Agenda item 3.4.

Annex 4 to MEP 014 meeting report

Energy efficiency measures in household cooking

Article 6.4 Supervisory Body – SBM Briefing on the outcomes of MEP 014
Bonn, Germany, 7 July 2026

UNFCCC Secretariat
Mitigation Division

Procedural background

- **2026 MEP workplan:** includes the revision of CDM methodology “AMS-II.G.: Energy efficiency measures in thermal applications of non-renewable biomass”

- **MEP012 finalized the draft methodology and agreed to launch a call for public input**
  - 24 April to 15 May 2026
  - 20 submissions received (285 comments) + 1 confidential input;

- **MEP013** considered the public inputs, conducted further analysis and **recommended the draft methodology for approval by the Supervisory Body**

- In parallel, the MEP is advancing another clean cooking methodology with a different/broader scope (on the basis of CDM AMS-I.E and the PMM004 methodology submission)

Key Issues

- Stakeholder inputs
- Applicability
- Baseline setting
- Monitoring
- Uncertainty
- Non-permanence

Public input received

- **Call for public input** open on the draft methodology after MEP012
  - 24 April to 15 May 2026
  - 20 submissions received (285 comments) + 1 confidential input;

Key comments *(consideration detailed in the cover note)*

- Methodology is too conservative
  - Strong concerns on compounding uncertainty + deductions: (i) Ambitious benchmark; (ii) Conservative BAU comparison; (iii) $\Psi_{\_y}$ percent of households that qualify as users; (iv) Hawthorne adjustment; (v) 1%/yr downward adjustment; (vi) Buffer pool contribution; (vii) fNRB; (viii) OMGE and SOP deduction
  - Exempt from downward adjustment
  - Select a less conservative wood to charcoal conversion factor
  - Exempt from buffer pool contribution for non-permanence risk
  - More realistic fuel consumption per capita
- Improve definitions and applicability conditions (e.g. poverty demonstration, efficiency testing)
- Views on ambitious benchmark set at the methodology level vs. activity level
- Correct equations

APPLICABILITY

Applicability

To define the procedures, requirements, and guidelines for developing and monitoring Article 6.4 activities that involve the distribution and operation in **households** that qualify as **low-income or impoverished** in **rural areas** of **improved cookstoves** for **fuelwood or charcoal** where the fuels remain the same between the baseline and the activity scenarios.

Key issues and proposed solutions- Applicability -1/2

Key applicability conditions (1/2)

- Households only (not institutions)
- Rural areas only
- Location demonstrated to experience low income or poverty
- Main fuel: >75% of fuelwood or artisanal charcoal (and no fuel switching)
- Only energy efficiency
- Project cookstoves:
  - meet the needs of the target population
  - identifiable/traced

Academic literature points to strong additionality of improved cookstoves in the context of rural areas experiencing poverty

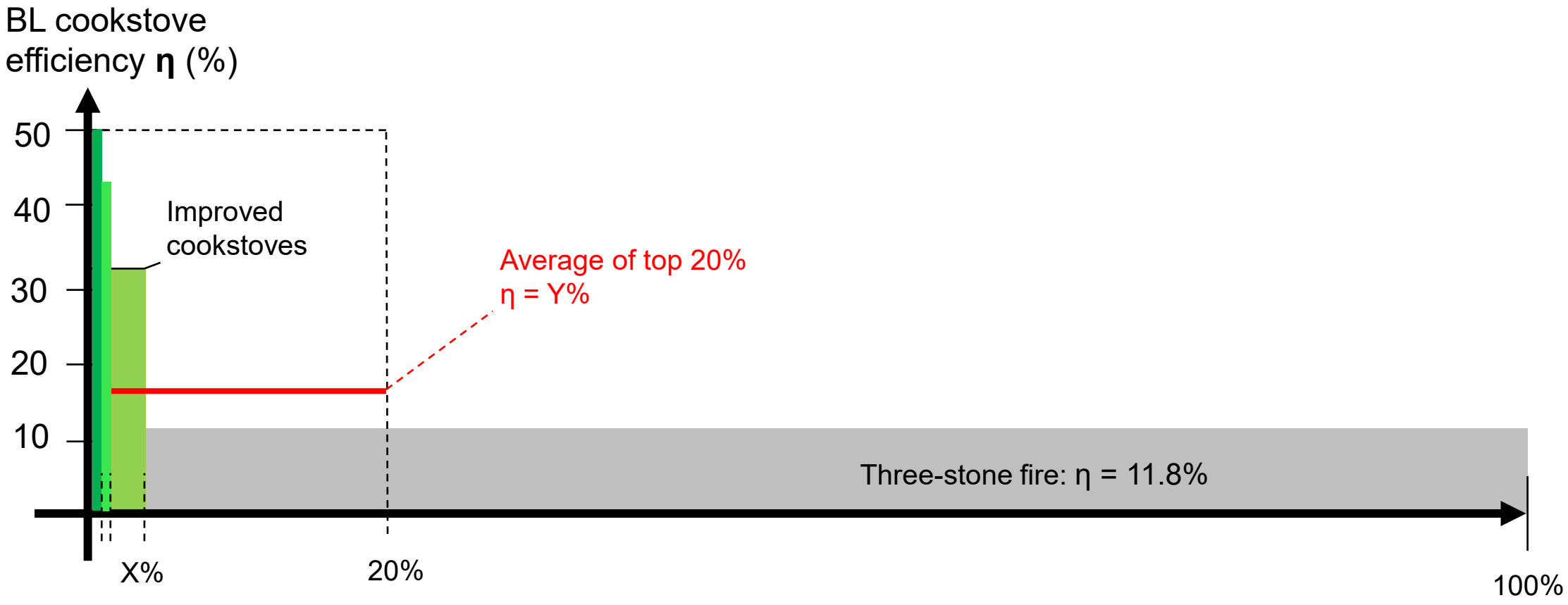
Key applicability conditions (2/2)

