenced mechanism methodology before its adoption.

[14] For example, where the government has established criteria for classifying urban areas, the Article 6.4 activity shall be implemented outside those areas.

(c) User households have used fuel types[15] other than electricity in the pre-activity scenario and the Article 6.4 activity involves the distribution and operation of cooking devices that involve both a fuel switch and a technology switch through the transition from higher-emission cooking fuels and technologies to cleaner or lower-emission electricity-based cooking devices, such electric cookers, induction cookstoves, and electric pressure cookers (also called project cookstoves for purpose of this methodology). [16] The project cookstoves:

(i) May be based in any location; and

(ii) Shall use electricity from:

a. A regional or national electricity system; or

b. A decentralised or mini-grid renewable electricity system, and not from a decentralised or mini-grid fossil-fuel-fired electricity system.

(d) [User households have used fuel types other[17] than electricity or LPG in the pre-activity scenario and the Article 6.4 activity involves the distribution and operation of LPG cookstoves in locations where [at least one] [all] of the following conditions applies:

(i) Within the geographical boundary of the Article 6.4 activity where project cookstoves are distributed, either fifty per cent or more of households do not have access to electricity, or the grid provides an unreliable electricity supply (i.e., an average of less than 12 hours of electricity per day or less than 4,380 hours per year);

(ii) [LPG cookstoves are not distributed to user households that have access to reliable electricity];

(iii) [The emission factor of the project electricity system is higher than 0.6 tCO_2/MWh. The Article 6.4 activity remains eligible for crediting till the year when the emission factor of the electricity system reaches a value of 0.6 tCO_2/MWh or less. The emission factor of the electricity system shall be calculated as per a valid version of Electricity emission factor tool. The following applies to the application of the tool for determining the emission factor for this purpose:

a. Identification of the electricity consumption source: Article 6.4 activity electricity-based project cookstove. This consumption source is determined not to be dependent on an intermittent electricity supply;

b. Identification of the relevant scenario: For this consumption source, the relevant scenario is scenario A;

[15] The fuels may include either or combination of fuelwood, charcoal (fuel types associated with reversal risks), and kerosene, dung, LPG (fuel types not associated with reversal risks).

[16] Solar thermal cookers and biomass fuels derived from biomass waste or cultivated biomass (e.g., ethanol and pellets) are not eligible under this version of the mechanism methodology. Kerosene and solid fossil fuels are also not eligible under this mechanism methodology.

[17] The fuels may include either or combination of fuelwood, charcoal (fuel types associated with reversal risks), and kerosene, dung, etc. (fuel types not associated with reversal risks).

c. Identification of the relevant electricity system: To be undertaken in accordance with section 5.3, step 3 of the tool;

d. The activity participant shall apply the requirements pertaining to case 2.]

(iv) [The Article 6.4 activity does not result in the development of new LPG distribution infrastructure;]

(v) [The Activity proponent shall not be directly involved in LPG production or distribution networks.]

Question 2: Stakeholders are requested to provide inputs on the potential inclusion of LPG stoves as an Article 6.4 activity, considering concerns related to the lock-in risk of promoting new uses of fossil fuels under the Article 6.4 mechanism. Stakeholders are also requested to consider the different proposed conditions for eligibility of LPG cookstoves and the extent to which these address lock-in risks, the GHG emissions of LPG cooking versus alternatives available in the activity context, and so forth.

12. Furthermore, this mechanism methodology is applicable to Article 6.4 activities only if the following conditions apply:

(a) For Article 6.4 activities that distribute and operate biomass cookstoves with increased thermal efficiency, methods for sampling based energy consumption are applied; and

(b) For Article 6.4 activities that distribute and operate cooking devices using electricity [or LPG], methods for monitored energy consumption are applied;

(c) Activity participants demonstrate that the Article 6.4 activity has selected project cookstove technologies that meet the cooking needs of the target population, either by citing robust research or by conducting an investigation of cooking practices and attitudes during the activity design phase;

(d) Where space heating has been identified in the pre-activity scenario, project cookstoves may also be used to meet heating requirements in cold rural climates or under seasonal conditions;

(e) Project cookstoves are linked to a specific household through a permanent unique identifier affixed to the cookstove. Each identifier shall correspond to one cookstove and one household only. The identifier shall be implemented through one of the following equally acceptable means:

(i) A tag or plate affixed or fired into the body of the cookstove in such a way that its removal would damage or destroy the stove; or

(ii) A stove use monitor (SUM) with a recorded serial number permanently installed on the cookstove.

(f) Household-only identification cards that are detached from the cookstove shall not be accepted as the sole means of identification. Activity participants shall maintain an identifier management system that ensures the traceability of each cookstove and its linkage to the corresponding household, tracks stove use and/or fuel and energy consumption, and manages the replacement of any cookstoves within the crediting period;

(g) The Article 6.4 activity shall identify and either replace or retrofit malfunctioning cookstoves with technologies of comparable or better quality and thermal efficiency or shall not claim emission reductions for households where such failures occur. Activity participants shall provide a documented plan for this process at the project design phase, taking into account the lifetime of the project cookstove technologies;

(h) All biomass-burning project cookstove models [and LPG cookstoves] shall be tested for thermal efficiency using the ISO 19867-1:2018, Clean cookstoves and clean cooking solutions – Harmonized laboratory test protocols (or any subsequent revision), by a laboratory accredited to ISO 17025, or an equivalent national standard where such an accredited laboratory is not available in the host country, according to which:

(i) All biomass-burning project cookstoves shall achieve a minimum thermal efficiency of 30 per cent or higher; and

(ii) [All LPG project cookstoves shall achieve a minimum efficiency of 50 per cent per cent or higher.]

(i) In the case of electric cookstoves, activity participants should select project cookstoves with the highest nationally available efficiency rating;

(j) From 01 January 2028 onwards, stove usage, in accordance with section 7.4.1, shall be determined using SUMs;

(k) This mechanism methodology is not applicable to households that use electricity as their primary baseline energy source;[18] and

(l) For informational purposes, the activity participants shall report the technical lifetime of the project cookstove, as determined on the basis of the manufacturer's specifications and operating manuals, or in the absence of these (e.g., for artisanal cookstoves), on the basis of a third-party assessment by a certified or suitably qualified expert.

13. This mechanism methodology is applicable only on a standalone basis, with the exception that it may be used in conjunction with the Draft mechanism methodology: “Energy efficiency measures in household cooking” in Article 6.4 PoAs that include CPs with different baseline scenarios, and only one or the other methodology is applied to each individual CP. It shall not be applied in combination with other methodologies unless one or more of the other methodologies specify how the interaction with this mechanism methodology is taken into account.

14. The above provisions shall be demonstrated as follows:

(a) The provisions in paragraph 11, 12(a), 12(d), 12(e), 12(i), 12(j), 12(k) and 13 above shall be demonstrated in the Project Design Document (PDD), PoA design document (PoA-DD) or Component Project design document (CP-DD) and shall be assessed at the initial validation or, in the case of CP-DD, at inclusion;

(b) The provisions in paragraphs 12(l) above shall be demonstrated in the PDD, PoA-DD or CP-DD and assessed at the initial validation or, in the case of a CP-DD, at

[18] Use of electricity as a supplementary baseline fuel is permitted as it is not expected to be materially affected by Article 6.4 activity.

inclusion, or shall be demonstrated in the first monitoring report and assessed at the first verification; and

(c) The provisions in paragraphs 12(g) and 12(h) above shall be demonstrated in each monitoring report and shall be assessed at each verification.

15. The applicability conditions included in the methodological tools referred to in paragraph 9 above also apply.

5. Activity Boundary

16. The activity boundary of the Article 6.4 activity is defined as:

(a) The physical and geographical sites where the project cookstoves operate; and

(b) The location(s) where the fuels used by user households are produced or from which they are collected in the baseline and Article 6.4 activity scenarios.

17. Where project cookstoves use electricity, the activity boundary includes the electricity generation system and, where applicable, the electricity transmission and distribution system.

18. The emission sources included in or excluded from the activity boundary are specified in Table 1 below. The greenhouse gas (GHG) reservoirs included in or excluded from the activity boundary are specified in Table 2 below.

Table 1. Emission sources included in or excluded from the activity boundary

	Source	**Gas**	**Included?**	**Controlled / Related to / Affected by?**	**Justification / Explanation**
BASELINE SCENARIO	Thermal energy generation through fuel combustion	CO_2	Yes	Controlled	Major source of emissions
		CH_4	Yes		Can be significant for some fuels
		N_2O	Yes		Can be significant for some fuels
	Fuel production (charcoal, fossil fuels)	CO_2	Yes	Affected by	Major source of emissions for some fuels
		CH_4	Yes		Can be significant for some fuels
		N_2O	Yes		Can be significant for some fuels
	Fuel transport	CO_2	Yes	Related to	Can be significant in some cases
		CH_4	Yes		Can be significant in some cases
		N_2O	Yes		Can be significant in some cases

	Source	Gas	Included?	Controlled / Related to / Affected by?	Justification / Explanation
ARTICLE 6.4 ACTIVITY SCENARIO	Thermal energy generation through fuel combustion	CO_2	Yes	Controlled	Major source of emissions
		CH_4	Yes		Can be significant for some fuels
		N_2O	Yes		Can be significant for some fuels
	Fuel production (charcoal, fossil fuels)	CO_2	Yes	Affected by	Major source of emissions for some fuels
		CH_4	Yes		Can be significant for some fuels
		N_2O	Yes		Can be significant for some fuels
	Fuel transport	CO_2	Yes	Related to	Can be significant in some cases
		CH_4	Yes		Can be significant in some cases
		N_2O	Yes		Can be significant in some cases
	Electricity generation and transmission distribution	CO_2	Yes	Affected by	Major source of emissions in some cases
		CH_4	No		Excluded for simplification
		N_2O	No		

Table 2. Greenhouse gas reservoirs included in or excluded from the activity boundary

	Reservoir	Included?	Controlled / Related to / Affected by?	Justification / Explanation
BASELINE SCENARIO	Above-ground woody biomass in landscape	Yes	Affected by	Primary source of harvested biomass
ARTICLE 6.4 ACTIVITY SCENARIO	Above-ground woody biomass in landscape	Yes	Affected by	Primary source of harvested biomass
	Biochar	No	Controlled	Potential removals associated with biochar produced by gasifier cookstoves are not quantified. This is conservative

19. Where the Article 6.4 activity reduces fuel consumption, but does not change the fuel types utilized, baseline and Article 6.4 activity emissions from fuel transport are excluded for simplicity. This is conservative because fuel transport emissions in the Article 6.4 activity scenario are lower than those in the baseline scenario.

20. Activity participants shall include in the activity information sheet (refer to **Appendix** 1 for further details) the location of the Article 6.4 activity in the form of Keyhole Markup Language (KML) files or similar formats, represented as one or more polygon(s), by specifying the coordinates of the geographic boundary, using a known coordinate system or any other established method.

21. Where the Article 6.4 activity reduces the use of non-renewable biomass fuels, the physical and geographical sites where the projects cookstoves operate are different from the location(s) where the fuels used by the user households are produced or from which they are collected in the baseline and Article 6.4 activity scenarios.[19] Activity participants shall demonstrate this by complying with the requirements in paragraphs 22 and 23 below.

22. For non-renewable biomass fuels, the geographical limits of the activity boundary related to fuels (paragraph 16(b)) shall be defined as the sub-national, national, or multi-national level for each fuel type, as follows:

(a) For charcoal, the geographical limits of the activity boundary shall be defined as follows:

(i) **Multi-national**, if both of the following conditions apply:

a. The host Party imports at least 50 per cent of its charcoal from outside its national boundaries (including, where applicable, undocumented or illegal trade); and

b. The applicable multi-national parameter from the fNRB tool is lower than the national parameter for the host Party.

(ii) **Sub-national**, if all of the following conditions apply:

a. The specific source of the charcoal and the harvested biomass used to produce the charcoal is known;

b. The specific source is reported in a KML file or a similar format; and

c. The specific source of the harvested biomass used to produce the charcoal is located entirely within one subnational jurisdiction.

(iii) **National**, in all other circumstances where a national parameter is available for the host Party from the fNRB tool; and

(iv) **Multi-national**, in all other circumstances.

(b) For fuelwood, the geographic limits of the activity boundary shall be defined as follows:

[19] For example, the location where fuels are produced or collected may comprise a sub-national administrative boundary, whereas the Article 6.4 activity may involve the operation of project cookstoves in one or more communities or households within, but not throughout, that administrative boundary. In other words, the fuels are sourced from a location different than the kitchens where the project cookstoves are used by households.

(i) **Sub-national**, where a sub-national parameter is available for the applicable sub-national jurisdiction from the fNRB tool;

(ii) **National**, in all other circumstances where a national parameter is available for the host Party from the fNRB tool; and

(iii) **Multi-national** in all other circumstances(i.e., where a national parameter is not available).

23. Where the geographical limits of the activity boundary related to fuels are determined pursuant to paragraph 22(a)(ii) only, activity participants shall further include in the PDD, PoA-DD or CP-DD:

(a) The exact (where known), or approximate location, from which activity fuels are produced or collected, in the form of Keyhole Markup Language (KML) files or similar formats, represented as one or more polygon(s), by specifying the coordinates of the geographic boundary of the production or collection areas using a known coordinate system or another established method; and

(b) A description of how the location is determined or estimated.

24. For Article 6.4 activities implemented as PoAs, the geographic limits of the activity boundary related to fuels shall be defined at the level of each component project (CP) within a PoA.

6. Demonstration of additionality

25. This mechanism methodology provides two options for demonstrating additionality. Option 1 (refer to section 6.2 below) provides a simplified demonstration of additionality based on compliance with specified eligibility criteria. Option 2 (refer to section 6.3 below) provides a comprehensive demonstration of additionality and shall be applied where the eligibility criteria under Option 1 are not met.

26. Under this mechanism methodology, additionality shall be assessed and demonstrated from the perspective of the activity participants responsible for distributing project cookstoves.

27. Additionality shall be reassessed upon each renewal of the crediting period for all Article 6.4 activities.

6.1. Regulatory analysis

28. All Article 6.4 activities shall apply a regulatory analysis. The proposed Article 6.4 activity shall be considered additional only if the regulatory analysis is concluded positively.

29. For Article 6.4 activities implemented as a PoA, the regulatory analysis may be demonstrated in a standardized manner at the PoA level by demonstrating compliance at the PoA-jurisdictional level and defining CP-based eligibility criteria within the jurisdiction, that enable each CP to demonstrate that the regulatory analysis is concluded positively.

30. Activity participants shall review the legal requirements applicable to the host Party and to the use of cooking devices and shall justify, for each relevant legal requirement, that either:

(a) The law or regulation refers to, or formally integrates, the Article 6.4 mechanism as an instrument for implementation;[20] or

(b) The emission reductions resulting from the Article 6.4 activity would not occur as a result of the legal requirement, by demonstrating that the following conditions are met:

(i) The legal requirements do not directly or indirectly require the installation of efficient cookstoves within the geographical boundary of the Article 6.4 activity where the project cookstoves are distributed; and

(ii) One of the following conditions apply:

a. Public sector finance, including through fiscal incentives (e.g., tax or import duty exemptions) or blended finance for the installation or operation of project cookstoves, is not provided and is not reasonably expected to be provided; or

b. Public sector finance, including through fiscal incentives (e.g., tax or import duty exemptions) or blended finance for the installation or operation of project cookstoves, is provided, or is reasonably expected to be provided. In this case, activity participants shall undertake the investment analysis as per section 6.3.2 and demonstrate that the conditions in paragraph 50(f) below are satisfied.

31. The regulatory analysis shall be based on credible and current evidence and shall be justified.

32. Activity participants shall update the regulatory analysis for each monitoring report.

33. If either of the following takes effect during the crediting period, the Article 6.4 activity may continue to claim emission reductions only up to the date on which it takes effect:

(a) A relevant legal requirement becomes effective that directly or indirectly requires the installation of efficient cooking devices within the geographical boundary of the Article 6.4 activity where the project cookstoves are distributed; or

(b) A relevant public sector finance becomes effective, unless the activity participants apply the Investment Analysis as per section 6.3.2 below ex-post and demonstrate that the public support is insufficient to render the activity financially viable and that the Article 6.4 activity would not be implemented in the absence of additional carbon finance.

6.2. Option 1: Simplified additionality demonstration

34. Option 1 provides for the demonstration of additionality at the methodology level, in accordance with the Additionality Standard (A6.4-STAN-METH-003).

35. An analysis of lock-in risk and a barrier analysis are conducted at the level of the mechanism methodology for Article 6.4 activities that fulfil the conditions for applying option 1 under this mechanism methodology (see Appendix 10).

[20] For example, where the legislation or regulations explicitly provide that Article 6.4ERs, and their associated revenues are to be used as incentives to achieve emission reductions in a specific sector.

36. [For Article 6.4 activities implemented as a PoA, the simplified additionality demonstration may be demonstrated in a standardized manner at the PoA level by demonstrating compliance at the PoA-level and defining CP-based eligibility criteria that enable each CP to demonstrate that the simplified additionality demonstration is concluded positively.]

6.2.1. Fuelwood and charcoal cookstoves

37. In addition to applying the regulatory analysis as per section 6.1 above, Article 6.4 activities involving the distribution and operation of high-efficiency biomass cookstoves, including improved charcoal cookstoves, may demonstrate additionality using the simplified approach in this section, provided all of the following eligibility conditions are met:

(a) In the pre-activity scenario, the primary energy source for cooking within the target population is fuelwood or artisanal charcoal (i.e., on average, more than 75 per cent of cooking events use fuelwood or artisanal charcoal), as determined through the pre-activity survey;

(b) In user households, the primary energy source for cooking (i.e., fuelwood or artisanal charcoal) shall remain unchanged between the pre-activity and Article 6.4 activity scenarios, thereby excluding fuel switching. The comparison between the pre-activity and Article 6.4 activity scenarios shall ensure consistency in the proportion of cooking events using the primary fuel, such that any reduction in its use does not exceed 20 per cent below the pre-activity level during implementation of the Article 6.4 activity.[21] This variation shall be interpreted solely as reflecting normal variability in household energy use and not as representing a change in the primary energy source or the introduction of other fuels. This determination shall be made regarding the first monitoring report and shall be based on a comparison of the results of the first usage survey with those of the pre-activity survey;

(c) Where artisanal charcoal is used in the pre-activity scenario, it shall be demonstrated that the principal charcoal production methods within the geographical area of the activity boundary related to the fuel charcoal are consistent with the definition of artisanal charcoal.[22] In other words, at least 90 per cent of the charcoal produced within that geographical area shall be produced using traditional, small-scale methods, which typically involve stacking wood and covering it with earth. This shall be substantiated using relevant literature sources. Where the multi-national activity boundary related to this fuel applies, the activity participant shall demonstrate that the host Party where the activity is located and all neighbouring countries import at least 50 per cent of its charcoal;

(d) The Article 6.4 activity shall be implemented in locations where the population is demonstrated to experience low income or poverty levels, based on a recognized poverty index, as follows:

(i) Where available, poverty levels shall be demonstrated using national or sub-national poverty indices and the corresponding thresholds;

[21] For example, if fuelwood accounted for 90 per cent of cooking events in the pre-activity scenario, its use during implementation of the Article 6.4 activity shall not fall below 72 per cent of cooking events (i.e. a reduction of no more than 20 per cent relative to the pre-activity level). Any increase in the proportion of cooking events using the primary energy source is acceptable.

[22] See section 16 of the mechanism methodology.

(ii) In the absence of the indices referred to in subparagraph (i), the internationally recognized Multidimensional Poverty Index (MPI) shall be applied.[23] The population shall be considered to satisfy the poverty criterion where the average MPI score is 0.2 or greater; or

(iii) Where neither of the above indices is available, applicability shall be demonstrated on the basis of the average income level. In such cases, the Article 6.4 activity shall demonstrate that the income level of the target population is at or below the poverty threshold established by the national or sub-national government, based on literature sources.

(e) Irrespective of the location of the Article 6.4 activity or the indices and thresholds used, the income level of the target population shall not exceed the latest poverty threshold established by the World Bank for lower-middle-income countries (e.g., USD 4.2 per person per day (2021 PPP));

(f) Prior to the implementation of the Article 6.4 activity, the proportion of households within the target population that have a functioning cooking technology with the same or higher thermal efficiency than the project cookstoves shall be 4.5 per cent or less, as determined in accordance with the methods in section 7.4.1; and

(g) Project cookstoves shall be provided to households [free of charge or may be sold to end users or] for a fee that does not exceed [50 per cent] [XX per cent] of the production cost][24]. Compliance with this requirement shall be assessed at each verification.

Question 3: Stakeholders are requested to provide inputs on the proposed thresholds *comprising low cost to Activity 6.4 households, their advantages and disadvantages and proposed level.*

38. Where any of the conditions in paragraph 34 are not met, activity participants shall apply Option 2: Comprehensive additionality demonstration (section 6.3) and undertake the Investment Analysis and common practice analyses to support the demonstration of additionality.

39. An analysis of lock-in risk and a barrier analysis are conducted at the level of the mechanism methodology for all applicable Article 6.4 activities that fulfils the conditions for applying option 1 under this mechanism methodology (see Appendix 10).

6.2.2. [LPG and]electric cookstoves

40. In addition to applying the regulatory analysis as per section 6.1 above, Article 6.4 activities involving the distribution and operation of [high-efficiency LPG or] electric cookstoves, may demonstrate additionality using the simplified approach in this section, provided all the following eligibility conditions are met:

(a) In the pre-activity scenario, the primary energy source for cooking within the target population is not LPG or electricity. The primary energy source in the pre-activity scenario may be one or more higher-emission cooking fuels, such as fuelwood,

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[23] See https://ophi.org.uk/global-mpi/2025.

[24] Nominal pricing is often used where end users are charged a small, symbolic fee. The purpose is not to recover costs or generate a profit, but to avoid the perception that a device provided free of charge has little or no value.

charcoal, kerosene, coal, agricultural residues, animal dung, or another higher-emission cooking fuel, as determined through the pre-activity survey;

(b) The Article 6.4 activity is implemented in locations where the population is demonstrated to experience low income or poverty levels, based on a recognized poverty index, as follows:

(i) Where available, poverty levels shall be demonstrated using national or sub-national poverty indices and the corresponding thresholds;

(ii) In the absence of the indices referred to in subparagraph (i), the internationally recognized Multidimensional Poverty Index (MPI) shall be applied.[25] The population shall be considered to satisfy the poverty criterion where the average MPI score is 0.2 or greater; or

(iii) Where neither of the above indices is available, applicability shall be demonstrated on the basis of the average income level. In such cases, the Article 6.4 activity shall demonstrate that the income level of the target population is at or below the poverty threshold established by the national or sub-national government, based on literature sources.

(c) Irrespective of the location of the Article 6.4 activity or the indices and thresholds used, the income level of the target population does not exceed the latest poverty threshold established by the World Bank for lower-middle-income countries (e.g., USD 4.2 per person per day (2021 PPP);

(d) Prior to the implementation of the Article 6.4 Activity, the percent of households in the target population with a functional cooking technology that is assessed to have the same or a higher efficiency as the project cookstoves is 4.5 per cent or less, as determined by following the methods in section 7.4.1;

(e) Devices are provided to households [free of charge or may be sold to end users] for a fee that does not exceed [50 per cent] [XX per cent] of the production cost[26]; and

Question 4: Similar to above, stakeholders are requested to provide inputs on the proposed thresholds comprising low cost to Activity 6.4 households, their advantages and disadvantages and proposed level.

(f) Project cookstoves shall have a technical lifetime of 10 years or less.

41. Where any of the conditions in paragraph 37 are not met, activity participants shall apply Option 2: Comprehensive additionality demonstration (section 6.3) and undertake the Investment Analysis and common practice analyses to support the demonstration of additionality.

6.3. Option 2: Comprehensive additionality demonstration

42. In addition to applying the regulatory analysis as per section 6.1 above, to demonstrate additionality, activity participants shall apply:

[25] See https://ophi.org.uk/global-mpi/2025.

[26] Nominal pricing is often used where end users are charged a small, symbolic fee. The purpose is not to recover costs or generate a profit, but to avoid the perception that a device provided free of charge has little or no value.

(a) A lock-in analysis (section 6.3.1);

(b) An investment analysis (section 6.3.2); and

(c) A common practice analysis (section 6.3.3).

43. The proposed Article 6.4 activity shall be considered additional only if all three analyses are concluded positively.

44. [For Article 6.4 activities implemented as a PoA, each CP shall demonstrate that the comprehensive additionality demonstration is concluded positively.]

6.3.1. Analysis of lock-in risk

45. A lock-in risk analysis is not required for the following project cookstove technologies:

(a) Fuelwood cookstoves;[27] and

(b) Electric cookstoves.[28]

46. Where the Article 6.4 activity involves the distribution and operation of types of project cookstoves other than those referred to in paragraph 45 above, activity participants shall determine the technical lifetime of the project cookstove(s) using the “Methodological tool: Determination of the technical lifetime of equipment (A6.4-AMT-006).[29]

47. Where a project cookstove type is determined to have a technical lifetime of 10 years or less, the project cookstove is not deemed to cause lock-in risk.

48. Where a project cookstove type is determined to have a technical lifetime of more than 10 years, activity participants shall conduct a lock-in risk analysis using the “Methodological tool: Analysis of lock-in risk” (A6.4-AMT-008). Under this mechanism methodology, the applicability condition referred to in paragraph 9(a) of version 1.0 of the tool shall not apply. Furthermore, activity participants shall apply the tool as follows:

(a) The relevant region when identifying comparable activities as per Step 2: (Greenhouse gas intensity assessment) of the Lock-in risk tool shall be the activity boundary;

(b) The GHG intensity of the project cookstoves, the BAU scenario and that of the lowest emissions intensity alternative shall be quantified on a life-cycle basis following the principles and requirements of ISO 14040, ISO 14044 and ISO 14067:

(i) The intensity shall be expressed as tCO_2 per unit of useful cooking energy delivered (MJuseful);

(ii) The assessment shall include fuel production, processing, transportation, distribution, combustion emissions, and manufacturing emissions of the main cooking device where material to the comparison.

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[27] These stoves are deemed to typically have a technical lifetime of less than 10 years (see Appendix 10).

[28] These stoves represent the least GHG-intensive technology. Accordingly, they are exempt from any further lock-in analysis and are deemed to present no GHG lock-in risk. (see Appendix 10).

[29] See https://unfccc.int/process-and-meetings/the-paris-agreement/article-6/article-64-pacm/mechanism-process/methodologies/a64-amt-006-determination-of-the-technical-lifetime-of-equipment.

(c) The list of comparable alternatives identified in steps 2 shall include alternatives that third parties could implement;

(d) Step 3 (Resource Use Efficiency Assessment) is not required for cookstove activities because the activity uses high-efficiency stoves, representing best-available commercial technology. Furthermore, there are no credible comparable alternatives that provide the same cooking service while using the same resource more efficiently;

(e) Scale assessment is not required for cookstove activities. Each project cookstove is one of several options and does not prevent the uptake of alternative solutions by households or entities and create a monopoly condition expected to generate lock-in risk through scale effects.

6.3.2. Investment analysis

49. Under this mechanism methodology, activity participants shall conduct investment analysis by applying a valid version of the "Methodological tool: Investment analysis" (A6.4-AMT-002).[30]

50. In applying the Investment analysis tool, activity participants shall:

(a) Identify realistic and credible alternative scenarios to the proposed Article 6.4 activity, including, but not limited to, the following:

(i) Continued use of existing baseline cooking practices; or

(ii) Implementation of the Article 6.4 activity without registration under the Article 6.4 mechanism.

(b) Apply the simple cost analysis where the Article 6.4 activity does not generate any revenue other than from the sale of the A6.4ERs;

(c) Otherwise, apply the investment comparison analysis or, where the only alternative to the proposed Article 6.4 activity is the continuation of the pre-activity situation, apply the benchmark analysis;

(d) Use the Net Present Value (NPV) as the financial indicator where the investment comparison analysis is applied and select an appropriate financial indicator where the benchmark analysis is applied, such as the Internal Rate of Return (IRR) or NPV;

(e) Assume that the Article 6.4 activity could be implemented by either the activity participants or another entity, unless the activity participants demonstrate that, in the specific context of the proposed Article 6.4 activity, it can only be implemented by the activity participants; and

(f) Where public finance is provided, or is reasonably expected to be provided, including through fiscal incentives (e.g., tax or import duty exemptions) or blended finance for the installation or operation of cooking devices, such finance shall be incorporated into the calculation of the financial indicator. In this case, the investment analysis shall be concluded positively only where both: (i) the public support is insufficient to render the Article 6.4 activity financially viable; and (ii) the

[30] See https://unfccc.int/process-and-meetings/the-paris-agreement/article-6/article-64-pacm/mechanism-process/methodologies/a64-amt-002.

Article 6.4 activity would not be implemented in the absence of additional carbon finance.

51. In conducting the sensitivity analysis, activity participants shall apply a variation of at least ± 10 per cent to the input values that constitute more than 20 per cent of the total costs or total revenues.

6.3.3. Common practice analysis

52. Activity participants shall conduct a common practice analysis, using a valid version of the "Methodological tool: Common practice analysis" (A6.4-AMT-001), following the specifications in paragraphs 53 to 73 below for how the different steps of the tool shall be applied.

53. For Article 6.4 projects, the common practice analysis shall be conducted before validation. For Article 6.4 PoAs, the PoA-DD shall define the approach to common practice analysis, data sources, applicable geographical area, technology categories, [total] [target] market and common practice threshold to be applied in line with the requirements of this methodology; and the CP-DD shall demonstrate compliance with these at the time of inclusion, unless the PoA-DD demonstrates that the assessment can be validly and conservatively conducted at the PoA level for all CPs.

54. The analysis shall be conducted separately for:[31]

(a) Urban and non-urban households; and

(b) The relevant cooking fuel category, differentiating between fuelwood cookstoves, charcoal cookstoves, electric cooking devices[, and LPG cooking devices].

55. The analysis shall be based on credible, recent and representative data. Where the disaggregation in paragraph 54 above is not supported by available data, activity participants may apply a broader categorization (e.g. considering fuelwood and charcoal as one category), provided that the approach is conservative and transparently justified.

56. The Article 6.4 activity shall apply the analysis to the relevant settings and technologies.

57. The Market Penetration Method (Approach B) shall be used, noting that the tool indicates that Approach B is generally suited to highly distributed small-scale technologies and practices, including cookstoves and solar home systems.

58. The indicator of common practice shall be *count-based*, based on the number of households in the [total] [target] market with functioning cooking technologies/devices that are similar to the Article 6.4 activity technology.

59. An output or capacity range shall not be applied, since the relevant output is the provision of household cooking energy services.

[31] Activity participants shall apply the analysis to the setting and technologies relevant in the context of their project or CP. For example, for Article 6.4 activities implemented only in urban settings, activity participants shall apply the analysis to for urban households only. For Article 6.4 activities implemented only in non-urban settings, activity participants shall apply the analysis for non-urban households only. Where an Article 6.4 activity covers both urban and non-urban households, the analysis shall be conducted separately for each category, or, where the data is not available, a conservative combined approach shall be applied and justified.

60. A stock-based approach shall be applied (i.e., counting all households), rather than a time-bound approach (i.e. counting only households which recently installed new cookstoves).

61. By default, the applicable geographical area shall be the *host country*. A sub-national geographical area may be used where it corresponds to the actual [total] [target] market of the Article 6.4 activity and where credible, recent and representative data are available. The selected geographical area shall be justified and shall not selectively exclude areas where similar technologies are already widely used.

62. Activity participants shall determine the [‘total market’] [‘target market’] as the total number of households within the applicable geographical area that rely on cooking energy services and are potential users of the Article 6.4 activity technology.

63. The [total] [target] market size, P_{all}, shall be the number of households within the applicable geographical area and urban/non-urban category that could realistically take up the Article 6.4 activity technology, taking into account relevant technical, infrastructure, financial, socio-economic and supply-chain constraints.

64. The [total] [target] market size shall be determined separately for each relevant cooking fuel category, where credible, recent and representative data are available, such that the sum of the [total] [target] market sizes for all relevant cooking fuels corresponds to the [‘total market’][‘target market’].

65. For electric cooking devices, P_{all} shall not include households without access to electricity, whether grid, mini-grid or off-grid. For LPG cooking devices, P_{all} should reflect households with realistic access to LPG supply. For fuelwood and charcoal cookstoves, P_{all} may be based on households already using the relevant baseline fuel in the applicable urban or non-urban category.

66. Activity participants shall determine the [total] [‘target] market size’ and P_{all} using recent, credible and representative data, such as census data, nationally representative household surveys, energy access surveys, Demographic and Health Surveys Program (DHS), UNICEF Multiple Indicator Cluster Surveys (MICS), government statistics or other authoritative sources.

67. In the context of this specific mechanism methodology, activity participants may exclude cookstoves installed as part of other registered Article 6.4 activities or registered activities under other carbon crediting programmes when determining the number of households with similar technologies (see appendix 10 for the justification).

68. [Where households use multiple fuels or cooking technologies, activity participants shall count each household once in the market penetration assessment for each relevant cooking technology it uses, to avoid skewing the analysis.]

69. A similar technology shall mean a functioning cooking technology or device that:

(a) Provides the same type of household cooking service as the Article 6.4 activity technology;

(b) Uses the same primary fuel or energy carrier, such as fuelwood, charcoal, electricity[, or LPG]; and

(c) Is available to, and used by, the same [target][total] market.

