PROJECT DEVELOPER FORUM

Annex 1

Application of PACM baselines rules – an Improved Cookstoves case study

By Project Developer Forum

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CONTEXT & OVERVIEW

The Project Developer Forum endorses PACM's (Paris Agreement Crediting Mechanism) high-integrity objectives. This analysis examines how PACM's baseline standard applies to an improved cookstove project, focusing on the impact of PACM's additional adjustments when applied to methodologies that already incorporate conservative parameters.

RISK

Generic reductions in credit volumes may discourage development of much-needed cookstove projects in LDCs and SIDS without delivering proportionate environmental integrity benefits.

KEY FINDING

Conservative parameters used in new cookstove methodologies are already ~67% below legacy CDM methods. Applying PACM's structural adjustments to these results in an additional ~27% reduction in credits.

RECOMMENDATION

Avoid over-correction of baselines and recognize methodologies that already embed conservative approaches. Prioritize accuracy, sectoral specificity, and proportionate flexibility to data-constrained geographies. Feasibility and broad participation/access has to be part of the equation if PACM is to deliver at scale.

Summary of our analysis

Standards and methodologies have calibrated for integrity

Newer cookstove methodologies (Gold Standard, Verra, Clean Cookstove Alliance–CLEAR) and tools apply market-accepted defaults calibrated for conservativeness and accuracy-focused parameters, better reflecting real conditions over legacy methods.

fNRB (fraction of Non-Renewable Biomass)
Estimation is becoming more sophisticated. CDM Tool 33 (v03) provides conservative defaults. Standards are moving to standardized tools (MoFuSS, Tool 33, PACM-compliant) while phasing out legacy Tool 30. The next step is greater data granularity and project-/context-specific modelling.

Baseline stove efficiency
More conservative default values for pre-project device efficiency.

Emission factors
New methods add charcoal-specific factors for use and production, better reflecting real baseline conditions, and improve wood-to-charcoal conversion ratios.

Result: In our test case, applying the most conservative parameters from current methodologies reduced crediting potential by ~67% compared to legacy CDM approaches, showing significant conservativeness already built into updated parameters.

PACM's additional requirements

PACM requires two baselines to be identified: the *baseline scenario* and the conservative BAU baseline, each subject to specific adjustments ("trims"). The downward-adjusted baseline must always be lower than the *conservative BAU baseline*.

Year 1 downward adjustment
Baseline scenario can be identified using three options:

(i) Best Available Technology (BAT)
(ii) Ambitious Benchmark (sector/national high-performance benchmarks)
(iii) Actual/Historic Emissions.

Methodology developers must justify why stricter options are not feasible. If option (iii) is used, values are adjusted using two methods: one accounting for data uncertainty, another by applying a 10% reduction to the gap between baseline and project emissions. The lower value is applied. Where project emissions are zero, at least 10% of emission reductions are deducted. BAT and benchmark options are exempt from this adjustment.

Conservative BAU, which is a forward-looking BAU baseline (policies, targets, technology trends), is also trimmed for uncertainty, and a minimum 10% reduction, whichever is lower, is applied.

Ongoing reductions: From Year 2, baselines decline ≥1% annually.

Additional deductions: 7% for OMGE and the Adaptation Fund.

Analysing three scenarios

We analysed three scenarios for the selected cookstove project:

1. **Legacy CDM (AMS-II.G):** Original outdated methodology
2. **Conservative market practice:** Accuracy-focused and market-accepted conservative defaults in current methodologies
3. **PACM scenario:** Conservative market practice + PACM adjustments comparison

Key finding

Moving from legacy > conservative market practice > PACM results in ~76% fewer carbon credits than legacy methods:

- **~67%** reduction from legacy to current market (due to parameter improvements)
- **~27%** additional reduction from conservative market practice to PACM (due to PACM adjustments)
- **~32%** total PACM impact including OMGE/Adaptation Fund deductions

Why this matters

PACM's adjustments are designed to correct overly generous baselines. However, when applied to baselines that are already restrictive, they risk:

- **Overcorrection:** Reducing credits beyond what integrity requires, potentially discouraging project development
- **Project viability threats:** Making financially marginal but climatically valuable projects, such as cookstoves, unviable
- **Limited integrity gains:** Minimal environmental benefit from additional conservatism

Carbon Credit volume comparison

Scenarios	Annual Credits (tCO2e)	Share of legacy (%)	Reduction compared to previous scenario (%)	Reduction compared to conservative market practice (%)
Legacy CDM (AMS-II.G) - obsolete	24,977	100%	N/A	N/A
Conservative market practice	8,164	33%	-67%	N/A
PACM + conservative market practice	6,000	24%	-27%	-27%
PACM required adjustments (OMGE / Adaptation Fund Deduction)	5,580	22%	-7%	-32%

Note: Conservative market practice scenario reflects parameter-level improvements already implemented in newer cookstove methodologies. PACM's structural adjustments compound these reductions.

PACM required adjustments (OMGE/ Adaptation Fund deductions) are shown here only to illustrate the total impact of PACM's requirements on emissions reductions. PD Forum is supportive of contributions to these funds.