- Cookstove efficiency
  - Tested with ISO 19867-1:2018 (or subsequent) – or equivalent national standard if not available
  - Minimum efficiency: 20% (plancha/griddle); 25% (fuelwood); 30% (charcoal)
- Prior to the A6.4 activity: ≤ 4.5% of households with an efficient stove
  - Stoves from other carbon crediting mechanisms not taken into account

BASELINE SETTING

Key issues and proposed solutions- Baseline

Baseline setting: ambitious benchmark (approach as per RMP 36(ii))



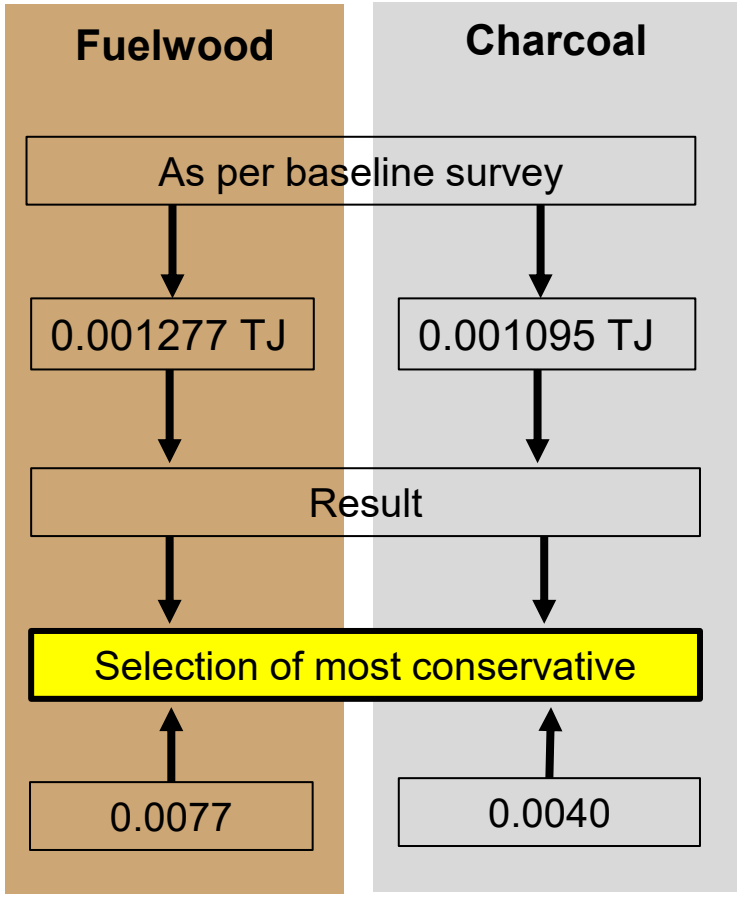
Baseline setting: (through the ambitious benchmark)

Average thermal efficiency (η) of the top 20% in the baseline:

Useful energy provided per person per year:

Energy consumption from fuel use for cooking per person and year (TJ /(person x year)):

Comparison with backstop values: (TJ / (person x year)



Key issues and proposed solutions- Baseline emissions

Generic equation: $BE_y = BE_{CO2,rr,i,y} + BE_{nonCO2,i,y} + BE_{CO2,j,y} + BE_{nonCO2,j,y}$

Reversal risk

No reversal risk:

Primary fuels *j* (CO_2+N_2O+CH_4)
- Charcoal
- Fuelwood

Secondary fuels *j* (CO_2+N_2O+CH_4)
- Dung and wastes
- Fossil fuels

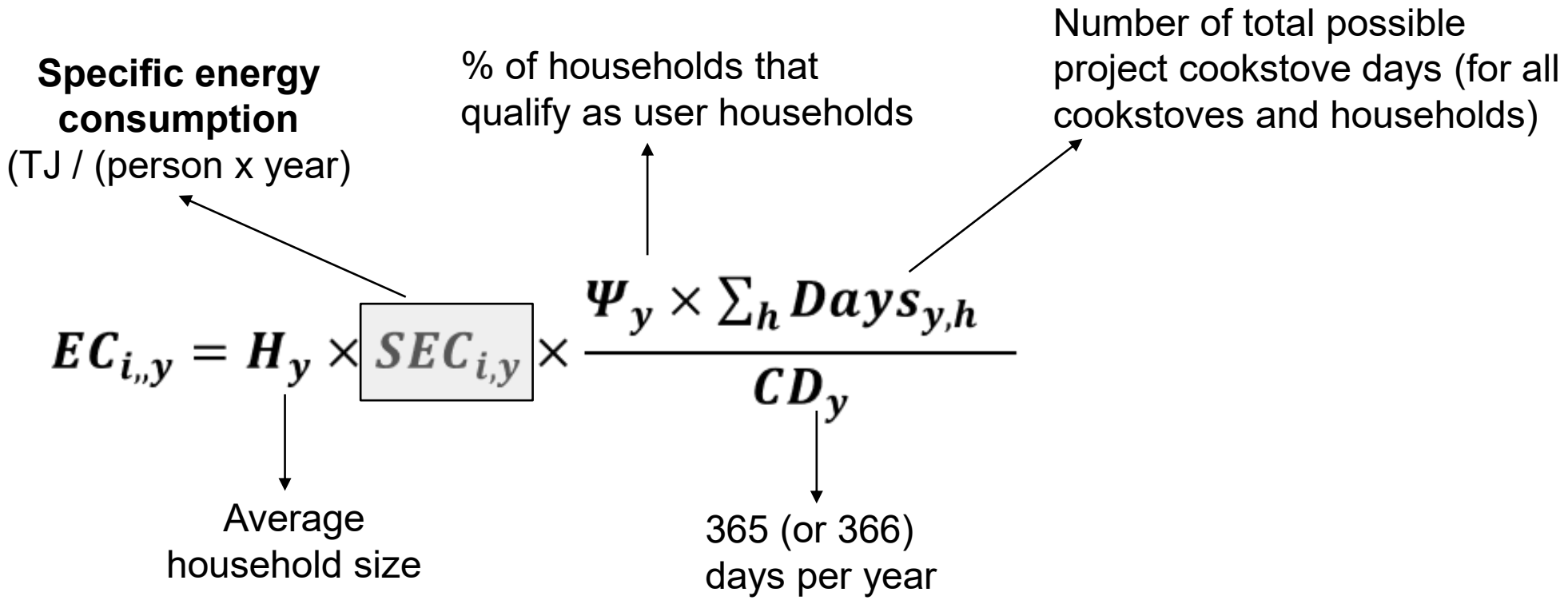
$$BE_{CO2,rr,i,y} = \sum_i \left(EC_{BL,i,y} \times fNRB_{i,y} \times \left(EF_{i,CO2} + EF_{i,CO2,upstream} \right) \right)$$

Baseline primary fuel *i* consumption
- With 1% downward adjustment/year, or
- without (exemption)