70. For biomass and charcoal cookstoves, similar technologies shall also have a thermal efficiency within ±5 percentage points of, or higher than, the thermal efficiency of the project cookstove.

71. For electric [and LPG] cooking technologies, similarity shall be assessed based on the same energy carrier.

72. The common practice thresholds, F, shall be:

(a) [X] per cent for urban households; and

(b) [Y] per cent for non-urban households.

Question 5: Stakeholders are requested to provide inputs on the appropriate common practice thresholds for similar technologies in urban and non-urban areas.

73. Activity participants shall document the following as part of the common practice analysis:

(a) The applicable geographical area;

(b) The [target] [total] market;

(c) The[total] [target] market size for each fuel type for urban and non-urban households;

(d) All data sources used;

(e) Any assumptions, adjustments, disaggregation methods, and calculations applied;

(f) The determination of similar technologies; and

(g) The resulting values of P_{sim}, P_{all} and the thresholds for F.

7. Baseline Scenario

7.1. Description of the pre-activity situation

74. Activity participants shall describe the pre-activity situation in the PDD or CP-DD. The pre-activity situation corresponds to the circumstances existing before the implementation of the Article 6.4 activity for the provision of the activity output(s) within the baseline geographical reference area.

75. The pre-activity situation shall be identified and described through the application of a pre-activity survey of the target population using a valid version of the “Methodological tool: Sampling and surveys tool” complemented by the provisions included in Appendix 9. The pre-activity survey shall be conducted within one year before the start date of the first crediting period of the Article 6.4 activity.

76. The following parameters shall be determined through the pre-activity survey:

(a) The type of existing cooking technology-fuel combinations in use and the frequency of their use (cooking events per day); and

(b) Household size (number of persons per household).

77. The pre-activity survey may also be used to demonstrate compliance with the applicability condition requiring that the technologies and fuels selected for the Article 6.4 activity meet the cooking needs of the target population.

78. The findings of the pre-activity survey shall be cross-checked against recent, appropriate (i.e., geographically and demographically comparable) information from nationally or regionally representative surveys or reputable literature, as follows:[32]

(a) Where, for parameters listed in paragraph 76(a), the discrepancy between the pre-activity survey findings and the cross-check data is no more than 10 per cent, the findings of the pre-activity survey shall be used;

(b) Where, for parameters listed in paragraph 76 the discrepancy between the pre-activity survey findings and the cross-check data is more than 10 per cent, the following shall apply:

(i) The value supported by the strongest evidence base and of greatest relevance to the geographic area of the Article 6.4 activity shall be selected and justified;[33] and

(ii) Where it is not possible to determine which value is supported by the strongest evidence base and is of greatest relevance to the geographical area of the Article 6.4 activity, the more conservative value from either the pre-activity survey or the cross-check data shall be used.

7.2. Selection of the baseline approaches from paragraph 36 of the rules, modalities and procedures

79. The following approach from the Rules, Modalities and Procedures (RMPs), as per decision 3/CMA.3, is used to determine the baseline in this mechanism methodology:[34]

☐ Best available technologies that represent an economically feasible and environmentally sound course of action, where appropriate.

☐ An ambitious benchmark approach where the baseline is set at least at the average emission level of the best performing comparable activities providing similar outputs and services in a defined scope in similar social, economic, environmental and technological circumstances.

☒ An approach based on existing actual or historical emissions, adjusted downwards to ensure alignment with paragraph 33 of the RMPs.

[32] Examples of reputable literature include peer-reviewed publications and publications issued by national government agencies or multi-lateral organizations.

[33] In some cases, the value selected may differ from that determined through the pre-activity survey.

[34] The approach is selected based on baseline emissions depending greatly on location-specific factors including: (a) available cooking fuels/energy sources; (b) buying power of the households; (c) affordability of the available cooking technologies; and (d) cultural cooking practices and foods.

7.3. Application of the selected approach, prior to implementation of a downward adjustment

7.3.1. Procedure for identifying the baseline scenario

80. The baseline scenario(s) shall be identified on the basis of the existing baseline cooking technologies and fuel consumption patterns displaced by the Article 6.4 activity technology, using the results of the pre-activity survey and quantified according to the selected baseline emissions method. The baseline scenario shall be described as the proportion of each cooking technology-fuel combination within the target population.

81. If an Article 6.4 activity promotes multiple project cookstove technologies, project cookstoves with similar design and performance characteristics (defined as having the same combustion technology, where differences in thermal efficiencies within five per cent, in accordance with ISO 19867-1 or equivalent national standards where an accredited laboratory with this capacity is not available in the host country) may be included under a single activity scenario and apply the same baseline emissions method. Otherwise, they shall be treated as independent activity scenarios and may require different baseline emissions methods.[35] Please also refer to paragraph 146. The baseline emissions methods shall be selected as follows:

    (a) Article 6.4 activities that distribute and operate biomass cookstoves shall apply the approach in section 7.4.2 to calculate baseline emissions related to biomass project cookstoves;

    (b) All other Article 6.4 activities shall apply either Method 1 or Method 2 in section 7.4.1.

82. Activity participants shall specify in the PDD or CP-DD which baseline emissions method is selected and apply the selected option throughout the crediting period.

Note 1: The MEP is considering introducing a hierarchy of methods or conditions for choosing Method 1 or Method 2 for Article 6.4 activities that apply monitored energy consumption.

83. Multiple baseline scenarios may be identified, as appropriate (e.g., for multiple geographical areas with different demographic characteristics or different user groups with different baseline fuel mixes), with each baseline scenario compared against the corresponding Article 6.4 activity scenario.

84. All baseline scenarios shall be assessed for consistency with government policies and legal requirements. In addition, any baseline scenario that is inconsistent with government policies and instead constrains their intended outcomes shall be excluded.

85. The baseline scenario shall remain valid for five years. The baseline scenario shall be re-identified upon renewal of the crediting period or five years after the start date of the crediting period, whichever occurs first.

[35] For example, if the PoA distributes one model of efficient charcoal cookstoves to some households and one model of electric cookstoves to other households, then these would require different baseline emissions methods.

7.3.2. Baseline energy consumption caps and flags

86. The following baseline fuel consumption caps and flags shall apply. These were developed based on published and independent KPT studies in locations in Central and South America, Sub-Saharan Africa, and Asia. Further explanation is provided in Appendix 10.

87. Baseline energy consumption values for urban and peri-urban users shall be capped at 0.00295 TJ of useful energy delivered per person-year (equivalent to 0.40 tonnes charcoal per person-year).[36] Values above 0.0015 TJ of useful energy delivered per person-year (equivalent to 0.20 tonnes charcoal per person-year) shall be flagged for additional justification.

88. Baseline energy consumption values for rural users shall be capped at 0.0047 TJ of useful energy delivered per person-year (equivalent to 2.0 tonnes fuelwood per person-year). Values above 0.0023 TJ of useful energy delivered per person-year (equivalent to 1.0 tonnes fuelwood per person-year) shall be flagged for additional justification.

89. A summary of the baseline caps and flags is presented in Table 3 below.

Table 3. Summary of the baseline caps and flags

User group	Cap	Flag	Unit
Rural users	0.0047	> 0.0023	TJ useful energy delivered / (person-year)
	0.031	0.0156	TJ fuelwood energy / (person-year)
	2	> 1.0	Tonnes fuelwood /(person-year)
Urban or peri-urban users	0.00295	> 0.0015	TJ useful energy delivered / (person-year)
	0.012	0.0059	TJ charcoal energy / (person-year)
	0.4	>0.2	Tonnes charcoal /(person-year)

90. Where the flagged threshold is exceeded, activity participants shall provide justification in the PDD or CP-DD explaining why a higher baseline is realistic for the applicable geographic area. Such justification may include, for example, the use of plancha cookstoves or circumstances where wood is relatively abundant. Where no appropriate and credible justification can be provided, the baseline energy consumption values shall be capped to the flag values.

Question 6: The MEP is considering the appropriateness of the flag and cap values. Further, the MEP is considering alternatives for aggregating or disaggregating the cap values, for example on a geographical basis. Finally, the MEP is also considering the utility of the "flag" values and requests stakeholder inputs on all these issues.

7.4. Calculation of unadjusted baseline emissions

91. Emissions shall be calculated based on fuel consumption expressed on an energy basis. Conversions from fuel mass to energy shall be performed using equation (1):

[36] As an example, the cap for multiple baseline fuels would be as follows: Charcoal consumption: (0.80× 0.00295 TJ of useful energy/(person-year)) ÷ 25 per cent thermal efficiency = 0.00944 TJ of fuel energy /(person-year) of charcoal; LPG (0.20× 0.00295 TJ of useful energy /(person-year)) ÷ 50 per cent thermal efficiency = 0.00118 TJ of fuel energy/(person-year) of LPG.

$$EC_x = FC_x \times NCV_x \qquad \text{Equation (1)}$$

Where:

EC_x	=	Energy consumption for fuel type x, where x can be fuel *i, j,* or *k*. (TJ)
FC_x	=	Fuel consumption for fuel type x, where x can be fuel *i, j,* or *k*. (tonnes)
NCV_x	=	Net calorific value of fuel type x, where x can be fuel *i, j,* or *k*. (TJ / tonnes) (see Appendix 5)

92. Under all methods, unadjusted baseline emissions are calculated using equation (2): [37]

$$BE_y = BE_{CO2,rr,i,y} + BE_{nonCO2,i,y} + BE_{CO2,j,y} + BE_{nonCO2,j,y} + UE_{BL,j,y} \qquad \text{Equation (2)}$$

Where:

BE_y	=	Unadjusted baseline emissions in year *y* (t CO_2eq)
$BE_{CO2,rr,i,y}$	=	Unadjusted baseline emissions of CO_2 from greenhouse gas reservoirs subject to reversal risk for fuel type *i* in year *y* (t CO_2eq)
$BE_{CO2,j,y}$	=	Unadjusted baseline emissions of CO_2 not subject to reversal risk from the combustion of fuel type *j* in year *y* (t CO_2eq)
$BE_{nonCO2,i,y}$	=	Unadjusted non-CO_2 baseline emissions from fuel type *i* not subject to reversal risk in year *y* (t CO_2eq)
$BE_{nonCO2,j,y}$	=	Unadjusted non-CO_2 baseline emissions from fuel type *j* not subject to reversal risk in year *y* (t CO_2eq)
$UE_{BL,j,y}$	=	Upstream baseline emissions for fuel type *j* in year y (t CO_2eq)
i	=	Fuel types subject to reversal risk (fuelwood or charcoal)[38]
j	=	Fuel types not subject to reversal risk (e.g., fossil fuels or dung)
y	=	Calendar year of the crediting period

7.4.1. Baseline emissions for monitored energy consumption

93. For these Article 6.4 activities, energy consumption is determined by measuring fuel or energy consumption through built-in or external data loggers, for all project cookstoves, or by tracking all fuel sales to determine the total energy consumption of all project cookstoves used by activity households. Two options are provided for calculating baseline emissions for these Article 6.4 activities.

[37] In this mechanism methodology, the subscripts *i* and *j* represent either a fuel or a fuel–cookstove combination, depending on the parameter concerned. For fuel-specific parameters (e.g., fNRB), *i* and *j* refer to the fuel only (e.g., fuelwood, charcoal, LPG). For parameters specific to a fuel-cookstove combination (e.g., thermal efficiency or emissions factors), *i* and *j* refers to the corresponding fuel–cookstove combination (e.g., fuelwood with three-stone fire or fuelwood with a high-efficiency wood cookstove).

[38] The characterization of fuels as type *i* and type *j* is based on whether there is an associated reversal risk. It is recognized that fuel that is sourced from standing biomass of forest such as fuelwood and charcoal have associated risk of reversal whereas other sources such as electricity, kerosene, LPG, dung, and locally collected crop residues do not have associated risk of reversal.

94. Under Method 1 (see section 7.4.1.1), baseline energy consumption shall be back calculated from the energy consumption of the project cookstoves using the ratio of the specific energy consumption of the baseline and project cookstoves, as determined through CCTs conducted for each cookstove model. Under this option, a baseline CCT measurement campaign shall be conducted and shall form the basis for calculating unadjusted baseline emissions.

95. Under Method 2 (see section 7.4.1.2), the baseline and activity KPTs shall be used to define a baseline emissions quotient proportional to the project cookstove energy use, to multiply by the total monitored activity energy consumption for the monitoring period to determine baseline emissions. Under this option, a baseline KPT measurement campaign shall be conducted and shall form the basis for calculating unadjusted baseline emissions.

7.4.1.1. Method 1: Specific energy consumption ratios

96. This approach calculates baseline energy consumption for each displaced cooking technology-fuel combination by determining the equivalent amount of energy that would be required by the baseline technology(ies) to provide the same level of cooking service as the project cookstove, based on its monitored energy consumption.

97. The estimate shall be based on specific energy consumption ratios derived from CCTs conducted for each baseline and project cookstove model, in line with the guidelines and requirements in the corresponding parameter tables and Appendix 7.

98. Unadjusted baseline emissions of CO_2 from greenhouse gas reservoirs that are subject to reversal risk shall be calculated using equation (3). Fuel types *i* (fuelwood and charcoal) shall apply equation (3) as follows:

$$BE_{CO2,rr,i,y} = \sum_{i} \left(EC_{d-BL,i,y} \times fNRB_{i,y} \times \left(EF_{i,CO2} + EF_{i,CO2,upstream}\right)\right) \quad \text{Equation (3)}$$

Where:

$BE_{CO2,rr,i,y}$	=	Unadjusted baseline emissions of CO_2 from greenhouse gas reservoirs subject to reversal risk for fuel type *i* in year *y* (t CO_2)
$EC_{d-BL,i,y}$	=	Displaced energy consumption of fuel *i* in baseline scenario in year *y* (TJ)
$fNRB_{i,y}$	=	Fraction of non-renewable biomass for fuel type i consumed in year *y* (per cent)
$EF_{i,CO2}$	=	CO_2 emission factor for fuel types *i* (t CO_2 / TJ)
$EF_{i,CO2,upstream}$	=	Upstream CO_2 emission factor for fuel type *i* (t CO_2 / TJ)

99. Unadjusted baseline emissions of CO_2 from the combustion of fuel types *j*, which are not subject to reversal risk, shall be calculated using equation (4) as follows:

$$BE_{CO2,j,y} = \sum_{j} \left(EC_{d-BL,j,y} \times EF_{j,CO2}\right) \quad \text{Equation (4)}$$

Where:

$BE_{CO2,j,y}$	=	Unadjusted baseline emissions of CO_2 from the combustion of fuel type *j* that are not subject to reversal risk in year *y* (t CO_2eq)
$EC_{d-BL,j,y}$	=	Displaced energy consumption of fuel type *j* in the baseline scenario in year *y* (TJ)
$EF_{j,CO2}$	=	CO_2 emission factor for fuel type *j* (t CO_2 / TJ)
j	=	Fuel types not subject to reversal risk (e.g. fossil fuels or dung)
y	=	Calendar year of the crediting period (number)

100. Unadjusted non-CO_2 baseline emissions shall be calculated using equations (5) and (6) as follows:

$$BE_{nonCO2,i,y} = \sum_{i} \left(EC_{d-BL,i,y} \times \left(EF_{i,nonCO2} + EF_{i,nonCO2,upstream}\right)\right)$$ Equation (5)

$$BE_{nonCO2,j,y} = \sum_{j} \left(EC_{d-BL,j,y} \times EF_{j,nonCO2}\right)$$ Equation (6)

Where:

$EC_{d-BL,i,y}$	=	Displaced energy consumption of fuel type *i* in the baseline scenario in year *y* (TJ)
$EC_{d-BL,j,y}$	=	Displaced energy consumption of fuel type *j* in the baseline scenario in year *y* (TJ)
$EF_{i,nonCO2}$	=	Non-CO_2 emission factor for fuel type *i* (t CO_2eq /TJ)
$EF_{i,nonCO2,upstream}$	=	Upstream non-CO_2 emission factor for fuel type *i* (t CO_2eq /TJ)
$EF_{j,nonCO2}$	=	Non-CO_2 emission factor for fuel type *j* (t CO_2eq / TJ)
I	=	Fuel types subject to reversal risk (fuelwood and charcoal)
j	=	Fuel types not subject to reversal risk (e.g., fossil fuels or dung)
y	=	Calendar year of the crediting period (number)

101. The baseline energy consumption displaced by the project cookstove shall be apportioned proportionately in accordance with equation (7) and (8): [39]

$$EC_{d-BL,i,y} = tEC_{AS,k,y} \times PC_{b,i} \times \left(\frac{SEC_{BL,i}}{SEC_{AS,k}}\right)$$ Equation (7)

[39] Where multiple fuel-cookstove combinations are used in the baseline by the end user in the same household, the proportion of use shall be established through surveys or cookstove use monitoring (see Appendix 9 for guidance on SUMs). For example, if baseline cookstove use is estimated as 50% of cooking events on a three-stone fire, 10% on a charcoal cookstove, and 40% on an LPG cookstove, n the proportion of cooking events parameter shall reflect this distribution. The sum of $PC_{b,i}$ and $PC_{b,j}$ over all fuels shall equal 100%.

$$EC_{d-BL,j,y} = tEC_{AS,k,y} \times PC_{b,j} \times \left(\frac{SEC_{BL,j}}{SEC_{AS,k}}\right)$$ Equation (8)

Where:

$EC_{d-BL,i,y}$	=	Displaced energy consumption of fuel type *i* in the baseline scenario in year *y*. (TJ)
$EC_{d-BL,j,y}$	=	Displaced energy consumption of fuel type *j* in the baseline scenario in year *y* (TJ)
$PC_{b,i}$	=	Proportion of cooking events using fuel type *i* in the baseline scenario (per cent)
$PC_{b,j}$	=	Proportion of cooking events using fuel *j* in the baseline scenario (per cent)
$tEC_{AS,k,y}$	=	Total monitored energy consumption of activity fuel type *k* in year y (TJ)
$SEC_{BL,i}$	=	Specific energy consumption of fuel *i* required to cook a given quantity of food in the baseline scenario, as determined from the baseline CCT (MJ / kg food)
$SEC_{BL,j}$	=	Specific energy consumption of fuel type *j* required to cook a given quantity of food in the baseline scenario, as determined from the baseline CCT (MJ / Kg food)
$SEC_{AS,k}$	=	Specific energy consumption of activity fuel type *k* required to cook a given quantity of food in the activity scenario, as determined from the activity CCT (MJ / Kg food)
i	=	Fuel types (fuelwood and charcoal)
j	=	Fuel types (e.g., fossil fuels or dung)
y	=	Calendar year of the crediting period (number)
k	=	Fuel type (e.g., electricity)

7.4.1.2. Method 2: Baseline emission quotient using KPTs

102. This approach determines, for each fuel type, a baseline emission quotient, which corresponds to the GHG emissions caused in the baseline scenario per unit of energy consumed in the activity scenario, using energy consumption measured through an ex-ante KPT for the baseline scenario and an ex-post KPT for the activity scenario.

103. Unadjusted baseline emissions of CO_2 from greenhouse gas reservoirs that are subject to reversal risk shall be calculated using equation (9). Fuel types *i* (fuelwood and charcoal) shall also apply equation (9) as follows:

$$BE_{CO2,rr,i,y} = (EQ_{BL,CO2,rr,i} \times tEC_{AS,k,y})$$ Equation (9)

Where:

$BE_{CO2,rr,i,y}$	=	Unadjusted baseline emissions of CO_2 from greenhouse gas reservoirs that are subject to reversal risk for fuel type *i* in year *y* (t CO_2)
$EQ_{BL,CO2,rr,i}$	=	Baseline emissions quotient of CO_2 from greenhouse gas reservoirs that are subject to reversal risk for fuel type *i* for the consumption of energy for cooking (tCO_2/TJ or tCO_2/kWh)

$tEC_{AS,k,y}$	=	Total monitored energy consumption of activity fuel k in year y (TJ or kWh)
y	=	Calendar year of the crediting period (number)
k	=	Fuel type (e.g., electricity)

104. Unadjusted baseline emissions of CO_2 from the combustion of fuel types *j* are not subject to reversal risk and are calculated using equation (10) as follows:

$$BE_{CO2,j,y} = \sum_{j} \left(EQ_{BL,CO2,j} \times tEC_{AS,k,y}\right) \quad \text{Equation (10)}$$

Where:

$BE_{CO2,j,y}$	=	Unadjusted baseline emissions not subject to reversal risk for fuel types *j* in year *y* (t CO_2eq)
$EQ_{BL,CO2,j}$	=	Baseline emissions quotient of CO_2 for fuel type *j* for the consumption of energy for cooking ($tCO_2/TJ\ or\ tCO_2/kWh$)
$tEC_{AS,k,y}$	=	Total monitored energy consumption of activity fuel k in year y (TJ or kWh)
y	=	Calendar year of the crediting period (number)

105. Unadjusted non-CO_2 baseline emissions shall be calculated using equations (11) and (12) as follows:

$$BE_{nonCO2,i,y} = \sum_{i} \left(EQ_{BL,nonCO2,i} \times tEC_{AS,k,y}\right) \quad \text{Equation (11)}$$

$$BE_{nonCO2,j,y} = \sum_{j} \left(EQ_{BL,nonCO2,j} \times tEC_{AS,k,y}\right) \quad \text{Equation (12)}$$

Where:

$EQ_{BL,nonCO2,i}$	=	Baseline emissions quotient of non-CO_2 emissions for fuel type *i* for the consumption of energy for cooking ($tCO_2eq/TJ\ or\ tCO_2eq/kWh$)
$EQ_{BL,nonCO2,j}$	=	Baseline emissions quotient of non-CO_2 emissions for fuel type *j* for the consumption of energy for cooking ($tCO_2eq/TJ\ or\ tCO_2eq/kWh$)
$tEC_{AS,k,y}$		Total monitored energy consumption of activity fuel k in year y (Tj or kWh)
y		Calendar year of the crediting period (number)

106. This approach involves determining baseline emission quotients per unit activity fuel energy by using the energy consumption through its measurement by ex-ante KPTs of the baseline scenario and ex-post KPTs of the activity scenario, carried out in line with

the guidelines and requirements in the corresponding parameter tables and Appendix 6 which shall be undertaken using the following equations (13) to (16):

$$EQ_{BL,CO2,rr,i} = \frac{\sum_i [EC_{BL,KPT,i} \times fNRB_i \times (EF_{i,CO2} + EF_{i,CO2,upstream})]}{tEC_{AS,KPT,k}}$$ Equation (13)

$$EQ_{BL,CO2,j} = \frac{\sum_j \ [EC_{BL,KPT,j} \times EF_{j,CO2}]}{tEC_{AS,KPT,k}}$$ Equation (14)

$$EQ_{BL,nonCO2,i} = \frac{\sum_i \ [EC_{BL,KPT,i} \times (EF_{i,nonCO2} + EF_{i,nonCO2,upstream})]}{tEC_{AS,KPT,k}}$$ Equation (15)

$$EQ_{BL,nonCO2,j} = \frac{\sum_j [EC_{Bl,KPT,j} \times EF_{j,nonCO2}]}{tEC_{AS,KPT,k}}$$ Equation (16)

Where:

$EC_{BL,KPT,i}$	=	Energy consumption of each baseline fuel type *i* based on the baseline KPT (TJ / person-year)
$fNRB_i$	=	Fraction of non-renewable woody biomass for fuel type i consumed (per cent)
$EF_{i,CO2}$	=	CO_2 emission factor for fuel type *i* (t CO_2 / TJ)
$EF_{i,CO2,upstream}$	=	CO_2 emission factor for upstream emissions for fuel type *i* (t CO_2 / TJ)
$tEC_{AS,KPT,k}$	=	Monitored energy consumption of activity fuel k for project cookstove(s) only, based on the activity KPT (TJ / person-year or kWh / person-year)
$EC_{BL,KPT,j}$	=	Energy consumption of each baseline fuel type *j* based on baseline KPT (TJ / person-year)
$EF_{j,CO2}$	=	CO_2 emission factor for fuel type *j* (t CO_2 / TJ)
$EF_{i,nonCO2}$	=	Non-CO_2 emission factor for fuel type *i* (t CO_2eq /TJ)
$EF_{i,nonCO2,upstream}$	=	Non-CO_2 emission factor for upstream emissions for fuel type *i* (t CO_2eq /TJ)
$EF_{j,nonCO2}$	=	Non-CO_2 emission factor for fuel type *j* (t CO_2eq / TJ)

107. For baseline energy sources $EC_{BL,KPT,i}$ or $EC_{BL,KPT,j}$, equation (1) shall be used to convert fuel mass to fuel energy.

108. Where the project cookstove uses electricity, the equation will result in a quotient expressed in tCO_2eq / kWh.

7.4.2. Baseline emissions for sampling based energy consumption

109. Baseline emissions for these activities shall be calculated based on an ex-ante KPT of the baseline scenario.

110. Unadjusted baseline emissions of CO_2 from greenhouse gas reservoirs that are subject to reversal risk shall be calculated using equation (17). Primary fuel type *i* (fuelwood and charcoal) shall apply equation (17) as follows:

$$BE_{CO2,rr,i,y} = \sum_{i} \left(EC_{BL,i,y} \times fNRB_{i,y} \times \left(EF_{i,CO2} + EF_{i,CO2,upstream}\right)\right)$$ Equation (17)

Where:

$BE_{CO2,rr,i,y}$	=	Unadjusted baseline emissions of CO_2 from greenhouse gas reservoirs that are subject to reversal risk for primary fuel type *i* in year *y* (t CO_2eq)
$EC_{BL,i,y}$	=	Consumption of primary fuel type *i* in the baseline scenario in year *y* (TJ)
$fNRB_{i,y}$	=	Fraction of non-renewable biomass of primary fuel type i consumed in year *y* (per cent)
$EF_{i,CO2}$	=	CO_2 emission factor for primary fuel type *i* (t CO_2 / TJ)
$EF_{i,CO2,upstream}$	=	Upstream CO_2 emission factor for primary fuel type *i* (t CO_2 / TJ)
i	=	Fuel type (fuelwood or charcoal)
y	=	Calendar year of the crediting period

111. Unadjusted baseline emissions of CO_2 from the combustion of fuel types re not subject to reversal risk and shall be calculated using equation (18). This equation shall apply where fuel type *j* (e.g., fossil fuels or dung) is identified in the pre-activity survey and measured in the baseline KPT.

$$BE_{CO2j,y} = \sum_{j} \left(EC_{BL,j,y} \times EF_{j,CO2}\right)$$ Equation (18)

Where:

$BE_{CO2,j,y}$	=	Unadjusted baseline emissions of CO_2 not subject to reversal risk for secondary fuel type *j* in year *y* (t CO_2eq)
$EC_{BL,j,y}$	=	Consumption of secondary fuel type *j* in the baseline scenario in year *y* (TJ)
$EF_{j,CO2}$	=	CO_2 emission factor for secondary fuel type *j* (t CO_2 / TJ)
j	=	Fuel type (e.g., fossil fuels or dung)
y	=	Calendar year of the crediting period (number)

112. Unadjusted non-CO_2 baseline emissions shall be calculated using equations (19) and (20) as follows:

$$BE_{nonCO2,i,y} = \sum_{i} \left(EC_{BL,i,y} \times \left(EF_{i,nonCO2} + EF_{i,nonCO2,upstream}\right)\right.$$ Equation (19)

$$BE_{nonCO2,j,y} = \sum_{j} \left(EC_{BL,j,y} \times EF_{j,nonCO2}\right)$$ Equation (20)

Where:

$BE_{nonCO2,i,y}$	=	Unadjusted non-CO_2 baseline emissions for fuel type *i* in year *y* (t CO_2eq)
$EC_{BL,i,y}$	=	Consumption of fuel type *i* in the baseline scenario in year *y* (TJ)
$EF_{i,nonCO2}$	=	Non-CO_2 emission factor for fuel type *i* (t CO_2eq / TJ)
$BE_{nonCO2,j,y}$	=	Unadjusted non-CO_2 baseline emissions for fuel type *j* in year *y* (t CO_2eq)
$EC_{BL,j,y}$	=	Consumption of fuel type *j* in the baseline scenario in year *y* (TJ)
$EF_{j,nonCO2}$	=	Non-CO_2 emission factor for fuel type *j* (t CO_2eq / TJ)
i	=	Fuel type (fuelwood and charcoal)
j	=	Fuel type (e.g. fossil fuels or dung)
y	=	Calendar year of the crediting period (number)

113. Activity participants shall determine energy consumption in the baseline scenario for fuel types *i* and *j* for the sum of all households, as indicated in equations (21) and (22), based on an ex-ante KPT of the baseline scenario:

$$EC_{BL,i,y} = H_y \times EC_{BL,KPT,i} \times \frac{\Psi_y \times \sum_h Days_{y,h}}{CD_y}$$ Equation (21)

$$EC_{BL,j,y} = H_y \times EC_{BL,KPT,j} \times \frac{\Psi_y \times \sum_h Days_{y,h}}{CD_y}$$ Equation (22)

Where:

$EC_{BL,i,y}$	=	Consumption of fuel type *i* in the baseline scenario in year *y* (TJ)
$EC_{BL,j,y}$	=	Consumption of fuel type *j* in the baseline scenario in year *y* (TJ)
H_y	=	Average household size in year *y* (number of persons per household)
$EC_{BL,KPT,i}$	=	Energy consumption of baseline fuel type *i* based on the baseline KPT (TJ / (person-year))
$EC_{BL,KPT,j}$	=	Energy consumption of baseline fuel type *j* based on the baseline KPT (TJ / (person-year))
Ψ_y	=	Percent of activity households with cookstoves present that qualify as user households in year *y* (per cent)
$Days_{y,h}$	=	Total possible number of project cookstove days during the year *y* in household *h* (day)
CD	=	Number of days in calendar year *y* (day)
h	=	Article 6.4 activity household
i	=	Fuel type (fuelwood or charcoal)
j	=	Fuel type (e.g., fossil fuels or dung)
y	=	Calendar year of the crediting period (number)

7.4.2.1. Option 1 (valid until 31 December 2027)

114. The parameter representing the percentage of activity households with cookstoves that qualify as user households (Ψ_y) shall be determined exclusively through usage surveys. In this case, the parameter shall be applied as the lower bound of the confidence interval at the 95/10 reliability level of the survey result. A cap of 90 per cent or 58 per cent shall be applied, even where the survey results indicate a higher usage rate.

115. The applicable cap shall depend on the customer support actions undertaken by the activity participants, as described below.

116. Customer support actions: To be eligible to claim up to 90 per cent of the total possible cookstove days ($Days_{y,h}$), activity participants that do not estimate Ψ_y using SUMs shall undertake the following customer support actions during each monitoring period and provide details of how each condition has been met in the Activity Information Cover Sheet (see appendix 1) included in the monitoring report for that monitoring period:

(a) Provide evidence of household participant support activities that shall include the provision of materials (printed, in-person, and video) on how to operate the cookstove to prepare common local foods, troubleshoot common operational issues, and undertake minor repairs (including how to access any necessary parts). All communications and materials provided to household participants shall be in the local language(s) commonly used in the location where the Article 6.4 activity is implemented; and

(b) Household participants shall be able to contact the activity participant or its representative to access continuously available, ongoing support (e.g., maintenance and repair services) through a commonly used, toll-free communications channel that is known to household participants. Contact by household participants through this communications channel shall have occurred during the monitoring period.

117. Activity participants that do not provide evidence that each of these customer support actions has been undertaken may claim a maximum value of 58 per cent for Ψ_y for the corresponding monitoring period. These caps shall not apply where Ψ_y is estimated using SUMs.

7.4.2.2. Option 2 (mandatory from 01 January 2028)

118. The parameter representing the percentage of activity households with cookstoves that qualify as user households (Ψ_y) shall be estimated through measurements using SUMs, which may be conducted on a sampling basis.

119. In this case, the parameter representing the percentage of activity households with cookstoves that qualify as user households (Ψ_y) shall be applied as the lower bound of the confidence interval at the 95/10 reliability level.

7.4.3. Upstream emissions

120. Upstream baseline emissions for fuel type *j* in the baseline scenario in year *y* ($UE_{BL,j,y}$) shall be calculated using equation (23) as follows:

$$UE_{BL,j,y} = EC_{BL,j,y} \times EF_{j,upstream} \quad \text{Equation (23)}$$

Where:

$UE_{BL,j,y}$	=	Upstream baseline emissions for fuel type *j* in the baseline scenario in year *y* (t CO_2eq)
$EC_{BL,j,y}$	=	Consumption of fuel type *j* in the baseline scenario in year *y* (TJ)
$EF_{j,upstream}$	=	Upstream emission factor for fuel type *j* (t CO_2eq/ TJ)

121. For activities applying the methods in section 7.4.2, Baseline emissions for sampling based energy consumption, $EC_{BL,j,y}$ shall be as defined in equation (20).

122. For activities applying the methods in section 7.4.1.1, Option 1: Specific fuel consumption ratios, $EC_{BL,i,y}$ shall be taken as equal to $EC_{d-BL,j,y}$ as defined previously in equation (8).

