ARTICLE 6.4 MECHANISM

A6.4-MEP013-A02

Draft Methodology

Energy efficiency measures in household cooking

Version 01.0

Sectoral scope(s): 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 workplan for 2025 for the Methodological Expert Panel (MEP) and requested the MEP to initiate work on the revision of 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 open from 16 June 2025 to 06 July 2025, and a total of 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, at its eleventh meeting, considered the PMM004 submission together with the CDM 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" and agreed to continue working on the revision. [3]

5. The MEP, at its twelfth meeting, continued considering the PMM004 submission together with the CDM 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" and agreed to continue working on the revision. [4]

6. The MEP, at its thirteenth meeting, considered a draft version of a mechanism methodology with a scope similar to the CDM methodology "AMS-II.G.: Energy efficiency measures in thermal applications of non-renewable biomass". This draft mechanism methodology incorporates components of the proposed PMM004 mechanism methodology and further components developed by the MEP to align with the requirements of approved Article 6.4 mechanism standards for the development of new mechanism methodologies, while also

[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] See https://unfccc.int/sites/default/files/resource/A6.4_MEP011.pdf.

[4] See https://unfccc.int/sites/default/files/resource/A6.4-MEP012.pdf.

incorporating significant simplifications for users of the mechanism methodology. The MEP will continue consideration of the PMM004 submission together with the CDM methodology “AMS-I.E.: Switch from non-renewable biomass for thermal applications by the user” with the aim of considering a second draft mechanism methodology for cooking with a different scope at a future meeting. [5]

2. Purpose

7. The purpose of this mechanism methodology is to define the procedures, requirements, and guidelines for developing and monitoring Article 6.4 activities that involve the distribution and operation in rural areas of improved cookstoves for fuelwood or charcoal where the fuels remain the same between the baseline and the activity scenarios.

3. Key issues and proposed solutions

8. The following sub-sections outline the key elements of the mechanism methodology, including a comparison of the elements with the approved CDM methodology “AMS-II.G.: Energy efficiency measures in thermal applications of non-renewable biomass”.

3.1. Applicability conditions

9. This mechanism methodology applies to activities that distribute and operate improved biomass cookstoves in households located in rural areas where the target population is at or below an applicable poverty threshold, where emission reductions are achieved through higher thermal efficiency compared to baseline cookstoves. Locations described by these conditions frequently share characteristics related to cooking practices and fuel types that permit simplification for eligible activities due to standardization at the methodology level related to additionality demonstration, determination of baseline scenario and baseline emissions, downward adjustment, determination of conservative business-as-usual (BAU) and leakage.

10. The mechanism methodology is applicable only where baseline cooking relies predominantly on fuelwood or artisanal charcoal, meaning these fuels must be used for at least 75% of the cooking events in the households. The primary fuel type shall remain unchanged between baseline and activity scenarios. The mechanism methodology is not applicable to activities that involve fuel switch between the pre-activity and activity scenarios. Fuel switch activities will be included in a separate mechanism methodology, as described in paragraph 6. The mechanism methodology is designed to be used on a standalone basis, but future methodologies could refer to applying it in combination if they address areas of potential interaction appropriately.

11. Cookstoves distributed by Article 6.4 activities, called “project cookstoves” in this mechanism methodology, shall be appropriate to local cooking needs and be uniquely identified and traceable to the household level. All cookstove models shall be tested for thermal efficiency in accordance with ISO 19867-1:2018 – Clean cookstoves and clean cooking solutions — Harmonized laboratory test protocols, which is a widely accepted and applied standard for laboratory tests of biomass cookstoves for energy efficiency and other operational characteristics. Project cookstoves must meet minimum thermal efficiency

[5] See https://unfccc.int/sites/default/files/resource/A6.4-MEP013.pdf.

thresholds (20 per cent for plancha-type stoves, 25 per cent for other wood-burning stoves, and 30 per cent for charcoal stoves).

12. The mechanism methodology applies to project-level activities and may apply to programmes of activities (PoAs) if relevant Article 6.4 standards are updated to apply to PoAs; therefore, the methodology includes proposed text in brackets related to PoA applicability.

13. The methodology is based on the CDM methodology "AMS-II.G.: Energy efficiency measures in thermal applications of non-renewable biomass" while also incorporating components of PMM004, but only those related to the scope of the CDM methodology. The following table 1 outlines the main differences in applicability conditions between the two methodologies:

Table 1. Comparison of applicability conditions between the CDM methodology and the Article 6.4 mechanism methodology

	CDM Methodology (AMS-II.G)	**Draft Article 6.4 mechanism methodology**
Overall scope	Applies broadly to efficiency improvements in biomass thermal applications (households, institutions, etc.)	Applies to distribution and operation of improved biomass cookstoves for efficiency improvements in households
Target population	Does not explicitly include or exclude a certain category of population Deemed to be eligible for rural, peri-urban and urban region	Restricted to rural locations, where the income levels are demonstrated to be below an applicable poverty threshold
Target usage	The use of biomass thermal applications includes cooking (household, institutional, etc) and other uses such as drying	The use of the biomass stoves is limited to cooking events in households
Baseline fuel condition	Requires use of non-renewable biomass in the project region, with no quantitative threshold	Requires >75% use of fuelwood or artisanal charcoal, and no fuel switching is allowed
Technology type	Cookstoves, ovens, dryers, including retrofits	Improved biomass cookstoves
Minimum efficiency	Minimum 25% efficiency for cookstoves; multiple testing approaches	Differentiated thresholds: 20% (plancha), 25% (wood), 30% (charcoal); mandatory ISO testing
Technology penetration	Used for additionality only (≤2.5% sales or ≤1.5% stock thresholds)	N.A. A performance-based approach for additionality is included
Fuel consistency	Fuel switching not allowed	Primary fuel type must remain unchanged between baseline and activity; fuel switching is not allowed
Cookstove lifetime	Lifetime must be documented, no fixed limit	Lifetime must be documented, no fixed limit; expectation that lifetimes will generally be ≤10 years
User needs / suitability	Not specified	Requires demonstration that technologies meet local cooking needs

	CDM Methodology (AMS-II.G)	Draft Article 6.4 mechanism methodology
Identification and tracking	Requires unique identification and tracking to avoid double counting	Requires unique identifiers linked to households and a management system; Requires declaration of consent by participating households that also prevent double counting
Replacements/ repairs	Allows replacement/repair and continued eligibility	Requires repair/replacement or exclusion from ER claims, with documented plan
Scale of application	Applicable to project activities and PoAs	Applicable to project activities, with options for applicability to PoAs once related standards are approved
Combination with other methodologies	Allowed	Standalone use (unless explicitly allowed to be combined by other methodologies)
Project Scale	≤60 GWh/year energy savings limit, (small scale)	The methodology does not limit applicability via scale or total achieved net GHG emissions reductions
Historical biomass use requirement	Requires biomass use in region since 31 December 1989	Not specified; Includes provisions for remediating risk of reversals in the reservoir affected by the activities

3.2. Project boundary

14. The project boundary encompasses (i) the physical and geographical locations where project cookstoves are distributed and operated, and (ii) the locations from which biomass fuels (fuelwood or charcoal) are produced or collected in both the baseline and activity scenarios.

15. The geographical site of the Article 6.4 activity is different from the location where the fuels are collected or produced.

16. Within this boundary, emissions sources include fuel combustion for cooking (CO_2, CH_4, N_2O) and upstream emissions from charcoal fuel production, which are accounted for in both baseline and activity scenarios. Emissions from fuel transport are excluded, as the activity reduces fuel consumption without altering fuel types, meaning that this is a conservative assumption.

17. Relevant greenhouse gas reservoirs for both the baseline and activity include above ground forest biomass, as this is assumed to be the primary source of harvested biomass. Therefore, CO_2 emission reductions from the reduction in use of biomass fuels affect a greenhouse gas reservoir subject to reversal risks and are addressed as such in this methodology. Biochar and potential removals related to any biochar that is produced from gasifier stoves is not quantified and, therefore, biochar has been excluded as a reservoir source. This is a conservative approach. Reductions in emissions of CH_4 and N_2O from biomass combustion do not have reversal risks.

18. The geographical scope of the boundary related to fuels is defined using subnational, national, or multi-national delineations based on the source and supply chains of the fuelwood or charcoal, consistent with parameters from the related methodological tools that also are under development. Activity proponents are required to clearly specify separately

both the cookstove deployment areas, using geospatial data (e.g., KML), and fuel sourcing locations.

3.3. Demonstration of additionality

19. The mechanism methodology requires activity participants to demonstrate additionality by conducting a regulatory analysis, where activity participants review current legal requirements and confirm that the legal requirements (for example, environmental and energy legislation) do not require the implementation of the Article 6.4 activity directly or indirectly. As part of this analysis, activity participants also review whether any government subsidies are provided for clean cooking, and activities are not eligible where subsidies are provided. The fulfilment of this condition ensures that the other standardized components of additionality demonstration are valid. The regulatory analysis shall be updated at each verification and at renewal of crediting period.

20. The risk of lock-in is standardized at the mechanism methodology level given that the mechanism methodology is applicable to improved cooking technologies that generally have a technical lifetime of no more than 10 years; therefore, the mechanism methodology assumes that no lock-in risk exists for eligible improved cookstoves, and its validity expires on 31 December 2030 (as opposed to five full years from its approval). The assumptions and conditions related to lock-in risk will be reevaluated when the methodology is revised in the future.

21. The mechanism methodology applies the performance-based approach for additionality demonstration through standardized thermal efficiency benchmarks for household cooking technologies in rural, low-income settings. The performance-based approach is developed in fulfilment of the applicability conditions and requirements of section 6.6 of the "Standard: Demonstration of additionality in mechanism methodologies" (A6.4-STAN-METH-003). The approach assumes that cooking with fuelwood or charcoal in low-income households serves a common purpose - providing thermal energy for cooking events (e.g. cooking a meal, preparing beverages, or heating water) - which can be consistently compared across households using measurable performance indicators. Drawing on empirical evidence and peer-reviewed research, the methodology defines efficiency thresholds (16.6 per cent for fuelwood and 23.6 per cent for charcoal) to distinguish improved cookstoves from baseline practices. These thresholds are set to ensure a high likelihood of additionality (at least 90 per cent), reflecting the low rates of spontaneous adoption of improved cookstoves in similar contexts, particularly in the absence of public sector subsidies.

22. Since a performance-based approach is applied, a common practice analysis is not included, in line with paragraph 20 of the "Standard: Demonstration of additionality in mechanism methodologies" (Version 01.2) (A6.4-STAN-METH-003).[6] Nevertheless, the methodology also requires existing cooking practices to be assessed, using the pre-activity survey, to confirm consistency with the assumptions used to define the performance-based thresholds.

3.4. Identification of the baseline scenario

23. The methodology provides requirements for describing the pre-activity scenario in line with paragraph 10 of version 01.0 of the "Standard: Setting the baseline in mechanism

[6] See https://unfccc.int/sites/default/files/resource/A6.4-STAN-METH-003.pdf.

methodologies” (A6.4-STAN-METH-004) (hereinafter referred to as “baseline standard”) that 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. The survey identifies key parameters including existing cooking technologies, fuel types and their relative use, household characteristics, and, where needed, relevant socio-economic indicators such as income levels. [7]

24. It also includes an assessment of the presence of cooking technologies with efficiency equal to or higher than the project cookstoves, in order to determine whether their penetration does not exceed the threshold of 4.5% that relates to the performance-based approach for additionality. Specifically, activity participants shall evaluate the percentage 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.

25. The survey results, relating to the identification of the pre-activity scenario, are cross-checked against recent, credible external data sources, with more conservative values applied where discrepancies arise. The survey also informs the design of the monitoring approach and may be used to demonstrate alignment of the selected technologies with local cooking needs.

26. The baseline scenario is determined following the ambitious benchmark approach, as per paragraph 36(ii) of the RMPs, with components defined at the level of the mechanism methodology, mainly with regard to the amount of useful energy provided per person and year. For the amount of useful energy delivered for cooking, a standardized value of 0.001095 TJ per person per year is assumed, that is based on 3 MJ per person per day. This value is supported by the review presented in Gill-Wiehl, et al. 2024 that cites a reasonable range of 2–4 MJ delivered per person per day (without distinguishing between rural, peri-urban, and urban conditions) and is consistent with the threshold value for useful energy delivered for cooking and heating up to 2.1 GJ per person per year (equivalent to 5.75 MJ per person per day) included in the version 01.0 of the “Standard: Addressing suppressed demand in mechanism methodologies” (A6.4-STAN-METH-006). [8] Two options for the ambitious benchmark are provided in the methodology for stakeholder input: in option 1, the baseline scenario is determined at the level of the mechanism methodology, including with regard to the efficiency of baseline cookstoves, and an ambitious benchmark defined at the methodology level assumes the baseline as a combination of some adoption of higher efficiency improved cookstoves (ICS) and some continued use of existing practice of traditional cookstoves, and the same fuels as in the pre-activity scenario. Option 2 is an ambitious benchmark defined at the activity level, with a step-wise approach included to use pre-activity survey data as an empirical data input to define the distribution of existing cooking technologies and define the activity-specific benchmark based on the performance of the best-performing cohort (top 20th percentile) of the observed cookstove types and fuels. With respect to the respective merits of the two options, option 1 relies on conservative assumptions about the penetration of improved cookstoves and is expected to achieve both simplification and environmental integrity, while option 2 may more closely match the perceived intent of the ambitious benchmark approach by relying on empirical observations of the activity context.

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

[8] 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.

3.5. Calculation of unadjusted baseline emissions

27. Baseline emissions prior to downward adjustment are calculated by quantifying the consumption of baseline fuels (fuelwood or charcoal) required to deliver the standardized level of useful cooking energy of 0.001095 TJ per person per year. Baseline fuel consumption is determined using the ambitious benchmark approach, ensuring that the baseline remains conservative relative to business-as-usual conditions, and is scaled based on average household size and observed participation of households in the Article 6.4 activity through the use of a project cookstove.

28. The extent of usage is determined through the proportion of households using the activity cookstoves and the number of potential usage days during the monitoring period. Two options are proposed for stakeholder input to establish the usage percentage. According to Option 1, usage rates are derived from surveys, and conservative caps (e.g. 90 per cent or 75 per cent, depending on the provision of customer support measures) are applied, or direct measurement via Stove Use Monitors (SUMs) may be used on a sampling basis. Per Option 2, usage shall be measured using SUMs on a sample of users. When measurement based on SUMs is used, caps as in Option 1 do not apply.

3.6. Application of the downward adjustment

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

29. For baselines determined using the ambitious benchmark approach, no adjustment is applied in the calendar year of the start of the first crediting period; therefore, in this methodology, no adjustment is applied in the first calendar year.

3.6.2. Subsequent years

30. The methodology requires the application of downward adjustments on an annual basis throughout the crediting period using a value that increases 1% per year, beginning with 1% downward adjustment in year 2.

3.7. Identification of conservative BAU baseline and calculation of BAU emissions

31. The methodology defines a business-as-usual (BAU) scenario as the continuation of historical cooking practices in rural, low-income contexts where access to clean cooking remains limited and no significant trends toward improved technologies are observed. In these settings, households are expected to continue using traditional fuelwood or charcoal stoves, including replacing end-of-life devices with technologies of similar type and performance, in the absence of targeted interventions, regulatory requirements, or subsidies. The BAU baseline is standardized at the methodological level in relation to the delivery of useful energy demand for cooking. In establishing the BAU, the mechanism methodology includes an option to require incorporating relevant policies, legal requirements, and sector-specific targets expected to be in force during the crediting period in the benchmark for the conservative BAU baseline, since the MEP continues to consider whether this step is required, or if it is already adequately addressed through the BAU benchmark and requirements included in the regulatory analysis.

32. The conservative BAU baseline is derived following an approach consistent with paragraph 77(b) of version 01.0 of the baseline standard whereby a conservative BAU baseline is determined through an alternative method that ensures the crediting baseline remains

below BAU. The methodology isolates the primary parameter that varies between baseline and activity scenarios - thermal efficiency of the cookstove - and applies a conservative adjustment based on uncertainty directly to this parameter, rather than applying uncertainty across all baseline components as described in the paragraph 77(a) procedure. Key parameters related to fuels, such as calorific value, emission factors, and fraction of non-renewable biomass, are assumed to remain unchanged between baseline and activity scenarios, with the primary differentiating factor being the thermal efficiency of the cookstove. Conservative BAU thermal efficiencies are determined using uncertainty in observed measurements of efficiencies of traditional stoves, and applying the upper bound of the range, corresponding to 17.1 per cent for fuelwood cookstoves and 31.9 per cent for charcoal cookstoves.

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

33. Activity participants are required to compare the downward-adjusted baseline with the conservative business-as-usual (BAU) baseline. The downward-adjusted baseline shall always be lower than the conservative BAU baseline; where this condition is not met, the conservative BAU baseline is applied or further adjusted to ensure that credited emission reductions are not overstated. This comparison is conducted at the start of the crediting period and verified annually through monitoring reports.

3.9. Project Emissions

3.9.1. Fuel consumption in the activity scenario

34. The fuel consumption of project cookstoves is measured using a sampling approach at a subset of households. To determine fuel consumption during the activity, activity participants shall conduct an activity Kitchen Performance Test (KPT) campaign in a sample of activity households.

35. Energy consumption in the activity scenario is determined by converting measured fuel quantities into energy units. While fuel use is measured in mass units through KPTs, project emissions are calculated on an energy basis. Net calorific values are applied to convert fuel consumption from mass to energy.

36. Activity fuel consumption converted to energy units are scaled based on household size and qualification for inclusion in the calculation based on whether the household qualifies as a project cookstove user household. The methodology also includes a consistency check to ensure that the useful energy delivered in the activity scenario meets the minimum required cooking energy level; where this is not achieved, baseline emissions are pro-rated.