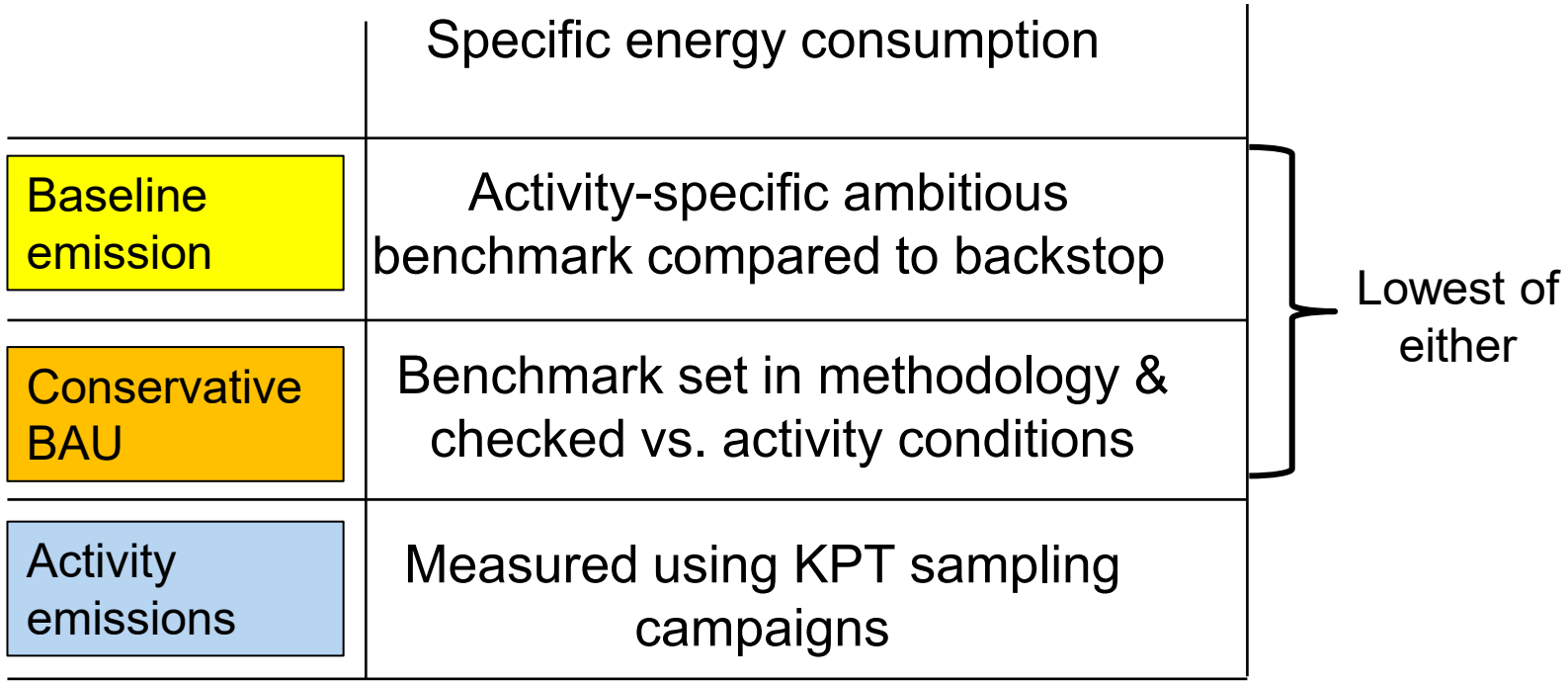
As per fNRB tool

Upstream emissions from artisanal charcoal production considering wood to charcoal ration of 5:1

Calculation of the energy consumption (generic formula)



Key issues and proposed solutions



Recommendation – Exempt from annual downward adjustment

The mechanism methodology provides significant benefits to communities with the lowest income.

Efficient cookstoves reduce fuel costs and the time spent for collecting firewood, benefiting low-income households that often devote a large share of their income and labour to cooking energy.

They also may reduce exposure to indoor air pollution, which disproportionately affects women, children, and vulnerable communities who spend significant time near traditional stoves.

These communities are often also particularly affected by the impacts of climate change and have contributed the least to global greenhouse gas emissions.

For these reasons, the MEP recommends that the Supervisory Body exempt this mechanism methodology from downward adjustment in subsequent years, in line with paragraphs 65 and 66 of the Baseline Standard, to facilitate the implementation of this project type.

MONITORING

Monitoring

Recommendation:

- Starting 01 January 2028, use of SUMs becomes mandatory for USAGE and HAWTHORNE EFFECT quantification;
- Before 2028: usage surveys allowed to determine % households that qualify as users, but cap at either 90% (with customer support actions) or otherwise 58% (without)

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			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)
SUMs Hawthorne effect measurements		X (during the first monitoring period of the crediting period)		
Ongoing monitoring tasks				
Maintenance of total sales and service records, and activity databases	Continuous	Maintenance of total sales and service records, and activity databases	Continuous	Maintenance of total sales and service records, and activity databases

Appendices

A1 Activity information cover sheet *(summarizes all key project characteristics)*

A2 A6.4ERs Waiver Certificate *(informed consent form signed by household which prevents double counting)*

A3 Activity-specific Survey Requirements *(Baseline survey, usage surveys, monitoring surveys)*

A4 Activity sampling provisions *(Guidelines on sampling, complements requirements in Sampling & Surveys Tool)*

A5 Kitchen Performance tests *(Guidelines and requirements on KPTs)*

A6 Stove use monitors (SUMs) *(Guidelines and requirements on use of SUMs)*

A7 Demonstration of Requirements at the methodology level *(explains the methodological assumptions)*

UNCERTAINTY

What do our standards say?

- Baseline Std. Appendix 1, para. 13.

  ”Mechanism methodologies shall apply a conservative approach to ensure that the emission reductions or net removals from an Article 6.4 activity using the methodology are **very unlikely to be overestimated**, taking into account the overall uncertainty in quantifying the emission reductions or net removals. …”