Where:

$EC_{d-BL,i,y}$	=	Displaced energy consumption of fuel type i in the baseline scenario in year y. (TJ)
$EC_{d-BL,j,y}$	=	Displaced energy consumption of fuel type j in baseline scenario in year y (TJ)
$PC_{b,i}$	=	Proportion of cooking events using fuel type i in the baseline scenario (per cent)
$PC_{b,j}$	=	Proportion of cooking events using fuel j in the baseline scenario (per cent)
$tEC_{AS,k,y}$	=	Total monitored energy consumption of activity fuel type k in year y (TJ)
$SEC_{BL,i}$	=	Specific energy consumption of fuel i required to cook a given quantity of food in the baseline scenario, as determined from the baseline CCT (MJ / kg food)
$SEC_{BL,j}$	=	Specific energy consumption of fuel type j required to cook a given quantity of food in the baseline scenario, as determined from the baseline CCT (MJ / Kg food)
$SEC_{AS,k}$	=	Specific energy consumption of activity fuel type k required to cook a given quantity of food in the activity scenario, as determined from the activity CCT (MJ / Kg food)
i	=	Fuel types (fuelwood and charcoal)
j	=	Fuel types (e.g., fossil fuels or dung)
y	=	Calendar year of the crediting period (number)
k	=	Fuel type (electricity)

123. Option 2: Baseline emission quotient using KPTs, $EC_{BL,j,y}$ shall be calculated by scaling the energy consumption for each fuel determined during the baseline KPT per TJ of activity fuel determined during the activity KPT by the total monitored activity fuel consumption for the year. It shall be calculated using equation (24) as follows:

$$EC_{BL,j,y} = \frac{EC_{BL,KPT,j}}{tEC_{AS,KPT,k}} \times tEC_{AS,k,y}$$

Equation (24)

Where:

$EC_{BL,j,y}$	=	Energy consumption for fuel type *j* in the baseline scenario in year *y* (TJ)

$EC_{BL,KPT,j}$	=	Energy consumption of each baseline fuel type *j* based on the baseline KPT (TJ / person-year)
$tEC_{AS,KPT,k}$	=	Monitored energy consumption of activity fuel k for project cookstove(s) only from the activity KPT (TJ / person-year or kWh / person-year)
$tEC_{AS,k,y}$	=	Total monitored energy consumption of activity fuel k in year *y* (TJ or kWh)

7.5. Application of the downward adjustment

124. The downward adjusted baseline emissions shall be determined in the following steps:

(a) Step 1: Determination of the initial downward adjustment ($DA_{initial}$);

(b) Step 2: Determination of the annual increase in the downward adjustment (*INDA*);

(c) Step 3: Determination of the downward adjusted baseline emissions ($BE_{adj,y}$).

7.5.1. Step 1. Determination of the initial downward adjustment ($DA_{initial}$)

125. The sub-steps below shall be followed to determine the initial downward adjustment for baseline emissions from electricity generation ($DA_{initial}$).

Note 2: This draft version of the methodology contains two options to determine the initial downward adjustment. Option 1 applies the approach in paragraph 64(a) of the Baseline Standard which considers all sources of uncertainty affecting the baseline. Option 2 applies an alternative approach, as referred to in paragraph 64(b) of the Baseline Standard, and limits the consideration of uncertainty to certain parameters. The MEP would like to seek feedback on these two options.

[Option 1:

7.5.1.1. Step 1.1. Determine the initial downward adjustment based on uncertainty ($DA_{initial,UNC}$)

126. Activity participants shall determine the initial downward adjustment as the uncertainty at the lower bound of the 95 per cent confidence interval relative to the central estimate of the estimated unadjusted baseline emissions in the first crediting period ($UNC_{BE,CP1}$), as follows:

$$DA_{initial,UNC} = UNC_{BE,CP1} \quad \text{Equation (25)}$$

Where:

$DA_{initial,UNC}$	=	Initial downward adjustment based on uncertainty (Dimensionless)
$UNC_{BE,EG,CP1}$	=	Uncertainty of the unadjusted baseline emissions in the first crediting period (fraction)

127. The uncertainty of the unadjusted baseline emissions in the first crediting period *($UNC_{BE,CP1}$)* shall be determined ex-ante in the PDD, following the relevant provisions in this mechanism methodology. Activity participants shall consider all sources of uncertainty, including uncertainty in data (e.g., measurements), parameters (e.g., representativeness of default values), assumptions (e.g., the baseline scenario), and

methods (e.g., models to quantify emission reductions). Activity participants shall document the uncertainties assigned to each parameter, specify assumptions made, and include any associated references for estimating the uncertainties of parameters in the PDD or CP-DD. This documentation and the derivation of the overall uncertainty through error propagation or Monte Carlo simulation methods, shall be provided together with the PDD or CP-DD (e.g., in a spreadsheet).

7.5.1.2. Step 1.2. Determine the minimum initial downward adjustment (*$DA_{initial,min}$*)

128. The minimum initial downward adjustment ($DA_{initial,min}$) shall be determined as follows:

$$DA_{initial,min} = \frac{(BE_{y1} - AE_{y1})}{BE_{,y1}} \times 0.1$$

Equation (26)

Where:

$DA_{initial,min}$	=	Minimum initial downward adjustment (dimensionless)
BE_{y1}	=	Unadjusted baseline emissions in year y_1 (t CO_2eq)
AE_{y1}	=	Activity emissions in year *y1* (t CO_2eq)
0.1	=	Default factor to determine the minimum downward adjusted baseline provided in the “Standard: Setting the baseline in mechanism methodologies” (A6.4-STAN-METH-004)[40]
y_1	=	Calendar year of the start date of the first crediting period

129. The baseline emissions and activity emissions in year *y1* shall be determined ex-ante in the PDD, consistent with the provisions in this section and section 8, respectively.

7.5.1.3. Step 1.3. Compare $DA_{initial,UNC}$ and $DA_{initial,min}$

130. To determine the initial downward adjustment ($DA_{initial}$), activity participants shall use the higher of the two values determined in steps 2 and 3 above, as follows:

$$DA_{initial} = max(DA_{initial,min}\ ;\ DA_{initial,UNC})$$

Equation (27)

Where:

$DA_{initial}$	=	Initial downward adjustment (dimensionless)
$DA_{initial,min}$	=	Minimum initial downward adjustment (dimensionless)
$DA_{initial,UNC}$	=	Initial downward adjustment based on uncertainty (dimensionless)

End of option 1].

[Option 2:

40 See https://unfccc.int/sites/default/files/resource/A6.4-STAN-METH-004.pdf.

7.5.1.4. Step 1.1. Determine the lower bound of the uncertainty interval for the baseline energy consumption

131. Activity participants shall estimate the overall uncertainty of the baseline energy consumption and determine the lower bound of the 95 per cent confidence interval relative to the central estimate for each baseline emissions methods, as follows:

(a) For activities applying the methods in section 7.4.2, baseline emissions for sampling-based energy consumption, uncertainty shall be estimated for the parameters $EC_{BL,KPT,i}$ and $EC_{BL,KPT,j}$;

(b) For activities applying the methods in section 7.4.1.1,

(i) Option 1: specific fuel consumption ratios, uncertainty shall be estimated for the parameters $SEC_{BL,i}$, $SEC_{BL,j}$, $PC_{b,i}$, and $PC_{b,j}$;

Where:

$EC_{d-BL,i,y}$	=	Displaced energy consumption of fuel type i in the baseline scenario in year y. (TJ)
$EC_{d-BL,j,y}$	=	Displaced energy consumption of fuel type j in baseline scenario in year y (TJ)
$PC_{b,i}$	=	Proportion of cooking events using fuel type i in the baseline scenario (per cent)
$PC_{b,j}$	=	Proportion of cooking events using fuel j in the baseline scenario (per cent)
$tEC_{AS,k,y}$	=	Total monitored energy consumption of activity fuel type k in year y (TJ)
$SEC_{BL,i}$	=	Specific energy consumption of fuel i required to cook a given quantity of food in the baseline scenario, as determined from the baseline CCT (MJ / kg food)
$SEC_{BL,j}$	=	Specific energy consumption of fuel type j required to cook a given quantity of food in the baseline scenario, as determined from the baseline CCT (MJ / Kg food)
$SEC_{AS,k}$	=	Specific energy consumption of activity fuel type k required to cook a given quantity of food in the activity scenario, as determined from the activity CCT (MJ / Kg food)
i	=	Fuel types (fuelwood and charcoal)
j	=	Fuel types (e.g., fossil fuels or dung)
y	=	Calendar year of the crediting period (number)
k	=	Fuel type (electricity)

(ii) Option 2: Baseline emission quotient using KPTs, uncertainty shall be estimated for the parameters $EC_{BL,KPT,i}$ and $EC_{BL,KPT,j}$.

132. Activity participants shall consider uncertainty in all parameters used to calculate the baseline energy consumption, following the guidance in Volume 1, Chapter 3 of the 2019 Refinement to the IPCC Guidelines through the error propagation method or Monte Carlo simulation.

133. Activity participants shall document the uncertainties assigned to the inputs to each parameter, specify assumptions made, and include any associated references used to estimate the overall uncertainty in the PDD or CP-DD. This documentation, including the

derivation of the overall uncertainty using the error propagation or Monte Carlo simulation method, shall be provided together with the PDD or CP-DD (e.g., in a spreadsheet).

7.5.1.5. Step 1.2. Determine the downward-adjusted baseline emissions based on another approach to uncertainty

134. For the calendar year of the start date of the first crediting period, activity participants shall determine the downward-adjusted baseline emissions based on another approach to uncertainty ($BE_{adj,UNC,y1}$) as follows:

(a) For activities applying the methods in section 7.4.2 activity participants shall use the values at the lower bound of the 95 per cent confidence interval for the parameters $EC_{BL,KPT,i}$ and $EC_{BL,KPT,j}$ in equations (21) and (22), and shall subsequently carry out the related calculations through equation (2), where the result shall be $BE_{adj,UNC,y1}$;

(b) For activities applying the methods in section 7.4.1.1,

(i) Option 1: Specific fuel consumption ratios, activity participants shall recalculate equations (6) and (7) as follows:

a. Use the values at the lower bound of the 95 per cent confidence interval for the parameters $SEC_{BL,i}$ and $SEC_{BL,j}$;

b. For $PC_{b,i}$ and $PC_{b,j}$, rank the baseline fuel-technology combinations from the lowest to the highest emissions intensity, apply the proportion at the upper bound of the 95 per cent confidence interval for the combination with the lowest emissions intensity, and pro-rate the remaining proportions so that the sum of the proportions equals 100 per cent, while maintaining each proportion within the bounds of its 95 per cent confidence interval; and

c. Subsequently carry out the related calculations through equation (2), where the result shall be $BE_{adj,UNC,y1}$; and

Where:

$ECd - BL,i,y$	=	Displaced energy consumption of fuel type i in the baseline scenario in year y. (TJ)
$ECd - BL,j,y$	=	Displaced energy consumption of fuel type j in baseline scenario in year y (TJ)
$PC_{b,i}$	=	Proportion of cooking events using fuel type i in the baseline scenario (per cent)
$PC_{b,j}$	=	Proportion of cooking events using fuel j in the baseline scenario (per cent)
$tEC_{AS,k,y}$	=	Total monitored energy consumption of activity fuel type k in year y (TJ)
$SEC_{BL,i}$	=	Specific energy consumption of fuel i required to cook a given quantity of food in the baseline scenario, as determined from the baseline CCT (MJ / kg food)
$SEC_{BL,j}$	=	Specific energy consumption of fuel type j required to cook a given quantity of food in the baseline scenario, as determined from the baseline CCT (MJ / Kg food)

$SEC_{AS,k}$	=	Specific energy consumption of activity fuel type k required to cook a given quantity of food in the activity scenario, as determined from the activity CCT (MJ / Kg food)
i	=	Fuel types (fuelwood and charcoal)
j	=	Fuel types (e.g., fossil fuels or dung)
y	=	Calendar year of the crediting period (number)
k	=	Fuel type (electricity)

(ii) Option 2: Baseline emission quotient using KPTs, activity participants shall use the values at the lower bound of the 95 per cent confidence interval for the parameters $EC_{BL,KPT,i}$ and $EC_{BL,KPT,j}$ in equations (13), (14), (15) and (16), and shall subsequently carry out the related calculations through equation (2), where the result shall be $BE_{adj,UNC,y1}$.

7.5.1.6. Step 1.3. Determine the minimum downward adjusted baseline emissions

135. The minimum downward-adjusted baseline emissions shall be determined for the calendar year of the start date of the first crediting period using equations (28) to (33) as follows:

$$BE_{adj,min,y1} = BE_{y1} - \left(BE_{y1} - AE_{y1}\right) \times 0.1 \quad \text{Equation (28)}$$

Where:

$BE_{adj,min,y1}$	=	Minimum downward-adjusted baseline emissions during year y_1 (tCO_2eq)
BE_{y1}	=	Unadjusted baseline emissions during year y_1 ($t\ CO_2eq$)
AE_{y1}	=	Activity emissions during year y_1 ($t\ CO_2eq$)
y_1	=	Calendar year of the start date of the first crediting period

136. The activity emissions referred to in above equation shall be calculated in accordance with section 8 below.

7.5.1.7. Step 1.4. Compare $BE_{adj,UNC,y1}$ and $BE_{adj,min,y1}$

137. To determine the downward-adjusted baseline emissions for the calendar year of the start date of the first crediting period, activity participants shall use the lower of the two values determined in steps 2 and 3 above, as follows:

$$BE_{adj,y1} = \min(BE_{adj,min,y1}, BE_{adj,UNC,y1}) \quad \text{Equation (29)}$$

Where:

$BE_{adj,y1}$	=	Downward adjusted baseline emissions in year y_1 ($t\ CO_2e$)
$BE_{adj,min,y1}$	=	Minimum downward-adjusted baseline emissions in year y_1 (tCO_2eq)
$BE_{adj,UNC,y1}$	=	Downward-adjusted baseline emissions based on another approach to uncertainty in year y_1 ($t\ CO_2eq$)
y_1	=	Calendar year of the start date of the first crediting period

7.5.1.8. Step 1.5. Determine the initial downward adjustment *$DA_{initial}$*

138. In the subsequent section 7.5.2, on downward-adjusted baselines in subsequent years, the initial downward adjustment is an input parameter. It shall be determined as follows:

$$DA_{initial} = 1 - \min\left(\frac{BE_{adj,min,y1}}{BE_{y1}}, \frac{BE_{adj,UNC,y1}}{BE_{y1}}\right) \quad \text{Equation (30)}$$

Where:

$DA_{initial}$	=	Initial downward adjustment for baseline emissions (dimensionless)
$BE_{adj,min,y1}$	=	Minimum downward-adjusted baseline emissions in year y_1 ($t\ CO_2eq$)
$BE_{adj,UNC,y1}$	=	Downward-adjusted baseline emissions based on another approach to uncertainty in year y_1 ($t\ CO_2eq$)
BE_{y1}	=	Unadjusted baseline emissions in year y_1 ($t\ CO_2eq$)

End of option 2].

7.5.2. Step 2: Determination of the annual increase in the downward adjustment (INDA)

139. A value of 0.01 shall be applied for the annual increase in the downward adjustment (INDA). The first increase shall be applied in the calendar year following the calendar year of the start date of the first crediting period, following the provisions below.

7.5.3. Step 3: Determination of the downward adjusted baseline emissions (*$BE_{adj,y}$*)

140. For every calendar year y of the crediting period, the downward adjusted baseline emissions are determined as follows:

$$BE_{adj,y} = BE_y \times \left(1 - DA_y\right) \quad \text{Equation (31)}$$

Where:

$BE_{adj,y}$	=	Downward adjusted baseline emissions in the calendar year *y* (t CO_2eq)
BE_y	=	Unadjusted baseline emissions from the Article 6.4 activity in calendar year *y* (t CO_2eq)
DA_y	=	Downward adjustment applicable to calendar year *y* (dimensionless)
y	=	Calendar year of the crediting period

141. The downward adjustment applicable to calendar year y (*DA_y*) shall be determined as follows:

(a) For the first calendar year of the crediting period (y_1), *DA_1* = *DA_{intial}*.

(b) For the second and subsequent calendar years of the crediting period, *DA_y* shall be calculated as follows:

$$DA_y = DA_{initial} + INDA \times \left[\frac{cd_y}{nd_y} + (y - y1) - 1\right] \quad \text{Equation (32)}$$

Where:

DA_y	=	Downward adjustment applicable to calendar year *y* (dimensionless)
$INDA$	=	Annual increase in the downward adjustment (dimensionless)
cd_y	=	Number of crediting days in the calendar year *y* that belong to the subsequent year of the crediting period[41]
nd_y	=	Number of days in the calendar year *y*
y	=	Calendar year of the crediting period
$y1$	=	Calendar year of the start date of the first crediting period

(c) For the last calendar year *y* of the last crediting period, DA_y shall be calculated as follows:

$$DA_y = DA_{initial} + INDA \times [(y - y1) - 1] \quad \text{Equation (33)}$$

Where:

DA_y	=	Downward adjustment applicable to calendar year *y* (dimensionless)
$INDA$	=	Annual increase in the downward adjustment (dimensionless)
y	=	Calendar year of the crediting period
$y1$	=	Calendar year of the start date of the first crediting period

142. The 1 per cent annual reduction rate is intended to ensure that baselines remain ambitious over time while acknowledging the economic realities of clean cooking activities, which often face significant affordability barriers.

7.6. Identification of the conservative business-as-usual scenario and comparison of the downward-adjusted baseline and the conservative business-as-usual baseline

143. The conservative BAU scenario for Article 6.4 activities eligible under this mechanism methodology shall be deemed to be the same as the baseline scenario, i.e., the cooking service delivered by the Article 6.4 activity would otherwise be provided by the existing baseline technologies and fuel consumption patterns.

144. Since the conservative BAU scenario and the baseline scenario are the same, the conservative BAU emissions will always be higher than the downward-adjusted baseline emissions, except for the calendar year of the start date of the first crediting period. Therefore, for that year, the crediting baseline determined in equation (27) shall be multiplied by a factor of 0.99 to ensure that it is lower than the conservative BAU emissions. Activity participants do not need to calculate or compare the conservative BAU emissions in subsequent years.

8. Activity scenario

145. Under all methods, activity emissions shall be calculated as follows:

[41] For example, if the start date of the first crediting period is 1 October 2025, then in the year 2028, this parameter includes the days from 1 October 2028 to 31 December 2028 (i.e. 92 days).

$$AE_y = AE_{CO2,rr,i,y} + AE_{nonCO2,i,y} + AE_{CO2,j,y} + AE_{nonCO2,j,y} + UE_{AS,j,y}$$ Equation (34)

Where:

AE_y	=	Activity emissions during year *y* (t CO_2eq)
$AE_{CO2,rr,i,y}$	=	Activity emissions of CO_2 from greenhouse gas reservoirs that are subject to reversal risk for fuel type *i* in year *y* (t CO_2)
$AE_{nonCO2,i,y}$	=	Activity emissions of non-CO_2 from greenhouse gas reservoirs that are not subject to reversal risk for fuel type *i* in year *y* (t CO_2eq)
$AE_{CO2,j,y}$	=	Activity emissions of CO_2 that are not subject to reversal risk from the combustion of fuel type *j* in year *y* (t CO_2)
$AE_{nonCO2,j,y}$	=	Non-CO_2 activity emissions not subject to reversal risk for fuel type *j* in year *y* (t CO_2eq)
$UE_{AS,j,y}$	=	Upstream emissions for activity fuel type *j* in year *y* (t CO_2eq)
i	=	Fuel types (fuelwood or charcoal)
j	=	Fuel types (e.g. fossil fuels or dung)
y	=	Calendar year of the crediting period (number)

8.1. Application of multiple activity scenarios

146. If an Article 6.4 activity promotes multiple project cookstove technologies, project cookstoves with similar design and performance characteristics (defined as having the same combustion technology and thermal efficiencies within five per cent, in accordance with ISO 19867-1 or equivalent national standards where an accredited laboratory with this capacity is not available in the host country) may be included under a single activity scenario. Otherwise, they shall be treated as independent activity scenarios and included as different CPs in an Article 6.4 Programme of Activities.

8.2. Activity emissions for monitored energy consumption

147. The energy consumption in the Article 6.4 activity scenario shall be determined by tracking fuel or electricity use for all project cookstoves, or through tracking all fuel sales.

148. For any given Article 6.4 activity, if more than [half] of the possible data for a monitoring period is missing, only the available data may be included in the emission reduction calculations. If the available data for a given Article 6.4 activity consists of more than half of the possible data, then the activity participant shall use the 25th percentile of the available monitored activity energy consumption for that Article 6.4 activity as a conservative replacement for the missing data.

149. For Article 6.4 activities applying these methods, the energy consumption of all project cookstoves shall be measured as follows:

$$tEC_{AS,k,y} = \sum_h tEC_{AS,k,h,y}$$ Equation (35)

Where:

$tEC_{AS,k,y}$	=	Total monitored energy consumption of activity fuel *k* in year *y* (TJ or kWh)

$tEC_{AS,k,h,y}$	=	Monitored energy consumption of activity fuel *k* in activity household *h* in year *y* (TJ or kWh)
h	=	Activity household (number)

150. For activity energy sources, equation (3) shall be applied to convert fuel masses to fuel energy.

151. Activity participants shall specify whether activity fuel *k* pertains to fuel type *i*, which is associated with reversal risk, or a fuel type *j*, which is not associated with reversal risk.

152. The following applies if the project cookstove uses electricity:

(a) Where the activity is accompanied by a new [off-grid] renewable energy generating system, including a system accompanied by a battery energy storage system, and the electricity produced by the system is equal to or greater than the electricity consumed by the project cookstove, activity emissions for such scenarios shall be zero (0);

(b) Where the project cookstove relies on electricity from a mini-grid, the mini-grid shall be supplied by one hundred per cent renewable energy generating systems, and activity emissions for such scenarios shall be zero (0);

(c) Where the project cookstove relies on electricity from the grid, the emissions shall be calculated in accordance with the latest version of the Methodological Tool: Emissions from electricity generation and consumption. The following applies to the application of the tool:

(i) Identification of the electricity consumption source: Article 6.4 activity electricity-based cookstove. This consumption source is determined not to be dependent on an intermittent electricity supply;

(ii) Identification of the relevant scenario: For this consumption source, the relevant scenario is scenario A;

(iii) Identification of the relevant electricity system: To be undertaken in accordance with section 5.3, step 3 of the tool;

(iv) Higher value of activity emissions are more conservative. The activity participant shall apply the requirements pertaining to case 1; and

(v) Electricity consumption shall be monitored for each project cookstove.

8.2.1. Activity emissions when applying Option 1: Specific fuel consumption ratios

153. Under this option, other, non-project cookstoves that may be in use in the – Article 6.4 activity scenario shall be ignored, and the calculation of displaced baseline fuel consumption shall include only that displaced by the project cookstove.

154. All activity fuel type *k* applying this method are electricity [or LPG]. Therefore, the following equation does not apply, and $AE_{CO2,rr,i,y}$= 0.[42]

[42] The equation is retained for a future version of the mechanism methodology that may address measured, biomass-sourced fuel types.

$$AE_{CO2,rr,i,y} = \sum_{i} \left(tEC_{AS,i,y} \times fNRB_{i,y} \times \left(EF_{i,CO2} + EF_{i,CO2,upstream}\right)\right)$$ Equation (36)

Where:

$AE_{CO2,rr,i,y}$	=	Activity emissions of CO_2 from greenhouse gas reservoirs that are subject to reversal risk for activity fuel type *i* in year *y* (t CO_2)
$tEC_{AS,i,y}$	=	Consumption of activity fuel type *i* in the activity scenario in year *y* (TJ)
$fNRB_{i,y}$	=	Fraction of non-renewable biomass of fuel type *i* consumed in year *y* (per cent)
$EF_{i,CO2}$	=	CO_2 emission factor for fuel type *i* (t CO_2 / TJ)
$EF_{i,CO2,upstream}$	=	Upstream CO_2 emission factor for fuel type *i* (t CO_2 / TJ)
i	=	Fuel type *i* (fuelwood or charcoal) to which activity fuel type *k* corresponds
y	=	Calendar year of the crediting period

155. Activity emissions of CO_2 that are not subject to reversal risk shall be calculated as follows for all activity fuel types applying this method that are electricity [or LPG]:

$$AE_{CO2,j,y} = \sum_{j} tEC_{AS,j,y} \times EF_{j,CO2}$$ Equation (37)

Where:

$AE_{CO2,j,y}$	=	Activity emissions of CO_2 that are not subject to reversal risk for activity fuel type *j* in year *y* (t CO_2)
$tEC_{AS,j,y}$	=	Consumption of activity fuel type *j* in the activity scenario in year *y* (TJ)
$EF_{j,CO2}$	=	CO_2 emission factor for fuel type *j* (t CO_2 / TJ)
j	=	Fuel type *j* (i.e. LPG or electricity) to which activity fuel type *k* corresponds
y	=	Calendar year of the crediting period

156. Activity emissions of non-CO_2 shall be calculated using equation (35) or (36), depending on whether the activity fuel type *k* pertains to fuel type *i* or fuel type *j*. All activity fuel type k applying this method are electricity [or LPG]. Therefore, equation (37) does not apply, and $AE_{nonCO2,i,y}$= 0.[43] Activity emissions of non-CO_2 shall be calculated using equation (38) or (39) as follows:

$$AE_{nonCO2,i,y} = \sum_{i} \left(tEC_{AS,i,y} \times \left(EF_{i,nonCO2} + EF_{i,nonCO2,upstream}\right)\right.$$ Equation (38)

[43] The equation is retained for a future version of the mechanism methodology that may address measured, biomass-sourced fuel types.

$$AE_{nonCO2,j,y} = \sum_{j} \left(tEC_{AS,j,y} \times EF_{j,nonCO2}\right)$$ Equation (39)

Where:

$AE_{nonCO2,i,y}$	=	Activity emissions of Non-CO_2 from activity fuel type *i* (t CO_2eq)
$tEC_{AS,i,y}$	=	Consumption of activity fuel type *i* in the activity scenario in year *y* (TJ)
$EF_{i,nonCO2}$	=	Non-CO_2 emission factor for fuel type *i* (t CO_2eq/TJ)
$EF_{i,nonCO2,upstream}$	=	Upstream non-CO_2 emission factor for fuel type *i* (t CO_2eq / TJ)
$AE_{nonCO2,j,y}$	=	Activity emissions of non- CO_2 from activity fuel type *j* (t CO_2eq)
$EC_{AS,j,y}$	=	Consumption of activity fuel type j in the activity scenario in year *y* (TJ)
$EF_{j,nonCO2}$	=	Non-CO_2 emission factor for fuel type *j* (t CO_2eq / TJ)
i	=	Fuel type *i* (fuelwood or charcoal) to which activity fuel type *k* corresponds
j	=	Fuel type *j* (i.e., LPG or electricity) to which activity fuel type *k* corresponds
y	=	Calendar year of the crediting period

8.2.2. Activity emissions when applying Option 2: Baseline emission quotient using KPTs

157. For this option, the average activity emissions shall be estimated using an activity KPT.

158. Activity emissions for Article 6.4 activities using this option shall be calculated as follows:

$$AE_{CO2,rr,i,y} = \left(EQ_{AS,CO2,rr,i} \times tEC_{AS,k,y}\right)$$ Equation (40)

Where:

$AE_{CO2,rr,i,y}$	=	Activity emissions of CO_2 from greenhouse gas reservoirs that are subject to reversal risk for activity fuel type *i* in year *y* (t CO_2)
$EQ_{AS,CO2,rr,i}$	=	Activity emissions quotient of CO_2 from greenhouse gas reservoirs that are subject to reversal risk for fuel type *i* for the consumption of energy for cooking ($tCO_2/TJ \text{ or } tCO_2/kWh$)
$tEC_{AS,k,y}$	=	Total monitored energy consumption of activity fuel type *k* in year *y* (Tj or kWh)
y	=	Calendar year of the crediting period (number)

159. Activity emissions of CO_2 from the combustion of fuel type *j* that are not subject to reversal risk shall be calculated using equation (41) as follows:

$$AE_{CO2,j,y} = \sum_{j} \left((EQ_{AS,CO2,j} \times tEC_{AS,k,y}\right)$$ Equation (41)

Where:

$AE_{CO2,j,y}$	=	Activity emissions of CO_2 that are not subject to reversal risk from the combustion of fuel type *j* in year *y* (t CO_2)

$EQ_{AS,CO2,j}$	=	Activity emissions quotient of CO_2 for fuel type *j* for the consumption of energy for cooking ($tCO_2/TJ\ or\ tCO_2/kWh$)
$tEC_{AS,k,y}$	=	Total monitored energy consumption of activity fuel type *k* in year *y* (TJ or kWh)
y	=	Calendar year of the crediting period (number)

160. Activity emissions of non-CO_2 shall be calculated using equations (42) and (43) as follows:

$$AE_{nonCO2,i,y} = \sum_{i} \left(EQ_{AS,nonCO2,i} \times tEC_{AS,k,y}\right)$$ Equation (42)

$$AE_{nonCO2,j,y} = \sum_{j} \left(EQ_{AS,nonCO2,j} \times tEC_{AS,k,y}\right)$$ Equation (43)

Where:

$EQ_{AS,nonCO2,i}$	=	Activity emissions quotient of non-CO_2 emissions for fuel type *i* for the consumption of energy for cooking ($tCO_2eq/TJ\ or\ tCO_2eq/kWh$)
$EQ_{AS,nonCO2,j}$	=	Activity emissions quotient of non-CO_2 emissions for fuel type *j* for the consumption of energy for cooking ($tCO_2eq/TJ\ or\ tCO_2eq/kWh$)

161. This approach for determining activity emissions requires quantifying the energy consumption of all technologies used in the activity scenario (including any baseline technologies still in use) based on activity KPTs, using metered energy consumption data for the project cookstove specific to the KPT period or, for fuel consumption based on sales data, using traditional fuel weighing.

162. To link total activity emissions with the amount of monitored activity fuel consumption, the emissions measured during the activity KPTs shall be normalized by the activity fuel consumption measured during the activity KPTs and scaled by the amount of monitored activity fuel consumption, as follows:

$$EQ_{AS,CO2,rr,i} = \frac{\sum_i [EC_{AS,KPT,i} \times fNRB_i \times (EF_{i,CO2} + EF_{i,CO2,upstream})]}{tEC_{AS,KPT,k}}$$ Equation (44)

$$EQ_{AS,CO2,j} = \frac{\sum_j [EC_{AS,KPT,j} \times EF_{j,CO2}]}{tEC_{AS,KPT,k}}$$ Equation (45)

$$EQ_{AS,nonCO2,i} = \frac{\sum_i [EC_{AS,KPT,i} \times (EF_{i,nonCO2} + EF_{i,nonCO2,upstream})]}{tEC_{AS,KPT,k}}$$ Equation (46)

$$EQ_{AS,nonCO2,j} = \frac{\sum_j [EC_{AS,KPT,j} \times EF_{j,nonCO2}]}{tEC_{AS,KPT,k}}$$ Equation (47)

Where:

$EC_{AS,KPT,i}$	=	Activity energy consumption of each fuel type *i* based on the activity KPT (TJ / person-year)
$fNRB_i$	=	Fraction of non-renewable woody biomass fuel type *i* consumed (per cent)
$EF_{i,CO2}$	=	CO_2 emission factor for fuel type *i* (t CO_2 / TJ)
$EF_{i,CO2,upstream}$	=	Upstream CO_2 emission factor for fuel type *i* (t CO_2 / TJ)
$tEC_{AS,KPT,k}$	=	Monitored energy consumption of activity fuel type *k* for project cookstove(s) only from the activity KPT (TJ / person-year or kWh / person-year)
$EC_{AS,KPT,j}$	=	Activity energy consumption of each fuel type *j* based on the activity KPT (TJ / person-year)
$EF_{j,CO2}$	=	CO_2 emission factor for fuel type *j* (t CO_2 / TJ)
$EF_{i,nonCO2}$	=	Non-CO_2 emission factor for fuel type i (t CO_2eq /TJ)
$EF_{i,nonCO2,upstream}$	=	Upstream non-CO_2 emission factor for fuel type i (t CO_2eq /TJ)
$EF_{j,nonCO2}$	=	Non-CO_2 emission factor for fuel type *j* (t CO_2eq / TJ)

8.2.3. Unadjusted activity emissions

163. This approach applies only to biomass-based project cookstoves. Fuel consumption in the activity scenario shall be determined through a representative sample using KPTs comprising direct measurements of fuel, in accordance with the Sampling and surveys tool. The KPTs shall measure use of all fuel types by all cooking devices (project cookstoves and other cooking devices) in activity households.