3.9.2. Hawthorne effect adjustment

37. To adjust for the potential Hawthorne effect, activities can either (i) upward adjust their project emissions from what the activity KPT-based estimate would be by 25% of the difference between baseline and project emissions as a conservative default, or (ii) directly measure any Hawthorne effect using stove use monitors (SUMs), by comparing cookstove use during the KPT to the month before or after and adjusting project emissions accordingly. For methodological consistency, this adjustment is applied directly in the project

emissions calculation. The methodology includes two options for stakeholder input: allow either of these approaches, or only allow the measurement-based approach.

3.9.3. Defining user households

38. The methodology draws from PMM004. User households are activity households with a functioning project cookstove that is in use during a given monitoring period, confirmed through both self-reporting (annual usage surveys) and visual inspection, or through SUMs. The methodology seeks stakeholder input on whether a threshold of one use per week of the project cookstove is sufficient to qualify as a user household. The emission reductions calculations are structured such that emission reductions are not quantified from activity households that do not meet these criteria. [9]

39. The usage parameter is capped under the first option (annual usage surveys and visual inspection) based on whether the activity provides certain customer support actions described in the methodology. For activities to be eligible to claim up to 90 per cent usage, the activity participants must take the customer support actions described in the methodology and provide details of how each condition has or will be met on the Activity Information Cover Sheet during the design phase of the activity. Activity participants who do not undertake all these customer support actions may claim up to 75 per cent of maximum usage. These caps are waived when usage is estimated using SUMs. Rate of project cookstove use cannot be used as a substitute for direct fuel consumption measurements in the activity based on KPTs, which are required for calculating all project emissions and emission reductions.

3.9.4. Fraction of non-renewable biomass (fNRB)

40. The methodology requires the use of fNRB values contained in the "Methodological Tool: Fraction of non-renewable biomass" (A6.4-AMT-00X) and provides requirements for how to select the $fNRB_y$ default at the sub-national, national, or multi-national level. [10]

3.9.5. Wood to charcoal conversion

41. Based on the latest scientific evidence, the methodology includes emission factors based on a 4:1 conversion factor, where the conditions can be demonstrated that this factor is conservative, i.e., that the charcoal used is artisanal charcoal.

3.10. Leakage

42. The mechanism methodology includes provisions to assess and account for potential sources of leakage associated with the Article 6.4 activity. Leakage is evaluated across multiple dimensions, including continued use of baseline technologies, transfer or reuse of baseline equipment, resource diversion, and upstream emissions from the production and distribution of improved cookstoves. The mechanism methodology recognizes that continued or simultaneous use of baseline stoves by activity households do not constitute as project emissions. Similarly, baseline equipment transfer is not considered a source of

[9] A6.4-PNM004-Proposed new methodology: Comprehensive Lowered Emission Assessment and Reporting (CLEAR) Methodology for Cooking Energy Transitions.

[10] This draft methodological tool is still under development and are 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.

leakage due to its limited residual value and its potential to displace more emission-intensive alternatives. The activity reduces consumption of the same biomass resources used in the baseline, thereby avoiding resource diversion. Empirical evidence suggests that reductions in biomass use do not lead to increased consumption by neighbouring households, therefore leakage from this source also is ruled out. Leakage emissions from cookstove production and transport are conservatively estimated and included. Broader market effects, such as increased renewability of biomass due to reduced demand that may contribute to positive leakage, are acknowledged in the explanatory appendix but not addressed in the methodology.

3.11. Non-permanence provisions

43. A subset of the emission reductions affects GHG reservoirs that are subject to reversal risks. Specifically, the reversal risks apply to the GHG reservoirs that are identified in table 2 of the mechanism methodology and the provisions in section 10.2 (including equation 11) of the mechanism methodology.

44. The methodology applies an alternative approach to address non-permanence risks in accordance with the paragraph 13 of version 01.0 of the "Standard: Addressing non-permanence and reversals in mechanism methodologies" (A6.4-STAN-METH-007). [11] This approach is justified based on the demonstration that activity participants do not have control over the relevant greenhouse gas reservoirs, these reservoirs are geographically distinct from the locations of the cookstove deployment by the mitigation activity, and observed changes in the reservoirs cannot be directly attributed to the activity. On this basis, the mechanism methodology exempts activity participants from requirements related to monitoring, reporting, and managing reversals, including during the crediting period and any post-crediting monitoring period. Instead, potential reversal risks are conservatively quantified based on a 100-year risk assessment using the applicable risk assessment tool, and then addressed through contributions to the Reversal Risk Buffer Pool, where these A6.4 emission reductions are immediately cancelled. This ensures that any potential future reversals are fully remediated. Furthermore, the approach avoids moral hazard, as activity participants neither control the relevant carbon reservoirs nor have any incentive to increase reversal risks, with their interests aligned toward reducing biomass consumption and associated emissions. These provisions ensure a practical and risk-based approach to non-permanence.

3.12. Emission reductions

45. The overarching equation for calculation of net GHG emission reductions is provided in section 11 of the methodology. The section also reiterates an equation from "Standard: Addressing non-permanence and reversals in mechanism methodologies" (A6.4-STAN-METH-007) to allow the user of the methodology to calculate, for their informational purposes and transparency, the eligible A6.4ERs after consideration of buffer deductions and deductions associated with the share of proceeds (SoP)[12] and overall mitigation in global

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

[12] Share of proceeds for adaptation account, which receives A6.4ERs in accordance with paragraph 58 of the RMPs (SoP account).

emissions (OMGE) in line with “Procedure: Article 6.4 mechanism registry” (A6.4-PROC-REGS-001).[13]

3.13. Uncertainty

46. The MEP observes that, perhaps, the methodology may warrant an alternative approach towards uncertainty as some parameters have large uncertainty intervals. For example, as per IPCC (2006), the methane emission factor for charcoal combustion has a default emission factor of 200 kg/TJ with a lower bound value of 70 and higher bound value of 600. Furthermore, these parameters remain same in both baseline and activity scenario, and hence, may require different consideration, as well. [14]

47. Multiple parameters included in the mechanism methodology as default factors have already been established as conservative by taking the conservative bound of the value, e.g., BAU thermal efficiency values for both fuelwood and charcoal, and most emission factors.

48. The mechanism methodology proposes an option of that would require the activity proponent to conduct uncertainty analysis using error propagation or Monte Carlo simulations; however, the parameters that are established to be conservative are not required to be in included in the uncertainty analysis. The MEP seeks stakeholder inputs on this proposal and alternate proposals for addressing uncertainty in line with paragraph 13 of the Appendix to the baseline standard (Version 01.0).

3.14. Monitoring, Data and parameters

49. The methodology establishes monitoring requirements for critical parameters of the activity. Section 14 describes the schedule of monitoring for elements such as usage surveys, KPTs, and SUMs, while also prescribing additional contextual requirements such as consideration of seasonality.

50. Section 15 of the mechanism methodology establishes data and parameters that are fixed and are not required to be monitored by the activity proponents during the crediting period. These include key data and parameters such as technical lifetime of project cookstove, thermal efficiency of the project cookstove, fraction of non-renewable biomass (fNRB), emission factors, and baseline energy consumption benchmarks.

51. Section 16 of the mechanism methodology establishes data and parameters that are monitored, including procedures on monitoring and measurement of the parameters. These parameters include but are not limited to, days in which project cookstoves are present in households, average household size, usage status based on cooking events per week per household, quantity of new project cookstoves added each year, and project energy use measured using sampling campaigns of KPTs.

52. Appendices 4 and 5 of the draft mechanism methodology are adapted from PMM004 and have been revised to streamline their content by retaining only activity-specific requirements relating to surveys and sampling, while removing or consolidating generic provisions that are now addressed in the main body of the “Methodological tool: Sampling and

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

[14] See: https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf.

surveys for Article 6.4 activities and programmes of activities" (A6.4-AMT-XXXX) (hereinafter referred to as "sampling and surveys tool"), which is under development. In particular, requirements and guidance related to survey design, sampling approaches, and data quality assurance have been harmonized and aligned with the overarching statistical framework established in the sampling and surveys tool under development. The appendices now focus on practical implementation aspects, including usage surveys and visual verification requirements, while reflecting updated data collection practices such as the use of digital tools with geotagging and automated metadata capture. This restructuring improves clarity, reduces duplication, and enhances consistency across the document, and will be of particular use in the context of application under Programmes of Activities, when this becomes eligible.

53. As part of this revision, tables 6 and 7 in appendix 7 of the PMM004 have been deleted. These tables previously provided prescriptive lookup-based guidance (e.g., based on assumed coefficients of variation), which is no longer necessary under the revised framework. The underlying concepts are now more appropriately and flexibly addressed through the general provisions for sample size determination set out in the sampling and surveys tool under development, which rely on parameters such as variance, mean values, confidence level, and reliability requirements. Their removal reduces the risk of misapplication and ensures consistency with a broader range of activity characteristics and sampling designs, including stratified and PoA contexts (when these become eligible), while maintaining methodological robustness.

3.15. Avoidance of double counting

54. The mechanism methodology includes provisions to ensure the avoidance of double counting of emission reductions from the Article 6.4 activity. Activity participants are required to demonstrate, in each monitoring report, that emission reductions from the activity are not claimed in other environmental markets or accounting frameworks, except for non-greenhouse gas outcomes such as air quality or social benefits. In addition, participants are required to demonstrate that the 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. Furthermore, explicit consent is required to be obtained from participating households confirming that emission reductions are solely attributed to the 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

55. Activity participants shall provide the DOE with a confirmation from the DNA of the host Party that the DNA has undertaken an assessment of the activity's consistency with Decision 3/CMA.3 paragraph 40 (c) and paragraph 27 (a), as part of the host Party's approval.

4. Impacts

56. The approval of this methodological tool will allow both:

(a) The development of new Article 6.4 activities that aim to reduce emissions from reducing biomass combustion through improved cookstoves in rural areas; and

(b) The transition of those CDM activities for improved cookstoves which fall under the scope of this methodology.

5. Subsequent work and timelines

57. The MEP agreed to seek public input from stakeholders on the draft mechanism methodology. The MEP will consider stakeholders' input and recommend an updated draft of the mechanism methodology for consideration by the Supervisory Body.

58. The MEP is particularly interested in receiving inputs on:

(a) Approaches to demonstrate the population that experience low-income levels or poverty levels such that it ensures appropriateness and adequacy of baseline and additionality elements as established in the methodology;

(b) Options and provisions related to establishing the baseline scenario in accordance with the ambitious benchmark approach as defined the paragraph 36 of the RMPs. The mechanism methodology provides two options. Option 1 establishes the ambitious benchmark at the methodology level and Option 2 allows the ambitious benchmark to be set at the activity level;

(c) The threshold for setting the minimum level of usage of the project cookstove to qualify as a "user household", and whether the tentatively proposed threshold of once per week would be sufficient to ensure that uncertainties in project emissions quantification are reduced as far as is practical;

(d) The approach to combine survey-only monitoring with caps for the usage parameter, and the adequacy of the proposed caps, for counteracting the potential overestimation associated with the use of surveys without corresponding direct measurements, versus requiring direct measurements in all activities, and

(e) The approach proposed for uncertainty calculations to avoid overestimation of GHG emission reductions and any alternative proposals that can ensure alignment with paragraph 13 of the Appendix of the baseline standard (Version 01.0).

59. Specific considerations may be necessary to ensure the methodology adequately addresses the needs of Programme of Activities, for expanding the application in the future.

60. It may be noted that the MEP will continue working on the bottom-up submission A6.4 PMM004 and top-down revision of CDM Methodology: "AMS-I.E.: Switch from non-renewable biomass for thermal applications by the user" to develop a mechanism methodology with broader applicability conditions to cover a wider variety of clean and efficient cooking activities than the current proposed methodology. [15]

6. Recommendations to the Supervisory Body

61. Not applicable (Document is published for a call for public input).

[15] Comprehensive Lowered Emission Assessment and Reporting (CLEAR) Methodology for Cooking Energy Transitions hereinafter referred to as A6.4-PMM004.

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1. Introduction

1.1. Scope

1. This mechanism methodology applies to Article 6.4 activities that comprise efficiency improvements in thermal applications in household cooking. Examples of applicable technologies and measures include the introduction of high efficiency fuelwood or artisanal charcoal-fired cookstoves to replace existing devices.

2. A6.4ERs issued based on this mechanism methodology represent emission reductions. A subset of these emission reductions is subject to reversal risks.

1.2. Applicability of sectoral scopes

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

1.3. Entry into force

4. This mechanism methodology enters into force on XX Month 2026.

5. This mechanism methodology remains valid for 5 years, until DD Month YYYY, unless an earlier date applies if the 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]

2. Definitions

2.1. General terms

6. The following general terms are applied in 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 general terms and definitions apply in this mechanism methodology:

   (a) **Artisanal cookstoves:** cookstoves produced by small-scale manufacturing processes that can result in large variations in dimensions and performance across units. They are generally made by hand by skilled workers, rather than mass-produced in factories;

   (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

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

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 judgment and literature sources;

(d) **Cooking event:** 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) **Displacement:** discontinuation of use of baseline cooking technologies and fuels due to use of the project cookstove;

(f) **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;

(g) **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;

(h) **Hawthorne Effect**: impact on user behaviour (such as altered 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;

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

(j) **Kitchen Performance Test (KPT):** Field-based procedure to quantify fuel consumption under typical household and cookstove usage conditions that involves daily measurements of the amount of fuel used across several days in the user household's kitchen;

(k) **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;

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

(m) **Stove Use Monitor (SUM):** Device that quantifies cookstove usage through direct measurements of physical or chemical parameters (e.g., temperature) of cookstoves. SUMs do not measure fuel or energy consumption;[2]

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

(o) **User household:** Article 6.4 activity household with a functioning project cookstove that is in use at least [once] per week during a given monitoring period;

[2] Information, requirements and best-practice guidance related to SUMs are available in Appendix 6.

Note: The MEP seeks feedback on the definition of the user household, and what minimum level of use of the project cookstove should be used, noting that the baseline and activity baseline energy consumptions are determined using different methodological approaches and that, with a low reduction in fuel use due to a low frequency of use of the project cookstove, there could be a risk that calculated emissions reductions are partially attributable to the different methods used to calculate emissions and not to the activity intervention.

(p) **Usage:** Frequency of cooking events with the project cookstove; and

(q) **Wood-to-charcoal conversion factor:** The amount of wood needed to produce a certain quantity of charcoal, expressed as a ratio of the mass of air-dry wood input per 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.

3. Normative and informative references

9. This mechanism methodology is based on elements from version 14.0 of the Clean Development Mechanism (CDM) Methodology "AMS-II.G.: Energy efficiency measures in thermal applications of non-renewable biomass"[3] and bottom up submission, "A6.4- Proposed new methodology: Comprehensive Lowered Emission Assessment and Reporting (CLEAR) Methodology for Cooking Energy Transitions" (A6.4-PNM004).[4]

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

(a) ["Methodological tool: Sampling and surveys for Article 6.4 activities and programmes of activities" (A6.4-AMT-XXXX) (hereinafter referred to as "sampling and surveys tool");[5]

(b) "Methodological tool: Reversal risk assessment" (A6.4-AMT-XXXX) (hereinafter referred to as "reversal risk assessment tool");[6]

(c) "Methodological tool: Fraction of non-renewable biomass" (A6.4-AMT-XXX) (hereinafter referred to as "fNRB tool");[7]]

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[3] See https://cdm.unfccc.int/methodologies/DB/5V2D9RXNOWLQII5N26KJK0J3A0JJV8.

[4] See https://unfccc.int/process-and-meetings/the-paris-agreement/article-6/article-64-pacm/mechanism-process/methodologies/A6.4-PMM004.

[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 tools are made by the time of their adoption.

[6] 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.

[7] The 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 versions of the methodological tool are made by the time of their adoption.

(d) Intergovernmental Panel on Climate Change (2019). 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Volume 1: General Guidance and Reporting. IPCC, Geneva, Switzerland;[8]

(e) Intergovernmental Panel on Climate Change (2006). 2006 IPCC Guidelines for National Greenhouse Gas Inventories.[9]

4. Applicability

11. The mechanism methodology is applicable to Article 6.4 activities that:

(a) Distribute project cookstoves that reduce greenhouse gas emissions through increased thermal efficiency relative to the baseline scenario;

(b) Are implemented in households; and

(c) Are implemented in rural areas, according to the relevant national or sub-national government classification.[10]

12. The mechanism methodology is not applicable to activities that involve fuel switch between the pre-activity and activity scenario. [11]

13. Furthermore, this mechanism methodology is only applicable if all the following conditions apply:

(a) In the pre-activity scenario, the energy source for cooking in the target population is primarily fuelwood or artisanal charcoal (i.e., more than 75 per cent of cooking events are fired with fuelwood or artisanal charcoal), as determined via the pre-activity surveys;

(b) In the user households, the primary energy source for cooking (i.e., fuelwood or artisanal charcoal) remains the same between the pre-activity and activity scenario [(the difference of the share of the primary energy source between the pre-activity and the activity scenario is no more than +/- 20%)], as determined via the first usage survey administered in any given activity household;

(c) Where artisanal charcoal is used in the pre-activity scenario, it shall be demonstrated that the main charcoal production methods in the geographical area of the project boundary related to the fuel "charcoal" are consistent with the definition of artisanal charcoal, in other words that at least 90% of charcoal production in that geographical area is produced using traditional, small-scale methods, which typically involve stacking wood and covering it with earth, based on literature

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

[9] See https://www.ipcc-nggip.iges.or.jp/public/2006gl/.

[10] For example, where the government provides criteria for classifying rural areas, the Article 6.4 activity shall be implemented inside these areas; whereas, where the government provides criteria for classifying urban and peri-urban areas, the Article 6.4 activity shall be implemented outside these areas.

[11] This condition is introduced as the emission reductions calculations are based only due to gain in thermal efficiency of cookstoves between the pre-activity and activity scenario. Fuel switch activities will be included in a separate mechanism methodology.

sources.[12] When the multi-national project boundary related to this fuel is applied, this demonstration shall include the host Party where the activity is located as well as all neighbouring countries that are a significant source of imported 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, the poverty levels shall be demonstrated using national or sub-national poverty indices and their thresholds;]

(ii) [In the absence of the previous indices,] the internationally recognized Multi-dimensional Poverty Index (MPI) shall be applied.[13] A population shall be considered to meet the poverty level criterion, if the average MPI score is equal to or greater than [0.2]; [or][and]

(iii) Where [neither of] the indices above is [not] available or applicable, the applicability [can] [may] be demonstrated based on the average income level. In such cases, the Article 6.4 activity may demonstrate that the income level of the activity households is at or below the income threshold for poverty level established by the national or sub-national government.