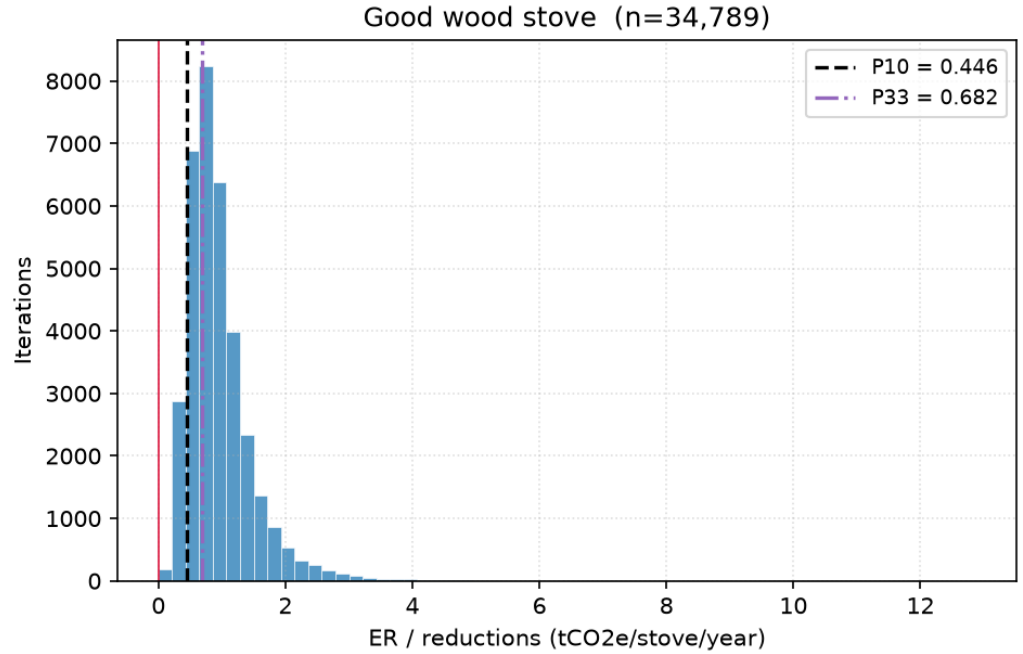
- In IPCC AR5 and AR6 calibrated-language usage (which the A6.4 ecosystem references throughout), "very unlikely" means below 10% probability. "Extremely unlikely" means below 5%. ”Exceptionally unlikely" means below 1%. “Unlikely” means below 33% probability. (e.g. AR5 WG1 Technical Summary (TS), Box TS.1).