164. When applying this method, the emissions resulting from equation (31) shall equal $AE_{unad,y}$.

165. Activity emissions of CO_2 from greenhouse gas reservoirs that are subject to reversal risk shall be calculated using equation (48). Fuel type *i*(fuelwood and charcoal) shall apply this equation:

$$AE_{CO2,rr,i,y} = \sum_i \left(EC_{AS,i,y} \times fNRB_{i,y} \times EF_{i,CO2}\right) \quad \text{Equation (48)}$$

Where:

$AE_{CO2,rr,i,y}$	=	Activity emissions of CO_2 from greenhouse gas reservoirs that are subject to reversal risk for fuel type *i* in year *y* (t CO_2)
$EC_{AS,i,y}$	=	Consumption of fuel type *i* in year *y* (TJ)
$fNRB_{i,y}$	=	Fraction of non-renewable biomass of fuel type *i* consumed in year *y* (per cent)
$EF_{i,CO2}$	=	CO_2 emission factor for fuel type *i* (t CO_2 / TJ)
i	=	Fuel type *i* (fuelwood or charcoal)
y	=	Calendar year of the crediting period

166. Activity emissions of CO_2 from the combustion of fuel type *j* that are not subject to reversal risk shall be calculated using equation (49). This equation shall be applied where the use of fuel type *j* is identified in the activity KPT:

$$AE_{CO2,j,y} = \sum_j EC_{AS,j,y} \times EF_{j,CO2} \qquad \text{Equation (49)}$$

Where:

$AE_{CO2,j,y}$	=	Activity emissions of CO_2 that are not subject to reversal risk from the combustion of fuel type *j* in year *y* (t CO_2)
$EC_{AS,j,y}$	=	Consumption of fuel type *j* in the activity scenario in year *y* (TJ)
$EF_{j,CO2}$	=	CO_2 emission factor for fuel type *j* (t CO_2 / TJ)
j	=	Fuel type *j* (e.g., fossil fuels or dung)
y	=	Calendar year of the crediting period

167. Activity emissions of non- CO_2 from all fuel types shall be calculated using equations (50) and (51) as follows*:*

$$AE_{nonCO2,i,y} = \sum_i \left(EC_{AS,i,y} \times EF_{i,nonCO2}\right) \qquad \text{Equation (50)}$$

$$AE_{nonCO2,j,y} = \sum_j \left(EC_{AS,j,y} \times EF_{j,nonCO2}\right) \qquad \text{Equation (51)}$$

Where:

$AE_{nonCO2,i,y}$	=	Activity emissions of non-CO_2 from fuel type *i* in year *y* (t CO_2eq)
$EC_{AS,i,y}$	=	Consumption of fuel types *i* in activity scenario in year *y* (TJ)
$EF_{i,nonCO2}$	=	Non-CO_2 emission factor for fuel type *i* (t CO_2eq / TJ)
$AE_{nonCO2,j,y}$	=	Activity emissions of non- CO_2 from fuel type *j* (t CO_2eq)
$EC_{AS,j,y}$	=	Consumption of fuel type *j* in the activity scenario in year y (TJ)
$EF_{j,nonCO2}$	=	Non-CO_2 emission factor for fuel type *j* (t CO_2eq / TJ)
i	=	Fuel type *i* (fuelwood or charcoal)
j	=	Fuel type *j* (e.g. fossil fuels or dung)
y	=	Calendar year of the crediting period

168. Fuel consumption in the activity scenario shall be determined through a representative sample using KPTs comprising direct measurements of fuel, in accordance with the Sampling and surveys tool. The KPTs shall measure the use of all fuel types by all cooking devices (project cookstoves and other cooking devices) in the activity

households. The results of the KPTs shall be converted to energy terms using equation (3) before being aggregated and used in the following equations (52) and (53):

$$EC_{AS,i,y} = H_y \times FEC_{AS,i,y} \times \frac{\Psi_y \times \sum_h Days_{y,h}}{CD_y}$$ Equation (52)

$$EC_{AS,j,y} = H_y \times FEC_{AS,j,y} \times \frac{\Psi_y \times \sum_h Days_{y,h}}{CD_y}$$ Equation (53)

Where:

$EC_{AS,i,y}$	=	Consumption of fuel type *i* in the activity scenario in year *y* (TJ)
$EC_{AS,j,y}$	=	Consumption of secondary fuel type *j* in the activity scenario in year *y* (TJ)
H_y	=	Average household size in year *y* (number of persons per household)
$FEC_{AS,i,y}$	=	Energy consumption of fuel type *i* for activity households, as measured by the activity KPT, during year *y* (TJ / (person x year))
$FEC_{AS,j,y}$	=	Energy consumption of fuel type *j* for activity households, as measured by the activity KPT, during year *y* (TJ / (person x year))
Ψ_y	=	Per cent of activity households with cookstoves present that qualify as user households in year *y* (per cent)
$Days_{y,h}$	=	Number of total possible project cookstove days during the year *y* in household *h* (days)
CD_y	=	Days in calendar year *y* (days)
h	=	Article 6.4 activity household
i	=	Fuel type *i* (fuelwood or charcoal)
j	=	Fuel type *j* (e.g., fossil fuel or dung)
y	=	Calendar year of the crediting period

8.2.4. Adjustment for the potential impact of the Hawthorne effect

169. To account for the potential impacts of the Hawthorne Effect on activity KPTs, this mechanism methodology applies a Hawthorne Effect adjustment factor (HE_{ind}). This factor adjusts the calculated emission reductions. For methodological consistency, the adjustment is incorporated directly into the activity emissions calculation.

170. The final activity emissions (AE_y) shall be calculated using equation (54).

$$AE_y = AE_{unad,y} + \left(BE_{final,y} - AE_{unad,y}\right) \times (1 - HE_{ind})$$ Equation (54)

Where:

AE_y	=	Final activity emissions during year *y* (tCO2eq)
$AE_{unad,y}$	=	Activity emissions during year *y* before applying any Hawthorne Effect adjustment (t CO_2eq)

$BE_{final,y}$	=	Final downward-adjusted baseline emissions during year *y* (t CO_2eq)
HE_{ind}	=	Hawthorne Effect adjustment factor (per cent)

171. Activity participants shall complement KPTs and surveys with SUMs measurements to determine the activity-specific Hawthorne Effect adjustment factor (HE_{ind}). They shall apply the ratio of project cookstove usage (cooking events/day) measured during the KPT to that measured during the month before or after the KPT to adjust the activity emissions estimate, such that, in equation (50), HE_{ind} equals the result of this ratio (see equation (52)). This requires that SUMs be applied to all project cookstove in households where the KPT is performed. See section 7.4.2.2 for SUMs monitoring requirements and Appendix 8 for SUMs requirements and best practice guidance. The use of SUMs for this purpose shall be applied from 01 January 2028.

172. Otherwise, activity emissions shall be adjusted to account for the Hawthorne Effect, such that, in equation (55), HE_{ind} shall equal 75 per cent.[44] The default Hawthorne Effect adjustment is valid through 31 December 2027.

$$HE_{ind} = \min(1, \frac{PCE_m}{PCE_{KPT}})$$ Equation (55)

Where:

PCE_m	=	Average project cookstove cooking events per day over 1 month, based on SUMs measurements (number of events)
PCE_{KPT}	=	Average Energy efficiency measures in household cooking (number of events)

8.3. Upstream emissions in the activity scenario

173. Upstream emissions for fuel type *j* in year *y* in the activity scenario ($UE_{AS,J,y}$) shall be calculated as follows:

$$UE_{AS,j,y} = EC_{AS,j,y} \times EF_{j,upstream}$$ Equation (56)

Where:

$UE_{AS,j,y}$	=	Upstream emissions for activity fuel type *j* in year *y* (t CO_2eq)
$EC_{AS,j,y}$	=	Total monitored energy consumption of project fuel j for projects in year *y* (TJ)
$EF_{j,upstream}$	=	Upstream emission factor for fuel type *j* (t CO_2eq / TJ)

174. Where the Article 6.4 activity introduces a new fuel type in the activity, the upstream emission factor shall include emissions from fuel transport.

175. For activities applying the methods in section 8.2.1 , $EC_{AS,j,y}$ is as defined in equation (52).

[44] See Appendix 10 for further details on the Hawthorne Effect, the activity emissions adjustment, and how the default percentage was derived.

176. For activities applying the methods in section 8.2.1, Activity emissions when applying Option 1: Specific fuel consumption ratios, $EC_{AS,j,y}$ shall be taken as equal to $tEC_{AS,j,y}$ as defined previously in equation (36).

177. For activities applying the methods in section 8.2.2, Activity emissions when applying Option 2: Baseline emission quotient using KPTs, $EC_{AS,j,y}$ shall be calculated by scaling the amount of energy consumption for each relevant fuel type *j* during the activity KPT per TJ of activity fuel during the activity KPT by the total monitored activity fuel consumption per year:

$$EC_{AS,j,y} = \frac{EC_{AS,KPT,j}}{tEC_{AS,KPT,k}} \times tEC_{AS,k,y}$$ Equation (57)

Where:

$EC_{AS,j,y}$	=	Energy consumption of fuel type *j* in the activity scenario in year *y* (TJ)
$EC_{AS,KPT,j}$	=	Energy consumption of each fuel type *j* based on the activity KPT (TJ / person-year)
$tEC_{AS,KPT,k}$	=	Monitored energy consumption of activity fuel type k for project cookstove(s) only from the activity KPT (TJ / person-year or kWh / person-year)
$tEC_{AS,k,y}$	=	Total monitored energy consumption of activity fuel type *k* in year *y* (TJ or kWh)
$tEC_{AS,k,y}$	=	Total monitored energy consumption of activity fuel type *k* in year *y* (TJ or kWh)

9. Leakage

178. The leakage assessment is determined at the level of the mechanism methodology. Appendix 10 describes how the estimated leakage emissions parameter was derived.

179. The leakage assessment concludes that no negative leakage emissions are likely to be attributable to the Article 6.4 activity, apart from emissions associated with the materials, manufacture, and transport of project cookstoves, which are estimated as follows:

$$LE_y = AC_{New,y} \times E_{LE}$$ Equation (58)

Where:

LE_y	=	Leakage emissions in year *y* (t CO_2eq)
$AC_{new,y}$	=	Quantity of new project cookstoves added to the activity in year *y*
E_{LE}	=	Estimated leakage emissions per project cookstove (t CO_2eq/cookstove)
y	=	Calendar year of the crediting period

180. For industrially manufactured cookstoves, imported appliances, or stoves constructed predominantly of refined metals (e.g., steel or aluminium), leakage shall be estimated using the default value of 0.0128 t CO_2eq per cookstove or a value established on the basis of a verified study.

181. For artisanal, built-in-place, or domestically constructed cookstoves manufactured predominantly (>75 per cent by mass) from locally sourced, non-industrial earthen materials (e.g., unbaked clay, mud, or brick) where transport distances are minimal, embodied emissions are demonstrably negligible. For these specific technologies, E_{LE} shall be set to 0.0064 tCO_2eq per cookstove.

10. Non-permanence provisions

10.1. Monitoring and reporting requirements

182. For the reasons described in Appendix 10, activity participants shall not be required to:

(a) Monitor the greenhouse gas reservoirs described in Table 2 during either the crediting period or the post-crediting monitoring period;

(b) Submit reversal-related notifications or reports about potential or actual reversals in relation to the greenhouse gas reservoirs described in Table 2; or

(c) Perform post-reversal actions.

10.2. Buffer pool contributions

183. Activity participants shall apply the Reversal Risk Assessment tool to determine the parameter $F_{buffer,i,t}$ in equation (59), which determines the number of A6.4ERs to be contributed to the Reversal Risk Buffer Pool Account for each applicable fuel type *i*.[45]

184. All A6.4ERs contributed to the Reversal Risk Buffer Pool Account under this mechanism methodology shall be immediately cancelled by the Mechanism Registry Administrator for the purpose of remediating future reversals and appropriately labelled as such.

$$A6.4ER_{buffer,y} = \sum_{i} \left(BE_{CO2,rr,i,final,y} - AE_{CO2,rr,i,y}\right) \times F_{buffer,i,t} \qquad \text{Equation (59)}$$

Where:

$A6.4ER_{buffer,y}$	=	The number of A6.4ERs to be forwarded to the Reversal Risk Buffer Pool Account in year *y* (tCO_2)
$BE_{CO2,rr,i.final,y}$	=	Final downward-adjusted baseline emissions of CO_2 from greenhouse gas reservoirs that are subject to reversal risk for fuel type *i* in year *y* (t CO_2)
$AE_{CO2,rr,i,y}$	=	Activity emissions of CO_2 from greenhouse gas reservoirs that are subject to reversal risk for fuel type *i* in year *y* (t CO_2)
$F_{buffer,i,t}$	=	The fraction of A6.4ERs associated with the greenhouse gas reservoir *aboveground woody biomass in landscapes*, for the period covered by monitoring report *t*, that shall be contributed to the Reversal Risk Buffer Pool Account for fuel type *i* (per cent)
i	=	Primary fuel types (fuelwood or charcoal)
y	=	Calendar year of the crediting period

[45] This draft methodological tool is still under development and has not yet to been approved by the Supervisory Body. The draft mechanism methodology will be revised accordingly if changes are made to this draft methodological tool before its adoption.

t	=	Period of time covered by a monitoring report

11. Emission reductions

185. Total emission reductions for Article 6.4 activities shall be calculated using equation (60), which is equivalent to the total number of A6.4ERs to be issued in respect of the Article 6.4 activity for the period.

$$ER_y = BE_{final,y} - AE_y - LE_y \qquad \text{Equation (60)}$$

Where:

ER_y	=	Emission reductions for the Article 6.4 activity during year *y* (tCO_2eq)
$BE_{final,y}$	=	during year *y* (tCO_2eq)
AE_y	=	Activity emissions during year y (tCO_2eq)
LE_y	=	Leakage emissions during year y (tCO_2eq)
y	=	Calendar year of the crediting period (number)

186. For informational purposes, the following equation reflects the number of A6.4ERs to be issued to the accounts of the activity participants:[46]

$$A6.4ER_{activity,y} = ER_y - A6.4ER_{SOP,y} - A6.4ER_{OMGE,y} - A6.4ER_{buffer,y} \qquad \text{Equation (61)}$$

Where:

$A6.4ER_{activity,y}$	=	The number of Article 6.4ERs to be forwarded to the accounts of the activity participants for year *y* ($t\ CO_2eq$)
ER_y	=	Emission reductions for the activity during year *y* ($t\ CO_2eq$)
$A6.4ER_{SOP,y}$	=	The number of A6.4ERs to be forwarded or first transferred, where applicable, to an account of the Adaptation Fund in year *y* ($t\ CO_2eq$)
$A6.4ER_{OMGE,y}$	=	The number of A6.4ERs to be forwarded to the account for cancellation towards delivering overall mitigation in global emissions for year *y* ($t\ CO_2eq$)
$A6.4ER_{buffer,y}$	=	The number of A6.4ERs to be forwarded to the Reversal Risk Buffer Pool Account for year *y* (tCO_2eq)
y	=	Calendar year of the crediting period

187. [Activity participants shall conduct an uncertainty analysis following the guidance from Volume 1, Chapter 3 of the IPCC 2019 Refinement to the IPCC Guidelines using either the error propagation method or the Monte Carlo simulation. The emission reductions in equation (56) shall be determined with a one-sided 90 per cent confidence level, demonstrating that they are not overestimated. All sources of uncertainty shall be considered, including uncertainty in data (e.g., measurements), parameters (e.g., representativeness of default values), assumptions (e.g., the baseline scenario), and methods (e.g., models to quantify emission reductions). In conducting the analysis, the following parameters do not need to be varied, as they are already deemed to be conservative: NCV of wood, CH_4 and N_2O emission factors for wood; CO_2, CH_4 and N_2O

[46] See https://unfccc.int/sites/default/files/resource/A6.4-PROC-REGS-001.pdf.

emission factors for charcoal, CO_2 and CH_4 upstream emission factors for charcoal, and estimated leakage emissions for project cookstoves. The rationale for deeming these parameters conservative is included in the respective tables in sections 15 and 16 below.]

Note 3: The MEP will conduct further analysis to assess whether conservative assumptions in the methodology could ensure that this principle is fulfilled for all projects or whether the adherence to this principle would need to be assessed for each project individually, as described above.

12. Avoidance of double counting

188. Activity participants shall demonstrate that the Article 6.4 activity will not result in double counting by:

(a) Providing evidence, in each monitoring report, that the outcomes from the Article 6.4 activity (e.g., reduced emissions from household cooking) for which they intend to request issuance of A6.4ERs are not also claimed in other environmental markets, accounting frameworks or carbon crediting programmes (e.g., jurisdictional REDD), except for outcomes not related to reducing greenhouse gas emissions (e.g., air contaminant reductions or social impacts); and

(b) Demonstrating that the reported GHG emission reductions for which they intend to request issuance of A6.4ERs do not overlap with mandatory domestic mitigation schemes (e.g., emissions trading systems), or that measures are in place to ensure that any relevant impacts of the Article 6.4 activity (e.g., reduced emissions from household cooking) are not counted towards the achievement of targets or obligations under the mandatory domestic mitigation scheme (e.g., by cancelling allowances from the emissions trading system before issuing carbon credits), if the overlap exists, by: [47]

(i) Declaring and providing evidence in each monitoring report that the Article 6.4 activity does not fall within the scope of any mandatory domestic mitigation scheme; or

(ii) Where the Article 6.4 activity falls within the scope of a mandatory domestic mitigation scheme, activity participants shall:

a. Provide evidence in each monitoring report that the mitigation outcomes of the Article 6.4 activity are not counted in the mandatory mitigation scheme to reduce the obligations by the entities covered by the scheme; or

b. Demonstrate that activity participants are not requesting the issuance of A6.4ERs for any emission reductions resulting from a component of the Article 6.4 activity that falls within the scope of the mandatory domestic scheme.

189. Requirements for the avoidance of double counting with Jurisdictional REDD+ Programs:

[47] When full or partial impact of the activity is covered under mandatory domestic mitigation scheme and counted towards the achievement of targets and obligations under mandatory domestic mitigation scheme, the relevant share of the impact shall be deducted by the activity participants from the amount requested for issuance.

(a) These requirements are applicable to Article 6.4 activities that use either fuelwood, charcoal or a combination of both in the baseline scenario;

(b) These requirements are applicable to Article 6.4 activities implemented in an activity boundary that overlaps with a jurisdiction (national or sub-national) that has implemented a jurisdictional REDD+ carbon program (e.g., the architecture for REDD+ transactions) or another similar program that provides results-based finance for jurisdictional-level REDD+ activities;

(c) Where the activity boundary overlaps with a jurisdictional REDD+ program, but the program documentation explicitly does not include (or explicitly excludes) the collection of fuelwood (either for direct consumption or before conversion to charcoal) as a driver of deforestation or forest degradation, the activity participant shall provide evidence of this at validation and at each verification. This may be substantiated through activity documentation available in the registry or through formal communication from the relevant government ministry or department; and

(d) Where the activity boundary overlaps with a jurisdictional REDD+ program and the program documentation indicates that the forest reference emission level (FREL) includes the collection of fuelwood as a driver of deforestation or forest degradation, the activity participant shall provide evidence that the emission reductions claimed by the Article 6.4 activity are either not claimed by the REDD+ program or are deducted from the program's GHG accounting. This may be substantiated through formal communication from the relevant government ministry or department or through publicly available documentation of the REDD+ program.

190. [Requirement for the avoidance of double counting with other fNRB-dependent activities:

(a) These requirements are applicable to Article 6.4 activities implemented in geographic locations where other activities are seeking GHG emission reductions from the reduced use of fuelwood or charcoal for the provision of safe drinking water;

(b) No overlap with implementation boundaries: Where there are no implemented carbon crediting activities for example for safe drinking water within the applicable geographic area, no double counting is considered to occur. This shall be substantiated using data from carbon crediting programmes approved under CORSIA and/or endorsed by the ICVCM, together with any applicable local carbon crediting programs, demonstrating that no such activities are implemented within the applicable geographic area;

(c) Overlap without double counting: Where there are activities seeking carbon credits for the provision of clean drinking water, the Article 6.4 activity shall not account for fuel savings attributable to boiling water for drinking water. This shall clearly be documented when establishing the baseline emissions.]

Note 4: The MEP is considering whether it is necessary to include these specific conditions for risk of double counting with other fNRB-dependent activities.

191. Evidence demonstrating avoidance of double counting may include as applicable, official confirmation from the host Party DNA or other relevant national authority, declarations from activity participants and implementation partners, among other forms of evidence.

192. Notwithstanding paragraph 191 above, where the policy establishing the framework, environmental market, or mandatory domestic mitigation scheme refers to, or formally integrates, the mechanism as an implementation instrument, participation in that framework, environmental market, or mandatory domestic mitigation scheme shall not result in double counting.

193. All Article 6.4 activities under this mechanism methodology shall obtain explicit evidence of consent from all participating households, for example through signed A6.4ER Waiver Certificates (see Appendix 2), confirming that A6.4ERs may be claimed only by the activity participants and that participating households shall not claim A6.4ERs or carbon credits under any other carbon crediting program. The evidence of consent shall include any special considerations relating to ongoing measurements of the project cookstove, as applicable.

13. Demonstration of alignment with the policies, options and implementation plans of the Host Party with regard to its NDC and LT-LEDS and the long-term temperature goal of the Paris Agreement and long-term goals of the Paris Agreement

194. Activity participants applying this mechanism methodology shall ensure that the Article 6.4 activity complies with paragraph 10 of the appendix to the "Standard: Setting the baseline in mechanism methodologies" (A6.4-STAN-METH-004).

14. Monitoring requirements

14.1. Monitoring activity schedules

Table 4. Monitoring activity schedule for activities with monitored energy consumption

Activity	Prior to validation	Prior to first verification	Annual	Every monitoring period
Pre-activity studies				
Pre-activity survey	X			
Baseline energy consumption KPT measurement campaign for activities using baseline emission quotient using KPTs approach		X		
Specific energy consumption of baseline cookstove and fuel combination from CCTs for activities using specific fuel consumption ratios approach	X			
Activity studies				
Usage survey			X	

Activity	**Prior to validation**	**Prior to first verification**	**Annual**	**Every monitoring period**
Activity KPTs (energy consumption measurement) & Activity KPT survey		X		X* (shall be performed no less frequently than every two years even if the monitoring period is longer)
Specific energy consumption of project cookstove and fuel combination from CCTs before validation and every two years thereafter for activities using specific fuel consumption ratios approach.	X			X
Compilation of monitored energy consumption or fuel sales records of all project cookstoves			X	
Ongoing monitoring tasks				
Maintenance of total sales and service records, and project databases	Continuous	Maintenance of total sales and service records, and activity databases	Continuous	Maintenance of total sales and service records, and activity databases

Table 5. Monitoring activity schedule for activities with sampling-based energy consumption

Activity	**Prior to validation**	**Prior to first verification**	**Annual**	**Every monitoring period**
Pre-activity studies				
Pre-activity scenario survey	X			
Pre-activity energy consumption measurement from KPTs		X		
Activity studies				
Usage surveys			X	
Usage SUMs measurements			Continuous	

Activity	Prior to validation	Prior to first verification	Annual	Every monitoring period
Activity KPTs energy consumption measurement & Activity KPT survey		X		X (shall be performed no less frequently than every two years even if the monitoring period is longer)
SUMs Hawthorne effect measurements		X (during the first monitoring period of the crediting period)		
Ongoing monitoring tasks				
Maintenance of total sales and service records, and project databases	Continuous	Maintenance of total sales and service records, and project databases	Continuous	Maintenance of total sales and service records, and project databases

14.2. Other monitoring requirements

195. When the activity participants apply for crediting period renewal, all methodological parameters shall be reassessed as per the latest version of the methodology available at the time of renewal.

14.2.1. Kitchen performance tests

196. KPTs shall be undertaken every two years, within the last four months of the monitoring period for which emission reductions are quantified (if the monitoring period itself is longer than four months), rather than at the beginning of a monitoring period. For a five-year crediting period, activity participants are expected to conduct activity KPTs at the end of year 2 and year 4. They may either conduct an additional KPT in year 5 or if the crediting period is renewed, apply the results from KPTs conducted in year 6.

14.2.2. Seasonality

197. Activities are required to account for the impact of seasonal variation on fuel-use measurements in the activity scenarios. Prior to activity validation, activities shall collect data during the pre-activity survey on the relative fuel use at different times of the year (see section 7). Activity participants shall incorporate the resulting information into their monitoring plan design and justify on the Activity Information Cover Sheet how the approach they are taking will result in accurate activity fuel use measurements. If space heating is common in the activity area, the justification shall include an explanation of how space heating has been addressed in the activity design. If an accurate approach

cannot be taken, then the activity participants shall instead select and justify a conservative approach.

14.2.3. Monitored energy consumption data

198. For any given project, if more than [half] of the possible data for a monitoring period is missing, only available monitored energy consumption data may be included in emission reduction calculations. If missing data for a given project participant or technology consists of less than [half] of the possible data, then the project proponent may use the 25th percentile of the available monitored energy consumption for that project as a conservative replacement of the missing data.

14.2.4. Stove use monitoring

199. The algorithm for estimating technology use events shall be able to reliably distinguish cookstove use events from other potential factors that could be interpreted as cooking events that are caused by external reasons (e.g., temperature fluctuations from typical diurnal patterns).

200. The algorithms shall be clearly presented publicly in the PDD or CP-DD with associated equations and/or logic rules.

201. The same algorithm and SUM device type should be used for the duration of the Article 6.4 activity. If a different SUM device type or algorithm is used, then the activity shall demonstrate that the stove use estimates between the two approaches are unbiased. This can be demonstrated by conducting a side-by-side comparison in a representative subsample of households, where both devices/algorithms are applied simultaneously, and the resulting cooking event estimates are compared. Statistical tests such as paired t-tests, regression analyses, or Bland–Altman plots may be used to assess whether systematic bias exists. The results of these tests, along with all supporting data and documentation, shall be provided to the DOE.

202. Sampling shall meet the 95/10 confidence/precision guidelines, per the sampling guidance included in Appendix 5.

203. SUMs sampling protocols (installation, placement, downloading) and algorithms used to convert raw data into cooking events shall not change between sampling during KPTs and sampling following KPTs.

204. Activity households in the SUMs sample shall not receive any support different or additional to those not in the sample (see Appendix 5).

205. Activity participants shall ensure that photographs of the SUMs placement in each sampled household are taken and retained as part of the monitoring record.

206. For projects using the KPT and SUMs approach described in, the average of the cookstove use events per day during the full 30 days of stove use monitoring shall be used to adjust for potential Hawthorne Effects. If SUMs data is incomplete or missing, it shall be omitted from the analysis.

14.2.5. Requirements for conducting baseline KPTs

207. Proponents using the KPT to measure the baseline shall also use the pre-activity scenario survey to collect data on the relative fuel use at different times of the year to address potential seasonal variation. The following question (or an appropriate variation) shall be asked, “Relative to the amount of fuel you used this week, are there other times

of the year when you use more fuel? If so, when? And/or less fuel? If so, when?". For additional information on addressing seasonal variation in fuel consumption, see section 14.2.2 Seasonality.

208. For activities with KPT baselines, activity proponents shall identify any mismatch between values documented during the baseline scenario and those reported by activity households during the first activity usage survey for primary fuel type and household size. This assessment shall be carried out using retrospective questions of activity households during the first usage survey in any given household. Where a material discrepancy between the baseline scenario and the baseline observed in activity households occurs, activity proponents shall either not claim emission reductions for households that do not conform to the baseline scenario profile, or further adjust the baseline toward lower baseline emissions.

209. A material discrepancy is defined as more than a 10 per cent absolute difference between the baseline scenario and the baseline observed in activity households for the primary fuel type used. [48,49] For household size, a material discrepancy is defined as an estimate measured during an activity usage scenario (Hs) that is greater than the baseline scenario estimate. When calculating the difference, the absolute difference should be relative to the activity estimate. For example, if the proportion of use events with wood is 85 per cent in the baseline and 80 per cent in the activity, the difference is estimated as (0.85-0.80)/0.80 = 6.2 per cent (within the 10 per cent threshold). Specific requirements for baseline and activity scenario comparisons are provided in the below.

Table 6. Requirements for baseline and activity scenario comparisons

Potential material difference	Action required
The number of people per household in the project is greater than in the baseline scenario	The number of people per household (Hs) estimated from project usage surveys shall be lowered to the baseline scenario
The number of people per household in the project is less than in the baseline scenario	No change
The primary fuel used for cooking events identified through the baseline scenario survey is more than 10 per cent different from that determined retrospectively through the first project usage survey, and the difference results in baseline emissions that are lower than they would be if the proportion of primary fuel from the baseline and activity scenarios matched. For example, if the baseline (from before the project technology was introduced) scenario indicates 85 per cent wood use, and 15 per cent charcoal use; and the first project usage survey indicates a baseline of 75 per cent wood use and 25 per cent charcoal use, then the emissions in the baseline scenario would be considered conservative, as charcoal has higher	No change

[48] The mechanism methodology uses a greater than 10% variation as the definition of a material discrepancy throughout the methodology as this is appropriate given the distributed nature of the cooking technology intervention, the natural variation in human cooking behaviors, and the challenges of collecting real-word field data, especially in many low resource environments.

[49] Parameters $PC_{b,i}$ and $PC_{p,j}$ are used in Appendix 5 providing sampling requirements for these proportions of cooking events; they are used in the material difference calculation noted above, and not in emission reduction quantification equations.

Potential material difference	Action required
CO_2eq emissions than wood per unit of useful energy delivered. If more than two fuels are used, the same process shall be applied for all	
The primary fuel used for cooking events identified through the baseline scenario survey is more than 10 per cent different from that determined retrospectively through the first project usage survey and the difference results in baseline emissions that are higher than they would be if the proportion of primary fuel in baseline and activity scenarios matched. For example, if the baseline scenario indicates 75 per cent primary wood use, and 25 percent charcoal use; and the first project usage survey indicates a baseline of 85 per cent wood use and 15 per cent charcoal use (from before the project technology was introduced), then the emissions in the baseline scenario would be considered non-conservative, as charcoal has higher CO_2eq emissions than wood per TJ of useful energy delivered. If more than two fuels are used, the same process shall be applied for all	The project shall exclude the baseline energy consumption from non-primary fuels in the estimation of baseline emissions, or proportionately reduce the energy consumption of the primary fuel by the percent difference in primary fuel use between the baseline scenario and project-estimated baseline from the first project usage survey, whichever results in a lower baseline CO_2eq emissions estimate

14.2.6. Data requirements

210. All calculated variables shall:

(a) Exclude technologies installed under an activity registered under another carbon crediting scheme;

(b) Be based on recent (no more than three years old) and credible data sources; and

(c) Include documentation of data sources, reference years, and all calculations.

211. Acceptable data sources may include national household energy surveys, census data, or other representative market studies. Where no such sources are available, baseline surveys may be used as a last resort, provided that they follow statistically robust sampling and are documented transparently.

212. Where the available dataset reports only fuel type and not cookstove technology, and the fuel type alone does not clearly indicate whether the cookstove meets the equivalence definition (e.g. fuels such as charcoal or wood, which may be used in a variety of cookstove types), the project proponent shall use credible supplementary data sources to determine the proportion of users of that fuel who own and regularly use a functional equivalent technology. Where no such supplementary data are available, the proportion may be obtained from the baseline survey. For fuels that correspond to a specific technology (e.g., LPG, electricity, ethanol), the reported fuel shall be assumed to correspond directly to one functional cookstove.

213. Where functional status or thermal efficiency data are not directly available, project proponents shall apply conservative assumptions to classify equivalent technologies, with justification provided. Where only the primary cooking fuel or device is reported, this shall be interpreted as representing the main technology in regular use. Secondary cookstove ownership shall only be included where credible evidence demonstrates that the cookstove is functional and regularly used. Where data less than three years old are not available, the most recent credible dataset may be used, provided that a conservative

adjustment is applied to reflect likely changes in penetration since the data were collected.

15. Data and parameters not monitored

214. For parameters where the uncertainty was not provided, activity participants shall assume uncertainty based on expert judgement and justify the estimates.

Data / Parameter table 1.

Data/parameter	**Technical Lifetime of project cookstove**
Description	Number
Data unit	Years or hours
Equations referred	N/A
Purpose of data	☒ Baseline Scenario ☐ Activity Scenario ☐ Leakage
Value(s) applied	To be determined at the activity level
Source of data	☐ Measured ☒ Other sources
Choice of data or measurement methods and procedures	For biomass based cookstoves (e.g., charcoal based stoves). Technical lifetime of the project cookstoves shall be determined based on the manufacturer's specifications and operation manuals, or in the absence of these, e.g., in the case of artisanal cookstoves, based on a third-party assessment by a certified or suitably qualified expert. For electric and LPG stoves accepted evidence only include manufacturer's specification and operation manuals and the following shall be true: (i) The stove is mass produced; and (ii) The stove has received relevant safety and other regulatory compliance certification either from the country of manufacturing or the country of distribution. E.g., in case of India, the LPG stove shall have the ISI mark denoting its compliance to IS 4246:2002, thus, demonstrating that LPG stove is safe to be used in the households for the purpose of cooking
Treatment of uncertainty	N/A
Additional comments	Used for information purposes and not used in any equations Where the technical lifetime of project cookstove is less than 5 years (e.g., 3 years), the activity proponent shall undertake either of the following: (i) Replace the non-function stove with the new cookstove that is of same or better efficiency. In such cases, the leakage emission per stove shall be added again and deducted from net emission reductions; (ii) Remove the project cookstove and subsequently the household from net emission reduction calculation. This shall be reflected in Ψ_y.

	Where activities include distribution of electric cookstoves, the activity shall have documented plan for collection and disposal of non-functional electric cooking devices during the crediting period

Data / Parameter table 2.

Data/parameter:	**Thermal efficiency of the project cookstove**
Description:	Thermal efficiency using the ISO Standard 19867-1:2018 (or any subsequent revision thereof), or equivalent national standards where an accredited laboratory with this capacity is not available in the host country
Data unit:	per cent
Equations referred:	N/A
Purpose of data:	☒ Baseline emissions ☐ Activity emissions ☐ Leakage emissions
Value(s) applied:	
Source of data:	☐ Measured ☒ Other sources
Choice of data or measurement methods and procedures:	Determined using the ISO Standard 19867-1:2018 Clean cookstoves and clean cooking solutions — Harmonized laboratory test protocols (or any subsequent revision thereof), or equivalent national standards where an accredited laboratory with this capacity is not available in the host country. For electric or LPG stoves: Efficiency provided by the manufacturer may also be deemed appropriate if both are true: (i) the stove is mass produced; and (ii) the rated efficiency provided by the manufacturer is determined using relevant efficiency standard in the country of stove manufacturing. For artisanal cookstoves, at least three randomly selected samples of each cookstove model must be used when testing for ISO thermal efficiency. The mean value from the three samples shall be applied
Treatment of uncertainty:	Results of measurements shall be reported with their uncertainty range, for informational purposes
Additional comments:	Used for demonstrating compliance with the applicability conditions (for biomass stoves) and for estimating useful energy delivered in the project

Data / Parameter table 3.