(e) Irrespective of the location of the activity, indices and thresholds used, the income level shall not be above the poverty level threshold determined by the World Bank in their respective category (e.g. US $4.2/day per person PPP 2021 for lower middle-income country).

Note: The MEP would like to seek feedback from stakeholders on the appropriateness of the above approaches, and proposals for alternate approaches, to identifying locations where the population is demonstrated to experience low income or poverty levels that are consistent with the assumptions included in the additionality and baseline elements determined at the level of this draft mechanism methodology.

(f) 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 conducting an investigation of cooking practices and attitudes during the activity design phase;

(g) Project cookstoves are identified with a permanent unique identifier affixed to the cookstove. Each identifier is linked to a specific household, and the activity participants have an identifier management system in place;[14]

(h) The Article 6.4 activity identifies and either replaces or retrofits malfunctioning project cookstoves with a technology of comparable or better quality and thermal

[12] See section 5 of the mechanism methodology.

[13] See https://hdr.undp.org/content/2025-global-multidimensional-poverty-index-mpi#/indicies/MPI ; https://ophi.org.uk/global-mpi/2025.

[14] The purpose of the permanent unique identifier ensures linkage of a particular cookstove to the household (i.e. one cookstove is mapped to only one household and vice versa); that one cookstove is accounted only once, i.e., only associated with one carbon credit activity claiming GHG emission reductions; and traceability for repair and replacement of the project cookstove in the event of damage or malfunctioning or when the cookstove is at the end of its technical lifetime.

efficiency or does not claim emission reductions for households when such failures occur. Article 6.4 activities provide a documented plan for this process at the design phase;

(i) All project cookstove models shall be tested for thermal efficiency using the ISO Standard 19867-1:2018 – Clean cookstoves and clean cooking solutions — Harmonized laboratory test protocols, according to which:

    (i) Wood-burning project cookstoves that use a griddle surface (e.g., plancha cookstoves for making tortillas) achieve a minimum efficiency of 20 per cent;

    (ii) All other wood-burning project cookstoves achieve a minimum efficiency 25 per cent; and

    (iii) Project cookstoves burning charcoal achieve a minimum efficiency of 30 per cent.

(j) 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 7.1.1.

14. This mechanism methodology is applicable to Article 6.4 activities implemented at the project level [or as a programme of activities]. The mechanism methodology is not applicable to activities implemented at other scales (e.g., policies, sectoral approaches, etc.).

15. This mechanism methodology is only applicable on a standalone basis and 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.

    (a) The above provisions shall be demonstrated as follows:

        (i) The provisions in paragraphs 11, 12, 13(a), (c), (d), (e), (f), (h), (i), 14 and 15 shall be demonstrated in the project design document (PDD) and be assessed at the initial validation, as well as in the case of a change in project cookstove design over the activity lifetime; and

        (ii) The provisions in paragraphs 13(b), (g) and (h) shall be demonstrated in each monitoring report and be assessed at each verification.

16. The applicability conditions included in the methodological tools referred to in paragraph 10 also apply.

5. Project Boundary

17. The project boundary includes two components:

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

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

18. The emission sources included in or excluded from the project boundary are specified in table 1 below. The greenhouse gas reservoirs included in or excluded from the project boundary are specified in table 1 below.

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

	Source	Gas	Included?	Controlled / Related to / Affected by?	Justification / Explanation
BASELINE SCENARIO	Thermal energy generation by burning of fuel	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)	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	No	Related to	Excluded for simplification
		CH_4	No		Excluded for simplification
		N_2O	No		Excluded for simplification
ARTICLE 6.4 ACTIVITY SCENARIO	Thermal energy generation by burning of fuel	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)	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	No	Related to	Excluded for simplification
		CH_4	No		Excluded for simplification
		N_2O	No		Excluded for simplification

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

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

	Reservoir	Included?	Controlled / Related to / Affected by?	Justification / Explanation
BASELINE SCENARIO	Above-ground woody biomass in Forest	Yes	Affected by	Primary source of harvested bio-mass
ARTICLE 6.4 ACTIVITY SCENARIO	Above-ground woody biomass in Forest	Yes	Affected by	Primary source of harvested bio-mass
	Biochar	No	Controlled	Potential remov-als related to any biochar that is produced from gasifier stoves is not quantified. This is conserva-tive

20. The physical, geographical sites where the project cookstoves operate are different from the location(s) in which the fuels used by the user households are produced or from where they are collected in the baseline and activity scenario.[15] Activity participants shall confirm this by complying with the requirements in paragraphs 21 to 23 below.

21. Activity participants shall include in the PDD the location of the implementation of the Article 6.4 activity in the form of Keyhole Markup Language (KML) files or similar formats as one or more polygon(s), by specifying the coordinates of the geographic boundary where project cookstoves are distributed and operated (paragraph 17(a)) using a known coordinate system or any other established method.

22. The geographic limits of the activity boundary related to fuels (paragraph 17(b) shall be defined as sub-national, national or multi-national for each fuel type as follows:

(a) For charcoal, the geographical limits of the activity boundary:

(i) Shall be multi-national if both of the following conditions are true:

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 from the methodological tool. [16]

[15] For example, the location from which fuels are produced or collected is a subnational administrative boundary, while the Article 6.4 activity involves the operation of project cookstoves in any number of communities or households, but not the entire subnational administrative boundary as a whole.

[16] This draft methodological tool is still under development and are yet to be approved by the Supervisory Body. The draft methodology will be revised accordingly if changes to this draft version of this methodological tools are made by the time of their adoption.

(ii) Shall be sub-national if all of the following conditions are true:

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

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

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

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

(iv) Shall be multi-national in all other circumstances.

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

(i) Subnational where a subnational parameter is available for the applicable subnational 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. When the geographic 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:

(a) The exact (if known) or approximate location(s) from which activity fuels are produced or collected in the form of Keyhole Markup Language (KML) files or similar formats 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 any other established method; and

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

6. Demonstration of additionality

24. To demonstrate additionality, activity participants shall apply a regulatory analysis (section 6.1 below). The proposed Article 6.4 activity shall only be considered additional if the regulatory analysis is concluded positively.

25. An analysis of lock-in risk and an analysis using a performance-based approach are conducted at the level of the methodology (see Appendix 7).

26. Additionality shall be reassessed at the renewal of the crediting period.

6.1. Regulatory analysis

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

(a) The law or regulation refers to or formally integrates the mechanism as an instrument for implementation;[17] or

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

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

(ii) Public sector finance is not providing a subsidy for the adoption of efficient cookstoves or cooking fuels or energy sources cleaner (i.e. less GHG intensive or lower in pollutant intensity including CO and PM2.5) than fuelwood or artisanal charcoal in the geographic boundary of the Article 6.4 activity where activity cookstoves are distributed.

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

29. Activity participants shall further update the regulatory analysis at each activity verification.

30. If either of the following comes into effect during the crediting period, the Article 6.4 activity may only continue claiming credits up to the date that it becomes effective:

(a) A relevant legal requirement, or

(b) A relevant subsidy.

7. Baseline Emissions

7.1. Description of the pre-activity scenario in the PDD

31. The pre-activity scenario is the situation that corresponds to the circumstances immediately prior to the implementation of the Article 6.4 activity.

Note: The MEP would like to seek feedback from stakeholders on the use of the term “pre-activity scenario” to describe observed conditions on the ground prior to implementation of an Article 6.4 activity, and whether it may be better to term this the “pre-activity situation” since it reflects empirical observations rather than hypothetical conditions.

32. The pre-activity scenario shall be identified and described through the application of a pre-activity survey to the target population that complies with the sampling and surveys tool, complemented by Appendix 2, Appendix 3 and Appendix 4. The pre-activity survey shall be undertaken within the three years prior to the start date of the first crediting period of the Article 6.4 activity.

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

(a) The type of existing cooking technologies in use and the frequency of their use (cooking events per day);

(b) The fuel type(s) used in each type of existing cooking technology;

[17] For example, where the regulations explicitly state that Article 6.4ERs and their generated revenues are to be used as incentives to achieve the emission reductions in a specific sector.

(c) The household size (in number of persons per household); and

(d) The daily household income, where the low-income or poverty conditions from the applicability conditions are demonstrated at the household level.

34. The pre-activity survey may also be used to assess the applicability condition of demonstrating that the activity has selected technologies and fuels that meet the cooking needs of the target population.

35. The findings from the pre-activity survey shall be cross-checked with recent, appropriate (geographically and demographically comparable) information from nationally- or regionally-representative surveys or reputable literature.[18] If the cross check finds that a parameter in the cross-check information is more conservative than the value identified through the pre-activity survey (e.g., a lower household size), then the value from the cross-check shall be used instead of the survey results.

36. In conducting the pre-activity survey, activity participants shall follow the requirements in the sampling and surveys tool and the modes of data collection set out in the parameter tables of this mechanism methodology, as complemented in Appendix 2, Appendix 3 and Appendix 4.

7.1.1. Assessment of the presence of cooking technologies equivalent to the project cookstoves

37. Activity participants shall evaluate the percentage 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 (i.e., equivalent to the project cookstoves). As set out in paragraph 13(j) in section 4, this mechanism methodology is not applicable if this proportion is greater than 4.5 per cent.

38. This assessment in paragraph 37 above shall:

(a) [Exclude technologies installed under another 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 a documentation of data sources, reference years, and all calculations.

39. Acceptable data sources may include national household energy surveys, census data, or other representative market studies. Where no such sources are available, the pre-activity survey may be used.

40. Where the available data sources report only fuel type and not cookstove technology, and the fuel type alone does not clearly indicate whether the related cookstove is equivalent to the project cookstoves, the activity participants shall use credible supplementary data sources to determine the proportion of users of that fuel who own and regularly use an equivalent cookstove. Where no such supplementary data are available, the proportion may be obtained from the pre-activity survey.

41. Where functional status or thermal efficiency data are not available from the data sources, activity participants shall apply conservative assumptions to identify equivalent

[18] Examples of reputable literature include sources that are peer-reviewed and/or published by a national or multi-national agency.

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.

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

42. 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:[19]

☐ 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 RMP.

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

7.3.1. Procedure for the identification of the baseline scenario

43. The baseline scenario is determined at the level of the mechanism methodology, including with regard to the amount of useful energy provided per person per year and the efficiency of baseline cookstoves. Appendix 7 describes how these parameters were derived.

44. For the amount of useful energy delivered for cooking, a standardized value of 0.001095 TJ per person per year is assumed. This value reflects the minimum level of energy service required for household cooking in rural settings.

[*Option 1*:

45. The baseline scenario for the different Article 6.4 activities eligible under this mechanism methodology are described in the table 3 below:

[19] The approach is selected based on the context of household cooking activities in rural areas with low economic development, where the baseline emissions are subject to the restrictions of limited purchasing power that correlate with the use of low-efficiency cooking technologies and unpriced or low-priced fuels including woody biomass or artisanal charcoal.

Table 3. Baseline scenario for fuel types eligible under the mechanism methodology

Fuel types	Baseline approach	Baseline scenario
Improved fuelwood-fired cookstoves where the pre-activity scenario fuel is fuelwood	Ambitious benchmark approach	The useful energy would be provided at the ambitious benchmark efficiency of 16.6 per cent, for a total energy consumption of fuelwood of 0.0066 TJ / (person x year), equivalent to 0.42 tonnes/ (person x year)
Improved charcoal-fired cookstoves where the pre-activity scenario fuel is artisanal charcoal	Ambitious benchmark approach	The useful energy would be provided at the ambitious benchmark efficiency of 23.6 per cent, at a total energy consumption of charcoal of 0.0046 TJ / (person x year), equivalent to 0.16 tonnes/ (person x year)]

[*Option 2*:

46. The ambitious benchmark is set at the activity level by applying the following steps.

47. **Step 1. Identify the baseline geographical reference area.** The baseline geographical reference area shall be the same as that of the location of the target population.

48. **Step 2: Identify comparable technologies.** Use the results of the pre-activity survey to provide the empirical data on comparable technologies providing similar output as the Article 6.4 activity in the appropriate time period. Organize the collected data by classifying each combination of the type of existing cooking technology and its fuel type as a "comparable technology". Analyse the comparable technologies in the following steps.

49. **Step 3. Identify the thermal efficiency of each comparable technology**. This shall be determined as follows:

(a) Traditional cookstoves using fuelwood or charcoal fuel shall use the central value of the corresponding efficiency in table 4 below;

(b) Improved fuelwood and charcoal cookstoves without external energy sources (e.g., for fans for forced draft) or without a gasifier-type combustion chamber shall use:

(i) The average values for Improved Cookstoves (ICS) in Appendix 7; or

(ii) The thermal efficiency values based on the manufacturer's specifications and operation manuals; or

(iii) Test results for the thermal efficiency using the ISO Standard 19867-1:2018.

(c) Any other improved fuelwood or charcoal cookstoves (e.g. gasifier, forced-draft) or fossil-fuel fired cookstoves (e.g. LPG) shall apply:

(i) A thermal efficiency values based on the manufacturer's specifications; or

(ii) A default value of 50%.

50. **Step 4. Prepare a performance distribution curve.** Plot, separately for fuelwood and charcoal (as applicable), the quantity of units of each comparable technology versus the thermal efficiency from lowest to highest efficiency. Identify the best performing comparable technologies as those units within the top 20th percentile.

51. **Step 5. Calculate the performance of the best comparable activities.** Calculate, separately for fuelwood and charcoal (as applicable), the weighted average (by quantity of units) performance of all the best performing comparable technologies within the top 20th percentile. The standardized value for useful energy delivered for cooking shall be divided by the resulting thermal efficiency to determine the ambitious benchmark for total energy consumption of each relevant fuel type per person per year (TJ/(person x year).]

52. When fuels other than fuelwood or artisanal charcoal are used in the pre-activity scenario, their energy use must be accounted for in the 0.001095 TJ useful energy delivered/(person x year), respectively.[20]

53. The identification of the baseline scenario shall be re-determined at crediting period renewal or five years after the start date of the crediting period, whichever occurs first. This identification shall re-evaluate the amount of useful energy provided per person per year, the efficiency of baseline cookstoves, and the proportion of cooking technologies and fuel type combinations in the target population.

54. If a baseline cookstove reaches the end of its lifetime during the five-year period referred to in paragraph 53 above, the activity participants may assume that the household, in the absence of the activity, would replace it with a cookstove of the same type and performance. This assumption reflects that over periods of five years and without targeted support, households are unlikely to transition to improved or cleaner cookstoves due to persistent affordability and access barriers, as identified in the additionality analysis.[21]

7.4. Calculation of unadjusted baseline emissions

55. The unadjusted baseline emissions are calculated separately for the CO_2 emissions subject to reversal risk from the [combustion of][reduction in consumption of] fuelwood or artisanal charcoal ($BE_{CO2,rr,i,y}$), any CO_2 emissions not subject to reversal risk from the combustion of secondary fuels (i.e. any fuels other than fuelwood or artisanal charcoal), and non-CO_2 (CH_4 and N_2O) emissions that are not subject to reversal risk from direct combustion of fuelwood and artisanal charcoal and from upstream production of artisanal charcoal.

56. The calculations rely on the energy use from fuels in the baseline, fNRB values for fuelwood and charcoal fuels, and emission factors for direct use of fuels in residential settings as well as related to artisanal charcoal production in earth-mound kilns.

[20] For example, if surveys indicate in the baseline that 80% of cooking events are done on wood cookstoves and 20% on cookstoves using artisanal charcoal, then the baseline energy consumption would be as follows: wood consumption: 0.80 x 0.001095 TJ / (person x year) / benchmark efficiency = TJ wood fuel. Charcoal consumption: 0.20 x 0.001095 TJ / (person x year) / benchmark efficiency = TJ artisanal charcoal fuel. The proportion from any other improved fuelwood or charcoal cookstoves (e.g. gasifier, forced-draft) or fossil-fuel fired cookstoves (e.g. LPG) shall apply thermal efficiency values based on the manufacturer's specifications or a default value of 50%.

[21] Which is described further in Appendix 7.