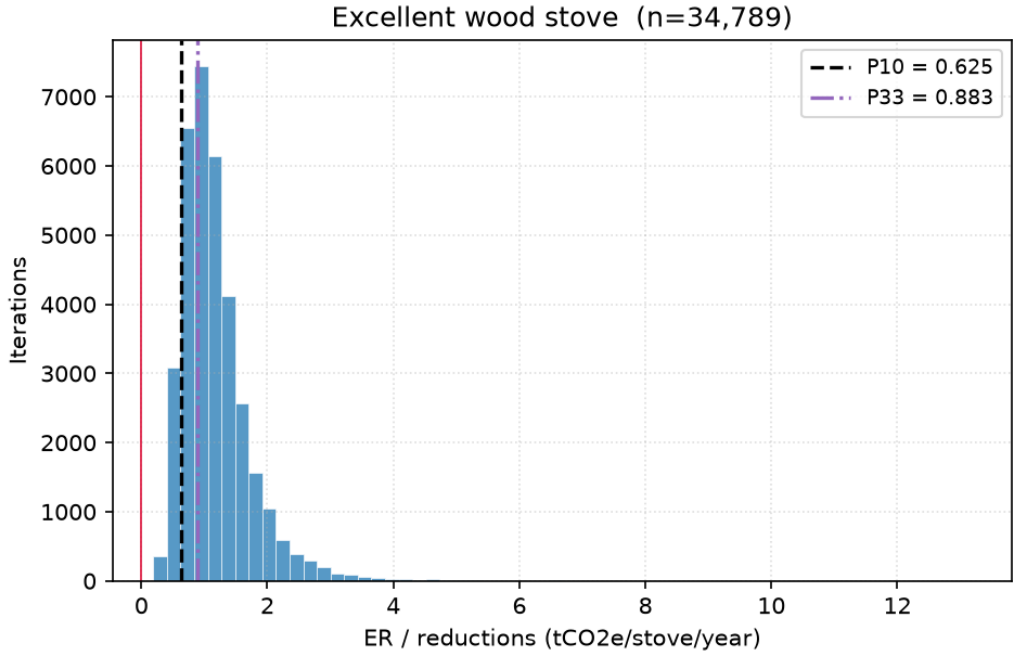
Monte Carlos Analysis for AMS-II.G

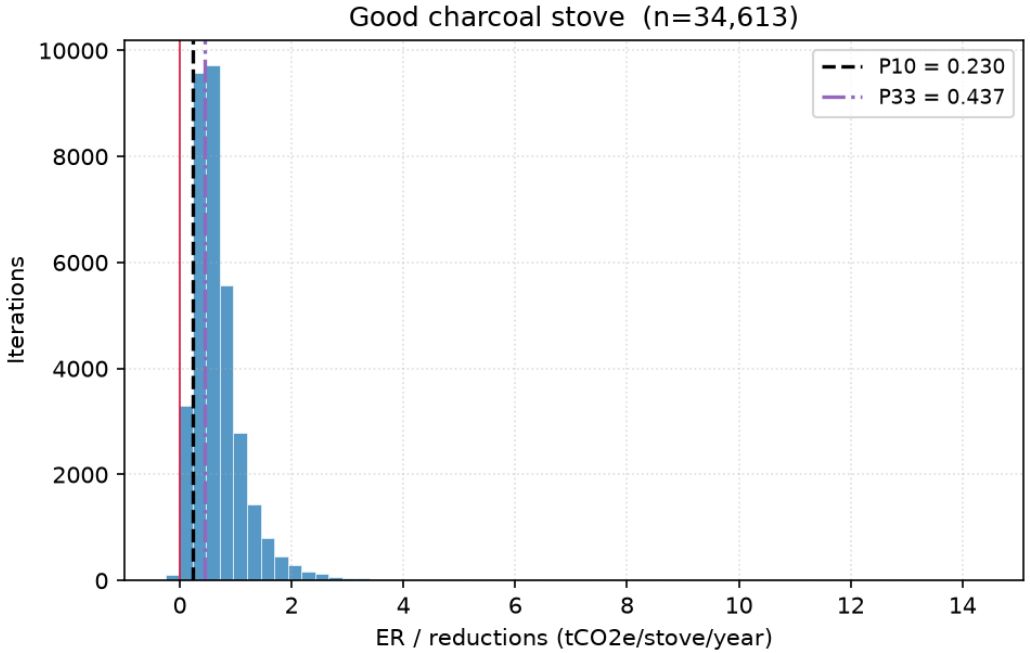
Parameter	Same draw in BE and PE?	Reason
E_{cook}	Yes	Same household useful cooking demand
H_s	Yes	Same household size
Usage	Yes	Same project-use adjustment applied to both equations
fNRB	Yes	Same country/project biomass context
Emission factors	Yes	Same physical emission factor must apply
η_{bench}	No (BE only)	Baseline stove efficiency only
$\eta_{project}$	No (PE only)	Project stove efficiency only — different physical stove
PCE_m and PCE_{KPT}	Different but related (screened)	Related measurements; impossibility screen rejects $PCE_m > PCE_{KPT}$

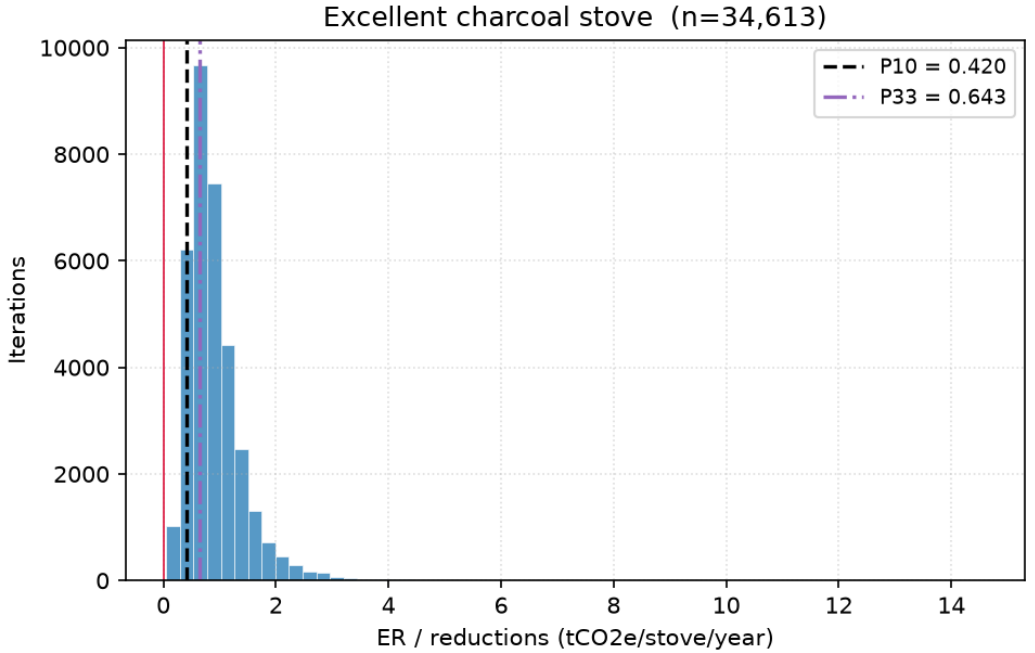
- P10 implements "very unlikely to be overestimated" exactly: there is a 90% probability the true *ER* is at least the credited value.
- Paragraph 13 is a one-sided test — it concerns overestimation, not underestimation. There is no symmetric concern about being too cautious. The natural one-sided lower bound at 90% confidence is P10.