Data/parameter:	$\boldsymbol{NCV_x}$ ($\boldsymbol{NCV_i}$ or $\boldsymbol{NCV_j}$ or $\boldsymbol{NCV_k}$)
Description:	Net calorific value of fuel *i*, *j* or k
Data unit:	TJ / tonnes
Equations referred:	(2)

Purpose of data:	☒ Baseline emissions ☒ Activity emissions ☐ Leakage emissions
Value(s) applied:	Values as per Appendix 4 of the methodology
Source of data:	☐ Measured ☒ Other sources
Choice of data or measurement methods and procedures:	Values referred to or derived either from 2006 IPCC Guidelines for National GHG Inventories, Chapter 1, Table 1.2 NCV values or other peer reviewed and reputable sources of information are provided in the Appendix 5 If a fuel is not included in Appendix 4, use literature-based values or project level tests using ISO 19867
Treatment of uncertainty:	The central value for wood represents average to conservative estimates. The central value for charcoal likely represents average estimates and its use is justified in relation to the conservativeness provisions in the definition of baseline efficiency
Additional comments:	Fuel i represents fuelwood or charcoal Fuel j represents fossil fuel such as kerosene that maybe present in the baseline Fuel k represents LPG in the activity scenario

Data / Parameter table 4.

Data/parameter:	$fNRB_{i,y}$
Description:	Fraction of non-renewable woody biomass fuel *i* during year *y*
Data unit:	per cent
Equations referred:	(4), (44)
Purpose of data:	☒ Baseline emissions ☒ Activity emissions ☐ Leakage emissions
Value(s) applied:	As per the fNRB tool
Source of data:	☐ Measured ☒ Other sources
Choice of data or measurement methods and procedures:	Select a multi-national, national, or sub-national parameter from the fNRB tool for each biomass fuel *i*, based on the requirements of paragraph 22
Treatment of uncertainty:	Note that it is ±30 per cent of the fNRB value at the 95 per cent confidence interval, for informational purposes
Additional comments:	Updated at crediting period renewal

Data / Parameter table 5.

Data/parameter:	$EF_{i,CO2}$
Description:	CO_2 emission factor for fuel *i*
Data unit:	t CO_2 / TJ
Equations referred:	(4), (5), (19), (44)
Purpose of data:	☒ Baseline emissions ☒ Activity emissions ☐ Leakage emissions
Value(s) applied:	Fuelwood: 112 Artisanal charcoal: 89
Source of data:	☐ Measured ☒ Other sources
Choice of data or measurement methods and procedures:	The wood value is derived from the 2006 IPCC Guidelines for National GHG Inventories, Chapter 2, Table 2.5 default emission factor values for CO_2. The charcoal value is derived from research results for artisanal charcoal combustion in traditional cookstoves summarized in Appendix 4
Treatment of uncertainty:	The values represent average (fuelwood) and conservative (charcoal) estimates. The use of the fuelwood value is justified in relation to the conservativeness provisions in the definition of the benchmark baseline efficiency of fuelwood stoves
Additional comments:	N/A

Data / Parameter table 6.

Data/parameter:	$EF_{j,CO2}$
Description:	CO_2 emission factor for fuel *j*
Data unit:	t CO_2 / TJ
Equations referred:	(5), (45)
Purpose of data:	☒ Baseline emissions ☒ Activity emissions ☐ Leakage emissions
Value(s) applied:	As per Appendix 5 of the methodology
Source of data:	☐ Measured ☒ Other sources
Choice of data or measurement methods and procedures:	Values referred to or derived either from 2006 IPCC Guidelines for National GHG Inventories, Chapter 1, Table 1.2 NCV values or other peer reviewed and reputable sources of information

	Where *j* is electricity: 1. if the source of electricity is a regional or national electricity system, then the emission factor of the grid is calculated as per the valid version of Electricity emission factor tool. The following applies to the application of the tool: • Identification of the electricity consumption source: Article 6.4 activity electricity-based cookstove. This consumption source is determined not to be dependent on an intermittent electricity supply; • Identification of the relevant scenario: For this consumption source, the relevant scenario is scenario A; • Identification of the relevant electricity system: To be undertaken in accordance with section 5.3, step 3 of the tool; • The activity participant shall apply the requirements pertaining to case 1. 2. If the source of electricity is a decentralised or mini-grid renewable electricity system, then the emission factor is deemed to be zero (0)
Treatment of uncertainty:	See paragraph 190
Additional comments:	N/A

Data / Parameter table 7.

Data/parameter:	$EF_{i,nonCO2}$
Description:	Non-CO_2 emission factor for fuel *i*
Data unit:	t CO_2eq / TJ
Equations referred:	(6), (46)
Purpose of data:	☒ Baseline emissions ☒ Activity emissions ☐ Leakage emissions
Value(s) applied:	Fuelwood: 8.635 Artisanal charcoal: 5.845
Source of data:	☐ Measured ☒ Other sources
Choice of data or measurement methods and procedures:	The wood value is derived from the 2006 IPCC Guidelines for National GHG Inventories, Chapter 2, Table 2.5 default emission factor values for CH_4 of 300 kg / TJ and for N_2O of 4 kg / TJ and IPCC Fifth Assessment Report (AR5) GWPs for biogenic CH_4 of 25.25 and for N_2O of 265. The charcoal value is derived from the 2006 IPCC Guidelines for National GHG Inventories, Chapter 2, Table 2.5 default emission factor values for CH4 of 200 kg / TJ and the higher bound for N_2O of 3 kg / TJ and the same AR5 GWPs as compared to research results for artisanal charcoal

	combustion in traditional cookstoves summarized in Appendix 11. The GWPs shall be updated according to any future CMA decisions
Treatment of uncertainty:	Wood value: The central value is average to conservative in the context of household cooking in the activity setting since the combustion setting tends toward higher emissions and the uncertainty of the average value -33 per cent to +300 per cent. Charcoal value: The values are average to conservative in the context of household cooking in the activity setting since the combustion setting tends toward higher emissions. In particular, the N_2O emissions level derived from research results for artisanal charcoal combustion in traditional cookstoves and summarized in Appendix 10 is 250 per cent of the default IPCC upper bound value applied here
Additional comments:	N/A

Data / Parameter table 8.

Data/parameter:	$EF_{j,nonCO2}$
Description:	Non-CO_2 emission factor for fuel *j*
Data unit:	t CO_2eq / TJ
Equations referred:	(6), (16)
Purpose of data:	☒ Baseline emissions ☒ Activity emissions ☐ Leakage emissions
Value(s) applied:	As per Appendix 4 of the methodology
Source of data:	☐ Measured ☒ Other sources
Choice of data or measurement methods and procedures:	Values referred to or derived either from 2006 IPCC Guidelines for National GHG Inventories, Chapter 1, Table 1.2 NCV values or other peer reviewed and reputable sources of information IPCC Fifth Assessment Report (AR5) GWPs for biogenic CH_4 of 25.25 and for N_2O of 265. The GWPs shall be updated according to any future CMA decisions
Treatment of uncertainty:	Central values shall be used
Additional comments:	N/A

Data / Parameter table 9.

Data/parameter:	$EF_{i,CO2,upstream}$
Description:	CO_2 upstream emission factor for fuel *i*
Data unit:	t CO_2 / TJ

Equations referred:	(6) (16)
Purpose of data:	☒ Baseline emissions ☒ Activity emissions ☐ Leakage emissions
Value(s) applied:	Fuelwood: 0 Charcoal: 98
Source of data:	☐ Measured ☒ Other sources
Choice of data or measurement methods and procedures:	The charcoal value is derived from research results for artisanal charcoal production in earth mound kilns summarized in Appendix 10
Treatment of uncertainty:	The value for charcoal is conservative since it reflects a wood-to-charcoal ratio of 5:1 whereas measured ratios in field operations are consistently higher than this as described further in Appendix 4
Additional comments:	Upstream emissions for fuelwood are considered to be zero

Data / Parameter table 10.

Data/parameter:	$EF_{i,nonCO2,upstream}$
Description:	Non-CO_2 upstream emission factor for fuel *i*
Data unit:	t CO_2eq / TJ
Equations referred:	
Purpose of data:	☒ Baseline emissions ☒ Activity emissions ☐ Leakage emissions
Value(s) applied:	Fuelwood: 0 Charcoal: 59.312
Source of data:	☐ Measured ☒ Other sources
Choice of data or measurement methods and procedures:	The charcoal value is derived from research results for artisanal charcoal production in earth mound kilns summarized in Appendix 4
Treatment of uncertainty:	The value for charcoal is conservative since it reflects a wood-to-charcoal ratio of 5:1 whereas measured ratios in field operations are consistently higher than this as described further in Appendix 4
Additional comments:	Upstream emissions for fuelwood are considered as zero

Data / Parameter table 11.

Data/parameter:	$\boldsymbol{E_{LE}}$
Description:	Estimated leakage emissions per project cookstove
Data unit:	t CO_2eq / cookstove unit
Equations referred:	(58)
Purpose of data:	☐ Baseline emissions ☐ Activity emissions ☒ Leakage emissions
Value(s) applied:	Default: - Biomass stove[, LPG] and electric stove (industrial manufacturing): 0.0128 - Biomass stove (artisanal): 0.0064 Activity specific: Activity participants may instead use the results of a verified Life Cycle Analysis (LCA) study for the project cookstoves, if available, to provide an activity-specific value
Source of data:	☐ Measured ☒ Other sources
Choice of data or measurement methods and procedures:	An estimate of the potential emissions from these sources for industrially manufactured, imported cookstoves was developed based on assumptions about cookstove materials (steel), mass (about 5 kg), and locations of manufacturing and use (China and east Africa, respectively), using emission factors from the World Steel Association and the Global Logistics
Treatment of uncertainty:	Central values shall be used
Additional comments:	

Data / Parameter table 12.

Data/parameter:	$\boldsymbol{PC}_{b,i}$
Description:	Proportion of pre-activity cooking events conducted using fuel *i*
Data unit:	Per cent
Equations referred:	(8)
Purpose of data:	☒ Baseline emissions ☐ Activity emissions ☐ Leakage emissions
Value(s) applied:	As per activity survey
Source of data:	☐ Measured ☒ Other sources
Choice of data or measurement	Pre-activity surveys. The survey shall identify all the cooking devices present in the household. For each cooking device present in the household, respondents shall be

methods and procedures:	asked “How many times did you cook using (*specify cooking device*) yesterday?” to determine the number of usage events per day per device. Estimate the proportion of cooking events conducted using fuel *i*, and use the result in conjunction with parameter $PC_{p,j}$ to identify any material difference between the baseline scenario and actual Article 6.4 activity households. This parameter does not appear in emissions reduction quantification equations
Treatment of uncertainty:	The parameter estimate from the survey shall meet the minimum reliability of 95/10 for the percentage of baseline cooking conducted using fuel *i*
Additional comments:	This parameter is used to verify that fuel switch does not occur during the Article 6.4 activity

Data / Parameter table 13.

Data/parameter:	$\boldsymbol{PC}_{b,j}$
Description:	Proportion of pre-activity cooking events conducted using fuel *j*
Data unit:	Per cent
Equations referred:	(8)
Purpose of data:	☒ Baseline emissions ☐ Activity emissions ☐ Leakage emissions
Value(s) applied:	As per activity survey
Source of data:	☐ Measured ☒ Other sources
Choice of data or measurement methods and procedures:	Pre-activity surveys. The survey shall identify all the cooking devices present in the household. For each cooking device present in the household, respondents shall be asked “How many times did you cook using (*specify cooking device*) yesterday?” to determine the number of usage events per day per device. Estimate the proportion of cooking events conducted using fuel *i*, and use the result in conjunction with parameter $PC_{p,j}$ to identify any material difference between the baseline scenario and actual Article 6.4 activity households. This parameter does not appear in emissions reduction quantification equations
Treatment of uncertainty:	The parameter estimate from the survey shall meet the minimum reliability of 95/10 for the percentage of baseline cooking conducted using fuel *i*
Additional comments:	This parameter is used to verify that fuel switch does not occur during the Article 6.4 activity

Data / Parameter table 14.

Data/parameter:	$\boldsymbol{SEC}_{BL,\boldsymbol{i}}$
Description:	Specific energy consumption of a baseline cookstove using fuel *i* to cook a given amount of food (fuelwood and charcoal)

Data unit:	MJ / kg food
Equations referred:	(8)
Purpose of data:	☒ Baseline emissions ☐ Activity emissions ☐ Leakage emissions
Value(s) applied:	Activity specific values
Source of data:	☒ Measured ☐ Other sources
Choice of data or measurement methods and procedures:	Follow the requirements from the most recent version of the CCT protocol available at this link: https://cleancooking.org/protocols/ The cooking should be a "standard meal" of the region such that cooking activity is consistent in both baseline and activity scenario
Treatment of uncertainty:	The parameter estimate from the test results shall meet the minimum confidence and precision of 95/10 to use the mean value. If the target precision is not met, the project proponent shall apply the lower bound of the confidence intervals as the parameter value. The conservative bounds are those that produce a lower CO_2eq emissions reduction estimate
Additional comments:	Refer to baseline energy consumption caps and flags as per section 7.3.2

Data / Parameter table 15.

Data/parameter:	$SEC_{BL,j}$
Description:	Specific energy consumption of a baseline cookstove using fuel j to cook a given amount of food (fuel other than fuelwood and charcoal)
Data unit:	MJ / kg food
Equations referred:	(8)
Purpose of data:	☒ Baseline emissions ☐ Activity emissions ☐ Leakage emissions
Value(s) applied:	Activity specific values
Source of data:	☒ Measured ☐ Other sources
Choice of data or measurement methods and procedures:	Follow the requirements from the most recent version of the CCT protocol available at this link: https://cleancooking.org/protocols/ The cooking should be a "standard meal" of the region such that cooking activity is consistent in both baseline and activity scenario
Treatment of uncertainty:	The parameter estimate from the test results shall meet the minimum confidence and precision of 95/10 to use the mean value. If the target precision is not met, the project proponent shall apply the lower bound of the confidence intervals as the parameter value. The conservative bounds are those that produce a lower CO_2eq emissions reduction estimate

Additional comments:	Refer to baseline energy consumption caps and flags as per section 7.3.2

Data / Parameter table 16.

Data/parameter:	***CD***
Description:	Number
Data unit:	Days in a calendar year *y*. Use 366 for leap years
Equations referred:	(21) (22)
Purpose of data:	☐ Baseline Scenario ☐ Activity Scenario ☐ Leakage
Value(s) applied:	365 (non-leap year) or 366 (leap year)
Source of data:	☐ Measured ☐ Other sources
Choice of data or measurement methods and procedures:	N/A
Treatment of uncertainty:	N/A
Additional comments:	N/A

Data / Parameter table 17.

Data/parameter:	$EC_{BL,KPT,i}$
Description:	Energy consumption of each baseline fuel i for projects based on baseline KPT (for baseline fuels – fuelwood and charcoal)
Data unit:	TJ / (person*year)
Equations referred:	(21)
Purpose of data:	☒ Baseline Scenario ☐ Activity Scenario ☐ Leakage
Value(s) applied:	As per activity data
Source of data:	☒ Measured ☐ Other sources
Choice of data or measurement methods and procedures:	Projects that use monitored energy consumption and KPTs to determine fuel consumption in the baseline scenario shall collect data from a representative sample of households and following the most recent version of the KPT protocol available at this link: https://cleancooking.org/protocols/

Treatment of uncertainty:	The treatment of uncertainty as per latest KPT protocol. The study shall meet the minimum confidence and precision of 95/10 for the target parameter of average annual energy consumption per person. The 95/10 rule is applied to the sum of energy consumption across fuels (see parameter $\sum tEC_{base,KPT,i}$ in Appendix 5, which subsumes this parameter). If the target precision is not met, the project proponent shall take the conservative bound of the confidence interval as the parameter value, proportionately applied across all of the fuels used. The conservative bound is that which produces a lower CO_2eq emissions reduction estimate. Baseline fuel consumption caps and flags described in section 7.3.2 apply and results shall be cross-checked against these Where the study does not meet the required confidence and precision levels, the lower bound of the confidence interval shall be taken as a conservative measure
Additional comments:	

Data / Parameter table 18.

Data/parameter:	$EC_{BL,KPT,j}$
Description:	Energy consumption of each baseline fuel for projects based on baseline KPT (for baseline fuels – other than fuelwood and charcoal)
Data unit:	TJ / (person*year)
Equations referred:	(22)
Purpose of data:	☒ Baseline Scenario ☐ Activity Scenario ☐ Leakage
Value(s) applied:	As per activity data
Source of data:	☒ Measured ☐ Other sources
Choice of data or measurement methods and procedures:	Projects that use monitored energy consumption and KPTs to determine fuel consumption in the baseline scenario shall collect data from a representative sample of households and following the most recent version of the KPT protocol available at this link: https://cleancooking.org/protocols/
Treatment of uncertainty:	The treatment of uncertainty as per latest KPT protocol. The study shall meet the minimum confidence and precision of 95/10 for the target parameter of average annual energy consumption per person. The 95/10 rule is applied to the sum of energy consumption across fuels (see parameter $\sum tEC_{base,KPT,i}$ in Appendix 5, which subsumes this parameter). If the target precision is not met, the project proponent shall take the conservative bound of the confidence interval as the parameter value, proportionately applied across all of the fuels used. The conservative bound is that which produces a lower CO_2eq emissions reduction estimate. Baseline fuel consumption caps and flags described in section 7.3.2. apply and results shall be cross-checked against these Where the study does not meet the required confidence and precision

	levels, the lower bound of the confidence interval shall be taken as a conservative measure
Additional comments:	

Data / Parameter table 19.

Data/parameter:	$\boldsymbol{H_s}$
Description:	Average household size
Data unit:	Persons per household, regardless of age or gender (number)
Equations referred:	(52) (53)
Purpose of data:	☒ Baseline Scenario ☒ Activity Scenario ☐ Leakage
Value(s) applied:	
Source of data:	☒ Measured ☐ Other sources
Choice of data or measurement methods and procedures:	Baseline survey and annual usage surveys, adjusting to the lower value when a decrease in persons per household is observed
Treatment of uncertainty:	The parameter estimate from the survey shall meet the minimum confidence and precision of 95/10 to use the mean value. If the target precision is not met, the project proponent shall apply the conservative bounds of the confidence intervals as the parameter value. The conservative bounds are those that produce a lower CO_2eq emissions reduction estimate
Additional comments:	

Data / Parameter table 20.

Data/parameter:	$\mathbf{BM}_{\mathbf{BL},\boldsymbol{i},\boldsymbol{y}}$
Description:	Energy consumption of baseline fuel *i* for Article 6.4 activities in year *y*
Data unit:	TJ / (person*year)
Equations referred:	
Purpose of data:	☒ Baseline emissions ☐ Activity emissions ☐ Leakage emissions
Value(s) applied:	As determined by KPT for the baseline
Source of data:	☐ Measured ☒ Other sources

Choice of data or measurement methods and procedures:	Projects that choose the KPT approach to determine fuel consumption in the baseline scenario shall collect data from a representative sample of households and follow the most recent version of the KPT protocol available at this link: https://cleancooking.org/protocols/ This parameter shall be updated at the beginning of each crediting period, or after five years from the start date of the crediting period, whichever comes first
Treatment of uncertainty:	Treatment of Uncertainty as per latest version of the KPT protocol. The study shall meet the confidence and precision of 95/10. Where confidence and precision levels are not met, the activity proponent shall take the lower bound of confidence interval
Additional comments:	N/A

Data / Parameter table 21.

Data/parameter:	$\mathbf{BM}_{\mathbf{BL},j,y}$
Description:	Energy consumption of baseline fuel j for Article 6.4 activities in year *y*
Data unit:	TJ / (person*year)
Equations referred:	
Purpose of data:	☒ Baseline emissions ☐ Activity emissions ☐ Leakage emissions
Value(s) applied:	As determined by KPT for the baseline
Source of data:	☐ Measured ☒ Other sources
Choice of data or measurement methods and procedures:	Projects that choose the KPT approach to determine fuel consumption in the baseline scenario shall collect data from a representative sample of households and follow the most recent version of the KPT protocol available at this link: https://cleancooking.org/protocols/ This parameter shall be updated at the beginning of each crediting period, or after five years from the start date of the crediting period, whichever comes first
Treatment of uncertainty:	Treatment of Uncertainty as per latest version of the KPT protocol. The study shall meet the confidence and precision of 95/10. Where confidence and precision levels are not met, the activity proponent shall take the lower bound of confidence interval
Additional comments:	N/A

16. Data and parameters monitored

Data / Parameter table 22.

Data/parameter:	$Days_{y,h}$	
Description:	Number of maximum possible project-technology days during the year *y* in household *h*	
Data unit:	Number	
Equations referred:	Equation (52) (53)	
Purpose of data:	☒ Baseline Scenario ☒ Activity Scenario ☐ Leakage	
Measurement methods and procedures:	For each Article 6.4 activity household h, this shall be maintained in a database based on all days covered by the monitoring period since the date on which the project cookstove was obtained by the household. For example, if the monitoring period starts on 1 January 2026 and ends on 31 December 2026 and the household received the cookstove on 1 April, then this parameter corresponds to 275 days. If the household already received the project cookstove in the previous monitoring period, this parameter corresponds to 365 days for that monitoring period	
Measurement and updating frequency:	Annual	
Entity / person responsible for the measurement:	Activity participant	
Measuring instrument(s):	*Type of instrument*	N/A
	Accuracy class	N/A
	Calibration requirements	N/A
	Location	N/A
Measurement intervals:	Annual	
QA/QC procedures:	Ongoing maintenance of total sales and service records and activity databases shall be undertaken	
Treatment of uncertainty:	N/A	
Additional comment:	-	

Data / Parameter table 23.

Data/parameter:	$\boldsymbol{H_y}$	
Description:	Average household size in year *y*	
Data unit:	Number of persons per household, regardless of age or gender	
Equations referred:	(21) (22)	
Purpose of data:	☒ Baseline emissions ☒ Activity emissions ☐ Leakage emissions	
Measurement and updating frequency:	Annually (ex-ante via the pre-activity survey and annually via usage surveys)	
Measurement methods and procedures:	Pre-activity survey and annual usage surveys, with the lower value applied where a decrease in household size is observed	
Entity/person responsible for the measurement:	Activity participant	
Measuring instrument(s):	*Type of instrument*	N/A
	Accuracy class	N/A
	Calibration requirements	N/A
	Location	N/A
Measurement intervals:	Annually	
QA/QC procedures:	The parameter estimate from the survey shall meet the minimum reliability of 95/10 to use the mean value	
Treatment of uncertainty:	If the target reliability is not met, the activity participant shall apply the lower bound of the confidence interval as the parameter value	
Additional comment:	-	

Data / Parameter table 24.

Data/parameter:	Ψ_y
Description:	Percent of A6.4 activity households that qualify as user households in year *y*
Data unit:	Percentage

Equations referred:	(21) (22)	
Purpose of data:	☒ Baseline emissions ☒ Activity emissions ☐ Leakage emissions	
Measurement and updating frequency:	Annual	
Measurement methods and procedures:	Household surveys of households participating in the Article 6.4 activity with project cookstoves present, where respondents are asked whether the cookstove is used more than five times per week. The project cookstove shall also be visually observed to identify and report on the following signs of consistent use. Project cookstove is: 1. Un-packed 2. Present in an easily accessible area 3. Not being used for a non-cooking purpose 4. In apparent working condition 5. Not showing signs of disuse (e.g., dust accumulation or spider webs) 6. Showing evidence of recent use (e.g., presence of recent ashes). The requirements of the Sampling and surveys tool shall be applied along with the complementary requirements in Appendix 5 and Appendix 9 When surveys only are used to estimate Ψ_y, the values shall be capped at 90 per cent for Article 6.4 activities that undertake customer support actions as described below and at 58 per cent for those that do not. When the percentage is measured using SUMs on a sample of Article 6.4 activity households. The requirements of the Sampling and surveys tool shall be applied along with the complementary requirements in Appendix 5 and Appendix 9. The results shall be processed such that each A6.4 activity household that uses the project cookstove at least once five times per week (or the minimum frequency defined for the A6.4 activity) is assigned a score of “1” and each A6.4 activity household that does not is assigned a score of “0”. The percentage is calculated at the sum of the scores “1” and “0” divided by the total number of A6.4 activity households sampled	
Entity/person responsible for the measurement:	Activity participant	
Measuring instrument(s):	*Type of instrument*	N/A or SUMs
	Accuracy class	When SUMs, in compliance with Appendix 8
	Calibration requirements	When SUMS, in compliance with Appendix 8
	Location	Article 6.4 activity households
Measurement intervals:	When SUMS, in compliance with Appendix 8	

QA/QC procedures:	Option 1*:* Sampling shall be conducted to meet the 95/10 reliability guideline on the target parameter of the percentage of Article 6.4 activity households with cookstoves present in which project cookstove is used at least once per week (or the minimum frequency defined for the A6.4 activity) Option 2: Sampling for the measurements using SUMs shall be conducted to meet the 95/10 reliability guideline on the target parameter of the percentage of Article 6.4 activity households with cookstoves present in which project cookstove is used at least once per week (or the minimum frequency defined for the A6.4 activity). The results based on the SUMs measurements shall be cross-checked against the survey results to confirm the presence of the project cookstove and SUM and support interpretation of usage data
Treatment of uncertainty:	The lower bound of the confidence interval is applied as the parameter value
Additional comment:	N/A

Data / Parameter table 25.

Data/parameter:	$\boldsymbol{FEC_{AS,i,y}}$	
Description:	Energy consumption of fuel *i* in the activity scenario as measured by the activity KPTs in year *y*	
Data unit:	TJ / (person*year)	
Equations referred:	(52)	
Purpose of data:	☐ Baseline emissions ☒ Activity emissions ☐ Leakage emissions	
Measurement and updating frequency:	Annual	
Measurement methods and procedures:	Representative sample using the KPT in compliance with the Sampling and surveys tool and follow the most recent version of the KPT	
Entity/person responsible for the measurement:	Activity participant	
Measuring instrument(s):	*Type of instrument*	In compliance with the valid KPT protocol
	Accuracy class	In compliance with the valid KPT protocol
	Calibration requirements	In compliance with the valid KPT protocol
	Location	Article 6.4 activity households

Measurement intervals:	N/A
QA/QC procedures:	The study shall meet the minimum reliability of 95/10 for the target parameter of average annual energy consumption per person. The 95/10 rule is applied to the sum of energy consumption across each fuel. Activity participants should apply the guidance in Appendix 5
Treatment of uncertainty:	If the target reliability is not met, the activity participant shall take the upper bound of the confidence interval as the parameter value, proportionately applied across all of the fuels used
Additional comment:	-

Data / Parameter table 26.

Data/parameter:	$FEC_{AS,j,y}$	
Description:	Energy consumption of secondary fuel *j* in the activity scenario as measured by the activity KPTs in year *y*	
Data unit:	TJ / (person*year)	
Equations referred:	(53)	
Purpose of data:	☐ Baseline emissions ☒ Activity emissions ☐ Leakage emissions	
Measurement and updating frequency:	At least every two years	
Measurement methods and procedures:	Representative sample using the KPT in compliance with the Sampling and surveys tool and the requirements in Appendix 5 and Appendix 9	
Entity/person responsible for the measurement:	Activity participant	
Measuring instrument(s):	*Type of instrument*	In compliance with the valid KPT protocol
	Accuracy class	In compliance with the valid KPT protocol
	Calibration requirements	In compliance with the valid KPT protocol
	Location	Article 6.4 activity households
Measurement intervals:	N/A	
QA/QC procedures:	The study shall meet the minimum reliability of 95/10 for the target parameter of average annual energy consumption per person. The 95/10	

	rule is applied to the sum of energy consumption across each fuel. Activity participants should apply the guidance in Appendix 5
Treatment of uncertainty:	If the target reliability is not met, the activity participant shall take the upper bound of the confidence interval as the parameter value, proportionately applied across all of the fuels used
Additional comment:	-

Data / Parameter table 27.

Data/parameter:	$mEC_{AS,k,h,y}$	
Description:	Mean monitored energy consumption of activity fuel k in activity households *h* in year *y* (TJ)	
Data unit:	TJ / (person*year)	
Equations referred:		
Purpose of data:	☐ Baseline Scenario ☒ Activity Scenario ☐ Leakage	
Measurement methods and procedures:	As per latest version of the KPT protocol	
Measurement and updating frequency:	Annual	
Entity / person responsible for the measurement:	Activity proponent	
Measuring instrument(s):	*Type of instrument*	As per latest version of the KPT protocol
	Accuracy class	As per latest version of the KPT protocol
	Calibration requirements	As per latest version of the KPT protocol
	Location	As per the latest version of the KPT protocol
Measurement intervals:	Annual	
QA/QC procedures:	As per latest version of the KPT protocol	
Treatment of uncertainty:	Treatment of uncertainty as per latest version of the KPT protocol meeting confidence and precision of 95/10 Where the study does not meet the confidence and the precision of 95/10, take value of the upper bound of the confidence internval	

Additional comment:	This option is valid when activity is not using CTEC approach, i.e., sampling approach is adopted. Sampling shall be taken as per the “Sampling and survey tool”

Data / Parameter table 28.

Data/parameter:	PCE_m	
Description:	Average project technology cooking events per day over 1 month from SUMs measurements	
Data unit:	Cooking events/day (Number)	
Equations referred:	(55)	
Purpose of data:	☐ Baseline Scenario ☒ Activity Scenario ☐ Leakage	
Measurement methods and procedures:	Installation of SUMs on a representative sample of project technology cookstoves	
Measurement and updating frequency:	Once for a one-month duration during the first monitoring period of the crediting period	
Entity / person responsible for the measurement:	Activity participant	
Measuring instrument(s):	*Type of instrument*	SUMs
	Accuracy class	In compliance with Appendix 8
	Calibration requirements	In compliance with Appendix 8
	Location	Article 6.4 activity households
Measurement intervals:	In compliance with Appendix 8	
QA/QC procedures:	The study shall meet the minimum confidence and precision of 95/10 for the target parameter of average cooking events per day per project technology cookstoves. If the target precision is not met, the project proponent shall take the conservative bounds of the confidence intervals as the parameter value. The conservative bounds are those that tend to underestimate project technology cooking events SUMs sampling protocols (installation, placement, downloading) and algorithms used to convert raw data into cooking events shall not change between sampling during KPTs and sampling during ongoing project operation	
Treatment of uncertainty:	If the target reliability is not met, the activity participant shall take the lower bound of the confidence intervals as the parameter value	

Additional comment:	User households in the SUMs sample shall not receive any support different or additional to those not in the sample

Data / Parameter table 29.

Data/parameter:	PTC_{KPT}	
Description:	Average project technology cooking events per day over the project KPT from SUMs measurements	
Data unit:	Cooking events/day (Number)	
Equations referred:		
Purpose of data:	☐ Baseline Scenario ☒ Activity Scenario ☐ Leakage	
Value applied:	Activity specific values	
Measurement methods and procedures:	Installation of SUMs on the project technology cookstoves during the project KPT	
Measurement and updating frequency:	Once during the project KPT	
Entity / person responsible for the measurement	In compliance with Appendix 8	
Measuring instrument(s):	*Type of instrument*	SUMs
	Accuracy class	In compliance with Appendix 8
	Calibration requirements	In compliance with Appendix 8
	Location	Article 6.4 activity households
Measurement intervals:	In compliance with Appendix 8	
QA/QC procedures:	The study shall meet the minimum confidence and precision of 95/10 for the target parameter of average cooking events per day per project technology cookstoves. If the target precision is not met, the project proponent shall take the conservative bounds of the confidence intervals as the parameter value. The conservative bounds are those that tend to underestimate project technology cooking events. SUMs sampling protocols (installation, placement, downloading) and algorithms used to convert raw data into cooking events shall not change between sampling during KPTs and sampling during ongoing project operation	

Treatment of uncertainty:	If the target reliability is not met, the activity participant shall take the lower bound of the confidence intervals as the parameter value
Additional comment:	Households in the SUMs sample shall not receive any support different from or additional to those not in the sample

Data / Parameter table 30.

Data/parameter:	$SEC_{AS,K}$	
Description:	Specific energy consumption of project fuel *k* to cook a given amount of food in activity scenario from activity CCT	
Data unit:	MJ / kg food	
Equations referred:	(7), (8)	
Purpose of data:	☒ Baseline Scenario ☒ Activity Scenario ☐ Leakage	
Value applied:	Activity specific values	
Measurement methods and procedures:	Follow the requirements from the most recent version of the CCT protocol, see Appendix 7. The cooking should be a "standard meal" of the region such that cooking activity is consistent in both baseline and activity scenario	
Measurement and updating frequency:	Annual	
Entity / person responsible for the measurement:	Activity proponent	
Measuring instrument(s):	*Type of instrument*	As per CCT protocol see Appendix 7
	Accuracy class	As per CCT protocol see Appendix 7
	Calibration requirements	As per CCT protocol see Appendix 7
	Location	As per CCT protocol see Appendix 7
Measurement intervals:	Refer to section 15, monitoring activity schedules, Appendix 7and Appendix 9 of the mechanism methodology	
QA/QC procedures:	as per requirements of the latest version of the CCT protocol	
Treatment of uncertainty:	The parameter estimate from the test results shall meet the minimum confidence and precision of 95/10 to use the mean value. If the target precision is not met, the project proponent shall apply the lower bound of the confidence intervals as the parameter value. The conservative bounds are those that produce a lower CO_2eq emissions reduction estimate	

Additional comment:	N/A

Data / Parameter table 31.