7.4.1. Baseline emissions

57. Baseline emissions are calculated using equation (1).

$$BE_y = \sum_i \left(BE_{CO2,rr,i,y} + BE_{nonCO2,i,y}\right) + \sum_j \left(BE_{CO2,j,y} + BE_{nonCO2,j,y}\right)$$ Equation (1)

Where:

BE_y	=	Unadjusted baseline emissions during year y (t CO2eq)
$BE_{CO2,rr,i,y}$	=	Unadjusted baseline emissions of CO2 from greenhouse gas reservoirs that are subject to reversal risk for fuel type i in year y (t CO2eq)
$BE_{CO2,j,y}$	=	Unadjusted baseline emissions of CO2 that are not subject to reversal risk from the combustion of secondary fuel type j in year y (t CO2eq)
$BE_{nonCO2,i,y}$	=	Unadjusted non-CO2 baseline emissions not subject to reversal risk for fuel type i in year y (t CO2eq)
$BE_{nonCO2,j,y}$	=	Unadjusted non-CO2 baseline emissions not subject to reversal risk for fuel type j in year y (t CO2eq)
i	=	Primary fuel types (fuelwood or charcoal)
j	=	Secondary fuel types (e.g. fossil fuels or dung)
y	=	Calendar year of the crediting period

58. Unadjusted baseline emissions of CO_2 from greenhouse gas reservoirs that are subject to reversal risk are calculated using equation (2). Primary fuel types *i* including fuelwood and charcoal shall apply this equation.

$$BE_{CO2,rr,i,y} = \sum_i \left(EC_{BL,i,y} \times fNRB_{i,y} \times \left(EF_{i,CO2} + EF_{i,CO2,upstream}\right)\right)$$ Equation (2)

Where:

$BE_{CO2,rr,i,y}$	=	Unadjusted baseline emissions of CO2 from greenhouse gas reservoirs that are subject to reversal risk for primary fuel types i in year y (t CO2eq)
$EC_{BL,i,y}$	=	Consumption of primary fuel types i in baseline scenario in year y (TJ)
$fNRB_{i,y}$	=	Fraction of non-renewable biomass of primary fuel types i consumed in year y (%)
$EF_{i,CO2}$	=	CO2 emission factor for fuel types i (t CO2/TJ)
$EF_{i,CO2,upstream}$	=	CO2 emission factor for upstream emissions for primary fuel types i (t CO2/TJ)
i	=	Primary fuel types (fuelwood or charcoal)
y	=	Calendar year of the crediting period

59. Unadjusted baseline emissions of CO_2 from the combustion of secondary fuel types *j* are not subject to reversal risk and are calculated using equation (3) below). This equation shall only be applied when secondary fuel types are identified in the pre-activity survey and incorporated proportionally in the baseline benchmark.

$$BE_{CO2j,y} = \sum_{i} (EC_{BL,j,y} \times EF_{j,CO2})$$ Equation (3)

Where:

$BE_{CO2,j,y}$	=	Unadjusted baseline emissions not subject to reversal risk for secondary fuel types j in year y (t CO2eq)
$EC_{BL,j,y}$	=	Consumption of secondary fuel types j in baseline scenario in year y (TJ)
$EF_{j,CO2}$	=	CO2 emission factor for secondary fuel types j (t CO2/TJ)
j	=	Secondary fuel types (e.g. fossil fuels or dung)
y	=	Calendar year of the crediting period (number)

60. Unadjusted non-CO_2 baseline emissions are calculated using equations (4) and (5). Upstream emissions shall not be calculated for secondary fossil fuel types *j*, which is conservative.

$$BE_{nonCO2,i,y} = \sum_{i} \left(EC_{BL,i,y} \times \left(EF_{i,nonCO2} + EF_{i,nonCO2,upstream}\right)\right)$$ Equation (4)

$$BE_{nonCO2,j,y} = \sum_{j} \left(EC_{BL,j,y} \times EF_{j,nonCO2}\right)$$ Equation (5)

Where:

$BE_{nonCO2,i,y}$	=	Unadjusted non-CO2 baseline emissions for primary fuel types i in year y (t CO2eq)
$EC_{BL,i,y}$	=	Consumption of primary fuel types i in baseline scenario in year y (TJ)
$EF_{i,nonCO2}$	=	Non-CO2 emission factor for primary fuel types i (t CO2eq /TJ)
$EF_{i,nonCO2,upstream}$	=	Non-CO2 emission factor for upstream emissions for primary fuel types i (t CO2eq /TJ) (only applicable to charcoal)
$BE_{nonCO2,j,y}$	=	Unadjusted non-CO2 baseline emissions for secondary fuel types j in year y (t CO2eq)
$EC_{BL,j,y}$	=	Consumption of secondary fuel types j in baseline scenario in year y (TJ)
$EF_{j,nonCO2}$	=	Non-CO2 emission factor for secondary fuel types j (t CO2eq /TJ)
i	=	Primary fuel types (fuelwood and charcoal)
j	=	Secondary fuel types (fossil fuels or dung)
y	=	Calendar year of the crediting period (number)

61. Activity participants shall determine energy consumption in the baseline scenario for primary and secondary fuel types *i* and *j* as indicated in equations (6) and (7):

$$EC_{BL,i,y} = H_y \times BM_{BL,i,y} \times \frac{\Psi_y \times \sum_h Days_{y,h}}{CD_y}$$ Equation (6)

$$EC_{BL,j,y} = H_y \times BM_{BL,j,y} \times \frac{\Psi_y \times \sum_h Days_{y,h}}{CD_y}$$ Equation (7)

Where:

$EC_{BL,i,y}$	=	Consumption of primary fuel types i in baseline scenario in year y (TJ)
$EC_{BL,j,y}$	=	Consumption of secondary fuel types j in baseline scenario in year y (TJ)
H_y	=	Average household size in year *y* (number of persons per household)
$BM_{BL,i,y}$	=	Energy consumption of baseline primary fuel types i taken from ambitious benchmark baseline energy consumption value (TJ/(person x year))
$BM_{BL,j,y}$	=	Energy consumption of baseline secondary fuel types j taken from ambitious benchmark baseline energy consumption value (TJ/(person x year))
Ψ_y	=	Percent of activity households with cookstoves present, that qualify as user households in year y (%)
$Days_{y,h}$	=	Number of total possible project cookstove days during the year y in household h (day)
CD	=	Days in a calendar year y (day)
h	=	A6.4 activity household
i	=	Primary fuel types (fuelwood or charcoal)
j	=	Secondary fuel types (fossil fuels or dung)
y	=	Calendar year of the crediting period (number)

[*Option 1*:

62. For the parameter representing the percent of activity households with cookstoves present that qualify as user households (Ψ_y), a cap of [90 per cent] or [75 per cent] shall be applied to results based exclusively on usage surveys, even if survey results indicate a higher usage rate, unless Ψ_y is estimated using SUMs. The applicable cap depends on whether the activity undertakes **customer support actions** as described below.

63. **Customer support actions:** To be eligible to claim up to [90 per cent] of the number of total days ($Days_{y,h}$), activity participants not estimating $\Psi_y$with SUMs shall take the following customer support actions and provide details of how each condition has been met in the Activity Information Cover Sheet (in Appendix 1) in the monitoring report for each monitoring period of the activity:

    (a) Provide evidence of household participant support activities. These may include providing materials (print, in-person, or video) on how to operate the cookstove to prepare common local foods, how to troubleshoot common operational issues, and how to make minor repairs (including how to access any necessary parts). All household participant communications and materials shall be provided in local language(s) commonly used in the location of the implementation of the Article 6.4 activity;

    (b) Household participants must be able to contact the activity proponent to access support (e.g., maintenance and repair services) through a commonly used, toll-free communications channel.

64. Activity proponents who do not undertake both of these customer support actions may claim up to a cap of [75 per cent] as Ψ_y. These caps do not apply where Ψ_y is estimated with SUMs.]

Note: The MEP would like to seek stakeholder feedback on the approach to combine survey-only *monitoring with caps, and the adequacy of the proposed caps, for counteracting the potential overestimation associated with the use of surveys without corresponding direct measurements, also noting that this methodology includes requirements and guidance to surveys to improve their accuracy and the objectivity of their execution, as described further in this methodology and particularly in its Appendix 3Appendix 2.*

[*Option 2*:

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

Note: The MEP seeks feedback on the definition of the user household, and what minimum level of use of the project cookstove should be used, noting that the baseline and activity baseline energy consumptions are determined using different methodological approaches and that, with a low reduction in fuel use due to a low frequency of use of the project cookstove, there could be a risk that calculated emissions reductions are partially attributable to the different methods used to calculate emissions and not to the activity intervention.

7.5. Application of the downward adjustment

66. No downward adjustment is determined in the calendar year of the start date of the first crediting period since the ambitious benchmark approach (paragraph 36(ii) of the RMPs) is applied.

7.5.1. Downward adjusted baseline emissions in subsequent years

67. For each calendar year after the first crediting year, a downward adjustment to the unadjusted baseline emissions shall be calculated by applying an annual reduction of 1 per cent relative to the baseline of year 1, using equation (8).

68. The one per cent annual 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. This downward adjustment for subsequent years applies to all activities.

69. The starting point for increasing the downward adjustment over time shall be the baseline values in the calendar year of the start date of the first crediting period, as determined in section 7.4.

70. The annual increase in the downward adjustment shall be applied starting on 1 January of a calendar year. The first increase shall be applied in the calendar year following the

calendar year of the start date of the first crediting period. A pro-rata approach may be used to apply this minimum value to periods other than a full calendar year. [22]

71. The downward adjusted baseline emissions in subsequent years shall be determined based on an increase in the downward adjustment by at least 1 per cent of the baseline emissions in the first calendar year of the crediting period as per paragraph 71 of version 01.0 of the "Standard: Setting the baseline in mechanism methodologies" (A6.4-STAN-METH-004) (hereinafter referred to as "baseline standard"), as indicated in equations (9), (10), (11), (12). The downward adjusted baseline emissions are determined based on downward adjusted fuel consumption. This downward adjustment on the energy consumption is equivalent to determining the downward adjustment directly on the baseline emissions, since the fuel consumption *i* in baseline scenario is the parameter that may vary from year to year, whereas the other components of the baseline emissions calculation ($fNRB_{i,y}$ and emission factors) remain constant (see equations (13) and (14)):

$$BE_{adj,y} = \sum_{i} (BE_{adj,CO2,rr,i,y} + BE_{adj,nonCO2,i,y}) + \sum_{j} (BE_{adj,CO2,j,y} + BE_{adj,nonCO2,j,y})$$ Equation (8)

$$BE_{adj,CO2,rr,i,y} = \sum_{i} EC_{BL,adj,i,y} \times fNRB_{i,y} \times (EF_{i,CO2} + EF_{i,CO2,upstream})$$ Equation (9)

$$BE_{adj,nonCO2,i,y} = \sum_{i} (EC_{BL,adj,i,y} \times (EF_{i,nonCO2} + EF_{i,nonCO2,upstream}))$$ Equation (10)

$$BE_{adj,CO2,j,y} = \sum_{j} (EC_{BL,adj,j,y} \times EF_{j,CO2})$$ Equation (11)

$$BE_{adj,nonCO2,j,y} = \sum_{j} (EC_{BL,adj,j,y} \times EF_{j,nonCO2})$$ Equation (12)

$$EC_{BL,i,adj,y} = EC_{BL,i,y} - \left[\mathrm{MAX}(EC_{BL,i,y}, EC_{BL,i,y_1}) \times 0.01 \times (y - y_1)\right]$$ Equation (13)

$$EC_{BL,j,adj,y} = EC_{BL,j,y} - \left[\mathrm{MAX}(EC_{BL,j,y}, EC_{BL,j,y_1}) \times 0.01 \times (y - y_1)\right]$$ Equation (14)

[22] The pro-rata approach is illustrated through the following numerical example. The first crediting period of an Article 6.4 activity starts on 1 October 2025. The annual increase in the downward adjustment is determined to be 5 TJ per year, resulting in a total downward adjustment of 5 TJ in the second year and 10 TJ in the third year. In this example, following a pro-rata approach means that a downward adjustment of 5 TJ per year shall be pro-rated before being applied in the second calendar year of the start date of the first crediting period, i.e., for the period from 1 October 2026 to 31 December 2026. This corresponds to an absolute value of 1.26 TJ for that period, calculated as 92 days divided by 365 days multiplied by 5 TJ. Starting from 2027, the annual downward adjustment is increased by 5 TJ on 1 January of each year, resulting in a value of 6.26 TJ for 2027, 11.26 TJ for 2028, and so forth.

Where:

$BE_{adj,y}$	=	Downward adjusted baseline emissions in year y (t CO2eq)
$BE_{adj,CO2,rr,i,y}$	=	Downward-adjusted baseline emissions of CO2 from greenhouse gas reservoirs that are subject to reversal risk for primary fuel types i in year y (t CO2eq)
$BE_{adj,nonCO2,i,y}$	=	Downward-adjusted non-CO2 baseline emissions not subject to reversal risk for secondary fuel types j in year y (t CO2eq)
$BE_{adj,CO2,j,y}$	=	Downward-adjusted baseline emissions of CO2 that are not subject to reversal risk from the combustion of secondary fuel types j in year y (t CO2eq)
$BE_{adj,nonCO2,j,y}$	=	Downward-adjusted Non-CO2 baseline emissions not subject to reversal risk for secondary fuel types j in year y (t CO2eq)
$EC_{BL,i,adj,y}$	=	Downward-adjusted consumption of primary fuel types i in baseline scenario in year y (TJ)
$fNRB_{i,}$	=	Fraction of non-renewable biomass of primary fuel types i consumed in year y (%)
$EF_{i,CO2}$	=	CO2 emission factor for primary fuel types i (t CO2/TJ)
$EF_{i,CO2,upstream}$	=	CO2 emission factor for upstream emissions for primary fuel types i (t CO2/TJ)
$EF_{i,nonCO2}$	=	Non-CO2 emission factor for primary fuel types i (t CO2eq/TJ)
$EF_{i,nonCO2,upstream}$	=	Non-CO2 emission factor for upstream emissions for primary fuel types i (t CO2eq/TJ)
$EC_{BL,i,adj,y}$	=	Downward-adjusted consumption of primary fuel types i in baseline scenario in year y (TJ)
$EC_{BL,j,adj,y}$	=	Downward-adjusted consumption of secondary fuel types j in baseline scenario in year y (TJ)
$EC_{BL,i,y}$	=	Unadjusted consumption of primary fuel types i in baseline scenario in year y (TJ)
$EC_{BL,i,y1}$	=	Unadjusted consumption of primary fuel types i in baseline scenario in year y1 (TJ)
$EC_{BL,j,y}$	=	Unadjusted consumption of secondary fuel types j in baseline scenario in year y (TJ)
$EC_{BL,j,y1}$	=	Unadjusted consumption of secondary fuel types j in baseline scenario in year y1 (TJ)
i	=	Primary fuel types (fuelwood or charcoal)
j	=	Secondary fuel types (e.g. fossil fuels or dung)
y	=	Calendar year of the crediting period (number)
y1	=	Calendar year of the start date of the crediting period (number)

7.6. Identification of the conservative Business-as-usual scenario

72. The conservative business-as-usual (BAU) scenario is determined at the level of the mechanism methodology, including with regard to the amount of useful energy provided per person per year and the efficiency of baseline cookstoves. Appendix 7 describes how these parameters were derived.

73. The BAU scenarios for the different Article 6.4 activities eligible under this mechanism methodology are described in table 4 below:

Table 4. BAU for fuel types eligible under the mechanism methodology

Fuel types	Baseline approach	BAU
Improved fuelwood-fired cookstoves where the pre-activity scenario fuel is fuelwood	Ambitious benchmark approach	The energy for cooking of 0.001095 TJ useful energy delivered/ (person x year) would be provided at the BAU efficiency of 11.8%±5.3%. For fuelwood, the value is 0.0064 TJ/(person x year)
Improved charcoal-fired cookstoves where the pre-activity scenario fuel is artisanal charcoal	Ambitious benchmark approach	The energy for cooking of 0.001095 TJ useful energy delivered/ (person x year) would be provided at the BAU efficiency of 22.1%±9.8%. For charcoal, the value is 0.0034 TJ/(person x year)

74. [In determining the BAU scenario and quantifying the BAU emissions, activity participants shall furthermore identify and incorporate in the BAU, for example by changing the BAU efficiency or useful energy delivery default values, as appropriate:

(a) Any policies that are active or scheduled to take effect within the crediting period, unless they refer to or formally integrate the mechanism as an instrument for implementation[23]. All legal requirements shall be deemed to be enforced while recognizing that regulatory environments vary; and

(b) Any specific national or sub-national targets for the sector or the type of activity, as long as these are supported by policy frameworks for implementation, but not general goals that are not specific to the sector or type of activity (e.g. national emissions target). [24]]

75. Conservative BAU emissions are calculated using equations (15) to (19).

$$BAU_{cons,y} = \sum_i \left(BAU_{cons,CO2,rr,iy} + BAU_{cons,nonCO2,i,y} \right) + \sum_j \left(BAU_{cons,CO2,j,y} + BAU_{cons,nonCO2,j,y} \right) \quad \text{Equation (15)}$$

$$BAU_{cons,CO2,rr,i,y} = \sum_i \left(EC_{BL,i,UNC,y} \times fNRB_{i,y} \times \left(EF_{i,CO2} + EF_{i,CO2,upstream} \right) \right) \quad \text{Equation (16)}$$

[23] The extent to which the policy frameworks in place are sufficient to enable the achievement of the policies/targets may be considered in determining their relevance for the BAU scenario.

[24] The extent to which the policy frameworks in place are sufficient to enable the achievement of the policies/targets may be considered in determining their relevance for the BAU scenario.

$$BAU_{cons,nonCO2,i,y} = \sum_{i} \left(EC_{BL,i,UNC,y} \times \left(EF_{i,nonCO2} + EF_{i,nonCO2,upstream}\right)\right)$$ Equation (17)

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

$$BAU_{cons,nonCO2,j,y} = \sum_{j} \left(EC_{BL,j,UNC,y} \times EF_{j,nonCO2}\right)$$ Equation (19)

Where:

$BAU_{cons,y}$	=	Conservative BAU baseline emissions during year y
$BAU_{cons,CO2,rr,i,y}$	=	Conservative BAU baseline emissions that are subject to reversal risk of primary fuel types i in year y (tCO2)
$BAU_{cons,nonCO2,i,y}$	=	Conservative BAU of non-CO2 baseline emission for primary fuel types i in year y (t CO2eq)
$BAU_{cons,CO2,j,y}$	=	Conservative BAU baseline emissions of secondary fuel types i in year y (tCO2eq)
$BAU_{cons,nonCO2,j,y}$	=	Conservative BAU of non-CO2 baseline emission of secondary fuel types i in year y (t CO2eq)
$EC_{BL,i,UNC,y}$	=	Consumption of primary fuel types i in the conservative BAU scenario based on uncertainty in year y (TJ)
$EC_{BL,j,UNC,y}$	=	Consumption of secondary fuel types j in the conservative BAU scenario based on uncertainty in year y (TJ)
$fNRB_{i,y}$	=	Fraction of non-renewable biomass of primary fuel types i consumed in year y (%)
$EF_{i,CO2}$	=	Fraction of non-renewable biomass of primary fuel types i consumed in year y (%)
$EF_{i,CO2,upstream}$	=	CO2 emission factor for upstream emissions for primary fuel types i (t CO2/TJ)
$EF_{i,\ nonCO2}$	=	Non-CO2 emission factor for primary fuel types i (t CO2eq/TJ)
$EF_{i,\ nonC2,\ upstream}$	=	Non-CO2 emission factor for upstream emissions for primary fuel types i (t CO2eq/TJ)
$EF_{j,CO2}$	=	CO2 emission factor for secondary fuel types i (t CO2/TJ)
$EF_{j,nonCO2}$	=	Non-CO2 emission factor for secondary fuel types i (t CO2eq/TJ)
i	=	Primary fuel types (fuelwood or charcoal)
j	=	Secondary fuel types (e.g. fossil fuels or dung)
y	=	Calendar year of the crediting period (number)

76. Activity participants shall determine energy consumption in the baseline scenario using the benchmark derived from the conservative BAU efficiency based on uncertainty for fuelwood or charcoal consumption as indicated in equations (20) and (21):

$$EC_{BL,i,UNC,y} = H_y \times BM_{BL,i,UNC,y} \times \frac{\Psi_y \times \sum_h Days_{y,h}}{CD_y}$$ Equation (20)

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

Where:

$EC_{BL,i,UNC,y}$	=	Consumption of primary fuel types i in the conservative BAU scenario based on uncertainty in year y (TJ)
$EC_{BL,j,UNC,y}$	=	Consumption of secondary fuel types j in the conservative BAU scenario based on uncertainty in year y (TJ)
H_y	=	Average household size in year y (number of persons per household)
$BM_{BL,i,UNC,y}$	=	Energy consumption of primary fuel types i taken from conservative BAU based on uncertainty energy consumption value (TJ/(person x year))
$BM_{BL,j,UNC,y}$	=	Energy consumption of secondary fuel types j taken from conservative BAU based on uncertainty energy consumption value (TJ/(person x year))
Ψ_y	=	Percent of activity households with cookstoves present, that qualify as user households in year y (%)
$Days_{y,h}$	=	Number of total possible project cookstove days during the year y in household h (days)
CD_y	=	Days in a calendar year y (days)
i	=	Primary fuel types (fuelwood or charcoal)
j	=	Secondary fuel types (fossil fuels or dung)
y	=	Calendar year of the crediting period
h	=	A6.4 activity household

77. [This calculation shall not include any caps on Ψ_y.]