ER (reductions) distribution per archetype - IPCC_Conservative_Distribution_DefaultLit









Monte Carlos Analysis outcome in tCO2e per household per year

	Good wood stove (25%)	Excellent wood stove (35%)	Good charcoal stove (35%)	Excellent charcoal stove (45%)
MEP014 recommendation	0.35	0.58	0.14	0.49
Final: Approach A at P10	**0.446**	**0.625**	**0.230**	**0.420**
Final: Mean ER (Monte Carlo)	0.950	1.173	0.678	0.909
P10 as % of central	46.9%	53.3%	33.9%	46.2%

- MEP concluded that the emissions reductions calculated by the methodology are "very unlikely to be overestimated": i.e. there is a 90% probability the true *ER* is at least the credited value.
- Simplification: Uncertainty analysis undertaken at methodology level and individual activities do not have to estimate uncertainty, i.e. undertake uncertainty propagation calculations or Monte Carlo analysis.

NON-PERMANENCE

Non-permanence

- Impact of cookstove activities is on the stock of “landscape trees” (reservoir at reversal risk)
- Application of the “Methodological tool: Reversal risk assessment”

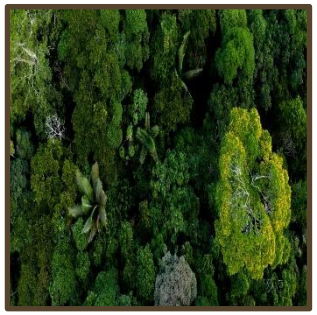
  → Contribution to the buffer pool
- However: Use of exemptions permitted by the “Reversal Standard”
  - No monitoring of the carbon reservoirs; No post-crediting period monitoring; No reversals-related notifications or actions

Year 10

Cooking – 100% renewable firewood

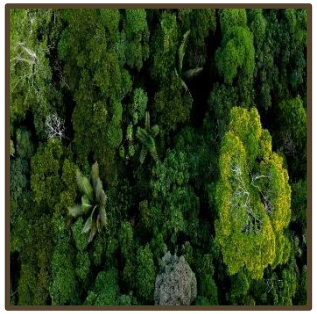
Pre-project

Project



No net avoided emissions since all firewood burned has been compensated by regrowth of biomass

Baseline



All harvesting replaced by regrowth

Non-permanence?

N/A

Carbon credits?

N/A

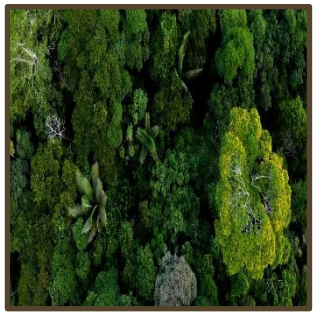
Year 10

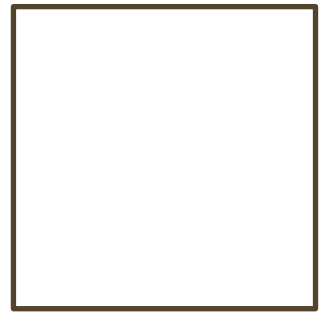
Year 11

Cooking – non-renewable biomass

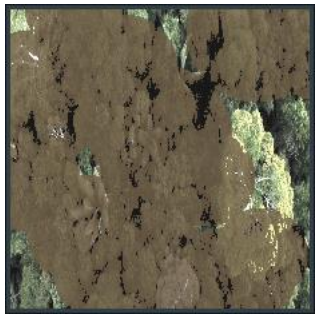
Pre-project

Project

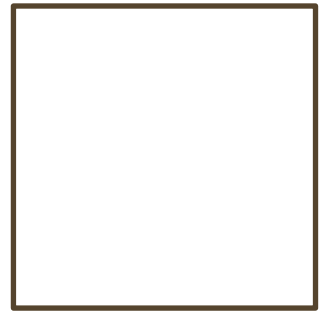




Baseline



25 tCO2 ↑



Non-permanence?

25 tCO2 of avoided emissions were credited, which were then emitted to the atmosphere for reasons unrelated to the carbon project & outside the control of the carbon project

Consideration of reversal risk

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

A6.4ERs to be forwarded to the reversal risk buffer pool account

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

Calculated emission reductions

fraction of the A6.4ERs contributed to the reversal risk buffer pool account for (%)

CLOSING

Recommendations to the Supervisory Body

- Provide an exemption from downward adjustment in subsequent years as per para. 65 and 66. of the “Baseline Standard”;

- To adopt this draft mechanism methodology contingent on the approval of the following methodological standards tools:
  - Methodological tool: Sampling and surveys;
  - Methodological tool: Reversal risk assessment;
  - Relevant revisions to approved standards and methodological tools required for PoAs.