Data/parameter:	$tEC_{AS,k,h,y}$	
Description:	Total monitored energy consumption of activity fuel *k* in household *h* in year *y*	
Data unit:	kWh (electricity) or Kg (fuel LPG) – TJ (calculated)	
Equations referred:		
Purpose of data:	☐ Baseline Scenario ☒ Activity Scenario ☐ Leakage	
Value applied:	Activity specific values	
Measurement methods and procedures:	Electricity: Meters – built in or external data loggers (including IOT based smart meters). As per provisions of the electricity tool LPG: Fuel sales record (e.g., purchase receipt by individual household). The fuel sales record mentions the amount of fuel consumed, e.g., 1 cylinder of LPG was used in a month by household k, and each cylinder has 14kg of LPG	
Measurement and updating frequency:	Continous measurement	
Entity / person responsible for the measurement:	Activity proponent	
Measuring instrument(s):	*Type of instrument*	For LPG – fuel sales record
	Accuracy class	N/A
	Calibration requirements	N/A
	Location	N/A
Measurement intervals:	Continous	
QA/QC procedures:	Where LPG is used in baseline, kg of fuel to be converted to energy (TJ) based on equation 1 of the mechanism methodology Where LPG is used in baseline, Kg of fuel to be converted to energy (TJ) based on equation (1) of the mechanism methodology	
Treatment of uncertainty:	For LPG – N/A For electricity – as per provisions of electricity emissions tool	

Additional comment:	For project measuring electricity consumption, the activity shall comply with the monitoring provisions of the parameters EGs,y and EGs,h from the electricity emissions tool shall be used to monitor the electricity generation from the Article 6.4 activity

Data / Parameter table 32.

Data/parameter:	$tEC_{AS,KPT,k}$	
Description:	Monitored energy consumption of activity fuel *k* for project cookstove(s) only from activity KPT	
Data unit:	TJ / person-year or kWh/person-year	
Equations referred:	Equation (35)	
Purpose of data:	☒ Baseline Scenario ☒ Activity Scenario ☐ Leakage	
Value applied:		
Measurement methods and procedures:	CTEC projects that use monitored energy consumption and KPTs shall collect data on all cookstoves operating in parallel with the project cookstove, from a representative sample of households (in compliance with the Sampling and surveys tool) and following the most recent version of the KPT protocol available at this link: https://cleancooking.org/protocols/	
Measurement and updating frequency:	Annual	
Entity / person responsible for the measurement:	Activity participant	
Measuring instrument(s):	*Type of instrument*	In compliance with the valid KPT protocol see Appendix 8
	Accuracy class	In compliance with the valid KPT protocol see Appendix 8
	Calibration requirements	In compliance with the valid KPT protocol see Appendix 8
	Location	Article 6.4 activity households
Measurement intervals:		
QA/QC procedures:	The study shall meet the minimum confidence and precision of 95/10 for the target parameter of average annual energy consumption per person. The 95/10 rule is applied to the sum of energy consumption across fuels (see parameter $\sum tEC_{base,KPT,i}$ in Appendix 5, which subsumes this parameter). If the target precision is not met, the project proponent shall	

	take the conservative bounds of the confidence intervals as the parameter value, proportionately applied across all of the fuels used. The conservative bounds are those that produce a lower CO_2eq emissions reduction estimate
Treatment of uncertainty:	If the target reliability is not met, the activity participant shall take the upper bound of the confidence interval as the parameter value, proportionately applied across all of the fuels used
Additional comment:	

Data / Parameter table 33.

Data / Parameter:	$AC_{New,y}$	
Description:	Quantity of new project cookstoves added to the activity in year *y*	
Data unit:	Number	
Equations referred:	(58)	
Purpose of data:	☐ Baseline scenario ☐ Activity scenario ☒ Leakage	
Measurement and updating frequency:	Annual	
Measurement methods and procedures:	It is the count of new project cookstoves that are included in the Article 6.4 activity database during a year	
Entity/person responsible for the measurement:	Activity participant	
Measuring instrument(s):	*Type of instrument*	N/A
	Accuracy class	N/A
	Calibration requirements	N/A
	Location	N/A
Measurement intervals:	Annual	
QA/QC procedures:	Cross check against household number and waiver certificates or similar form of evidence	
Treatment of uncertainty:	Not applicable	
Additional comment:	Where the technical lifetime of the stove is less than five (5) years and during the crediting period the stove is replaced with the new stove, it shall be accounted as a new stove for the purpose of leakage calculation	

Data / Parameter table 34.

Data/parameter:	$tEC_{AS,KPT,k}$

Description:	Monitored energy consumption of activity fuel *k* for project cookstove only based on activity KPT	
Data unit:	TJ / (person*year) or (in the case of electricity) kWh / (person*year)	
Equations referred:	(44) (45) (46) (47)	
Purpose of data:	☐ Baseline Scenario ☒ Activity Scenario ☐ Leakage	
Measurement methods and procedures:	CTEC projects that use monitored energy consumption and KPTs shall collect data on all cookstoves operating in parallel with the project cookstove, from a representative sample of households and following the most recent version of the KPT protocol available at this link: https://cleancooking.org/ protocols/. $EC_{proj,KPT,j-project}$ is extracted from the same measurements as the ones used to obtain $EC_{proj,KPT,j}$ and comprises energy consumption of project fuel *j* for project cookstove only. It also may be expressed in kWh / (person*year) if the project-technology consumes electricity	
Measurement and updating frequency:	Once per crediting period	
Entity / person responsible for the measurement:		
Measuring instrument(s):	*Type of instrument*	
	Accuracy class	
	Calibration requirements	
	Location	
Measurement intervals:		
QA/QC procedures:	The study shall meet the minimum confidence and precision of 95/10 for the target parameter of average annual energy consumption per person. The 95/10 rule is applied to the sum of energy consumption across fuels (see parameter $\sum tEC_{base,KPT,i}$ in Appendix 10, which subsumes this parameter). If the target precision is not met, the project proponent shall take the conservative bounds of the confidence intervals as the parameter value, proportionately applied across all of the fuels used. The conservative bounds are those that produce a lower CO_2eq emissions reduction estimate	
Treatment of uncertainty:	Uncertainty shall be determined as per requirements of the protocol adopted	
Additional comment:		

Data / Parameter table 35.

Data/parameter:	$tEC_{AS,k,h,y}$	
Description:	Monitored energy consumption of activity fuel *k* in project household *h* in year *y*	
Data unit:	TJ	
Equations referred:	Equation (35)	
Purpose of data:	☐ Baseline Scenario ☒ Activity Scenario ☐ Leakage	
Measurement methods and procedures:	Fuel sales records shall be monitored at the household level, and shall be cross-checked	
Measurement and updating frequency:	Annual	
Entity / person responsible for the measurement:		
Measuring instrument(s):	*Type of instrument*	
	Accuracy class	
	Calibration requirements	
	Location	
Measurement intervals:		
QA/QC procedures:		
Treatment of uncertainty:		
Additional comment:	Fuel sale records shall be used to track consumption of pellets, LPG and ethanol where LPG and ethanol fuel delivery systems are designed exclusively for use in a specific project technology and are not metered. Projects should implement safeguards to prevent fuel diversion for non-project activities (e.g., sealed canisters, tamper-evident meters, delivery log cross-verification, etc.), and cross-check household fuel consumption monitored through fuel sale records against average project energy consumption values. Any outliers, defined as a household where the per person energy consumption for the given monitoring period is greater than 1.5 times the interquartile range (IQR) above the third quartile shall be justified, or the household excluded	

Appendix 1. Activity information cover sheet

1. This cover sheet shall be completed at the activity design stage, presented at validation and updated at the time of each verification, highlighting any changes from original information submitted at validation.

2. Essential activity information:

(a) Type of Article 6.4 activity: ☐Project activity ☐Programme of activities (PoA);

(b) Start date of the crediting period;

(c) Crediting period end date;

(d) Article 6.4 activity fuel type(s);

(e) Baseline fuel type(s) or energy source(s);

(f) Baseline cooking technology/device type (s);

(g) Project cookstove fuel type(s) or energy source (s);

(h) Project cookstove(s)/device type(s), model(s);

(i) Project cookstove(s)/cooking device [ISO] thermal efficiency(ies);

(j) ISO tier(s) for PM2.5 emissions ([required for LPG cookstoves, otherwise] optional);

(k) ISO tier(s) for CO emissions ([required for LPG cookstoves, otherwise] optional);

(l) Total number of participating households;

(m) Average household size (persons per household, regardless of age or gender);

(n) Total number of cookstoves/devices of each type;

(o) Geographical boundary (stoves);

(p) Geographical boundary (fuel);

(q) Expected (ex-ante) or achieved (ex-post) gross CO_2eq emission reductions (per household);

(r) Calculation sheet publicly available? (Y/N); ☐ Yes ☐ No;

(s) Fuel or energy consumption monitored for all project cookstoves in all households? (Y/N). ☐ Yes ☐ No.

3. If no, for **sampling based energy consumption**:

(a) Baseline fuel consumption value and unit;

(b) Useful energy value applied, where relevant:

(c) Justification if value is above the flagged threshold;

(d) Project monitoring approach: ☐ KPT ☐ KPT+SUMs);

(e) Third party used for KPTs? [☐ Yes ☐ No] [(Y/N)] ;

(f) Number of households sampled for KPT;

(g) Number of households sampled for SUMs.

4. If yes, **for monitored energy consumption**:

(a) Project monitoring approach;

(b) Type of fuel or energy consumption data: ☐ Metered electricity ☐ LPG sales records ☐ Fuel delivery records ☐ Data logger ☐ Other, specify: ________;

(c) Third party used for KPTs, where applicable? ☐ Yes ☐ No(Y/N);

(d) Number of households sampled for KPT, where applicable;

(e) fNRB value;

(f) NCV approach for other than wood and charcoal: ☐ default ☐ self-determined;

(g) If self-determined, method used;

(h) If self-determined results vary significantly from Appendix 8 values, justification for the difference;

(i) Emission Factors (EFs): ☐ default ☐elf-determined;

(j) Details on customer support activities provided:

(i) Demonstration that the project has selected technologies and fuels that meet the cooking needs of the target population;

(ii) Project participant operations and maintenance support activities;

(iii) Support communication channels availability to activity participants.

5. How seasonality is addressed in the project monitoring plan:

(a) Justification for how this approach will result in accurate baseline and project fuel use measurements;

(b) If space heating is common in the project area, how space heating has been addressed in the project design.

6. For monitored energy consumption using fuel sale records to track consumption of [LPG]:

(a) Safeguards taken to prevent fuel diversion for non-project activities (e.g., sealed canisters, tamper-evident meters, delivery log cross-verification, etc.);

(b) Results of cross-check of household fuel consumption monitored through fuel sale records against average project energy consumption values, and justification or removal of any outliers.

7. Description of any missing and outlier/excluded data for KPTs, CCTs, SUMs, surveys, etc.

8. Description of how sampling randomization was conducted and what proof is available to auditors.

9. SUMs validation checks performed (as described in Appendix 8), for projects using SUMs.

10. Compliance with the Principles for Responsible Carbon Finance in Clean Cooking (optional).

Appendix 2. Sample template for A6.4ERs waiver certificate

1. Scope and Application

1. This appendix provides a template, requirements and guidance for the application of A6.4ERs Waiver Certificates.

2. The activity participant may obtain a A6.4ERs waiver certificate from each household in which a project cooking device is distributed as part of the activity.

3. When utilized, the contents of the A6.4ERs waiver certificate and the implication of the A6.4ERs Waiver Certificate shall be clearly communicated to the user and shall denote that the A6.4ERs Waiver Certificate is obtained with consent of the household.

4. When utilized, the A6.4ERs waiver certificate shall be signed by the head of the household, or a named delegated adult (typically spouse/partner) with documented authority (defined as per the national regulations).

5. The contents of the certificate, the meaning of A6.4ERs, and the implications of its execution shall be verbally explained to the signatory in their language prior to attestation. This verbal explanation shall be audio-recorded and archived as part of the documentation.

6. This appendix provides an example A6.4ERs waiver certificate to be used by the activity participant. The A6.4ERs waiver certificate shall be available in each language commonly spoken in the activity boundary. Where the head of household or adult resident is unable to read or write, attestation may be provided by (i) a thumbprint witnessed by both the enumerator and a community witness independent of the activity; (ii) an audio-recorded oral consent in the relevant local language; or (iii) a digital signature captured via biometric device. The contents of the certificate and the implications of its execution shall be verbally explained to the signatory in their language prior to attestation, and this verbal explanation shall itself be audio-recorded and archived as part of the documentation.

7. Personal data about the household and the user such as contact information and national identification number shall not be made public but shall be made available to the DOE during validation and verification, as relevant.

2. A6.4ERs waiver certificate

2.1. Household Data

8. Full Name of the Household representative.

9. Contact Number, if any.

10. Email address, if any.

11. Address:

    (a) Country;

(b) State;

(c) District;

(d) Village;

(e) Street;

(f) Local Landmark;

(g) House number.

12. National Identification Number or any Government issued ID (and evidence of number).

2.2. Details of the Project cooking device(s)

13. Type of Stove/other cooking device.

14. Fuel Type.

15. Manufacturer.

16. Vendor or Distributor.

17. Certified Efficiency.

18. Unique Identification Number.

19. Manufacturing series.

20. Installation Date.

2.3. A6.4ERs Waiver certificate statement

21. I, the undersigned, confirm my participation in the Article 6.4 activity (Name of the activity, Reference ID) by receiving the above-mentioned stove for the primary purposes of cooking meals, preparing beverages or heating water. I received the cooking device (free of charge) OR (at the cost of ______).

22. By signing this waiver, I voluntarily and with full knowledge and consent pass on my rights to A6.4ERs (carbon credits) to the activity participant [name of the proponent].

23. By signing this waiver, I voluntarily and with full knowledge and consent agree not to claim A6.4ERs (carbon credits) from any other carbon crediting programme related to the use of the above-mentioned stove.

24. By signing this waiver, I confirm my intention to adhere to any and all relevant rules, requirements and procedures established for the Article 6.4 activity and its methodologies, tools, and standards.

25. I confirm that I have read and understood the contents of this waiver and its contents have been explained adequately and appropriately by the activity participant.

26. Signature Date (DD/MM/YYYY).

Appendix 3. Upstream emission factors from other fuels in tonne / TJ

1. This appendix provides default upstream emission factors for selected non-electric cooking fuels that may be used in the calculation of baseline emissions and/or activity emissions, subject to the applicability conditions of this methodology.

2. Fuels listed as potential baseline fuels may be used only where they are identified in the pre-activity scenario and are eligible for inclusion in the baseline emissions calculation.

3. Fels listed as activity/project fuels may be used only where the corresponding project cooking technology and fuel are eligible under the applicability conditions of this methodology.

4. Kerosene and solid fossil fuels are included only as potential baseline fuels, where relevant to the pre-activity scenario. They are not eligible as activity/project fuels under this methodology.

Table 1. Upstream Emissions from Other Fuels in tonne/TJ

Potential activity fuels	**Potential baseline fuels**				
		CO_2	**CH_4**	**N_2O**	**CO_2eq**
-	Kerosene[a]	9.0	0.10	0.00016	11.9
LPG from crude oil	LPG from crude oil	18.4	0.12	0.00029	22.1
LPG from natural gas	LPG from natural gas	9.9	0.15	0.00019	14.5
LPG derived from a mix of crude and natural gas inputs[b]	LPG derived from a mix of crude and natural gas inputs[b]	13.6	0.11	0.00019	16.8
-	Coal mining and cleaning	1.5	0.23	0.00003	8.3

5. [Global Warming Potentials (GWPs) from the IPCC Sixth Assessment Report (AR6.4) should be multiplied by the emission factors to convert them to CO_2eq as follows:

(a) CO_2: 1;

(b) CH_4 fossil fuels: 29.8;

(c) CH_4 non fossil fuels: 27.2;

(d) N_2O: 273.]

1. Notes:

(a) Kerosene emissions are based on jet fuel from the GREET model;

(b) Combined LPG is a weighted average using the 2021 global input mix, which was 37 per cent crude and 63 per cent natural gas.

Appendix 4. Default Point of Use Emission Factors, Thermal Efficiencies, and NCVs

Table 1. Default Point of Use EFs for selected cooking fuels

Fuel	Net Calorific Value (TJ/tonnes)	Thermal efficiency	CO_2 Emission Factor (tonnes/TJ)	CH_4 Emission Factor (tonnes/TJ)	N_2O Emission Factor (tonnes/TJ)
Charcoal [(2-5)]	0.0295	25 per cent	78.5	0.2	0.008
Kerosene[1]	0.0438	50 per cent	71.9	0.01	0.0006
LPG[1]	0.0473	50 per cent	63.1	0.005	0.0001
Wood[1]	0.0156	15 per cent	112	0.3	0.004
Dung[1, 6-9]	0.012	15 per cent	0[1]	0.83	0.004
Anthracite[1]	0.0267	Project-specific	98.3	0.3	0.0015
Other (Bituminous Coal)[1]	0.0258	Project-specific	94.6	0.3	0.0015
Sub-Bituminous[1]	0.0189	Project-specific	96.1	0.3	0.0015

1. Notes:

(a) To avoid double counting, the fuel emission factors above do not include upstream emissions, which are accounted for separately;

(b) Project proponents shall use the NCV values for wood and charcoal listed here. For other fuels, project level tests using ISO 19867 may be used. Significant variance between such outputs and the values above shall be noted and justified in the Activity Information Cover Sheet (see Appendix 1);

(c) Default net calorific values and default emission factors for other fuel types (e.g., specific types of coal) can also be found in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories or may be justified from literature and/or testing reports;

(d) [GWPs from the IPCC Sixth Assessment Report (AR6.4) should be multiplied by the emission factors to convert them to CO_2eq as follows:

(i) CO_2: 1;

(ii) CH_4 fossil fuels: 29.8;

(iii) CH_4 non fossil fuels: 27.2;

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[1] While the emission factor technically is 80.4 tCO_2/TJ, in this mechanism methodology, dung is assumed to be a renewable fuel with a CO_2 emission factor equivalent to zero.

(iv) N_2O: 273.]

(e) The tonnes CO_2eq per TJ for CO_2, CH_4, and N_2O should be summed.

2. Sources

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[5] Smith, Kirk, R. Uma, V. V. N. Kishore, K. Lata, V. Joshi, Junfeng Zhang, R. A. Rasmussen, and M. A. K. Khalil. “Greenhouse Gases From Small-Scale Combustion Devices In Developing Countries Phase IIa: Household Stoves In India.” Research Triangle Park, NC: US Environmental Protection Agency, June 2000.

[6]IPCC. Guidelines for National Greenhouse Gas Inventories: Reference Manual. 1996.

[7]Fleming LT, Weltman R, Yadav A, et al. Emissions from village cookstoves in Haryana, India, and their potential impacts on air quality. Atmos Chem Phys. 2018;18:15169–15182.

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[9]Akagi SK, Yokelson RJ, Wiedinmyer C, et al. Emission factors for open and domestic biomass burning for use in atmospheric models. Atmospheric Chemistry and Physics. 2011;11:4039–4072.

[10]The Earth’s Energy Budget, Climate Feedbacks and Climate Sensitivity, Table 7.15 in AR6 WG1 Chapter 7. https://doi.org/10.1017/9781009157896.009.

Appendix 5. Activity-specific survey requirements for cooking energy transition activities

1. Scope and Application

1. This appendix specifies activity-specific survey requirements for the design and implementation of surveys for cooking energy transition activities under this mechanism methodology. The activities may involve biomass cookstoves, LPG cookstoves, electric cooking devices and other eligible cooking energy transition devices.

2. General requirements for surveys, including data collection and quality assurance/quality control (QA/QC), as well as requirements for sampling design, sample size determination, and reliability, shall be applied in accordance with the Sampling and surveys tool.[1]

3. The provisions in this appendix supplement the Sampling and survey tool by providing:

(a) Survey types and their objectives;

(b) Key parameters to be assessed; and

(c) Activity-specific data collection and verification procedures.

4. Requirements and guidance for selecting samples of appropriate size and representativeness can be found in Appendix 5.

2. General survey requirements

2.1. Survey Administration

5. Surveys shall be conducted by trained enumerators in accordance with the sampling plan and QA/QC procedures. Enumerators shall be independent of the activity participant's organization. Where applicable, the independence of the entity shall be demonstrated through a signed conflict of interest form in which all conflicts are disclosed (including relational, financial, competitive, and others). At a minimum, enumerators shall not be engaged in a customer-facing role for the activity participant or its implementation partners, such as selling, marketing, distributing, or providing customer service for project cookstoves Data collection shall be carried out using methods that ensure accuracy, consistency and traceability.

6. Where feasible, surveys shall be conducted using electronic data collection system with built-in validation checks.

2.2. Respondent selection and consent

7. Surveys shall be conducted with the main household cook, who shall give their informed

[1] This draft methodological tool is still under development and is yet to be approved by the supervisory Body. The draft methodology will be revised accordingly if changes to this draft version of this methodological tool are made by the time of their adoption.

consent prior to the start of the interview. Consent shall be documented as part of the survey record.

8. Where the main cook is unavailable, the interview may be conducted with another knowledgeable household member, provided that reasonable efforts are made to validate responses. Where the main household cook is a dependent child, both the child and their guardian shall provide consent and be present.

2.3. Language and cultural considerations

9. Surveys shall be conducted in a language understood by the respondent. Where the enumerators do not speak the local language fluently, qualified interpreter shall be used in the exercise.

10. Surveys should be as concise as possible. Enumerators shall provide a realistic estimate of the time needed to complete the survey.

11. The survey implementation shall respect applicable national regulations, as well as local customs and practices. Hence, before conducting surveys, the activity participant shall ensure that relevant local authorities and community leaders have been consulted.

12. Survey instruments shall be designed to minimize respondent burden and reduce bias. Where retrospective information is required, questions should refer to recent and specific time periods (e.g., “yesterday”) to improve recall accuracy. This approach has been shown to be more accurate than asking interviewees to aggregate or approximate their activities over a longer period of time, such as “last week.

2.4. Definition of cooking events

13. For the purpose of this mechanism methodology, a *cooking event* refers to any instance in which useful energy is delivered from a cooking device to perform a discrete task or set of tasks (e.g., cooking a meal, preparing beverages, or heating water).

14. Survey instruments shall ensure that all relevant cooking events are captured consistently across respondents.

2.5. Additional guidance on survey design and implementation

15. Additional guidance on conducting high quality surveys in the low- and middle-income country (LMIC) context can be found in the following documents:

    (a) Household Sample Surveys in Developing and Transition Countries;

    (b) Designing Household Survey Samples: Practical Guidelines;

    (c) Siwatu,Gbemisola Oseni; Palacios-Lopez,Amparo; Mugera,Harriet Kasidi; Durazo,Josefine. *Capturing What Matters: Essential Guidelines for Designing Household Surveys (English).* LSMS Guidebook Washington, D.C.: World Bank Group. http://documents.worldbank.org/curated/en/381751639456530686.

16. Specific survey guidance and tested questions relating to various aspects of household energy patterns and transitions, including cooking carbon projects, can be found in the following resources.

(a) Guidance on survey design from the authors of Gill-Wiehl, A., Kammen, D.M. & Haya, B.K. Pervasive over-crediting from cookstove offset methodologies. Nat Sustain 7, 191–202 (2024). https://doi.org/10.1038/s41893-023-01259-6;

(b) Clean Cooking Alliance's Fuel Stacking Toolkit.

3. Pre-activity scenario survey requirements

3.1. Purpose

17. The pre-activity survey shall be conducted to:

(a) Establish household size (number of persons per household);

(b) Identify cooking fuels and technologies used;

(c) Quantify the proportion of cooking events associated with each fuel-technology combination;

(d) [Capture seasonal or other variation in the percentage of cooking events carried out on each fuel-technology combination over the course of one year[; and

(e) Assess whether space heating affects fuel consumption, where relevant;

(f) [Determine the income level and daily household consumption expenditure per capita, when required for evaluating the poverty index].

18. [Activity participants are required to incorporate the resulting information on seasonal or other variations in fuel use into their monitoring plan design and to justify on the Activity Information Cover Sheet how the approach they are taking will result in accurate baseline and project fuel use measurements. If space heating is common in the project area, the justification shall include an explanation of how space heating has been addressed in the project design. If an accurate approach cannot be taken, then the project proponent shall instead select and justify a conservative approach].

4. Application of the results

19. The results of the pre-activity survey shall be used to inform the design of the monitoring approach, including the treatment of seasonal variation and any additional uses of fuel (e.g. space heating).

20. Where significant variation is identified, activity participants shall demonstrate how such variation is accounted for in the monitoring plan or apply conservative assumptions, as appropriate.

21. Activity participants shall justify, in the Activity Information Cover Sheet, how the selected approach ensures accurate estimation of baseline and activity fuel use.

22. If space heating is common in the activity area, the justification shall include an explanation of how space heating has been addressed in the project design. Where an accurate approach cannot be taken, then the activity participants shall instead select and justify a conservative approach.

5. Examples of common cooking device types

23. To support consistent identification and classification of baseline technologies during surveys, the following non-exhaustive list of commonly observed cooking device types is provided.[2] Activity participants shall adapt the list to the local context and shall ensure that survey enumerators are trained to distinguish between cooking device types, fuel or energy carriers, and the level of improvement or efficiency of the device.

24. The classification of cooking devices shall capture, at a minimum:

(a) The device type and construction, e.g. open fire, metal stove, ceramic-lined stove, gas burner, electric hotplate or electric pressure cooker;

(b) The primary fuel or energy carrier used, e.g. fuelwood, charcoal, LPG, electricity, kerosene, coal, agricultural residues or other locally relevant fuels;

(c) Whether the device is fixed or portable;

(d) Whether the device is artisanal, locally manufactured, factory-made or mass-produced;

(e) Whether the device is used as the primary cooking device, a secondary device, or a backup device;

(f) Whether the device is used for cooking, water heating, space heating or other household energy services; and

(g) Whether the device has features expected to affect efficiency or emissions, such as insulation, chimney, grate, pot skirt, forced draft, pressure cooking, induction heating, thermostat or automatic shut-off.

25. Cooking device types may include, but are not limited to, the categories below.

6. Wood-based cooking devices

26. Three-stone Fire:

(a) A setup using three stones or bricks arranged in a triangular shape to support a cooking pot, with an open fire in the centre;

(b) Materials used: natural stones, bricks, or compacted earth;

(c) Is typically uninsulated, has no chimney or combustion chamber. Commonly uses fuelwood, agricultural residues or other solid biomass fuels.

27. Sunken pit cookstove:

(a) A shallow pit dug into the ground where wood is burned;

(b) Materials: bare earth or reinforced with clay.

[2] The inclusion of a cooking device type in this appendix is for the purpose of consistent survey identification and classification only. It does not imply automatic eligibility as an activity/project technology. Eligibility shall be determined in accordance with the applicability conditions of this methodology.

28. U-shaped mud cookstove or traditional mud stove:

   (a) A simple fixed or semi-fixed mud or clay structure in a U-shape, designed to hold one or more pots over an open fire;

   (b) Materials: locally sourced mud or clay, sometimes reinforced with straw;

   (c) Other features: provides some shielding from wing but usually has limited insulation and combustion control, commonly uses fuelwood or other solid biomass fuels.

29. Traditional chulha/chulho:

   (a) A raised, built-in clay or brick cookstove with one or more burner holes for pots;

   (b) Materials: clay, bricks, or mud, sometimes with cow dung.

30. Forced-draft biomass cookstove:

   (a) A biomass cookstove using a fan or other forced-air mechanism to improve combustion;

   (b) May use batteries, solar power or grid electricity to operate the fan;

   (c) Commonly designed to reduce smoke and improve combustion efficiency.

31. Gasifier biomass cookstove (not eligible under this methodology as a project device but may be identified as baseline technology):

   (a) A cookstove designed to gasify biomass fuel before combustion;

   (b) May use pellets, wood chips or other processed biomass fuels.

32. Plancha cookstove (Traditional):

   (a) A raised clay or metal cookstove with a flat griddle (plancha) for cooking tortillas or flatbreads;

   (b) Materials: clay, bricks, metal griddle;

   (c) Commonly designed to reduce smoke and improve combustion efficiency;

   (d) Where identified during surveys, the fuel used, fan power source, and whether the device is used as a baseline or activity cooking technology shall be recorded.

7. Charcoal-based cooking devices

33. Metal bucket charcoal cookstove:

   (a) A metal bucketor shallow metal bowl that is usually portable, with ventilation holes at the bottom and a top grate for placing charcoal;

   (b) Materials: sheet metal, iron, steel;

   (c) Typically has limited insulation and heat-retention capacity.

34. Ceramic-lined Charcoal Cookstove:

(a) A metal bucket cookstove with a ceramic liner inside for heat retention and insulation;

(b) Materials: sheet metal exterior with a ceramic inner lining;

(c) Often used in urban and peri-urban areas where charcoal is a common cooking fuel.

35. Clay pot Cookstove:

(a) A clay vessel with an opening for airflow and a flat surface for a cooking pot;

(b) Materials: fired clay or terracotta.

36. Improved charcoal stove with pot skirt or controlled airflow:

(a) A charcoal stove designed to improve heat transfer to the pot and reduce fuel consumption;

(b) May include improved insulation, controlled air inlets, a grate, pot skirt or improved combustion chamber;

(c) May be locally manufactured or factory-made.

8. Electric cooking devices

37. Electric hotplate:

(a) A cooking device using electric resistance heating;

(b) May have one or more heating plates;

(c) May be used for boiling, frying, simmering or reheating.

38. Electric coil stove:

(a) A stove using exposed or embedded electric coils to generate heat;

(b) May be portable or integrated into a larger cooker;

(c) Efficiency may vary depending on pot type and cooking practice.

39. Induction stove:

(a) A cooking device using electromagnetic induction to heat compatible cookware directly;

(b) Usually requires ferromagnetic cookware.

40. Electric pressure cooker:

(a) An electric cooking appliance that cooks food under pressure in an enclosed vessel;

(b) May reduce cooking time and energy consumption for foods requiring long boiling or simmering;

(c) Surveys should record whether the appliance is used for all cooking tasks or only for selected dishes.

9. LPG cooking devices

41. Single-burner LPG stove:

(a) A portable or fixed gas stove with one burner connected to an LPG cylinder;

(b) May be located inside or outside the main kitchen area.

42. Multi-burner LPG stove:

(a) A gas stove with two or more burners connected to an LPG cylinder or piped LPG system;

(b) May include a built-in oven or grill;

(c) Commonly used where households cook multiple dishes at the same time.]

43. LPG stove with oven or integrated cooker:

(a) A cooking appliance using LPG for burners and, where applicable, an oven;

(b) May support baking, roasting and other cooking practices not served by single-burner devices;

(c) Fuel consumption should be attributed to cooking services covered by the methodology.

44. For LPG devices, surveys should record the cylinder size, cylinder ownership or deposit arrangement, refill frequency, regulator and hose condition, and whether LPG is used as the primary cooking fuel or alongside other cooking devices.

10. Kerosene and other fossil-fuel cooking devices used in the baseline

45. Kerosene wick stove:

(a) A stove using one or more wicks to draw kerosene from a fuel reservoir;

(b) May be used for boiling, cooking or for warming;

(c) Where present, it shall be recorded as a potential baseline technology only, subject to the applicability conditions of the methodology.

46. Kerosene pressure stove:

(a) A kerosene stove that pressurises fuel before combustion;

(b) May provide higher heat output than a wick stove;

(c) Where present, it shall be recorded as a potential baseline technology only.

47. Coal stove or coal pot:

(a) A cooking device using coal or other solid fossil fuel;

(b) May also be used for space heating in some cold-climate regions;

(c) Where present, surveys shall distinguish cooking use from space-heating use.

48. Kerosene and solid fossil-fuel devices shall not be recorded as eligible activity/project technologies under this methodology, but only as baseline cooking devices, where applicable.

11. Pre-activity and activity KPT surveys (simultaneous to KPTs)

11.1. Purpose

49. Survey conducted in conjunction with kitchen performance tests (KPTs) shall be used to:

(a) Determine, per cooking event, the number of people for whom cooking was performed; and

(b) Document any unusual cooking practices that may influence energy consumption.

11.2. Usage survey

50. Usage survey shall be conducted to:

(a) Determine whether the activity cooking device is present and in use within the household;

(b) Assess the frequency of use of the project cooking device to determine if the household may be counted as a user household;

(c) Identify any seasonal or other variations that may affect the project cooking device usage patterns and hence affect the project’s emission reductions.

51. Where stove use monitors (SUMs) are applied, surveys shall still be conducted to confirm the presence of the technology and support interpretation of usage data.

11.3. Visual verification requirements

52. Results from the usage survey hall be corroborated through visual inspection using a standardized checklist to assess if the activity technology is present in the kitchen and shows evidence of recent use.

53. Enumerators shall capture digital images of all the cooking devices present in the household, as well as the associated cooking area(s), using data collection devices capable of automatically recording the geolocation (e.g., GNSS/GPS), timestamp, and device metadata. The photographs shall include both close-ups of each technology and its fuel (if present) and wider-angle images showing the position of the cookstoves within or in proximity to the household.

54. All images shall be geotagged and time-stamped at the point of capture. Where connectivity is limited, metadata shall be stored locally and synchronized upon data

upload. The data collection system shall include validation checks (e.g., mandatory fields, metadata completeness, and duplicate detection) to ensure data integrity.