78. The BAU scenario shall be determined ex ante and described in the PDD at the start of the first crediting period for the same duration as the crediting period of the proposed Article 6.4 activity, and shall be redetermined at each crediting period renewal.

79. The quantification of the BAU emissions shall be determined:

(a) Ex ante and in the PDD at the start of the first crediting period for the same duration as the crediting period of the proposed Article 6.4 activity and specified for each calendar year within the crediting period; and

(b) Ex post for each calendar year within the crediting period.

7.7. Comparison of crediting baselines

80. Activity participants shall compare, in the PDD, the downward adjusted baseline ($BE_{adj,y}$) determined in section 7.5 with the conservative BAU baseline ($BAU_{cons,y}$) determined in 7.6 above.

81. If, as a result of the comparison, the ex-ante $BAU_{cons,y}$ is lower than the ex-ante $BE_{adj,y}$ for any calendar year or cumulatively over the crediting period, activity participants shall [apply the methods in 7.6 to set the baseline and apply to it any caps on $Days_{y,h}$ (number of total possible project cookstove days during the year *y* in household *h* (days)], to ensure that the downward adjusted baseline is lower than the conservative BAU baseline for each calendar year and cumulatively for the crediting period, thereby using a discounted value of conservative BAU for this purpose.

82. Activity participants shall also compare in monitoring reports, for each individual calendar year during the crediting period, the ex-post calculated downward adjusted baseline for the year and the ex-post calculated conservative BAU baseline for the same year to confirm that the downward adjusted baseline is lower than the conservative BAU baseline. If it is not, then the conservative BAU baseline shall be used for that specific calendar year.

8. Activity scenario

8.1. Application of multiple activity scenarios

83. If an Article 6.4 activity is promoting multiple project cookstove technologies, project cookstoves with similar design and performance characteristics (defined as having the same combustion technology and within 5 per cent thermal efficiency per ISO 19867-1) may be included under a single activity scenario. If not, they must be treated as independent activity scenarios and [included as different CPs in an Article 6.4 programme of activities.]

8.2. Project emissions

8.2.1. Fuel consumption in the activity scenario

84. Project emissions are calculated on an energy basis, while the amount of fuel consumed by the Article 6.4 activity is measured on a mass basis in the KPTs. Generally, the necessary conversions from mass to energy are conducted using equation (22):

$$EC_i = FC_i \times NCV_i \qquad \text{Equation (22)}$$

Where:

EC_i	=	Energy consumption for the fuel i (TJ)
FC_i	=	Quantity of primary fuel type i consumed (tonnes)
NCV_i	=	Net calorific value for primary fuel type i (TJ/tonnes)
i	=	Primary fuel types (fuelwood or charcoal)

8.2.2. Project emissions prior to Hawthorne effect adjustment

85. Project emissions before any Hawthorne effect adjustment are calculated using equation (23).

$$PE_{unadj,y} = \sum_{i}\left(PE_{CO2,rr,i,y} + PE_{nonCO2,i,y}\right) + \sum_{j}\left(PE_{CO2,j,y} + PE_{nonCO2,j,y}\right)$$ Equation (23)

Where:

$PE_{unadj,y}$	=	Project emissions during year y, before applying any Hawthorne effect adjustment (t CO2eq)
$PE_{CO2,rr,i,y}$	=	Project emissions of CO2 from greenhouse gas reservoirs that are subject to reversal risk for fuel i in year y (t CO2)
$PE_{nonCO2,i,y}$	=	Non-CO2 project emissions from greenhouse gas reservoirs that are not subject to reversal risk for fuel i in year y (t CO2eq)
$PE_{CO2,j,y}$	=	Project emissions of CO2 that are not subject to reversal risk from the combustion of secondary fuel types j in year y (t CO2)
$PE_{nonCO2,j,y}$	=	Non-CO2 project emissions not subject to reversal risk for secondary fuel types j in year y (t CO2eq)
i	=	Primary fuel types (fuelwood or charcoal)
j	=	Secondary fuel types (fuelwood or charcoal)
y	=	Calendar year of the crediting period (number)

86. Project emissions of CO_2 from greenhouse gas reservoirs that are subject to reversal risk are calculated using equation (24). Primary fuels *i*, including fuelwood and charcoal, shall apply this equation.

$$PE_{CO2,rr,i,y} = \sum_{i}\left(EC_{proj,i,y} \times fNRB_{i,y} \times \left(EF_{i,CO2} + EF_{i,CO2,upstream}\right)\right)$$ Equation (24)

Where:

$PE_{CO2,rr,i,y}$	=	Project emissions of CO2 from greenhouse gas reservoirs that are subject to reversal risk (t CO2)
$EC_{proj,i,y}$	=	Consumption of primary fuel types i in year y (TJ)
$fNRB_{i,y}$	=	Fraction of non-renewable biomass of primary fuel types i consumed in year y (%)
$EF_{i,CO2}$	=	CO2 emission factor for primary fuel types i (t CO2/TJ)
$EF_{i,CO2,upstream}$	=	CO2 emission factor for upstream emissions for primary fuel types i (t CO2/TJ)
i	=	Primary fuel types (fuelwood or charcoal)
y	=	Calendar year of the crediting period

87. Other project emissions of CO_2 are calculated using equation (25). This equation shall only be applied when secondary use of fuels *j* is identified in the pre-activity survey and incorporated proportionally in the baseline benchmark.

$$PE_{CO2,j,y} = \sum_{j} EC_{proj,j,y} \times EF_{j,CO2}$$ Equation (25)

Where:

$PE_{CO2,j,y}$	=	Other project emissions of CO2 (t CO2)
$EC_{proj,j,y}$	=	Consumption of secondary fuel types j in year y (TJ)
$EF_{i,CO2}$	=	CO2 emission factor for secondary fuel types j (t CO2/TJ)
j	=	Secondary fuel types (e.g. fossil fuels or dung)
y	=	Calendar year of the crediting period

88. Non- CO_2 project emissions from all type of fuels are calculated using equations (26) and (27). Upstream emissions shall not be calculated for secondary fuel types *j*.

$$PE_{nonCO2,i,y} = \sum_{i} \left(EC_{proj,i,y} \times \left(EF_{i,nonCO2} + EF_{i,nonCO2,upstream}\right)\right.$$ Equation (26)

$$PE_{nonCO2,j,y} = \sum_{j} \left(EC_{proj,j,y} \times EF_{j,nonCO2}\right)$$ Equation (27)

Where:

$PE_{nonCO2,i,y}$	=	Non- CO2 project emissions from primary fuel types i (t CO2eq)
$EC_{proj,i,y}$	=	Consumption of primary fuel types i in activity scenario in year y (TJ)
$EF_{i,nonCO2}$	=	Non-CO2 emission factor for primary fuel types I (t CO2eq/TJ)
$EF_{i,nonCO2,upstream}$	=	Non-CO2 emission factor for upstream emissions for primary fuel types i(t CO2eq/TJ)
$PE_{nonCO2,j,y}$	=	Non- CO2 project emissions from secondary fuel types j (t CO2eq)
$EC_{proj,j,y}$	=	Consumption of secondary fuel types j in activity scenario in year y (TJ)
$EF_{j,nonCO2}$	=	Non-CO2 emission factor for secondary fuel types j (t CO2eq/TJ)
i	=	Primary fuel types (fuelwood or charcoal)
j	=	Secondary fuel types (e.g. fossil fuels or dung)
y	=	Calendar year of the crediting period

89. Activities shall determine energy consumption in the activity scenario. Adjustments to account for the Hawthorne Effect are included below [differentiated by application (or non-application) of SUMs].

90. Fuel consumption in the activity scenario is determined through a representative sample with direct measurements of fuel using KPTs in compliance with the sampling and surveys tool. The KPTs shall measure use of all fuel types by all cooking devices (project

cookstoves and otherwise) in the activity household. The results from the KPT shall be converted to energy terms following equation (22) prior to their aggregation and use in equation (28).

$$EC_{proj,i,y} = H_y \times FEC_{proj,i,y} \times \frac{\Psi_y \times \sum_h Days_{y,h}}{CD_y}$$ Equation (28)

$$EC_{proj,j,y} = H_y \times FEC_{proj,j,y} \times \frac{\Psi_y \times \sum_h Days_{y,h}}{CD_y}$$ Equation (29)

Where:

$EC_{proj,i,y}$	=	Consumption of fuel i in activity scenario in year y (TJ)
$EC_{proj,j,y}$	=	Consumption of secondary fuel j in activity scenario in year y (TJ)
H_y	=	Average household size in year y (number of persons in household)
$FEC_{proj,i,y}$	=	Energy consumption of primary fuel i for activity households as measured by the activity KPT during year y (TJ/(person x year))
$FEC_{proj,j,y}$	=	Energy consumption of secondary fuel j for activity households as measured by the activity KPT during year y (TJ/(person x year))
Ψ_y	=	Percent of activity households with cookstoves present, that qualify as user households in year y (%)
$Days_{y,h}$	=	Number of total possible project cookstove days during the year y in household h
CD_y	=	Days in a calendar year y (days)
h	=	A6.4 activity household
i	=	Primary fuel types (fuelwood or charcoal)
j		Secondary fuel types (e.g. fossil fuel or dung)
y	=	Calendar year of the crediting period

91. Activity proponents shall check whether the activity energy consumption delivers at least the minimum amount of useful energy for cooking applied in the ambitious benchmark of the baseline of 0.001095 TJ/(person x year) by summing the amount of energy of fuel *i* ($FEC_{proj,i,y}$) multiplied by the efficiency of the type of cookstove in which the fuel is used during the activity. For project cookstoves, the efficiency shall be the same as that reported in Data / Parameter table 2 under section 15. For conventional fuelwood or charcoal cookstoves, the efficiency shall be the BAU central value reported in Table . Any other improved fuelwood or charcoal cookstoves (e.g. gasifier, forced-draft) or fossil-fuel fired cookstoves (e.g., LPG) shall apply thermal efficiency values based on manufacturer's specifications.

92. If the estimated useful energy delivered in the activity is at least as much as 0.001095 TJ/(person x year), then no further action is required. If, on the other hand, it is lower than this value, then the baseline emissions calculation shall be pro-rated by substituting the real amount of useful energy in the activity as the input to determine the baseline fuel energy for use in equations (6) and (7).

8.2.3. Adjustment for the potential impact of the Hawthorne effect

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

94. The final project emissions (PE_y) are calculated using equation (30).

$$PE_y = PE_{unadj,y} + \left(BE_{final,y} - PE_{unadj,y}\right) \times (1 - HE_{ind})$$

Equation (30)

Where:

PE_y	=	Final project emissions during year y (t CO2eq)
$PE_{unadj,y}$	=	Project 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 (%)
y	=	Calendar year of the crediting period (number)

95. Activities that complement KPTs and surveys with SUMs measurements to determine the activity specific Hawthorne Effect adjustment factor (HE_{ind}), apply the ratio of project cookstove usage (cooking events/day) measured during the KPT to that measured during the month prior to or following the KPT to adjust the project emissions estimate, such that in equation (24), HE_{ind} equals the result of this ratio (see equation (25)). This requires that SUMs be applied to all activity cookstoves in households where the KPT is performed. See section 14 for SUMs monitoring requirements and Appendix 6 for SUMs requirements and best practice guidance.

96. [Otherwise, project emissions are adjusted to account for the Hawthorne Effect, such that in equation (31), HE_{ind} equals 75 per cent.[25]]

$$HE_{ind} = \mathrm{MIN}(1, \frac{PCE_m}{PCE_{KPT}})$$

Equation (31)

Where:

HE_{ind}	=	Adjustment to calculated emission reductions for the Hawthorne Effect (%)
PCE_m	=	Average project cookstove cooking events per day over 1 month from SUMs measurements (number of events)
PCE_{KPT}	=	Average project cookstove cooking events per day over the activity KPT from SUMs measurements (number of events)

[25] See Appendix 7 for further details on the Hawthorne effect, the project emissions adjustment, and how the default percentage was derived.

9. Leakage

97. The leakage assessment is determined at the level of the mechanism methodology. Appendix 7 describes how the estimated leakage emissions parameter was derived.

98. The leakage assessment concludes that no negative leakage emissions are likely attributable to the Article 6.4 activity, apart from emissions associated with materials, manufacture and transport of the project cookstoves that are estimated as follows, using the value of [0.0068 t CO_2eq per cookstove].

$$LE_y = AC_{New,y} \times E_{LE}$$ Equation (32)

Where:

LE_y	=	Leakage emission in year y (t CO2eq)
$AC_{new,y}$	=	Quantity of new project cookstoves added to the activity in year y
E_{LE}	=	Estimated leakage emissions per project cookstove (tCO2eq/cookstove)
y	=	Calendar year of the crediting period

10. Non-permanence provisions

10.1. Monitoring and reporting requirements

99. For the reasons described in Appendix 7, activity participants shall not be required to:

(a) Monitor the greenhouse gas reservoirs described in Table , either in the crediting period or 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 ; or

(c) Perform post-reversal actions.

10.2. Buffer pool contributions

100. Activity participants shall apply the reversal risk assessment tool to determine the parameter $F_{buffer,i,t}$ in equation (33), which determines the number of A6.4ERs to be contributed to the Reversal Risk Buffer Pool Account for each applicable primary fuel type *i*. [26]

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

102. In applying equation (33), when $BAU_{cons,y}$ is lower than $BE_{adj,y}$ for the calendar year *y,* such that activity participants apply the methods in section 7.6 to set the baseline, then activity participants shall use the parameter $EC_{BL,i,UNC,y}$ in place of $EC_{BL,i,adj,y}$.

[26] 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.

$$6.4ER_{buffer,y} = \sum_{i} \left(\left(EC_{BL,i,adj,y} - EC_{proj,i,y} \right) \times \left(fNRB_{i,y} \times \left(EF_{i,CO2} + EF_{i,CO2,upstream} \right) \right) \right) \times F_{buffer,i,t}$$ Equation (33)

Where:

$A6.4ER_{buffer,y}$	=	The number of A6.4ERs to be forwarded to the Reversal Risk Buffer Pool account for year y (tCO2)
$EC_{BL,i,adj,y}$	=	Downward adjusted consumption of fuel i in baseline scenario in year y (TJ)
$EC_{proj,i,y}$	=	Consumption of fuel i in year y (TJ)
$fNRB_{i,y}$	=	Fraction of non-renewable biomass of biomass fuel type i consumed in year y (%)
$EF_{i,CO2}$	=	CO2 emission factor for fuel i (t CO2/TJ)
$EF_{i,CO2,upstream}$	=	Upstream CO2 emission factor for fuel i (t CO2/TJ)
$F_{buffer,i,t}$	=	The fraction of the A6.4ERs with respect to the greenhouse gas reservoir aboveground woody biomass in forest and for the period of time covered by a monitoring report t that is to be contributed to the Reversal Risk Buffer Pool Account for fuel i (%)
i	=	Primary fuel types (fuelwood or charcoal)
y	=	Calendar year of the crediting period
t	=	Period of time covered by a monitoring report

11. Emission reductions

103. Total emission reductions for activities are calculated using equation (34), which is equivalent to the total number of A6.4ERs to be issued with respect to the Article 6.4 activity over the period *y*.

$$ER_y = BE_{adj,y} - PE_y - LE_y$$ Equation (34)

Where:

ER_y	=	Emission reductions for the activity during year y (t CO2eq)
$BE_{adj,y}$	=	Final downward adjusted baseline emissions during year y (t CO2eq)
PE_y	=	Project emissions during year y (t CO2eq)
LE_y	=	Leakage emissions during year y (t CO2eq)
y	=	Calendar year of the crediting period (number)

104. For informational purposes, the following equation reflects the number of A6.4ERs to be issued to the accounts of activity participants [, following the requirements of the "Procedure: Article 6.4 mechanism registry" (A6.4-PROC-REGS-001)].[27]

$$A6.4ER_{activity,y} = ER_y - A6.4ER_{SOP,y} - A6.4ER_{OMGE,y} - A6.4ER_{buffer,y}$$ Equation (35)

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 CO2eq)
ER_y	=	Emission reductions for the activity during year y (t CO2eq)
$A6.4ER_{SOP,y}$	=	The number of A6.4ERs to be forwarded or first-transferred, where applicable, to an account of the Adaptation Fund for year y (t CO2eq)
$A6.4ER_{OMGE,y}$	=	The number of A6.4ERs to be forwarded to the account for cancellation towards delivering overall mitigation in global emissions for year y (t CO2eq)
$A6.4ER_{buffer,y}$	=	The number of A6.4ERs to be forwarded to the Reversal Risk Buffer Pool account for year y (tCO2eq)
y	=	Calendar year of the crediting period

105. [The activity participants shall conduct an uncertainty analysis following the guidance from Volume 1, Chapter 3 of the IPCC 2019 Refinement through the error propagation method or the Monte Carlo simulation. The emission reductions in equation (34) shall be determined with a [95%][90%] confidence level that they are not overestimated. All causes 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: Default Useful cooking energy delivered, NCV of wood, CH_4 and N_2O emission factors for wood; CO_2, CH_4 and N2O emission factors for charcoal, CO2 and CH_4 upstream emission factors for charcoal, estimated leakage emissions for project cookstoves. The rationale for deeming these parameters as already conservative is included in the respective tables in sections 14 and 15 below.]