APPENDIX: FURTHER DETAILS

Overview of the methodology

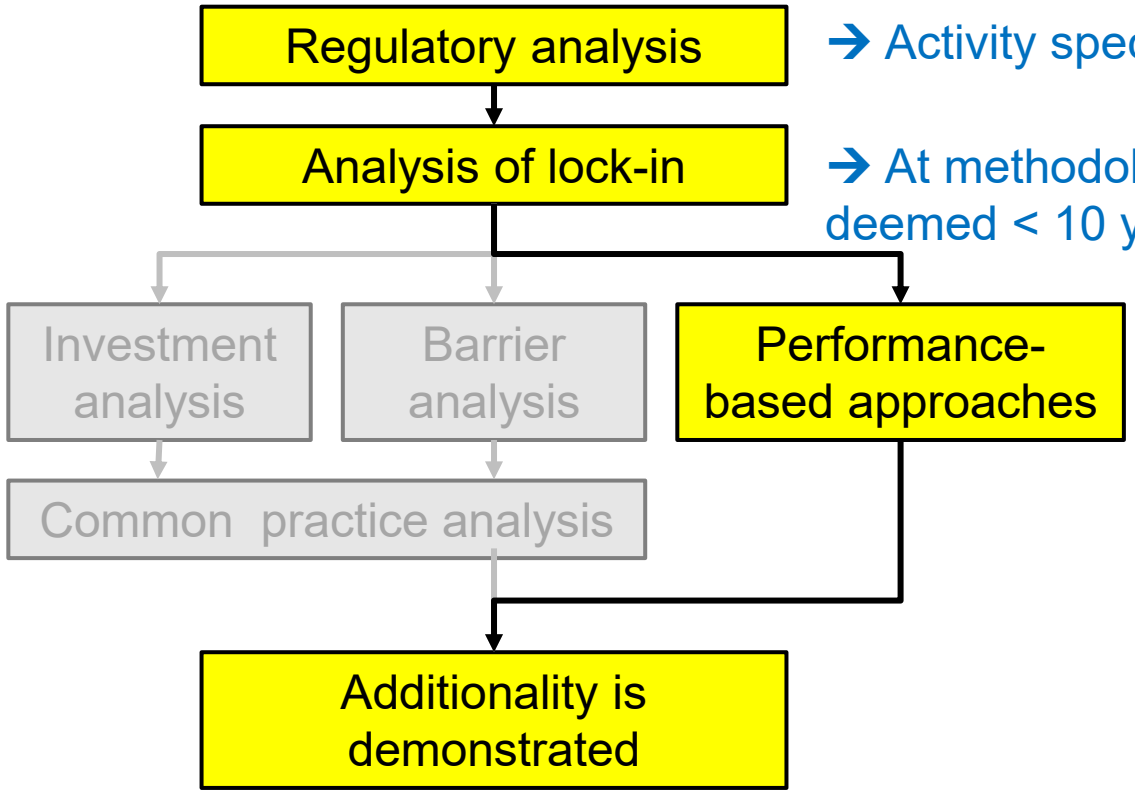
- Applicability
- Activity boundaries
- Additionality demonstration
- Baseline setting
- Baseline emissions
- Leakage
- Non-permanence
- Monitoring
- Recommendation

Activity boundaries

- Where the cookstoves operate + where the fuels are sourced / collected
- Above-ground woody biomass in landscape (source of main fuel(s)))

➔ This is a carbon reservoir

Additionality demonstration (flowchart as per the "Additionality Standard")



→ Activity specific

→ At methodology level (improved cookstoves deemed < 10 years technical lifetime)

→ At methodology level

Additionality demonstration

- Regulatory analysis:
  - No implementation as a result of law / regulatory requirement
  - Public sector finance does not enable improved cookstoves
    - ➢ Investment analysis required if such funding exists but is insufficient
- Common practice analysis: not required (use of “ambitious benchmark”)

- **Pre-activity scenario (survey):** serves as both
  - ➢ **additionality demonstration** *(performance-based approach)*: ≤ 4.5% improved cookstoves
  - ➢ **baseline setting** *(ambitious benchmark)*
  - ➔ cross-check recent/appropriate surveys or literature

Leakages

- Differentiation: Artisanal cookstoves vs. others

Correction for the "Hawthorne effect"

- Included in section 8

Non-permanence

- Impact of cookstove activities is on the stock of "landscape trees" (reservoir at reversal risk)
- Application of the "Methodological tool: Reversal risk assessment"

  → Contribution to the buffer pool
- However: Use of exemptions permitted by the "Reversal Standard"
  - No monitoring of the carbon reservoirs; No reversals-related notifications or actions

- **Total ER are calculated using the following equation (37)**

equivalent to the total number of A6.4ERs to be issued with respect to the Article 6.4 activity over the period *y*.

$$ERy = BEfinal,y - AEy - LEy$$

- Where: ERy = Emission reductions for the activity during year y (t CO_2eq)
- $BEfinal,y$ = Final baseline emissions during year y (t CO_2eq)
- AEy = Activity emissions during year *y* (t CO_2eq)
- LEy = Leakage emissions during year *y* (t CO_2eq)
- y = Calendar year of the crediting period (number

Risk of double counting

- E.g. with other activities to conserve/increase carbon stocks of landscape trees
- Addressed in section 12