11.4. Supplemental purpose of first usage survey administered in any given household

55. This supplemental usage survey activity is used to check how well the project household characteristics match the ex-ante baseline scenario. Retrospective questions are added to the first usage survey conducted in any given household. To the extent possible, these retrospective questions should be identical to the questions in the pre-activity survey, just asked retrospectively. Activity participants shall identify any mismatch between the primary fuel type and household size documented during the pre-activity survey and those reported by actual activity households during the activity roll-out.

56. Therefore, the first usage survey administered in any given household shall additionally serve to:

(a) Establish household size;

(b) Identify cooking fuels and technologies used prior to acquisition of project cooking device (retrospective baseline);

(c) Document the proportion of cooking events carried out on each fuel-technology combination used prior to acquisition of project cooking device (retrospective baseline).

Appendix 6. Requirements and Best Practices for Kitchen Performance Tests (KPTs)

1. Overview

1. The KPT is a field-based methodology used to estimate household fuel consumption under real-world conditions. The KPT serves as the primary tool for assessing fuel savings needed to calculate emissions reductions.

2. This document provides context for how the KPT protocol shall be applied in the mechanism methodology, as well as the best practice guidance for undertaking KPTs. It refers to the latest version of the KPT protocol available on the CCA website at https://cleancooking.org/protocols. Where guidance provided here conflicts with the directives of the KPT protocol, guidance in the mechanism methodology should be followed, including the energy consumption estimates on a per capita fuel consumption basis rather than per standard adult basis.

2. Sampling requirements

3. Activities shall meet the 95/10 reliability for the total energy consumption (TJ/(person*year)) for each fuel from the activity the project and baseline KPTs or use the conservative 95 percent confidence bound that results in the lower emissions reductions estimate.

4. For activity KPTs, households shall be selected from the group of households included in the pre-activity scenario survey and project usage surveys, respectively, and only from those qualifying as user households. Households are anticipated to be statistically similar to those of the larger surveys [and shall be within 10 per cent of the household size and proportion of cooking done with the primary fuel for the respective pre-activity and activity scenarios. If either of these conditions are not met, the project will conduct additional sampling until these conditions are met]. This requirement is separate and additional to checking that the pre-project scenario is representative of the activity scenario.

3. Measurements and sample integrity

3.1. Checks on scales for measurement of weight of fuel

5. Scales shall be checked with a certified calibration weight (5–20 kg) at least weekly during field campaigns and results of calibration checks clearly recorded to facilitate verification by DOEs.

6. The scale shall be accurate within 1 per cent of the calibration mass.

7. If a scale fails a check, any data collected since the last successful check shall be excluded from the analysis.

3.2. Accounting for Wood Moisture:

(a) Default energy conversions assume air-dried wood (~20 per cent moisture, wet basis) with a NCV of 0.0156 TJ/tonne;

(b) This NCV should be applied to wood quantities before making any moisture adjustments;

(c) While NCV assumptions provide a standardized approach, it is best practice to measure actual moisture content, particularly to:

(i) Identify potential outliers;

(ii) Assess seasonal variations in fuel characteristics.

3.3. Fuel provision

8. Because providing fuel to households can introduce substantial bias, fuel should not be provided to households for use during the KPT in most cases.

9. In situations where households normally collect their fuel (e.g., fuel wood,) daily and are not able to collect and store a full day's fuel in advance, activity participants may provide fuel for the KPT under the following conditions:

(a) The number of households that are unable to collect and store a full day's fuel in advance shall comprise more than 40 per cent of the KPT sample; otherwise, those households should simply be excluded from the sample;

(b) Where fuel is provided, the household shall be identified as having been provided fuel;

(c) The amount of fuel provided shall not exceed 30 MJ / (person*day) (approximately 2 kg/(person*day)).

10. For households that purchase the primary fuel in discrete quantities, and it is impractical to store three times the amount typically used in a day, activity shall follow the KPT protocol guidance for fuel purchases and estimate weights accordingly.

11. Alternatively, rather than providing fuel, activity participants may use fuel-weighing sensors that measure fuel consumption in real-time. This approach may be used for any KPT, regardless of household fuel constraints.

3.4. Data quality and outlier handling

3.4.1. Outliers Identification and Exclusion Criteria

12. Outliers shall be defined as data points that fall beyond 1.5 times the interquartile range[1]

13. (IQR) from its endpoints. Outliers may only be excluded if there is a clear, documented reason for their removal. Any excluded data shall be retained along with an explanation. Acceptable reasons for exclusion are:

[1] The IQR is the range of the middle 50% of the data. The 1.5 × IQR rule is a standard approximation for outlier identification (Tukey, 1977). It flags values falling below Q1 − 1.5 × IQR or above Q3 + 1.5 × IQR, where Q1 and Q3 are the 25th and 75th percentiles respectively. This threshold is robust to the right-skewed distributions typical of household fuel consumption data, where mean-based rules would over-flag legitimate high-consumption observations. Tukey, J.W. (1977). Exploratory Data Analysis. Addison-Wesley.

(a) Data entry errors;

(b) Documented unusual events (e.g., party, non-household members using the cookstove); or

(c) A per capita fuel consumption >175 MJ / (person*day) for any single day (equivalent to ~10 kg of wood / (person*day)).

3.4.2. Minimum Data Requirements

14. Only households with at least three complete days of data may be included in the analysis.

15. These three days do not need to be consecutive if:

(a) Some data are missing due to measurement failures; and additional visits were conducted to compensate; and

(b) All data collection shall occur within a two-week period.

3.5. KPT considerations for monitored energy consumption

16. The KPT approach for determining energy consumption in the activity scenario requires quantifying the energy consumption of all technologies used in the activity scenario based on an activity KPT. The activity shall use metered energy consumption data for the project cookstove/fuel specific to the KPT period where available.

17. Where metered energy consumption is not available specific to the KPT period, the traditional fuel-weighing KPT approach shall be used. Fuel-weighing shall always be used for fuel consumption based on sales tracking data.

Appendix 7. Requirements and Best Practices for Controlled Cooking Tests (CCTs) for cooking energy transition activities

1. Introduction

1.1. Overview

1. The Controlled Cooking Test (CCT) is a field-based test used to compare the performance of baseline and activity cooking technologies under controlled but locally representative cooking conditions. It uses local cooks, locally relevant recipes, pots, fuels or energy carriers, and cooking practices to prepare a predetermined local meal, which may include multiple dishes.

2. Within this methodology, the CCT may be used for eligible cooking technologies, including biomass, charcoal, LPG and electric cooking devices, where the baseline and activity technologies can reasonably be compared through preparation of the same representative local meal. CCTs shall not be used as a generic performance test for non-cooking thermal applications.

3. For monitored energy consumption devices, CCT results may be used to determine the ratio of specific energy consumption between baseline and activity cooking technologies, where required to estimate displaced baseline energy consumption. The CCT shall be applied only where the tested technologies, fuels or energy carriers, cooking tasks and cooking practices are representative of the target population.

4. This appendix provides context for how the CCT protocol should be applied in the context of the mechanism methodology. It refers to the latest version of the CCT protocol available on the CCA website at https://cleancooking.org/protocols. Where guidance provided here conflicts with the directives of the CCT protocol, guidance here should be followed for projects using the mechanism methodology.

1.2. Applicability

5. CCTs may be used under this methodology where:

    (a) The baseline and activity technologies are used to provide the same cooking service;

    (b) A representative local meal or set of cooking tasks can be defined;

    (c) The same or comparable pots, recipes, ingredient quantities, cooking practices and user requirements can be applied across tested technologies;

    (d) The tested baseline and activity technologies are representative of those used in the target population; and

    (e) The results are used only for the fuel or energy carrier and technology combinations tested.

6. CCTs shall not be used where the tested meal or cooking task is not representative of actual cooking needs, or where the activity technology is used for a materially different cooking service that cannot be compared through the same cooking task.

2. Sampling requirements

7. To ensure robust and representative data collection for the CCT within the mechanism methodology, the following sampling and testing requirements shall be adhered to.

2.1. Selection and testing of baseline and project cooking device

(a) Baseline technologies shall be tested in order to be included in baseline fuel consumption displacement. Untested baseline technologies shall not be included in calculating displaced fuel consumption. For example, if project surveys indicate that a baseline technology accounts for 10 per cent of cooking events and the project does NOT conduct a CCT with that baseline technology, then the 10 per cent displacement that would have been attributed to that baseline technology is disregarded and not included in the back calculation, nor is it redistributed to the other cooking device types, resulting in a lower baseline than could otherwise be claimed;

(b) The most common example of a given type of baseline cooking device should be selected (see section on cooking device types below). For example, if there are multiple simple open-fire cooking approach types (e.g., three-stone fire or U-shaped mud cooking device), the most common, representative example should be chosen for each cooking device type. This selection should be made as part of the process with project area cooks to determine the standard meal, per the CCT protocol;[1]

(c) At least three samples of each baseline cooking device type shall be tested to account for inter-stove type variability;

(d) Each cook shall prepare at least three meals per baseline cooking device type (at least one on each baseline cooking device type sample) to capture variability in performance;

(e) All project technologies shall be tested;

(f) When CCTs are conducted as part of ongoing project monitoring, including to account for any degradation over time, then at least three cooking devices per vintage randomly sampled from activity households, should be tested (households should receive a new replacement cooking device).

2.2. Selection of cooks

(a) At least three local cooks, who are unfamiliar with each other and reside in different locations within the project area, shall be recruited for testing;

[1] For example, common baseline wood cookstove types (i.e., categories) include three stone fires and sunken wood pits. For projects where both exist, project proponents would need to test one example of each type to be able to count displacement for both types in their emissions reductions. Displacement can be considered for stove types tested.

(b) Cooks recruited for testing shall not be affiliated with the project beyond their participation in the CCTs. Ideally, they would not be activity participants, but if they are they shall not receive any special treatment beyond what is required for the CCT. All cooks may be compensated for their time and travel for the CCT testing;

(c) The cooks should be familiar with and comfortable cooking on all of the baseline cooking device phenotypes;

(d) If any of the cooks do not yet have the project cooking device, they should be given one to use at their household for a minimum of two weeks before starting the CCT. They should be given the same training and support (and no extra) that regular activity participants receive; and

(e) Ideally, the same cooks should be used for the initial CCTs conducted during the validation phase and for subsequent project monitoring periods. If not possible, alternate cooks may be selected using the same criteria as above.

2.3. Technology-specific considerations

2. For biomass and charcoal cooking devices, CCTs shall record the type, quantity, moisture content and net calorific value (NCV) of fuels used, as applicable. Where default NCV values are applied, measurement of moisture content and NCV is not required for energy conversion.

3. [For LPG cooking devices, CCTs shall record LPG consumption using calibrated weighing or metering equipment before and after each test, and shall document the burner type, cylinder size, regulator and any material conditions affecting fuel flow.

4. For electric cooking devices, CCTs shall record electricity consumption using calibrated metering equipment for the test period. Where electric pressure cookers, induction stoves or other specialised devices are tested, the CCT shall document the cookware used, cooking mode, pressure setting, lid use, pre-heating, automatic shut-off and any keep-warm function.]

5. For all technologies, the CCT shall document whether the tested device is suitable for the cooking task and whether any part of the meal could not be completed using the tested device.

2.4. Testing matrix and precision guidelines

6. The Figure 1 below represents the minimum required testing configuration for a CCT given the set of cooking devices listed above. Each of the three cooks should conduct an equal number of tests across all cooking device types. The cooking device types included in the example below are:

(a) monitored energy consumption cooking devices (e.g., electric or LPG);

(b) LPG cookstove (baseline);

(c) Charcoal cookstove (baseline); and

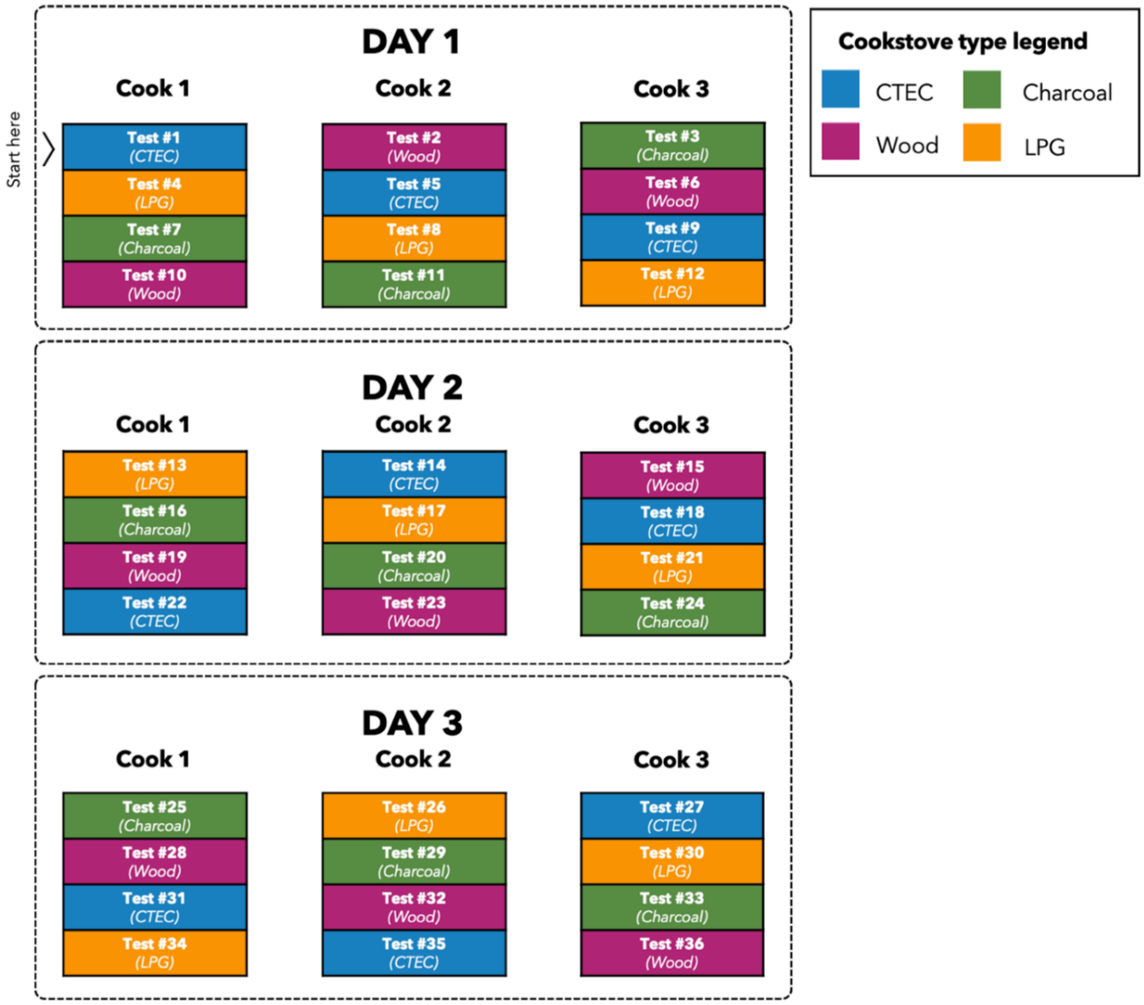
(d) Simple wood cookstove (baseline, e.g., three-stone fire or mud cookstove).

7. To minimize bias, cooking device models should be rotated systematically so that no cook follows the same sequence repeatedly.

8. As shown in the Figure 1 below, each set of three tests is conducted simultaneously, with Cook 1, Cook 2, and Cook 3 testing different cooking devices at the same time. The cooking device type order changes for each test block to ensure that no cook consistently follows the same cooking device sequence.

9. Where a representative local meal includes multiple dishes, the CCT shall document whether all dishes are prepared using the tested activity technology. Where only some dishes can reasonably be prepared using the activity technology, the CCT result shall be applied only to the corresponding cooking tasks, unless the activity participant justifies that the activity technology can meet the full cooking needs represented by the meal.

Figure 1. Minimum testing configuration and example schedule for CCT



2.5. Measurements and sample integrity

10. Scale Checks:

    (a) Scales shall be checked with a certified calibration weight (5–20 kg) daily during the testing campaign;

    (b) The scale shall be accurate within 1 per cent of the calibration mass; and

    (c) If a scale fails a check, any data collected since the last successful check shall be excluded from the analysis.

2.6. Data quality and outlier handling

11. Outliers Identification and Exclusion Criteria.

12. Outliers shall be defined as data points that fall beyond 1.5 times the interquartile range (IQR) from its endpoints. Outliers may only be excluded if there is a clear, documented reason for their removal. Any excluded data shall be retained along with an explanation. Acceptable reasons for exclusion are:

    (a) Data entry errors;

    (b) Documented unusual events (test was interrupted, weather impacts, etc.); and

    (c) A cook reports a problem with the specific test.

13. Minimum Data Requirements

    (a) There shall be equal numbers of successfully completed CCTs for each cook-technology combination; and

    (b) A minimum of three cooks and three repeated CCTs per cook-technology combination shall be completed.

2.7. Classifying baseline cooking device types

14. Baseline cooking devices can be categorized into distinct types based on their physical structure. This classification helps standardize the selection of representative cooking device models for performance testing and emissions reduction calculations. The types described here are common in many regions, but they are not exhaustive. Different contexts, geographies, and cultural cooking practices will influence the specific baseline cooking device used in a given project.

15. Project proponents shall identify and justify the most appropriate types for their specific setting, ensuring that selected models accurately represent the prevailing baseline cooking technologies. These types should be used as the basis for testing fuel consumption, thermal efficiency, and emissions when establishing baseline parameters.

Appendix 8. Requirements and Best Practices for use of Stove Use Monitors

1. This appendix provides requirements and best practices for the use of Stove Use Monitors (SUMs) to estimate cooking events, usage frequency and, where applicable, the relative use of baseline and activity cooking technologies. SUMs may be applied to biomass, charcoal, LPG, electric or other eligible cooking devices where the selected monitoring device and algorithm can reliably distinguish cooking events from non-cooking signals and other external influence. For LPG and electric cooking activities where project fuel or energy consumption is determined through monitored energy consumption data, SUMs shall not replace metered, logged or eligible fuel-sales-record data, but may be used as a supporting monitoring approach to confirm cooking use, assess usage frequency, identify continued use of baseline technologies, or interpret monitored fuel or energy consumption data.

1. General

2. In the context of this mechanism methodology, sample based monitoring cooking devices may choose from two approaches to adjust energy consumption in the activity scenario, for the Hawthorn effect differentiated by application (or non-application) of SUMs.

3. When activities complement KPTs with SUMs measurements, the ratio of project cookstove device usage that is (cooking events per day) measured during the KPT to project cookstove usage that is measured during the month prior to or following the KPT is used as a multiplier in the emission reduction estimate calculation (only when that value is less than one).

4. When activities measure fuel consumption through KPTs, complemented by usage surveys without SUMs, the maximum emission reductions are capped at 75 per cent of the KPT-based estimate to account for the Hawthorne Effect (the equivalent of a 75 per cent ratio of project technology usage described above).

5. Activity participants opting to use the SUMs method shall place SUMs on the project cooking devices for the duration of the KPT, as well as for the contiguous 30 days (before, after, or any combination of before and after1) to serve as a reference point.

6. SUMs may be used to characterize the primary fuel-stove combination usage for identification of a potential mismatch between the pre-activity and activity scenario profiles or to determine the proportion of cooking done on baseline cooking devcefor back-calculating the baseline energy consumption (tPCb,i).

7. SUMs [may also be] [are] used to estimate Ψ, the percent of activity households with the project cooking device present that qualify as user households. Projects shall use the same measurement period (at a minimum) as that used for determining a potential Hawthorne effect, and the same sampling requirements for Ψ as those outlined in

[1] In the case of a combination of before and after, for example, the SUM would be placed 10 days before the start of the KPT, remain during the KPT, and then remain for a further 20 days after completing the KPT.

Appendix 5. If sampling includes households where KPTs are being conducted, the frequency of use estimates shall not include data from days when KPTs are occurring. For households where SUMs installation is not possible because the activity cookstoves e is not present, these households shall be included as non-users in the estimate Ψ.

8. This appendix provides requirements and best practice guidance for using SUMs within the context of the mechanism methodology.

2. Requirements for the use of SUMs in the mechanism methodology

9. This section sets out requirements for the use of SUMs to estimate cooking device usage, cooking events, and, where applicable, fuel-stove use proportions under this methodology. SUMs shall be used only where the selected device, placement and algorithm are appropriate for the cooking technology monitored and can reliably distinguish cooking events from non-cooking signals. The requirements below apply to ensure that SUM-derived usage estimates are transparent, consistent, representative and conservative throughout the crediting period:

(a) The algorithm for estimating cooking device usage shall be able to reliably distinguish cooking events from other potential factors that could be interpreted as cooking events but that are actually caused by external circumstances (e.g., temperature fluctuations from typical diurnal patterns);

(b) The algorithm shall be clearly presented publicly with associated equations and/or logic rules (see section below titled: *Public presentation of stove use algorithms);*

(c) The same algorithm and SUM device type shall be used for the duration of the project. If a different SUM device and/or algorithm is used, then the activity participant shall demonstrate that the stove use estimates between the two approaches are unbiased. This can be demonstrated by conducting a side-by-side comparison in a representative subsample of households, where both devices/algorithms are applied simultaneously, and the resulting cooking event estimates are compared. Statistical tests such as paired t-tests, regression analyses, or Bland–Altman plots may be used to assess whether systematic bias exists. The results of these tests, along with all supporting data and documentation, shall be provided to the DOE;

(d) Sampling shall meet the 95/10 precision guidelines, per the sampling guidance included in Appendix 5;

(e) SUMs sampling protocols (installation, placement, downloading) and the algorithm used to convert raw data into cooking events shall not change between sampling during the KPTs and sampling prior to or following the KPTs;

(f) Activity participants in the SUMs sample shall not receive any support different or additional to those not included in the sample;

(g) Activity participants proponents shall ensure that photographs of the SUMs placement in each sampled household are taken and retained as part of the monitoring record;

(h) The average of the cooking events per day during the full 30 days of cooking device use monitoring shall be used to adjust for potential Hawthorne Effects. If SUMs data is incomplete or missing, it shall be omitted from the analysis.

3. Additional requirements for the use of SUMs to characterize fuel-stove use proportions

10. This section applies where SUMs are used to estimate the relative use of different fuel-stove combinations, including continued use of baseline technologies. It may support assessment of fuel or technology stacking and conservative estimation of the share of cooking displaced by the activity technology. For LPG and electric devices, SUMs shall not replace monitored fuel or energy consumption data where such data are required.

(a) If SUMs sampling is being used to characterize the primary fuel-stove combination usage for identification of a potential mismatch between the pre-activity and activity scenario profiles ($PC_{b,i}$) and ($PC_{p,j}$), or for determination of proportion of cooking done on baseline cooking device, for back-calculating the baseline energy consumption ($tPC_{b,i}$), the following guidelines shall be followed;

(b) The guidance in the above bullet points shall be followed, including the sample size guidance in Appendix 5;

(c) SUMs shall be placed on all cooking device-fuel combinations (in each household) that are to be included in the baseline.

4. Best practice guidance for using SUMs

4.1. Installation

11. Activity participants should follow manufacturer installation requirements (if provided) for the SUMs instrumentation being used. Unless specifically indicated otherwise, placement of the device should generally follow these key guidelines:

(a) The project cooking device's temperature profiles during cooking events should be analysed before the field campaign to determine optimal placement;

(b) Temperature sensors and loggers should not be placed in a location where temperatures exceed their maximum operating/sensing temperature specifications;

(c) Sensor placements should provide a maximum temperature differential between ambient and cooking device temperature (without exceeding maximum operating temperature for the sensor);

(d) When possible, cooking device and sensing units (e.g., thermocouple leads) should be kept out of direct sunlight to reduce sensors logging the radiant heat of the sun, which can be confounded with cooking;

(e) Sensor placement should be standardized as much as possible across the sample;

(f) Sensor placement should not get in the way of the pot, or obstruct or interrupt the cooking, or be located where liquids are likely to collect or boil over;

(g) Sensor placement should not interfere with participants' normal activities. Placement should also minimize risk of the sensor being accessed, moved, and/or damaged by participants, other people, or common household features, such as water, insects, or animals;

(h) Activity participants should explain to household members that the SUMs are for measuring temperature and should not be tampered with. Household members should not press buttons, move parts, or disconnect or connect the sensors to computers or power.

4.2. Cooking device temperature analysis

12. Activity participants should follow manufacturer guidelines for data analysis[2] where available. Unless specifically indicated otherwise, analysis should generally follow these key guidelines:

(a) Subtracting ambient temperature generally improves the ability to resolve a temperature response during cookstove events from normal diurnal and seasonal temperature variation;

(b) Perform validation or sense checks on the algorithms used to determine cookstove use. These can include:

(i) Having a person with expertise manually inspect at least a subset of analysed files to check that the algorithm is determining apparent cooking events as intended;

(ii) Cross-referencing observational data on cooking events with the analysed data;

(iii) Using common sense checks with what is generally known about cooking behaviours in the region. For example, if only one cooking event per week is being estimated when it's known that people are using several kg of fuel every day, the placement or algorithm are not working properly.

4.3. Public presentation of stove use algorithms

13. To support transparency and reproducibility in stove use monitoring, all algorithms that are used to convert raw SUM data into cooking events shall be publicly available throughout the crediting period and until renewal of the crediting period, following the requirements below.

4.3.1. Algorithm logic description

14. Provide a clear explanation of how the algorithm detects cooking events, including:

(a) Physical parameter(s) monitored (e.g., temperature, power);

(b) Logic for identifying events (e.g., threshold crossings, sustained changes);

(c) Preprocessing steps (e.g., filtering, smoothing);

(d) Contextual adjustments (e.g., ambient corrections, diurnal patterns).

[2] Of note, data analysis can be challenging for cookstoves that are frequently moved indoors and outdoors for cooking, due to solar radiation affecting heating and cooling rates, so piloting placement of temperature monitors or probes is critical for such applications.

4.3.2. Formal equation or code

15. Present the algorithm as:

(a) Equations and logic rules; or

(b) Annotated code outlining the decision steps.

4.3.3. Parameter definitions and units

16. All thresholds and time-related values shall be:

(a) Listed with units (e.g., C, seconds); and

(b) Applied consistently across devices and time.

4.3.4. SUM device specifications

17. These include:

(a) Manufacturer, model, and firmware version;

(b) Sampling rate and sensor types;

(c) Any known limitations affecting performance.

4.3.5. Data sample publication

18. Share at least three anonymized raw data files (two weeks or more of data) for three different project cooking devices with their processed output to demonstrate algorithm performance. Data shall:

(a) Be in a usable format (e.g., CSV, JSON); and

(b) Include clear headers, units, and time zone information.

4.3.6. Hosting and access

19. Shall publish the algorithm and sample dataset on a stable public platform (e.g., project website, registry, GitHub). Include the link in the Activity Information Cover Sheet.

Figure 1. Example photos of SUMs placement

Appendix 9. Activity-specific sampling provisions for cooking energy transition activities

1. This appendix sets out mandatory sampling requirements for all parameters estimated through sampling under this methodology. It applies to sampling for pre-activity surveys, usage surveys, visual verification, Kitchen Performance Tests (KPTs), Controlled Cooking Tests (CCTs), Stove Use Monitor (SUM) deployment, and verification of monitored energy consumption data, where applicable. Sampling plans shall be designed to ensure that estimates are representative and conservative for the relevant target population, user households, cooking technologies, fuels and energy carriers covered by the Article 6.4 activity.

2. For activities involving LPG or electric cooking devices, project fuel or energy consumption shall be determined using monitored energy consumption data, such as metered data, logged data or eligible fuel-sales records, as applicable. Sampling shall not be used as the primary basis for estimating project fuel or energy consumption for LPG or electric cooking devices, unless expressly permitted elsewhere in this methodology.

1. Scope and application

3. General requirements for sampling design, sample size determination, reliability, data collection, and quality assurance/quality control (QA/QC) shall be applied in accordance with the Sampling and surveys tool.[1]

4. The appendix supplements the tool by defining: the parameters requiring sampling under this methodology; activity-specific stratification requirements; and provisions for the use and integration of data sources, including surveys, kitchen performance tests (KPTs), and stove use monitors (SUMs).

5. For Article 6.4 activities implemented as PoAs, sampling may be undertaken at the PoA level only where component projects are sufficiently homogeneous with respect to technology type, baseline fuel or energy carrier, geography, user type, monitoring approach and expected usage patterns. Where component projects are not homogeneous, sampling shall be stratified by component project or by groups of homogeneous component projects. Parameters derived from pooled samples shall be applied only to component projects.

2. Define the sampling population for each parameter

6. For each sampled parameter, the activity participant shall define the sampling population before sampling is undertaken. The sampling population shall correspond to the parameter being estimated and may include, as applicable:

   (a) The target population before implementation of the Article 6.4 activity;

[1] This draft methodological tool is still under development and is yet to be approved by the supervisory Body. The draft methodology will be revised accordingly if changes to this draft version of this methodological tool is made by the time of their adoption.

(b) Households or institutions receiving activity cooking technologies;

(c) User households or user institutions;

(d) Cooking technologies or devices distributed by the Article 6.4 activity;

(e) Baseline cooking technologies retained by user households;

(f) Meters, data loggers, fuel-sales records, LPG refill records or energy accounts used for ongoing monitoring; or

(g) Component projects, where the Article 6.4 activity is implemented as a PoA.

3. Parameters requiring sampling

7. Sampling shall be applied to parameters identified in this methodology where direct measurement of the full population is not feasible. Parameters expected to be sampled and required sample size determination, are listed in section 16 of this methodology.

8. Activity participants shall ensure that:

(a) Each parameter is clearly defined and linked to an appropriate data source (e.g. surveys, KPTs, SUMs);

(b) Sampling approaches are applied consistently across parameters where feasible; and

(c) The required reliability levels are achieved for each parameter, in accordance with the Sampling and surveys tool.[2]

9. Where multiple parameters are estimated using a single sampling effort, activity participants shall demonstrate that the sampling design is appropriate for all parameters and meets the required reliability for each.

[2] These draft methodological tools are still under development and are yet to be approved by the supervisory Body. The draft methodology will be revised accordingly if changes to these draft versions of these methodological tools are made by the time of their adoption.

Table 1. Parameters requiring sampling and treatment of uncertainty related to sampling

Monitoring table	Parameter symbol	Monitored parameter	Parameter type	Main data source / method	Sampling population	Conservative treatment where reliability / precision is not met
Table 25	H_Y	Average household size in year y	Mean value	Pre-activity survey and annual usage surveys	Target population / Article 6.4 activity households	Apply the bound that gives lower ERs. In most cases this will be the lower bound where higher household size increases ERs
Table 26	Ψ_Y	Percent of A6.4 activity households that qualify as user households in year y, i.e. where the project cookstove is used at least five times per week, determined via survey and visual observation, or estimated with SUMs in year y	Proportion value	Usage survey, visual observation, or SUMs	Article 6.4 activity households with project cookstoves present	Use the lower bound of the confidence interval. Where surveys only are used, also apply the relevant survey cap, where applicable
Table 27	$FEC_{proj,i,y}$	Energy consumption of fuel i as measured by the activity KPTs in year y	Mean value	Activity KPT	Representative sample of activity households	Use the upper bound, as this is project/activity fuel consumption where higher consumption lowers ERs
Table 28	$FEC_{proj,j,y}$	Energy consumption of secondary fuel j as measured by the activity KPTs in year y	Mean value	Activity KPT	Representative sample of activity households using secondary fuels	Use the upper bound, proportionately across fuels where applicable

Monitoring table	Parameter symbol	Monitored parameter	Parameter type	Main data source / method	Sampling population	Conservative treatment where reliability / precision is not met
Table 29	$EC_{proj,grid,KPT,y}$ and $EC_{proj,offgrid,KPT,y}$	Electricity consumption in project KPT in year y	Mean value	Activity KPT using built-in or external data loggers	Representative sample of households included in project KPT	Apply the conservative bounds that produce lower ERs, proportionately across fuels or energy carriers. This is consistent with the draft text for this parameter
Table 30	FC_x / $FC_{i,h,y}$/ $FCj_{,h,y}$	Fuel consumption for the respective fuel and scenario x; also fuel consumption for fuel i or j in household h in year y	Mean value, where aggregated across a sample	KPT using calibrated weighing scales	KPT households / KPT observation days	Instrument uncertainty applies at measurement level. Where the value is used to estimate a sampled mean, apply the bound that gives lower ERs: lower bound for baseline fuel consumption; upper bound for project fuel consumption
Table 32	PTC_m	Average project technology cooking events per day over one month from SUM measurements	Mean value	SUMs	Sampled project cooking technologies / households	Use the lower bound where the parameter represents activity technology usage rate. If used in a ratio, apply the bound that gives lower ERs
Table 33	PTC_{KPT}	Average project technology cooking events per day during the project KPT from SUM measurements	Mean value	SUMs during project KPT	Project KPT sample households / project technologies	Apply the bound that gives lower ERs, considering its use in the Hawthorne-effect adjustment ratio

Monitoring table	**Parameter symbol**	**Monitored parameter**	**Parameter type**	**Main data source / method**	**Sampling population**	**Conservative treatment where reliability / precision is not met**
Table 34	$SEC_{AS,k}$	Specific energy consumption of project fuel k to cook a given amount of food in the activity scenario from activity CCT	Mean value	Activity CCT	Representative CCT tests / cooking tasks / devices	Apply the conservative bound that gives lower ERs. The direction may depend on the CCT ratio used in the calculation
Table 36	$tEC_{AS,KPT,k}$	Monitored energy consumption of activity fuel k for project cookstove(s) only from activity KPT	Mean value	Activity KPT for CTEC projects using KPTs	Representative sample of households	Use the upper bound or otherwise apply the conservative bound that produces lower ERs. The draft already states that conservative bounds should be proportionately applied across fuels
Table 38	$tEC_{AS,KPT,k}$	Monitored energy consumption of activity fuel k for project cookstove only based on activity KPT	Mean value	Activity KPT	Representative sample of households	Use the upper bound or the conservative bound producing lower ERs
Table 40	$tPC_{b,i}$	Proportion of cooking events conducted using fuel-stove combination i	Proportion value	Baseline scenario survey or SUMs	Baseline households / sampled households with multiple fuel-stove combinations	Apply the bound that gives lower ERs. This may be the lower or upper bound depending on whether the fuel-stove combination increases or decreases credited ERs

[a] Parameters determined from activity records, installation dates, databases, meters, data loggers or fuel-sales records are excluded from Table X unless sampling is used to estimate the parameter

3.1. Sampling approaches and requirements

3.1.1. Introduction

10. Activity participants may apply appropriate probability-based sampling approaches outlined in the Sampling and surveys tool.[3]

11. Where cluster or multi-stage sampling is applied, activity participants shall account for clustering effects in both the sampling design, including the application of appropriate design effects.