Note: The MEP would like to seek feedback on the above approach to addressing uncertainty, consistent with paragraph 13 in Appendix 1 to version 01.0 of the baseline standard and the specific assumptions in paragraph 105 above.

The MEP is also seeking views on whether this approach can ensure that the emission reductions for the activity in the year y *comply with the paragraph 13 of the appendix to version 01.0 of the baseline standard, or other approaches for how to ensure this compliance is achieved.* [28]

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

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

12. Avoidance of double counting

106. All 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 gases 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 activity (e.g., the GHG emission reductions achieved) 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,[29] by:

(i) Declaring and providing evidence in each monitoring report that the Article 6.4 activity and its baseline scenario (e.g., heat energy for household cooking using harvested biomass) do not fall within the scope of any mandatory domestic mitigation scheme; or

(ii) Where the Article 6.4 activity or its baseline scenario fall within the scope of a mandatory domestic mitigation scheme, activity participants may:

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.

107. Despite paragraph 106 106 above, where the policy for establishing the framework or environmental market or for establishing the mandatory domestic mitigation scheme refers to or formally integrates the mechanism as an instrument for implementation, participation in such a framework or environmental market or domestic mitigation scheme does not result in double counting.

108. All Article 6.4 activities under this mechanism methodology shall also employ explicit evidence of consent, for example signed A6.4ER Waiver Certificates (see Appendix 2), with all participating households under the Article 6.4 activity, indicating that A6.4ERs can only

[29] 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.

be claimed by the activity participants and that the households shall not claim A6.4ERs or carbon credits from any other carbon crediting programme.

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

109. Activity participants shall attach to the PDD presented to the DOE performing the validation a confirmation from the DNA of the host Party that the DNA has undertaken an assessment of the activity's consistency with Decision 3/CMA.3 paragraph 40 (c) and paragraph 27 (a), as part of the host Party's approval, to demonstrate that the activity does not constrain, but aligns with the policies, options and implementation plans of the host Party with regard to the nationally determined contribution (NDC) of the host Party, its long-term low greenhouse gas emission development strategies (LT-LEDS) if it has submitted one, and the long-term temperature goal of the Paris Agreement and long-term goals of the Paris Agreement.

14. Monitoring Requirements

14.1. Monitoring activity schedule for activities

110. The table 5 below presents the monitoring activities schedule for activities.

Table 5. Monitoring activities schedule for activities

Monitoring Activity	Prior to validation	Prior to first verification	Annual	Every monitoring period
Pre-activity studies				
Pre-activity survey	X			
Activity studies				
Usage surveys			X	
Usage SUMs measurements [*Option 1*: (Optional)] [*Option 2: No text*]			Continuous	
Activity KPTs (energy consumption measurement) & Activity KPT survey				X (must be performed no less frequently than every two years even if the monitoring period is longer)

Monitoring Activity	Prior to validation	Prior to first verification	Annual	Every monitoring period
SUMs Hawthorne effect measurements [*Option 1*: (Optional)] [*Option 2: No text*]		X (during the first monitoring period of the crediting period)		
Ongoing monitoring tasks				
Maintenance of total sales and service records, and activity databases	Continuous	Maintenance of total sales and service records, and activity databases	Continuous	Maintenance of total sales and service records, and activity databases

14.2. Other monitoring requirements

111. 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

112. KPTs shall be undertaken every two years, within the last four months of the monitoring period for which credits are being validated and issued (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

113. 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. 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 proponent shall instead select and justify a conservative approach.

14.2.3. Stove use monitoring (SUMs)

114. The algorithm for estimating cooking events shall be able to reliably distinguish cooking 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).

115. The algorithms shall be clearly presented publicly in the PDD with associated equations or logic rules.

116. 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 sub-sample 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.

117. Sampling shall meet the 95/10 confidence / reliability guidelines.

118. 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, nor from year to year.

119. Activity households in the SUMs sample shall not receive any support different or additional to those not included in the sample.

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

121. For activities using the KPT and SUMs approach described in section 8.2.3, 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.

15. Data and parameters not monitored

122. [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 the project cookstove**
Description:	The total period during which the cookstove can be expected to remain functional and deliver its intended level of service
Data unit:	Years or Hours
Equations referred:	N/A
Purpose of data:	☒ Baseline emissions ☐ Project emissions ☐ Leakage emissions
Value(s) applied:	
Source of data:	☐ Measured ☒ Other sources
Choice of data or measurement methods and procedures:	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
Treatment of uncertainty:	N/A
Additional comments:	Used for informational purposes and not used in any equation

Data / Parameter table 2.

Data/parameter:	**Thermal efficiency of the project cookstove**
Description:	Thermal efficiency using the ISO Standard 19867-1:2018
Data unit:	%
Equations referred:	N/A
Purpose of data:	☒ Baseline emissions ☐ Project 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 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:	In the uncertainty analysis referred to in paragraph 105, therefore, this parameter does not need to be varied
Additional comments:	Used for demonstrating compliance with the applicability conditions and for estimating useful energy delivered in the project

Data / Parameter table 3.

Data/parameter:	CD_y
Description:	Days in a calendar year *y*
Data unit:	Number
Equations referred:	6, 7, 20, 21, 28, 29
Purpose of data:	☒ Baseline emissions ☐ Project emissions ☐ Leakage emissions
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:	-

Data / Parameter table 4.

Data/parameter:	$\boldsymbol{EF_{i,CO2}}$
Description:	CO_2 emission factor for fuel *i*

Data unit:	t CO_2/TJ
Equations referred:	2, 9, 16, 24, 32
Purpose of data:	☒ Baseline emissions ☒ Project emissions ☐ Leakage emissions
Value(s) applied:	Fuelwood: 112 Artisanal charcoal: 87.9
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 7
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 and conservative BAU efficiency of fuelwood stoves. In the uncertainty analysis referred to in paragraph 105, therefore, the charcoal parameter may be treated as a constant
Additional comments:	N/A

Data / Parameter table 5.

Data/parameter:	$EF_{j,CO2}$
Description:	CO_2 emission factor for fuel j
Data unit:	t CO_2/TJ
Equations referred:	3, 11, 18, 25
Purpose of data:	☒ Baseline emissions ☒ Project emissions ☐ Leakage emissions
Value(s) applied:	Any other fuels: Default values from the latest version of the IPCC Guidelines for National GHG Inventories. For fuels such as dung and agricultural residues, the values shall be 0
Source of data:	☐ Measured ☒ Other sources
Choice of data or measurement methods and procedures:	-
Treatment of uncertainty:	See paragraph 105
Additional comments:	N/A

Data / Parameter table 6.

Data/parameter:	$EF_{i,nonCO2}$
Description:	Non-CO_2 emission factor for fuel *i*
Data unit:	t CO_2eq/TJ
Equations referred:	4, 10, 17, 26
Purpose of data:	☒ Baseline emissions ☒ Project 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 CH4 of 300 kg/TJ and for N_2O of 4 kg/TJ and IPCC Fifth Assessment Report (AR5) GWPs for biogenic CH4 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 7. 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% to +300%. 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 7 is 250% of the default IPCC upper bound value applied here. In the uncertainty analysis referred to in paragraph 105, therefore, this parameter may be treated as a constant
Additional comments:	N/A

Data / Parameter table 7.

Data/parameter:	$EF_{j,nonCO2}$
Description:	Non-CO_2 emission factor for fuel *j*
Data unit:	t CO_2eq/TJ
Equations referred:	5, 12, 19, 27
Purpose of data:	☒ Baseline emissions ☒ Project emissions ☐ Leakage emissions
Value(s) applied:	Default values from the latest version of the IPCC Guidelines for National GHG Inventories

Source of data:	☐ Measured ☒ Other sources
Choice of data or measurement methods and procedures:	IPCC Fifth Assessment Report (AR5) GWPs for biogenic CH4 of 25.25 and for N_2O of 265. The GWPs shall be updated according to any future CMA decisions
Treatment of uncertainty:	See paragraph 105
Additional comments:	N/A

Data / Parameter table 8.

Data/parameter:	$EF_{i,CO2,upstream}$
Description:	CO_2 upstream emission factor for fuel *i*
Data unit:	t CO_2/TJ
Equations referred:	2, 9, 16, 24, 32
Purpose of data:	☒ Baseline emissions ☒ Project emissions ☐ Leakage emissions
Value(s) applied:	Fuelwood: 0 Charcoal: 72
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 7
Treatment of uncertainty:	The value for charcoal is conservative since it reflects a wood-to-charcoal ratio of 4:1 whereas measured ratios in field operations are consistently higher than this as described further in Appendix 7. In the uncertainty analysis referred to in paragraph 105, therefore, this parameter may be treated as a constant
Additional comments:	Upstream emissions for fuelwood are considered to be zero

Data / Parameter table 9.

Data/parameter:	$EF_{i,nonCO2,upstream}$
Description:	Non-CO_2 upstream emission factor for fuel *i*
Data unit:	t CO_2eq/TJ
Equations referred:	4, 10, 17, 26
Purpose of data:	☒ Baseline emissions ☒ Project emissions ☐ Leakage emissions
Value(s) applied:	Fuelwood: 0 Charcoal: 4.25
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 7
Treatment of uncertainty:	The value for charcoal is conservative since it reflects a wood-to-charcoal ratio of 4:1 whereas measured ratios in field operations are consistently higher than this as described further in Appendix 7. In the uncertainty analysis referred to in paragraph 105, therefore, this parameter may be treated as a constant
Additional comments:	Upstream emissions for fuelwood are considered as zero

Data / Parameter table 10.

Data/parameter:	$fNRB_{i,y}$
Description:	Fraction of non-renewable woody biomass fuel *i* during year *y*
Data unit:	%
Equations referred:	2, 9, 16, 24, 32
Purpose of data:	☒ Baseline emissions ☒ Project 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:	±30 per cent of the fNRB value at the 95 per cent confidence interval See paragraph 105
Additional comments:	Updated at crediting period renewal

Data / Parameter table 11.

Data/parameter:	NCV_i
Description:	Net calorific value of fuel *i*
Data unit:	TJ/tonnes
Equations referred:	22
Purpose of data:	☒ Baseline emissions ☒ Project emissions ☐ Leakage emissions
Value(s) applied:	Fuelwood: 0.0156. Artisanal charcoal: 0.0295. Any other fuels: Default values from the latest version of the IPCC Guidelines for National GHG Inventories, unless otherwise specified
Source of data:	☐ Measured ☒ Other sources

Choice of data or measurement methods and procedures:	The wood and charcoal values are derived from the 2006 IPCC Guidelines for National GHG Inventories, Chapter 1, Table 1.2 NCV values
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 the baseline efficiency. See Appendix 7. In the uncertainty analysis referred to in paragraph 105, therefore, this fuelwood parameter may be treated as a constant
Additional comments:	N/A

Data / Parameter table 12.

<table>
<tr><th>Data/parameter</th><th colspan="3">$BM_{BL,i,y}$</th></tr>
<tr><td>Description</td><td colspan="3">Energy consumption of baseline fuel i for Article 6.4 activities in year y</td></tr>
<tr><td>Data unit</td><td colspan="3">TJ/(person*year)</td></tr>
<tr><td>Equations referred</td><td colspan="3">6</td></tr>
<tr><td>Purpose of data</td><td colspan="3">☒ Baseline emissions ☐ Project emissions ☐ Leakage emissions</td></tr>
<tr><td rowspan="4">Value(s) applied</td><td rowspan="2">Benchmark</td><td colspan="2">Fuel type</td></tr>
<tr><td>Fuelwood</td><td>Charcoal</td></tr>
<tr><td>[Option 1: Ambitious benchmark (methodology default)</td><td>0.0066</td><td>0.0046]</td></tr>
<tr><td>[Option 2: Ambitious benchmark (activity specific)</td><td>(activity specific)</td><td>(activity specific)]</td></tr>
<tr><td>Source of data</td><td colspan="3">☐ Measured ☒ Other sources</td></tr>
<tr><td>Choice of data or measurement methods and procedures</td><td colspan="3">Either a default value from this mechanism methodology or an ambitious benchmark determined at the activity level.
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</td></tr>
<tr><td>Treatment of uncertainty</td><td colspan="3">The benchmark values represent conservative estimates.
In the uncertainty analysis referred to in paragraph 105, therefore, this parameter may be treated as a constant</td></tr>
<tr><td>Additional comments</td><td colspan="3">N/A</td></tr>
</table>

Data / Parameter table 13.

Data/parameter	$BM_{BL,I,UNC,y}$
Description	Energy consumption of baseline fuel *i* for Article 6.4 activities taken from conservative BAU based on uncertainty in year *y*

Data unit	TJ/(person*year)
Equations referred	20
Purpose of data	☒ Baseline emissions ☐ Project emissions ☐ Leakage emissions
Value(s) applied	<table><tr><th rowspan="2">Benchmark</th><th colspan="2">Fuel type</th></tr><tr><th>Fuelwood</th><th>Charcoal</th></tr><tr><td>Conservative BAU (methodology default)</td><td>0.0064</td><td>0.0034</td></tr></table>
Source of data	☐ Measured ☒ Other sources
Choice of data or measurement methods and procedures	A default value from this mechanism methodology. 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	The benchmark values represent conservative estimates. In the uncertainty analysis referred to in paragraph 105, therefore, this parameter may be treated as a constant
Additional comments	N/A

16. Data and parameters monitored

Data / Parameter table 14.

Data/parameter	$Days_{y,h}$
Description	Number of total possible project cookstove days during the year *y* in household *h*
Data unit	Number
Equations referred	Equation (7) (20) (21)
Purpose of data	☒Baseline emissions ☒ Project emissions ☐Leakage emissions
Measurement and updating frequency	Annually
Measurement methods and procedures	For each Article 6.4 activity household *h*, this shall be determined using the Article 6.4 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

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	In the uncertainty analysis referred to in paragraph 105, therefore, this parameter may be treated as a constant	
Additional comment	-	

Data / Parameter table 15.

Data/parameter	H_y	
Description	Average household size in year *y*	
Data unit	Number of persons per household, regardless of age or gender	
Equations referred	Equation (20) (21) (29)	
Purpose of data	☒Baseline emissions ☒ Project 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.	

	If the target reliability is not met, the activity participant shall apply the lower bound of the confidence interval as the parameter value
Treatment of uncertainty	In the uncertainty analysis referred to in paragraph 105, therefore, this parameter may be treated as a constant when the lower bound of the confidence interval is applied as the parameter value
Additional comment	-

Data / Parameter table 16.

Data/parameter	*HH_income*	
Description	The daily household income	
Data unit	Local currency per household per year (converted to PPP-adjusted USD/person*day)	
Equations referred	N/A	
Purpose of data	☐Baseline emissions ☐ Project emissions ☐Leakage emissions	
Measurement and updating frequency	Ex-ante via the pre-activity survey	
Measurement methods and procedures	Pre-activity survey	
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	Once ex-ante, then periodic update at every crediting period renewal	
QA/QC procedures	The parameter estimate from the survey shall meet the minimum reliability of 95/10 to use the mean value. If the target reliability is not met, the activity participant shall apply the upper bound of the confidence interval as the parameter value	
Treatment of uncertainty	n/a	
Additional comment	Applies when the low-income or poverty conditions from the applicability conditions are demonstrated at the household level	

Data / Parameter table 17.

Data/parameter	$FEC_{proj,i,y}$
Description	Energy consumption of fuel *i* as measured by the activity KPTs in year *y*

Data unit	TJ/(person*year)	
Equations referred	Equation (22)	
Purpose of data	☐Baseline emissions ☒ Project 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 4	
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. 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. Activity participants should apply the guidance in Appendix 6	
Treatment of uncertainty	In the uncertainty analysis referred to in paragraph 105, therefore, this parameter may be treated as a constant when the upper bound of the confidence interval is applied as the parameter value	
Additional comment	-	

Data / Parameter table 18.

Data/parameter	$FEC_{proj,j,y}$
Description	Energy consumption of secondary fuel *j* as measured by the activity KPTs in year *y*
Data unit	TJ/(person*year)
Equations referred	Equation (25)
Purpose of data	☐Baseline emissions ☒ Project 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 4	
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. 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. Activity participants should apply the guidance in Appendix 6	
Treatment of uncertainty	In the uncertainty analysis referred to in paragraph 105, therefore, this parameter may be treated as a constant when the upper bound of the confidence interval is applied as the parameter value	
Additional comment	-	

Data / Parameter table 19.

Data/parameter	$PC_{b,i}$
Description	Proportion of pre-activity cooking events conducted using fuel *i*
Data unit	Percentage
Equations referred	N/A
Purpose of data	☐Baseline emissions ☐ Project emissions ☐Leakage emissions
Measurement and updating frequency	Once per crediting period
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 [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

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	Article 6.4 activity households
Measurement intervals	Once	
QA/QC procedures	The parameter estimate from the survey shall meet the minimum reliability of 95/10 for the percentage of baseline cooking conducted using fuel *i*,	
Treatment of uncertainty	N/A	
Additional comment	This parameter is used to verify that fuel switch does not occur during the Article 6.4 activity	

Data / Parameter table 20.