12. The activity participant shall document the randomisation process used for each sample. Documentation shall include the sampling frame, exclusion criteria, randomisation method, date of selection, software or random-number generator used, random seed where applicable, selected units, replacement procedures and justification for any replacement. These records shall be retained and made available to the DOE at validation or verification, as applicable. Further guidance on randomization is provided in the Sampling and surveys tool.

13. The activity participant shall document the randomisation process used for each sample. Documentation shall include the sampling frame, exclusion criteria, randomisation method, date of selection, software or random-number generator used (if applicable), random seed where applicable, selected units, replacement procedures and justification for any replacement. These records shall be retained and made available to the DOE at validation or verification, as applicable.

14. Where KPTs or CCTs are used, the sampled households, cooks, recipes, devices, fuels or energy carriers shall be representative of the target population and the parameter for which the test result is applied. KPT and CCT results shall not be applied to fuel-technology combinations, user groups, locations or cooking tasks that were not represented in the sampling design, unless the activity participant demonstrates that doing so is conservative.

3.1.2. Stratification requirements

15. Where sampling is applied, the sampling design shall reflect key characteristics of the population that may influence parameter values.

16. Stratified sampling shall be applied where material differences are expected across the population and where pooling would risk overestimating emission reductions. Relevant strata shall include, as applicable:

    (a) Activity technology type, including biomass, charcoal, LPG and electric cooking devices;

    (b) Baseline fuel or energy carrier;

    (c) Urban, peri-urban and non-urban locations;

[3] This draft methodological tool is still under development and is yet to be approved by the supervisory Body. The draft methodology will be revised accordingly if changes to this draft version of this methodological tool is made by the time of their adoption.

(d) Geographic region or fuel/energy supply area;

(e) Household or institutional user type;

(f) Income or poverty category, where relevant to eligibility or additionality;

(g) Monitored energy consumption devices and sample based energy consumption devices;

(h) Installation age or monitoring period e.g. less than 1 year, 1–2 years, 2-3, 3-4, and more than 4 years;

(i) Component project or groups of homogeneous component projects, where the Article 6.4 activity is implemented as a PoA.

17. Where cluster or multi-stage sampling is applied, stratification shall be preserved within or across clusters, as appropriate.

18. Additional stratification may be applied where relevant (e.g., geographic location, socio-economic characteristics, or technology types), in accordance with the Sampling and surveys tool.[4]

3.2. Determination of sample size

19. Sample size determination, including for both continuous and proportional variables, shall be conducted in accordance with Sampling and surveys tool. This includes the selection of appropriate statistical parameters, treatment of variability, and application of reliability requirements.

20. Where SUMs are used, oversampling by 20 per cent of the calculated sample size shall be applied to meet the required reliability. Where field conditions are particularly challenging (remote areas, long monitoring periods, or prior SUM failure rates above 15 per cent), an oversampling of 25 per cent is recommended. This is to account for SUMs that may be defective or whose readings may be considered outliers.

3.3. Methodology Reliability requirements and treatment of non-compliance

21. In line with the provisions of the Sampling and surveys tool, sampled parameters shall achieve a minimum confidence/precision level of 95/10, unless otherwise specified in this methodology. Where this level is not achieved, activity participants shall either:

(a) Increase the sample size; or

(b) Apply the conservative bound of the confidence interval.

22. The conservative bound shall be the value that results in lower emission reductions.

[4] This tool is under development.

Table 2. Treatment of non-compliance with the sampling reliability requirements

Parameter type	Conservative treatment where precision is not met
Baseline fuel or energy consumption	Use the lower bound where higher baseline consumption would increase ERs
Project fuel or energy consumption, where sampling is permitted	Use the upper bound
Activity technology usage rate	Use the lower bound
Continued baseline technology or fuel use	Apply the bound that gives lower ERs
Household size or persons cooked for	Apply the bound that gives lower ERs
Presence/functionality of activity technology	Use the lower bound

23. Table 2 above identifies the monitored parameters as mentioned under section 16 of this mechanism methodology that are estimated through sampling-based approaches, including surveys, KPTs, CCTs and SUMs. For each parameter, the table specifies the parameter symbol, parameter type, applicable data source, and the conservative treatment to be applied where the required confidence/precision level is not achieved.

Appendix 10. Demonstration of requirements at the level of the mechanism methodology

1. Additionality

1.1. Lock-in risk analysis

1. The types of fuelwood based cookstoves that are expected to be distributed when applying this mechanism methodology generally have a technical lifetime of 10 years or less (Wilson et al. 2016). Therefore, fuelwood based cookstoves under this mechanism methodology are not deemed to cause a lock-in risk, in line with the provisions in paragraph 32 of version 01.2 of the “Standard: Demonstration of additionality in mechanism methodologies” (A6.4-STAN-METH-003) (hereinafter referred to as “additionality standard”). For informational purposes, the Article 6.4 Activities related to fuelwood cookstoves are required to report the technical lifetime of the project cookstoves, as determined based on the manufacturer's specifications and operation manuals or, in the absence of these (e.g., in the case of artisanal cookstoves), based on a third-party assessment by a certified or suitably qualified expert. These data may inform future adjustments to the demonstration of lock-in risks for fuelwood based cookstoves under this mechanism methodology.

2. Electric cookstoves such as induction stoves, electric pressure cookers, etc., are considered the most GHG efficient cooking technologies, due to their high efficiency and broad trends toward increasing share of renewable mix in the grid. As per the World Bank Multi-Tier Framework for cooking[1], electric cookstoves meet the requirements of Tier 4 and Tier 5 cooking solutions. Studies, such as Floess et al. 2023, show immense GHG reduction potential from electric cooking even if it is powered via grid and assuming growth in grid decarbonisation as per the 2022 World Energy Outlook – Stated Policies Scenario (STEPS) (IEA 2022). Based on different regions and the degree to which grids would be supplied with renewable electricity, the potential for GHG reduction due to a shift from biomass to electricity varies. In the case of a grid that remains coal dominated (and relatively high renewability of forest biomass), the GHG benefits maybe minimal (Morelli et al. 2017), whereas if the grid has significant renewable electricity, the GHG reduction is significant (Pradhan & Limmeechokchai 2017). Considering that globally there is an increasing share of renewable electricity in the grid (e.g. through NDCs, LT-LEDS), electric cooking technologies are deemed to be the cleanest (IRENA 2023). Therefore, in such scenarios, distribution and operation of electric cooking devices under the mechanism methodology are not deemed to cause a lock-in risk.

3. For the other applicable activity cookstoves, full lock-in risk analysis is required if they do not qualify for the simplified additionality demonstration. This could be for example LPG cookstoves. In this context, the use of “Methodological tool: Analysis of lock-in risk” (A6.4-AMT-008) is required following the conditions that are specified in the methodology, which override the applicability conditions in the Tool. This requires determining if the technical lifetime of the cookstoves is more than 10 years and then

[1] https://www.worldbank.org/en/topic/energy/brief/fact-sheet-multi-tier-framework-for-cooking.

comparing the GHG intensity of the proposed cookstoves with the GHG intensity of the BAU and the lowest emission alternative as per the Step 2 of the Tool.

1.2. Barrier analysis

4. This mechanism methodology is eligible to use barrier analysis since it applies to activities that are implemented at individual households, in line with paragraph 52 of version 02.0 of the "Standard: Demonstration of additionality in mechanism methodologies" (A6.4-STAN-METH-003) (hereinafter referred to as "Additionality Standard"). The type of barrier is a financial barrier, where improved cookstoves face persistent affordability-related market barriers and lack of finance to overcome such barriers in the absence of carbon finance. The barrier analysis at the level of the mechanism methodology relies on the evidence that low-income households that rely on traditional cooking technologies and fuels, in areas where autonomous uptake of improved cooking technologies and fuels is sparse or non-existent, do not experience autonomous adoption in the absence of dedicated finance, subsidies or support.

5. These barriers prevent the Article 6.4 activities from being implemented without the incentives from the mechanism, as demonstrated by a variety of studies. The Berkouwer and Dean's (under review) study undertaken in low-income, urban areas of Nairobi, Kenya, provides robust empirical evidence that high-efficiency biomass (charcoal) cookstoves remain substantially under-adopted despite being commercially available through established supply chains. The research demonstrates that household uptake is highly price-sensitive and that a significant proportion of cookstove purchases occur only when financial support is provided. These findings indicate that autonomous market adoption remains limited and that market forces alone are insufficient to achieve widespread deployment. Accordingly, the research demonstrates the existence of persistent affordability-related market barriers and supports the conclusion that carbon finance can play a decisive role in enabling adoption. This constitutes the economic basis for a standardized demonstration of additionality for qualifying high-efficiency biomass cookstove activities under this methodology.

6. This is further supported by peer-reviewed literature that demonstrates that, across broad geographies, activities with a better performance have a higher likelihood of additionality, for example, improved cookstoves where the fuel is fuelwood or charcoal in low-income households in rural areas (Gill-Wiehl et al. 2026). Reports by multilateral agencies (e.g., International Energy Agency (IEA) et al. 2025) and peer-reviewed literature (Stoner et al. 2021) confirm that there continues to be lack of access to clean cooking and dominance of solid biomass fuels in rural areas, that lack of access to clean cooking correlates with poverty, and that several countries in Sub-Saharan Africa and Southern Asia, in particular, have seen only marginal progress in access to clean cooking and have growing population lacking access.

7. The Berkouwer and Dean (under review) study provides empirical evidence that affordability is a primary determinant of household adoption of improved cooking technologies, demonstrating that adoption remains highly sensitive to upfront costs despite the availability of long-term economic benefits. Although the study evaluated high-efficiency biomass (charcoal) cookstoves, other evidence indicates that similar or greater barriers affect the adoption of LPG and electric cooking technologies. Publications by the World Bank/ESMAP (ESMAP 2020, Kojima 2023), Sustainable Energy for All (SEforALL 2020, 2022 and 2023), and the Modern Energy Cooking Services (MECS 2022a, 2022b) programme (MECS 2022) consistently identify high

upfront appliance costs, limited access to consumer finance, recurring fuel or electricity costs, reliability of electricity supply, limitations in fuel distribution systems, and other market barriers as significant constraints to the widespread adoption and sustained use of LPG and electric cooking technologies in developing countries. Several studies further conclude that public support, consumer financing mechanisms and other interventions are required to overcome these barriers and enable large-scale deployment. This body of evidence demonstrates that LPG and electric cooking technologies face similar affordability barriers to improved biomass cookstoves. Accordingly, this mechanism methodology extends the standardized additionality approach to these technologies, when certain conditions are fulfilled.

8. The simplified additionality demonstration requires demonstrating that no other programs or incentives would incentive the Article 6.4 activities by first requiring the regulatory analysis, which checks that public sector finance, including through fiscal incentives (e.g., tax or import duty exemptions) or blended finance for the installation or operation of project cookstoves, is not provided and is not reasonably expected to be provided, or that if such finance exists, then the public support is insufficient to render the Article 6.4 activity financially viable; and the Article 6.4 activity would not be implemented in the absence of additional carbon finance.

9. The incentives from the mechanism are the determinant element in overcoming the identified barriers. As demonstrated by Berkouwer and Dean (under review), incentives such as those from carbon finance are determinant in raising the adoption of improved cooking technologies, as compared to the level of adoption in the absence of carbon finance.

10. The plausible alternative to the Article 6.4 activities is the continuation of the pre-activity scenario of existing cooking technologies and fuels. This alternative does not face the financial barrier, since it does not require any relatively large, one-time investment from the households to acquire a new cooking technology.

11. Determining the status of households as low-income relies on the use of one or more poverty indicators. The Multidimensional Poverty Index (MPI), developed by the United Nations Development Programme (UNDP)[2] and the Oxford Poverty and Human Development Initiative (OPHI)[3], measures poverty by capturing multiple deprivations across three dimensions: health, education, and living standards. In this approach, each household is assigned a deprivation score between 0 and 1 based on weighted indicators (including, inter alia, nutrition, schooling, cooking fuel, electricity, water, and sanitation). A household is classified as multidimensionally poor if its deprivation score is greater than or equal to 0.33, meaning it is deprived in at least one-third of the weighted indicators. At the population level, MPI = H × A, where H is the proportion of people who are poor (who live in a household with deprivation score of ≥ 0.33) and A is the average intensity of their deprivations (average deprivation score of only the population living in households scoring ≥ 0.33). Although the global MPI does not define a formal population-level threshold, values of 0.20 or higher are widely associated with substantial multidimensional poverty in empirical applications and is therefore used as a reasonable benchmark for identifying areas with significant deprivation. For example, H = 0.4 (40

[2] https://hdr.undp.org/content/2025-global-multidimensional-poverty-index-mpi#/indicies/MPI.

[3] https://ophi.org.uk/global-mpi/2025.

per cent of people considered poor) and A= 0.5 (average deprivation score of those 40 per cent people) results in the MPI of 0.2.

12. To ensure consistency, comparability, and a conservative identification of low-income populations across diverse geographic contexts, the methodology applies the World Bank poverty line expressed in purchasing power parity (PPP) terms for lower-middle income countries, e.g. US $4.20 per person per day (2021 PPP). This value is derived from the distribution of national poverty lines across countries within the same income category and represents a level of income below which households are typically unable to meet basic consumption needs. Its application provides a standardized and empirically grounded benchmark that reflects equivalent purchasing power across countries, thereby avoiding distortions arising from exchange rate differences or varying price levels. The use of this internationally recognized value ensures that activity locations are conservatively identified as low-income and supports a transparent and robust assessment of eligibility also in contexts where national or sub-national poverty metrics may not be available, comparable, or sufficiently robust. These conditions are important for ensuring the adequacy of barrier analysis for additionality at the mechanism methodology-level.

13. The conditions require that prior to the implementation of the Article 6.4 Activity, the percent of households in the target population with a functional cooking technology that is assessed to have the same or a higher efficiency as the project cookstoves is 4.5 per cent or less. While establishing this percentage, the mechanism methodology permits the activity participant to not consider the high efficiency cookstoves that are part of registered mitigation activities under other GHG crediting programmes in the applicable geographical area. Similarly, cookstoves installed under other carbon crediting programmes are excluded from the common practice analysis. This is due to the following:

(a) There is high confidence in additionality of such activities, due to the reasoning described later in this Appendix, and

(b) The quantification approaches under the other GHG crediting programmes are not relevant to fulfilling the applicability condition or assessing common practice under this mechanism methodology.

14. This analysis ensures that the Article 6.4 activity is very likely to be additional. The likelihood is based on a combination of the findings of Gill-Wiehl et al. 2026, Berkouwer and Dean (under review), and the further conditions of this mechanism methodology for applying the simplified approach to additionality, which require that no subsidy is being provided by public sector finance for cleaner cooking.

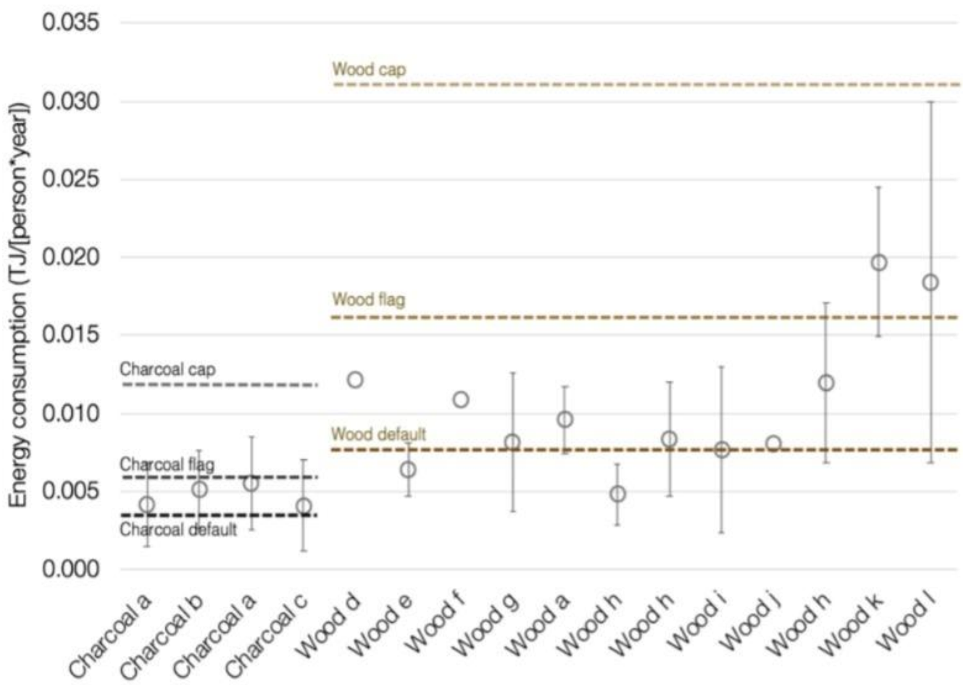
15. The validity of this approach defined at the mechanism methodology level shall be the same as the validity of this mechanism methodology, given the slow pace of change in the areas where lack of access to clean cooking is dominant (IEA et al. 2025, Stoner et al. 2021), since locations that fulfil the applicability conditions for the simplified additionality approach are generally consistent with the characteristics of those areas. At the end of the validity period, the conditions underlying the simplified additionality approach shall be re-evaluated based on up-to-date data and information, for example, on the autonomous adoption of improved cook stoves (ICS).

2. Baseline energy consumption caps and flags

16. The baseline energy consumption cap and flag values are based on published or independent KPT studies (BAMG 2019, Berrueta et al. 2008, Chagunda et al. 2017, Garland et al. 2015, Gizachew & Tolera 2018, Johnson et al. 2015, Johnson et al. unpublished, Johnson et al. 2013, Lam et al. 2017, Teune et al. 2020, Uwizeyimana et al. under review, and Wallmo & Jacobson 1998). The figure below demonstrates their relationship to potential default values of energy consumption (not included in this mechanism methodology), where "wood" values correspond to rural values under this methodology, while "charcoal" values correspond to urban values.

17. The values are different for rural and urban settings because, as shown in the figure below, in urban settings, where charcoal is more commonly used, the estimated charcoal consumption per person (0.0041–0.0055 TJ/(person-year) corresponds to an energy delivered value of approximately 0.0010–0.0014 TJ/(person-year) (assuming a thermal efficiency of 25% for baseline charcoal stoves). This is similar to the default assumption for basic cooking needs, which is 0.0012 TJ/(person-year). The slightly lower energy delivered values in urban areas, compared to rural wood users (who average 0.0016 TJ/(person-year)), are attributed to urban households relying on a diverse set of food sources. These may include meals from vendors or restaurants, school feeding programs, and other prepared food options, which reduce the amount of energy required for cooking at home.

Figure 1. Differences in wood and charcoal consumption per person



3. Emission factors

18. Default emission factors are set in the methodology for direct (point-use) CO_2, CH_4 and N_2O emissions from combusting fuelwood and charcoal in cookstoves in households in the rural, low-income contexts eligible for this methodology. The emission factors for fuelwood combustion are the central default values for residential categories from table 2.5 of IPCC 2006. These are considered average for the CO_2 emission factor, and tending toward conservative for the CH_4 and N_2O emission factors, since combustion efficiency in traditional stoves tends to be relatively lower (MacCarty et al. 2010), correlated with higher CH_4 emissions (e.g., Jetter et al. 2012). N_2O emissions have been less studied in this context, but the research on pollutant emissions of charcoal stoves summarized in 4C 2025b found much higher emissions of N_2O from traditional cooking technologies.

19. The CO_2 and CH_4 emission factors for charcoal combustion are drawn from context-specific research that better reflects activity conditions (Akagi et al. 2011, Bertschi et al. 2003, Brocard et al. 1996 and Smith et al. 2000). The CO_2 emission factor is lower than the IPCC 2006 factors (since a larger per cent of the C in charcoal is emitted as CO-included in the emission factor due to short life and oxidation in the atmosphere-, CH_4 and NMHC, instead of CO_2, under these combustion conditions) and is considered conservative. The CH_4 emission factor is the IPCC 2006 central value, which is considered tending toward conservative for this context based on the literature. The N_2O emission factor is the IPCC 2006 upper bound, which is considered conservative for this context, given that it is still 2.5 times lower than the values reported in context-specific research summarized in 4C 2025b.

20. Default emission factors also are set for upstream CO_2, CH_4 and N_2O emissions from the production of artisanal charcoal in kilns. Artisanal charcoal kiln emissions are analysed and emission factors derived from an analysis of data from Bertschi et al. 2003, Smith et al. 1999, Pennise et al. 2001, and three other peer-reviewed studies with measurements from low- to middle-income settings in sub-Saharan Africa, Asia, and the Americas. The average conversion rate from the studies is 3.5 tonnes of oven-dry wood per tonne of charcoal; however, those studies were conducted under controlled conditions that tend to yield higher conversion efficiencies than those typically observed in field conditions. Therefore, the CO_2 and CH_4 emission factors from the studies are adjusted to reflect a higher wood-to-charcoal conversion factor. Wood-to-charcoal conversion factors are reported in Urban et al. 2026 and reviewed and discussed in 4C 2025a. The review found that the individual measurements in the studies focused on conversion efficiency have mean and median values around 17 per cent (5.8:1). Further, Urban et al. 2026 undertook field studies of earth mound kilns prepared, operated and harvested by kiln operators in Ghana and Malawi and found an overall weighted average of 7.1:1 and variable performance across kilns. With this, a conversion factor of 5:1 is considered conservative, as are the resulting emission factors for CO_2 and CH_4 applying this conversion factor. The N_2O emission factor is also taken from the context-specific research and is considered an average value (4C 2025b). When compared with the emission factors for charcoal production from table 4.3.3 of IPCC 2019, the default emission factors in this methodology fall in the range between the average and upper bound default emission factors, and the IPCC 2019 ranges do not consider conversion efficiencies other than those directly reported in the studies of controlled conditions.

4. Leakage

21. Potential sources of leakage are identified and assessed.

22. The Article 6.4 activities are incentivized to select technologies and fuels that meet the cooking needs of the target population to substitute the level of service provided in the baseline in the most effective way possible, since the most effective substitutes will achieve the highest emission reductions. Activity households may always continue to use their pre-activity technologies to ensure they maintain an equal or better level of service during the activity as in the baseline, if they find the project technology does not suit 100 per cent of their needs. Such simultaneous stove use will be captured in the project emissions calculations and does not constitute leakage.

23. Baseline equipment transfer is not relevant, since baseline equipment may be maintained; or, if it is replaced completely, it does not present a value for third parties, or if its components are re-used, it can be assumed that this is because it replaces more GHG-intensive alternatives, since otherwise it would not offer any benefits for a third-party user.

24. The Article 6.4 activity reduces the consumption of the same resource used in the baseline (i.e., harvested biomass in the form of fuelwood or charcoal) and therefore avoids resource diversion.

25. One theoretical source of negative leakage is if the reduction in harvested biomass means that more is available for other users, and these other users utilize the same biomass that was reduced by the Article 6.4 activity. However, no leakage emissions are estimated from this potential source to be consistent with Gill-Wiehl et al. (under review), which found that in the context of interventions in households that reduce harvested

biomass use, neighbouring households generally experience no change in, or also decrease, their own harvested biomass use.

26. Leakage may occur associated with the project cookstoves, including their materials, manufacture, and transportation.

27. Potential sources of positive leakage are also identified. First, when efficient cooking activities such as those eligible under this mechanism methodology are successful, they reduce the demand for fuelwood or charcoal. At sufficient scale, this may impact the fNRB of the activity's location, meaning that the harvested biomass consumed as fuel becomes more renewable, reducing the net emissions of both the activity households and the neighbouring households. Such impacts are not captured in this mechanism methodology and could lead to positive leakage. Second, sustained, reduced harvesting of biomass may permit the standing trees and landscapes to regrow beyond the levels that were obtained in the pre-activity situation. Any such additional carbon storage in biomass is not captured in this mechanism methodology and could lead to positive leakage. Omission of these two potential sources of positive leakage is conservative.

4.1. Avoidance or minimisation of leakage

28. No sources of leakage were identified that need to be avoided or minimised.

4.2. Calculation and subtraction of leakage

29. Leakage associated with the project cookstoves, including their materials, manufacture, and transportation, shall be calculated and estimated. An estimate of the potential emissions from these sources for industrially manufactured, imported cookstoves was developed based on assumptions about cookstove materials (steel), mass (about 5 kg), and locations of manufacturing and use (China and east Africa, respectively), using emission factors from the World Steel Association and the Global Logistics Emissions Council, to derive an estimate of related leakage emissions of 0.0128 t CO2eq/unit. As a simplification, locally produced stoves are assumed to have about half those upstream emissions. The calculation for these potential leakage emissions is included in the methodology. Activity participants may instead use the results of a verified Life Cycle Analysis (LCA) study for the project cookstoves, if available, to provide an activity-specific value.

5. Non-permanence

5.1. Demonstration of eligibility to propose alternative approaches

30. Paragraph 13 of version 01.0 of the "Standard: Addressing non-permanence in mechanism methodologies" (A6.4-STAN-METH-007) (hereinafter the "reversals standard") provides that mechanism methodologies may propose alternative approaches to certain elements of the "Standard: Requirements for activities involving removals under the Article 6.4 mechanism" (A6.4-STAN-METH-002) (hereinafter the "removals standard"), provided that all of the following conditions are met:

(a) That activity participants using the mechanism methodology have no control over the greenhouse gas reservoir;

(b) That the greenhouse gas reservoir is not in the same location as where the mitigation activity is implemented; and

(c) That changes observed in the greenhouse gas reservoir cannot be attributed to the mitigation activity.

31. This methodology satisfies the requirements referenced in paragraph 30 because:

(a) Activity participants affect, but do not have control over, the greenhouse gas reservoirs listed in Table 2 of this methodology;

(b) The physical, geographical sites where the project cookstoves operate (paragraph 16(a)) are always distinct from the location(s) from which fuels are produced or collected in the baseline and activity scenarios (paragraph 17(b)), which location(s) correspond to the greenhouse gas reservoirs listed in Table 2 of this methodology are which are defined at a subnational, national, or multi-national level for each applicable fuel (paragraph 22); and

(c) Energy efficiency measures in household cooking reduce the consumption of non-renewable biomass and associated loss of carbon stocks but are just one of many factors that affect carbon stocks in the greenhouse gas reservoirs listed in Table 2. As a result, observed changes in carbon stocks in these reservoirs at the subnational, national, or multinational level(s) cannot be directly attributed to energy efficiency measures in household cooking.

5.2. Selection and justification of alternative approaches

32. Paragraph 15 of the reversals standard allows mechanism methodologies that meet the conditions referenced in paragraph 30 to propose alternatives to the following provisions of version 01.0 of the removals standard:

(a) General requirements for the identification and quantification of reversals (section 7.1 of version 01.0 of the reversals standard);

(b) Frequency of submitting monitoring reports (section 7.2 of version 01.0 of the reversals);

(c) Monitoring and reporting in the post-crediting period (section 7.4 of version 01.0 of the reversals standard);

(d) Reversal-related notifications and reports (section 2 of the "Information note: Elements related to non-permanence and reversals for inclusion in relevant regulatory documents" (A6.4-SBM018-A14) [4] (hereinafter referred to as “information note on non-permanence and reversals”);

(e) Post-crediting period monitoring and reporting (section 4 of the information note on non-permanence and reversals); and

(f) Post-reversal actions (section 5 of the information note on non-permanence and reversals).

33. This methodology adopts an alternative approach as follows:

(a) The methodology exempts activity participants from all of the provisions listed in paragraph 32. The practical effect of these alternative approaches is that activity

[4] See https://unfccc.int/sites/default/files/resource/A6.4-INFO-METH-002.pdf.

participants will not monitor or report on the greenhouse gas reservoirs listed in Table 2 either during the crediting period or in the post-crediting monitoring period; will not produce any reversal-related notifications or reporting for any reversals that may or have occurred; and will not perform any post-reversal actions; and

(b) The methodology requires that when A6.4ERs are contributed to the Reversal Risk Buffer Pool Account, they are immediately cancelled to remediate any potential reversals that may occur in the future (see paragraph 94).

34. When a mechanism methodology proposes alternative approaches, paragraph 13 of the reversals standard requires:

(a) That the alternative approaches ensure, with a high level of confidence, that reversals from Article 6.4 activities are fully remediated in the crediting period and post-crediting monitoring period; and

(b) That the alternative approaches do not cause instances of moral hazard.

35. This methodology satisfies the requirements referenced in paragraph 34 because:

(a) All A6.4ERs that are contributed to the Reversal Risk Buffer Pool Account are immediately cancelled to account for potential reversals in the crediting period and in the post-crediting monitoring period. Because the number of A6.4ERs contributed to the Reversal Risk Buffer Pool Account is determined using the Reversal risk assessment tool[5], which calculates the 100-year reversal risk rating for the greenhouse gas reservoirs listed in Table 2 of this methodology Table 2, these alternative provisions remediate any reversals that may occur in the future.

(b) Moral hazard requires that activity participants have the ability and interest to cause reversals or increase the risk of reversals through their own actions. Here, activity participants do not have any control over the greenhouse gas reservoirs listed in Table 2, which categorically limits the potential for moral hazard. Furthermore, activity participants' interests are directly aligned with reducing any risk of reversal over which they have control or influence. Because the number of A6.4ERs issued to activity participants is based on the use of efficient project cookstoves that reduce the consumption of fuelwood or charcoal, and therefore that reduce emissions from the greenhouse gas reservoirs listed in Table 2 of this methodology, activity participants have a direct economic interest only in actions that reduce forest emissions (rather than increase them).

5.3. Consistency with the Reversals Standard

36. Paragraph 18 of version 01.0 of the Reversals Standard requires that mechanism methodologies quantify emission reductions and net removals "consistent with the equations" in section 6 of version 01.0 of the Reversals Standard. This mechanism methodology complies with this requirement for the reasons provided in table 1.

[5] This draft methodological tool is still under development and is yet to be approved by the supervisory Body. The draft methodology will be revised accordingly if changes to the draft version of the methodological tool are made by the time of their adoption.

Table 1. Comparison of equations in the Reversals Standard and this methodology

Reversal Standard	This methodology	Rationale
Equation (1)	Equation (5), for monitored baseline Option 1; Equation (15), for monitored baseline Option 2; and Equation (19), for sample-based baseline	Consistent because the application of the fNRB Tool calculates changes in the quantities of storage the greenhouse gas reservoirs Table 2; see the definitions of “Harvested biomass” and “Fraction of non-renewable biomass” in paragraph 6 of version 01.0 of the fNRB Tool
Equation (2)	Not applicable	Not applicable because activity participants would not be required to monitor or report reversals in the post-crediting monitoring period (see section 5.1 and 5.2 of this appendix)
Equation (3)	Equation (57)	Consistent because the calculation of the net change in the emission of greenhouse gases is fully accounted for in the mechanism methodology
Equation (4)	Equation (57)	Consistent because the application of the fNRB Tool is consistent with equation (1) of version 01.0 of the Reversals Standard and the crediting deficit is not applicable, as discussed in this table below
Equation (5) **Equation (6)** **Equation (7)**	Not applicable	Not applicable. There cannot be a crediting deficit because (a) all default values in the fNRB Tool are equal to or greater than zero and (b) activity participants would not be required to monitor or report reversals in the post-crediting monitoring period (see sections 5.1 and 5.2 of this appendix)
Equation (8)	Equation (56)	Consistent because the methodology applies the parameter $F_{buffer,i,t}$ to credited changes in forest carbon storage
Equation (9) **Equation (10)**	Mandated externally	Contributions of A6.4ERs to the Adaptation Fund and cancellation of A6.4ERs for the purpose of overall mitigation of global emissions are addressed by the “Procedure: Article 6.4 mechanism registry” (A6.4-PROC-REGS-001)

Reversal Standard	This methodology	Rationale
Equation (11)	Equation (58)	Consistent because there are no substantive differences between the equations

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Document information

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01.0	30 July 2026	MEP 015, Annex 1. A call for input on this document will be issued following the conclusion of the MEP 015 meeting. Any input received will be considered by the MEP for the further development of this document at a future meeting. This draft mechanism methodology has been developed based on the proposed mechanism methodology A6.4-PMM004, submitted by the Clean Cooking and Climate Consortium (4C), and incorporates elements of the CDM methodology AMS-I.E.

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