Data/parameter	$PC_{p,i}$	
Description	Proportion of cooking events conducted using fuel *i* during the Article 6.4 activity	
Data unit	Percentage	
Equations referred	N/A	
Purpose of data	☐Baseline emissions ☐ Project emissions ☐Leakage emissions	
Measurement and updating frequency	Once per crediting period	
Measurement methods and procedures	Activity usage surveys. The first activity usage survey must ask to identify all the cooking devices present in the household. For the project cookstove and each other cooking device present in the household, ask "How many times did you cook using [cooking device] yesterday?" to determine the number of usage events per day per device. Estimate the proportion of activity cooking events conducted using fuel *i*, and use the result in conjunction with parameter $PC_{b,i}$ 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	
Entity/person responsible for the measurement	Activity participant	
	Type of instrument	N/A

Measuring instrument(s)	*Accuracy class*	N/A
	Calibration requirements	N/A
	Location	Article 6.4 activity households
Measurement intervals	Once	
QA/QC procedures	The parameter estimate from the survey shall meet the minimum reliability of 95/10 for the percentage of activity cooking conducted using fuel *i*	
Treatment of uncertainty	N/A	
Additional comment	This parameter is used to verify that fuel switch does not occur during the Article 6.4 activity	

Data / Parameter table 21.

Data/parameter	PCE_m	
Description	Average project cookstove cooking events per day over one month from SUMs measurements	
Data unit	Number of cooking events/day	
Equations referred	Equation (30)	
Purpose of data	☐Baseline emissions ☒ Project emissions ☐Leakage emissions	
Measurement and updating frequency	SUMs monitoring. Continuously during a contiguous one-month duration during the first monitoring period of the crediting period	
Measurement methods and procedures	Installation of SUMs on a representative sample of project cookstoves that are the same on which the KPT is performed	
Entity/person responsible for the measurement	Activity participant	
Measuring instrument(s)	*Type of instrument*	SUMs
	Accuracy class	In compliance with Appendix 6
	Calibration requirements	In compliance with Appendix 6
	Location	Article 6.4 activity households
Measurement intervals	In compliance with Appendix 6	
QA/QC procedures	The study shall meet the minimum reliability of 95/10 for the target parameter of average cooking events per day per project cookstoves. If the target reliability is not met, the activity participant shall take the lower bound of the confidence intervals as the parameter value. In compliance with Appendix 6	

Treatment of uncertainty	In the uncertainty analysis referred to in paragraph 105, therefore, this parameter may be treated as a constant when the upper bound of the confidence interval is applied 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 22.

Data/parameter	PCE_{KPT}	
Description	Average project cookstove cooking events per day over the activity KPTs from SUMs measurements	
Data unit	Number of cooking events/day	
Equations referred	Equation (30)	
Purpose of data	☐Baseline emissions ☒ Project emissions ☐Leakage emissions	
Measurement and updating frequency	Continuously for the duration of the first Article 6.4 activity KPTs	
Measurement methods and procedures	SUMs monitoring. Installation of SUMs on the project cookstoves during the activity KPT	
Entity/person responsible for the measurement	Activity participants	
Measuring instrument(s)	*Type of instrument*	SUMs
	Accuracy class	In compliance with Appendix 6
	Calibration requirements	In compliance with Appendix 6
	Location	Article 6.4 activity households
Measurement intervals	In compliance with Appendix 6	
QA/QC procedures	The study shall meet the minimum reliability of 95/10 for the target parameter of average cooking events per day per project cookstoves. If the target reliability is not met, the activity participant shall take the lower bound of the confidence intervals as the parameter value. In compliance with Appendix 6	
Treatment of uncertainty	In the uncertainty analysis referred to in paragraph 105, therefore, this parameter may be treated as a constant when the upper bound of the confidence interval is applied 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 23.

Data/parameter	Ψ_y

Description	Percent of A6.4 activity households that qualify as user households in year *y*
Data unit	Percentage
Equations referred	Equations (6) (7) (20) (21) (28) (29)
Purpose of data	☒Baseline emissions ☒ Project emissions ☐Leakage emissions
Measurement and updating frequency	Annual
Measurement methods and procedures	Household surveys of households participating in the Article 6.4 activity with cookstoves present, where respondents are asked whether the cookstove is used more than [once] 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. Unpacked 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 4 and Appendix 6. [*Option 1:* 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 75 per cent for those that do not. **Customer support actions:** To be eligible to claim up to 90 per cent of $Days_{y,h}$, activity participants shall take the following customer support actions and provide details of how each condition has been or will be met in the Activity Information Cover Sheet during the design phase of the Article 6.4 activity. • Provide evidence of activity participant support activities. These may include such things as providing materials (print, in-person, or video) on how to operate the cookstove to prepare common local foods, how to troubleshoot common operational issues, and how to make minor repairs (including how to access any necessary parts). All activity participant communications and materials shall be provided in local language(s) commonly used in the activity area. • Activity participants must be able to contact the activity proponent to access support (e.g., maintenance and repair services) through a commonly used, toll-free communications channel. Activity participants who do not undertake all three of these customer support actions may claim up to 75 per cent of $Days_{y,h}$. These caps are waived when $\Psi_y$is estimated using SUMs.] [*Option 2:* The percentage shall be measured using SUMs on a sample of Article 6.4 activity households. The requirements of the sampling and survey tool shall be applied along with the complementary requirements in Appendix 4 and Appendix 6.] The results shall be processed such that each A6.4 activity household

	that uses the project cookstove at least [once] per week 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] [SUMs]
	Accuracy class	[N/A] [In compliance with Appendix 6]
	Calibration requirements	[N/A] [In compliance with Appendix 6]
	Location	Article 6.4 activity households
Measurement intervals	[N/A][In compliance with Appendix 6]	
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] [*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. 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	In the uncertainty analysis referred to in paragraph 105, therefore, this parameter may be treated as a constant when the lower bound of the confidence interval is applied as the parameter value	
Additional comment	N/A	

Data / Parameter table 24.

Data / Parameter		$AC_{New,y}$
Description		Quantity of new project cookstoves added to the activity in year *y*
Data unit		Number
Equations referred		Equation (31)
Purpose of data		☐ Baseline emissions ☐ Project emissions ☒ Leakage emissions
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 require-ments	N/A
	Location	N/A
Measurement intervals	Annual	
QA/QC procedures	Cross check against household number and waiver certificates or similar	
Treatment of uncertainty	In the uncertainty analysis referred to in paragraph 105, this parameter may be treated as a constant	
Additional comment	-	

Appendix 1. Activity information cover sheet

1. To be completed at the project design stage (validation) and updated at time of each verification (highlighting changes from the most recent version).

2. Essential activity information:

   (a) Start date of the crediting period.

   (b) Crediting period end date.

   (c) Article 6.4 activity fuel type(s).

   (d) Project cookstove(s) type(s), model(s) used in the Article 6.4 activity.

   (e) ISO thermal efficiency(ies) of cookstoves used in the Article 6.4 activity.

   (f) ISO tier(s) for PM2.5 emissions (optional).

   (g) ISO tier(s) for CO emissions (optional).

   (h) Number of households.

   (i) Average household size (persons per household, regardless of age or gender).

   (j) Number of project cookstoves of each type distributed during the crediting period.

   (k) Geographical boundary (stoves).

   (l) Geographical boundary (fuel).

   (m) Expected (ex-ante) or achieved (ex-post) CO_2e emission reductions (per household).

   (n) Calculation sheet publicly available? (Y/N).

3. Emissions reduction information:

   (a) Primary fuel type(s) identified in the pre-activity scenario.

   (b) Secondary fuel type(s) identified in the pre-activity scenario.

   (c) Baseline fuel consumption approach (e.g., default).

   (d) Baseline fuel consumption value.

   (e) [Article 6.4 activity monitoring approach (KPT or KPT+SUMs)].

   (f) [Third party used for Usage survey? (Y/N)].

   (g) [Number of households sampled for SUMs (for usage)].

   (h) Third party used for KPTs? (Y/N);

   (i) Number of households sampled for KPT;

   (j) Number of households sampled for SUMs (for Hawthorne effect);

(k) fNRB value;

(l) Geographical boundary used to determine the fNRB value.

(m) Details on customer support activities provided:

(i) Demonstration that the Article 6.4 activity has selected technologies and fuels that meet the cooking needs of the target population;

(ii) Activity participant operations and maintenance support activities;

(iii) Availability of support communication channels to households participating in the Article 6.4 activity.

4. How seasonality is addressed in the Article 6.4 activity monitoring plan:

(a) Justification for how this approach will result in accurate Article 6.4 activity fuel use measurements;

(b) If space heating is common in the Article 6.4 activity area, how space heating has been addressed in the Article 6.4 activity design.

5. Description of any missing and outlier or excluded data for KPTs, SUMs, surveys.

6. Description of how sampling randomization was conducted and what proof is available to auditors.

7. SUMs validation checks performed (as described in Appendix 6, for Article 6.4 activities using SUMs.

8. Compliance with the Principles[1] for Responsible Carbon Finance in Clean Cooking (optional).

[1] See https://cleancooking.org/wp-content/uploads/2024/05/The-Principles-for-Responsible-Carbon-Finance-in-Clean-Cooking.pdf.

Appendix 2. Sample template for the 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 for XXX.

2. The activity participant may obtain a A6.4ERs Waiver Certificate from each household in which a project cookstove 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 any adult resident in the household (defined as per the national regulations).

5. This appendix provides an example A6.4ERs Waiver Certificate to be used by the activity participant. The A6.4ERs Waiver Certificate shall be obtained, preferably, in the language prevalent in the geographical boundary of activity implementation.

6. 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

7. Full Name of the Household representative

8. Contact Number, if any

9. Email address, if any

10. Address

    (a) Country

    (b) State

    (c) District

    (d) Village

    (e) Street

    (f) Local Landmark

    (g) House number

11. National Identification Number or any Government issued ID (and evidence of number).

2.2. Details of the Project Cookstove

12. Type of Stove

13. Fuel Type

14. Manufacturer

15. Vendor or Distributor

16. Certified Efficiency

17. Unique Identification Number

18. Manufacturing series

19. Installation Date

3. A6.4ERs Waiver Certificate Statement

20. 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 purpose of cooking meals, preparing beverages or heating water. I received the cookstove [free of charge] OR [at the cost of ______].

21. 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].

22. By signing this waiver, I voluntarily and with full knowledge and consent not to claim carbon credits from any other carbon crediting programme related to the use of the above mentioned stove.

23. 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.

24. 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.

25. Signature Date (DD/MM/YYYY)

Appendix 3. Activity-specific survey requirements for energy efficiency measures in household cooking

1. Scope and Application

1. This appendix specifies activity-specific survey requirements for the design and implementation of surveys for efficient cooking activities under this mechanism methodology.

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 surveys 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 4.

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. Best practice is for these enumerators to be independent of the activity proponent'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 proponent or its implementation partners, such as selling, marketing, distributing, or providing customer service for project cookstoves.

6. Data collection shall be carried out using methods that ensure accuracy, consistency and traceability. Where feasible, surveys shall be conducted using electronic data collection systems with built-in validation checks.

2.2. Respondent selection and consent

7. Surveys should be conducted with the main household cook, who must give her informed consent prior to the start of the interview. Consent shall be documented as part of the survey record.

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[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.

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 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, a 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 participants 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 purposes of this methodology, a *cooking event* refers to any instance in which useful energy is delivered from a cookstove 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 general 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 survey

3.1. Purpose:

17. The pre-activity survey shall be conducted to:

    (a) Establish the 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) assess whether space heating affects fuel consumption, where relevant; and

    (e) Determine the income level, when required for evaluating the poverty index.

3.2. Application of results

18. 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).

19. 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.

20. Activity participants shall justify, in the Activity Information Cover Sheet, how the selected approach ensures accurate estimation of baseline and activity fuel use.

21. If space heating is common in the activity area, the justification must 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 must instead select and justify a conservative approach.

3.3. Examples of common cookstove types

22. To support consistent identification and classification of baseline technologies during surveys, the following non-exhaustive list of commonly observed cookstove types is provided.

3.3.1. Wood-based cookstoves

23. 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: natural stones, bricks, or compacted earth.

24. Sunken pit cookstove:

    (a) A shallow pit dug into the ground where wood is burned;

(b) Materials: bare earth or reinforced with clay.

25. U-shaped mud cookstove:

(a) A simple mud or clay structure in a U-shape, designed to hold a pot over an open fire;

(b) Materials: locally sourced mud or clay, sometimes reinforced with straw.

26. 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.

27. 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.

3.3.2. Charcoal-based cookstoves

28. Metal bucket cookstove:

(a) A metal bucket or shallow metal bowl with ventilation holes at the bottom and a top grate for placing charcoal;

(b) Materials: sheet metal, iron, steel.

29. 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.

30. 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.

4. Activity KPT surveys (simultaneous to KPTs)

4.1. Purpose:

31. Surveys 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.

5. Usage survey

5.1. Purpose

32. Usage surveys shall be conducted to:

(a) Determine whether the activity cookstove is present and in use within the household;

(b) Assess the frequency of use of the activity cookstove to determine if the household may be counted as a user household;

(c) identify any seasonal or other variations that may affect the project cookstove usage patterns and hence affect the project's emission reductions.

33. 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.

5.2. Visual verification requirements

34. Results from the usage survey shall 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.

35. Enumerators shall capture digital images of all cookstoves 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 must 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.

36. 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.

5.3. Supplemental purpose of first usage survey administered in any given household

37. This supplemental usage survey activity is used to check how well the activity 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.

38. 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 cookstove (retrospective baseline);

(c) Document the proportion of cooking events carried out on each fuel-technology combination used prior to acquisition of project cookstove (retrospective cross-check of baseline);

Appendix 4. Activity-specific sampling provisions for energy efficiency measures in household cooking

1. Scope and application

1. This appendix specifies activity-specific provisions for the application of sampling in activities under this mechanism methodology.

2. 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].

3. 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).

2. Parameters requiring sampling

4. 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 Table .

5. 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]

6. Where multiple parameters are estimated using a single sampling effort, activity proponents shall demonstrate that the sampling design is appropriate for all parameters and meets the required reliability for each.

[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.

[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 applicable data sources

Parameter	Description	Unit	Data source	Rule and guidance	Reference section for guidance
H_y	Average household size	Number of persons per household (Number)	Pre-activity survey and Usage surveys	95/10	Continuous distribution
$FEC_{proj,i,y}$ and $FEC_{proj,j,y}$	Total energy consumption of activity fuels (*i* and *j*) in activity	TJ/(person-year)	Activity KPTs	95/10	Continuous distribution
$PC_{b,i}$	Proportion of pre-activity cooking events conducted using fuel *i*	Percent	Pre-activity survey	95/10	Continuous distribution
$PC_{p,i}$	Proportion of cooking events conducted using fuel *i* during the Article 6.4 activity	Percent	Usage survey	95/10	Continuous distribution
PCE_m	Average project cookstove cooking events per day over 1 month from SUMs measurements	Cooking events/day	SUMs	95/10	Continuous distribution
PCE_{KPT}	Average project cookstove cooking events per day over the project KPT from SUMs measurements	Cooking events/day	SUMs	95/10	Continuous distribution
Ψ_y	Percent of activity households that qualify as user households in year y	Percentage	[Usage survey or] SUMs	95/10	Proportional distribution

3. Selection of the sampling approach

7. Activity participants may apply appropriate probability-based approaches, in accordance with the sampling and surveys tool.[3]

[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

8. 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.

9. The activity participants shall document the sampling design, including the procedure used to ensure randomization in a manner that enables independent verification. Acceptable documentation may include a record of the random number generator or software used, screenshots of the randomization process, or signed attestations from third parties who witnessed the selection. These materials shall be maintained as part of the activity record and made available to the validation and verification body upon request.

4. Stratification requirements

10. Where sampling is applied, the sampling design shall reflect key characteristics of the population that may influence parameter values.

11. Sampling shall be stratified by cookstove age categories, when applicable, recognizing its influence on performance, usage and operational status. The following strata shall be applied: less than 1 year, 1–2 years, 2–3 years, 3–4 years, and more than 4 years.

12. Where cluster or multi-stage sampling is applied, stratification shall be preserved within or across clusters, as appropriate.

13. 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 [3]

5. Determination of sample size:

14. Sample size determination, including for both continuous and proportional variables, shall be conducted in accordance with the sampling and surveys tool[3]. This includes the selection of appropriate statistical parameters, treatment of variability, and application of reliability requirements.

15. 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%), an oversampling of 25% is recommended. This is to account for SUMs that may be defective or whose readings may be considered outliers.

Appendix 5. 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 requirements for how the KPT protocol shall be applied in the methodology, as well as 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 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 KPTs or use the conservative 95 per cent confidence bound that results in the lower emission reductions estimate.

4. For activity KPTs, households shall be selected from the group of households included in the pre-activity survey and activity 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 must 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 activity participant shall conduct additional sampling until these conditions are met]. This requirement is separate and additional to checking that the pre-activity 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 must 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.

4. 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., fuelwood) 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 two 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, activities 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.

5. Data quality and outlier handling

5.1. Outliers Identification and Exclusion Criteria

12. Outliers shall be defined as data points that fall beyond 1.5 times the interquartile range[1] (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;

[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.

(b) Documented unusual events (e.g., party, non-household members using the cookstove); or

(c) A per capita fuel consumption >175MJ/(person*day) for any single day (equivalent to ~10kg of wood/(person*day)).

5.2. Minimum Data Requirements

13. Only households with at least three complete days of data may be included in the analysis.

14. 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 must occur within a two-week period.

Appendix 6. Requirements and Best Practices for use of Stove Use Monitors (SUM)

1. General

1. In the context of the methodology, activity participants may choose from two approaches to adjust energy consumption in the activity scenario for the Hawthorne effect, differentiated by application (or non-application) of stove use monitoring (SUM). When activities complement KPTs with SUMs measurements, the ratio of project cookstove 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).

2. Activity participants opting to use the SUMs method must place SUMs on the project cookstoves for the duration of the KPT, as well as for the continuous 30 days (before, after, or any combination of before and after[1]) to serve as a reference point.

3. SUMs [may also be] [are] used to estimate Ψ, the per cent of activity households with the project cookstove 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 Appendix 4. If sampling includes activity 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 project cookstove is not present, these households shall be included as non-users in the estimate Ψ.

4. This appendix provides requirements and best practice guidance for using SUMs in the context of the methodology.

2. Best practice guidance for using SUMs

2.1. Installation

5. 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 cookstoves' 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 cookstove temperature (without exceeding maximum operating temperature for the sensor);

[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.

(d) When possible, cookstoves 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.

2.2. Cookstove temperature analysis

6. 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 or;

(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.

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.

2.3. Public presentation of stove use algorithms

7. 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, following the requirements below.

2.3.1. Algorithm logic description

8. 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).

2.3.2. Formal equation or code

9. Present the algorithm as:

   (a) Equations and logic rules; or

   (b) Annotated code outlining the decision steps.

2.3.3. Parameter definitions and units

10. All thresholds and time-related values shall be:

   (a) listed with units (e.g., °C, seconds) ;and

   (b) applied consistently across devices and time.

2.3.4. SUM device specifications

11. These include:

   (a) Manufacturer, model, and firmware version;

   (b) Sampling rate and sensor types;

   (c) Any known limitations affecting performance.

2.3.5. Data sample publication

12. Share at least three anonymized raw data files (two weeks or more of data) for three different project cookstoves 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.

2.3.6. Hosting and access

13. Shall publish the algorithm and sample dataset on a stable public platform (e.g., activity website, registry, GitHub). Include the link in the Activity Information Cover Sheet.

Example photos of SUMs placement.

Appendix 7. Demonstration of requirements at the level of the mechanism methodology

1. Applicability

1. The Multidimensional Poverty Index (MPI), developed by the United Nations Development Programme (UNDP)[1] and the Oxford Poverty and Human Development Initiative (OPHI)[2], 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% of people considered poor) and A= 0.5 (average deprivation score of those 40% people) results in the MPI of 0.2.

2. 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.

2. Additionality

2.1. Demonstration of lock-in risks

3. The types of project cookstoves that are expected to be distributed when applying this mechanism methodology generally have a technical lifetime of 10 years or less[3]. Therefore, activities under this mechanism methodology are not deemed to cause a lock-in risk,

[1] https://hdr.undp.org/content/2025-global-multidimensional-poverty-index-mpi#/indicies/MPI.

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

[3] Wilson et al. 2016.

applying 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 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. This may inform future adjustments to the analysis of lock-in risks under this mechanism methodology.

2.2. Performance-based approach

4. The related conditions of section 6.6.1 of the version 01.2 of the additionality standard are addressed as follows:

(a) In fulfilment of paragraph 61(a), this methodology uses the baseline approach referred to in paragraph 36(ii) of the rules, modalities and procedures of the Article 6.4 mechanism.

(b) In fulfilment of paragraph 61(b), the type of activity, i.e. more efficient household cooking using fuelwood or charcoal fuel in rural, low-income households, provides the service of thermal energy for cooking events for residents of the household;

(c) In fulfilment of paragraph 61(c), the performance of this type of activity can be standardized across households on the basis of thermal efficiency of the cooking technology and practices that are used for providing the thermal energy for cooking events;

(d) In fulfilment of paragraph 61(d), peer-reviewed literature[4] demonstrates that, across broad geographies, activities with a better performance have a higher likelihood of additionality, i.e., improved cookstoves where the fuel is fuelwood or charcoal in low-income households in rural areas. Reports by multilateral agencies (e.g., International Energy Agency (IEA) et al. 2025) 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;

(e) In fulfilment of paragraph 61(e), robust and representative data are available on the performance of household cooking technologies using fuelwood or charcoal fuel in rural, low-income households, providing the service of thermal energy for meal preparation for residents from academic literature[5]. Such data are also available for improved cookstoves (ICS), e.g., Jetter et al. 2012.

5. Following the provisions in version 01.0 of the baseline standard for baseline determination following paragraph 36 (ii) (detail provided below in Setting an ambitious benchmark for the baseline). This gives a benchmark efficiency of 16.6 per cent for fuelwood fired stoves and 23.6 per cent for charcoal fired stoves. These efficiencies are

[4] Gill-Wiehl et al. 2026.

[5] e.g., Urban et al. 2025.

applied as the threshold for the performance-based approach for additionality, in fulfilment of paragraph 63 of the additionality standard.

6. Since these conditions are fulfilled, the mechanism methodology defines the performance-based approach as threshold thermal efficiencies of cooking technologies and practices using fuelwood and charcoal (two thresholds).

(a) Each threshold ensures that the Article 6.4 activity is very likely (at least 90 per cent probability) to be additional. The likelihood is based on a combination of the findings of Gill-Wiehl et al. 2026 and the further conditions of this mechanism methodology in the regulatory analysis section of the additionality demonstration, which require that no subsidy is being provided by public sector finance for cleaner cooking. The academic study used a combination of review of published studies and primary data collection and found that 4.2 per cent per year of households in contexts similar to those of the applicability conditions of this mechanism methodology obtained an improved cookstove; however, this weighted average value was influenced by one particular case in which a national government implemented a subsidy for liquified petroleum gas (LPG) stoves during the time of the measurements. By eliminating cases where subsidies are present though the condition in the regulatory analysis of this mechanism methodology, the average non-additionality rate per year would be closer to 1.5 per cent and the likelihood of additionality may be considered above 90 per cent.

(b) The validity of the thresholds shall be the same as the validity of this mechanism methodology (31 December 2030), given the slow pace of change in the areas where lack of access to clean cooking is dominant (IEA et al. 2025), since locations that fulfil the applicability conditions of this mechanism methodology are generally consistent with the characteristics of those areas. Once the validity of these thresholds ends, the thresholds shall be re-evaluated based on up-to-date data and information on the spontaneous adoption of improved cook stoves (ICS) in locations that fulfil the applicability conditions of this mechanism methodology and on the thermal efficiency of baseline and ICS devices.

3. Setting an ambitious benchmark for the baseline

7. [*Option 1:* The ambitious benchmark approach at the mechanism methodology level is selected since reliable data on the performance of comparable activities providing similar outputs is available, as well as on the best performing comparable activities.

8. The type of activity provides the service of thermal energy for cooking events for residents of the household and can be standardized on the basis of the energy demand for the meals for a single person. The emissions per unit output depend on multiple factors including, primarily, the efficiency of the technologies used for cooking, the fuel type(s), and the cooking practices. Benchmarks can be identified by combining data from academic studies with conservative assumptions that apply to the locations that fulfil the applicability conditions of this mechanism methodology, i.e., rural, low economic development, where the solid biomass fuels fuelwood and charcoal dominate household cooking energy.

9. The ambitious benchmark is identified as the average emissions or removals level of the best performing comparable activities that provide similar outputs in the circumstances applicable under this mechanism methodology.

10. The ambitious benchmark is identified in the following way. Interpreting Gill-Wiehl et al. 2026, 1.5 per cent per year of households in contexts like those complying with the applicability conditions of this mechanism methodology and passing the regulatory analysis test may be expected to adopt an ICS. If a three-year period is assumed for tracking performance, over that period, 4.5 per cent of cookstoves may have the average performance level of an ICS (32.72% for fuelwood ICS, 28.49% for charcoal ICS), while 95.5 per cent would have average performance level for unimproved cookstoves (11.8% for fuelwood, 22.1% for charcoal). The top 20 per cent of the performance is selected[6], recognizing the wide variability in cookstove performance in the field, and this would give a weighting of 77.5 per cent with the performance of an unimproved cookstove and 22.5 per cent with the performance of an ICS.

11. The performance of these two groups is taken as represented by the results of the studies by Urban et al. 2025 for unimproved cookstoves and Jetter et al. 2012 for improved cookstoves. The Jetter et al. 2012 methods are based on lab tests, meaning they likely overestimate the efficiency of the ICS compared to field conditions, which is conservative for the purposes of baseline setting.

12. Applying the weighting set above, this gives a benchmark efficiency of 16.6 per cent for fuelwood fired stoves and 23.6 per cent for charcoal fired stoves. These efficiencies are applied as the threshold for the performance-based approach for additionality.

13. By combining the benchmark efficiencies with the useful energy delivered and the average net calorific value of fuelwood and charcoal, this results in an ambitious benchmark value of 0.42 tonnes of fuelwood per person per year (0.0066 TJ per person per year) for households using wood as the primary fuel, and 0.16 tonnes of charcoal per person per year (0.0046 TJ per person per year) for households using charcoal as the primary fuel.]

14. [*Option 2:* An activity-specific procedure is provided for determining the energy efficiency value to input to the ambitious benchmark to determine the indicator in fuel *i* per person per year in units of TJ/(person*year).]

15. For the baseline emissions determination, the efficiency benchmark is combined with the useful energy required for satisfying basic human needs related to meal preparation. An assumption is applied of 3 MJ per person per day of delivered energy for cooking. This value is supported by the review presented in Gill-Wiehl, et al. 2024 that cites a reasonable range of 2–4 MJ delivered per person per day and is consistent with the threshold value for useful energy delivered for cooking and heating up to 2.1 GJ per person per year (equivalent to 5.75 MJ per person per day) included in the “Standard: Addressing Suppressed Demand in mechanism methodologies”.

16. The validity of the ambitious benchmarks shall be the same as the validity of this mechanism methodology (31 December 2030), given the slow pace of change in the areas where lack of access to clean cooking is dominant (IEA et al. 2025) and the stability of useful energy required for satisfying basic human needs related to meal preparation.

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[6] The top 20% (the top quintile) is a common method for defining high performance or efficient households in energy benchmarking. It isolates true out-performers, not just slightly above-average households and avoids including the middle of the distribution, which may be influenced by normal variability. This aligns with how other benchmarking bodies define performance tiers e.g., ENERGY STAR frequently uses percentile-based groupings to segment building or household energy performance into statistically meaningful slices.

4. Calculation of baseline and project emissions

17. The concept of Ψ, the per cent of activity households with the project cookstove present that qualify as **user households**, is applied to calculate baseline and project emissions. The methodology includes a tentative requirement for what constitutes a user: A user is defined as an activity household with a functioning project cookstove that is in use once or more per week during a given monitoring period, confirmed through [both self-reporting (annual usage surveys) and visual inspection and through] SUMs measurement [(optional)]. This determination indicates whether the household can be included in the emission reductions calculations and is not used to calculate fuel consumption for that household. This is combined with the sum of the number of days for which project cookstoves are available (at each activity household, within the project boundary, and functioning) of a given monitoring period.

18. While the tentative minimum threshold of cookstoves required to be in use once per week is not highly frequent, it may be considered sufficient to indicate regular ongoing use and provide a consistent definition for all Article 6.4 activities under this methodology. This threshold provides a practical criterion for determining whether a household is included in ER calculations. Importantly, this "user" designation does not affect how much fuel consumption is attributed to the household. To calculate ERs, activities also need to measure the actual activity fuel consumption of included households via KPTs. KPTs directly measure household fuel consumption under real-world usage conditions. Because KPTs reflect actual cookstove use, including the effects of partial adoption and stacking with other technologies, any underutilization of project cookstoves is already accounted for in the fuel consumption estimates.

19. To adjust for any potential **Hawthorne effect** (i.e. a household may increase their use of the project cookstove when the KPT is being performed due to social desirability bias), the methodology requires that activity [either cap their ERs at 75% of what the activity KPT-based estimate would be, or] measure any effects directly with stove use monitors (SUMs), comparing stove use during the KPT to the month before or after. If a potential Hawthorne Effect is measured using SUMs (meaning SUMs don't show sustained project cookstove use), ERs will be adjusted proportionally downward. Activity participants cannot increase ERs based on SUMs data used to measure the Hawthorne Effect. [The 75% cap on ERs when the Hawthorne effect is not directly measured is conservative based on a review of published and grey literature. This review included recently released findings from a 2012-13 study by Berkeley Air Monitoring Group, that did not find evidence of a strong Hawthorne Effect (BAMG 2025), as well as others that did find evidence of the Hawthorne Effect (Gill-Wiehl et al. 2024).]

5. Emission factors

20. 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. 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.

21. Default emission factors also are set for upstream CO_2, CH_4 and N_2O emissions from the production of charcoal in earth-mound kilns. Charcoal earth mound kiln emissions are analysed and emission factors derived in CLEAR (4C 2025b), appendix 5, which incorporate 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 focused on earth-mound kilns is 3.7 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 together have mean and median values around 17% (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 4:1 is considered conservative, and the resulting emission factors for CO_2 and CH_4 applying this conversion factor as well. 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.

6. Determination of a conservative BAU scenario

22. The business as usual (BAU) scenario is standardized at the methodological level considering that locations that fulfil the applicability conditions of this mechanism methodology are generally consistent with the characteristics of areas where lack of access to clean cooking is dominant and a slow pace of change in access has persisted for decades (IEA et al. 2025). This IEA report confirms 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 that many in Sub-Saharan Africa have growing population lacking access; in other words, in these contexts, there is a trend toward equal or more people using equally inefficient cooking methods,

rather than a trend toward improved cooking methods consistent with clean cooking. Therefore, the BAU scenario is selected as the continuation of the historical situation (pre-activity scenario).

23. Since the activity is not a greenfield activity, this mechanism methodology considers the historical intensity of use of cooking fuels prior to the implementation of the activity, without any trends toward improving performance, since these are not evidenced for the areas targeted by this mechanism methodology. In the same line of reasoning, the methodology assumes that if a baseline cookstove reaches the end of its lifetime during the crediting period, the household, in the absence of the activity, would replace it with a cookstove of the same type and performance, since without targeted support, households are unlikely to transition to improved or cleaner cookstoves due to persistent affordability and access barriers, in the absence of legal requirements or government subsidies, which are addressed in the additionality demonstration and would result in the ineligibility of an activity under this methodology.

24. The mechanism methodology includes a step to identify and incorporate any policies, legal requirements, or targets relevant to quantifying the BAU in the steps for quantifying the BAU emissions.

25. The basis for identifying the conservative BAU baseline is paragraph 77(b) of version 01.0 of the baseline standard which allows using another approach than the approach set out in paragraph 77(a) provided that it ensures that the selected crediting baseline is below BAU, considering the minimum discount described in the method contained in paragraph 77(a) of version 01.0 of the baseline standard.

26. The purpose of determining a conservative BAU baseline in the baseline standard is ensuring that the crediting baseline is below BAU, considering the minimum discount. In the context of this mechanism methodology several parameters used in the calculation of baseline emissions and BAU emissions are identical, including net calorific value (NCV) of fuels, emission factors of fuels, and fNRB values of fuels (under current assumptions). Therefore, in the specific context of this mechanism methodology, the uncertainty associated with these parameters does not need to be considered when determining the conservative BAU baseline and comparing it to the crediting baseline. In this mechanism methodology, the crediting baseline is below the BAU baseline if the energy consumption in the baseline scenario is below the energy consumption in the BAU baseline. Therefore, this alternative approach focuses on comparing the energy consumption.

27. The energy consumption depends on the thermal efficiency of the cookstove. For the BAU scenario, data from academic research on the thermal efficiency of baseline cooking is used (Urban et al. 2025). This research found the mean thermal efficiency for wood-based cooking is 11.8 per cent with a standard deviation of 5.3; the upper bound of the uncertainty interval relative to the central estimate is, therefore, 17.1 per cent. The authors further found the mean thermal efficiency for charcoal-based cooking is 22.1 per cent with a standard deviation of 9.8; the upper bound of the uncertainty interval relative to the central estimate is, therefore, 31.9 per cent. This is the same literature source that was used to determine the performance-based approach [and ambitious benchmark] in this Appendix 7.

7. Leakage

28. Potential sources of leakage are identified and assessed.

29. 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.

30. 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.

31. 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.

32. 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.

33. Leakage may occur associated with the project cookstoves, including their materials, manufacture, and transportation. An estimate of the potential emissions from these sources was developed based on assumptions about cookstove materials, mass, and locations of manufacturing and use, using emission factors from the World Steel Association and the Global Logistics Emissions Council, to derive an estimate of related leakage emissions of 0.0068 t CO2eq/unit.

34. Potential sources of positive leakage are also identified. For example, 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, impacting 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.

8. Non-permanence

8.1. Demonstration of eligibility to propose alternative approaches

35. 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.

36. This methodology satisfies the requirements referenced in paragraph 35 because:

(a) Activity participants affect, but do not have control over, the greenhouse gas reservoirs listed in Table ;

(b) The physical, geographical sites where the project cookstoves operate (paragraph 17(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 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.

8.2. Selection and justification of alternative approaches

37. Paragraph 15 of the reversals standard allows mechanism methodologies that meet the conditions referenced in paragraph 35 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)[7] (hereinafter referred to as "information note on non-permanence and reversals").

[7] See https://unfccc.int/sites/default/files/resource/A6.4-INFO-METH-002.pdf.

(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).

38. This methodology adopts an alternative approach as follows:

(a) The methodology exempts activity participants from all of the provisions listed in paragraph 37. The practical effect of these alternative approaches is that activity participants will not monitor or report on the greenhouse gas reservoirs listed in Table , 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).

39. 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.

40. This methodology satisfies the requirements referenced in paragraph 39 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[8], which calculates the 100-year reversal risk rating for the greenhouse gas reservoirs listed in **Table** , 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 , 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** , activity participants have a direct economic interest only in actions that reduce forest emissions (rather than increase them).

[8] 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.

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Document information

Version	*Date*	*Description*
01.0	24 April 2026	MEP 013, Annex 2. A call for input on this document will be issued following the conclusion of the MEP 013 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 is developed based on CDM methodology AMS-II.G.

Decision Class: Regulatory
Document Type: Standard
Business Function: Methodology
Keywords: A6.4 mechanism, methodologies, biomass, energy efficiency, household appliances.