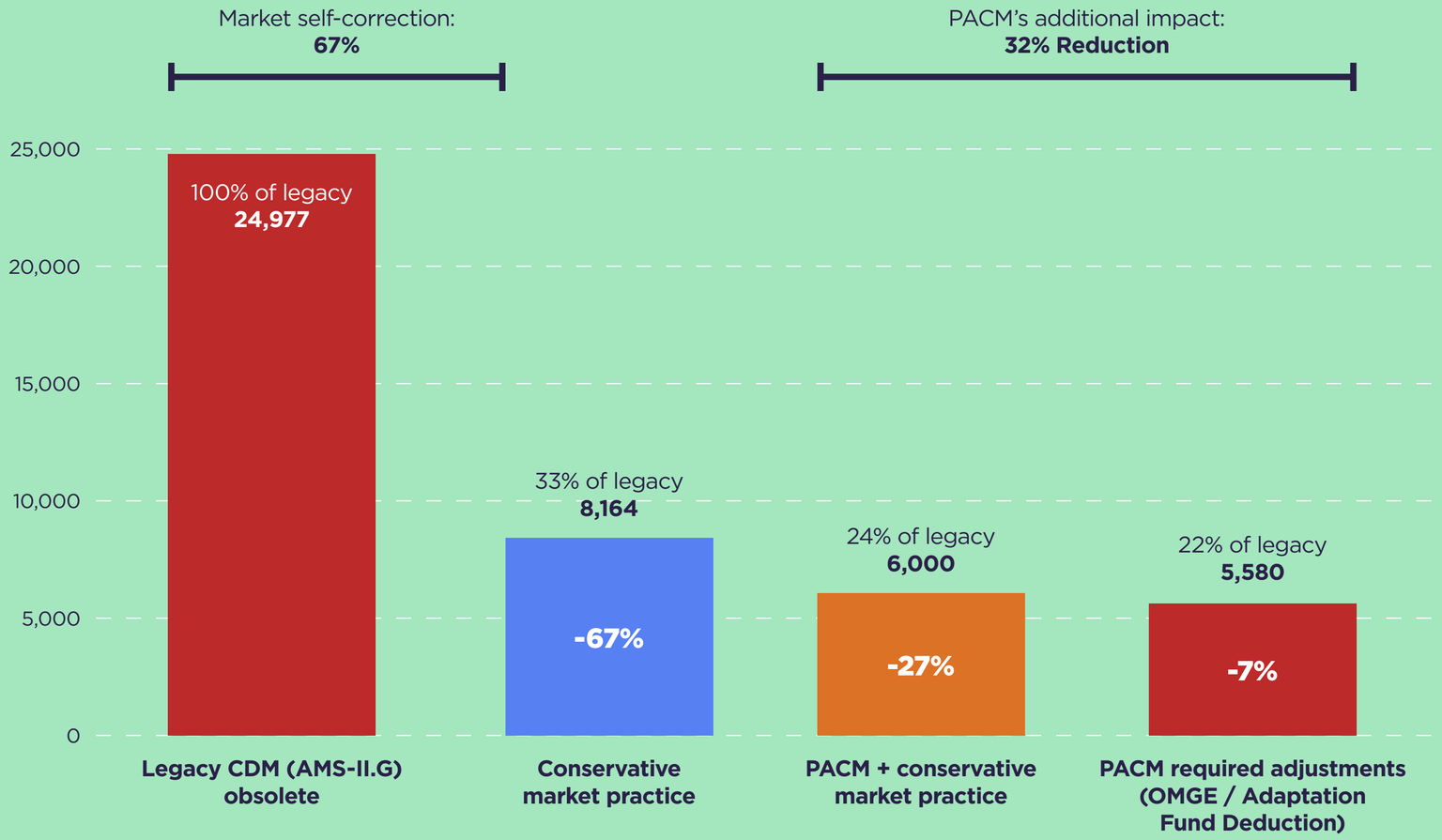
TOTAL IMPACT

76% fewer credits under PACM compared to legacy methodology.

KEY INSIGHT

Methodologies have already embedded ~67% conservativeness, yet PACM applies an additional 27% reduction through generic adjustments that don't enhance measurement accuracy.

PACM's impact on credits in a test-case Improved Cookstove Project



TOTAL PACM IMPACT

32% reduction from conservative market practice

Note: PACM required adjustments (OMGE/ Adaptation Fund deductions) are shown here only to illustrate the total impact of PACM's requirements on emissions reductions. PD Forum is supportive of contributions to these funds.

Recommendations for Article 6.4 Supervisory Body

1 OVER-CORRECTION RISK ANALYSIS

Assess the cumulative impact of all adjustments towards a conservative baseline setting, to consider the risk of over-correction, particularly for methodologies that have already incorporated conservative parameter updates.

2 ACCURACY OVER CONSERVATIVENESS

Allow well-justified deviations from the baseline standard's stepwise baseline determination and default adjustments - to ensure credits reflect actual project performance.

3 SECTOR AND REGIONAL SPECIFICITY

Recognize and facilitate the development of robust sectoral or national values or defaults, where such data is available, rather than applying universal conservative adjustments.

4 PROPORTIONATE FLEXIBILITY

Incorporate proportionate flexibility for small-scale activities or data-constrained contexts, including Least Developed Countries (LDCs) and Small Island Developing States (SIDS), while maintaining environmental integrity.

CALL TO ACTION

Establish methodology-specific assessment protocols that distinguish between legacy approaches requiring correction and conservative market practice methodologies that have already self-corrected.

Ensure ongoing feedback channels and dialogue platforms for meaningful private sector technical and operational input throughout the standard's development and implementation.

Technical note

In the absence of an approved methodology under the Paris Agreement Crediting Mechanism (PACM) for the project type selected, the analysis focused on applying the stepwise approach set out in the recently approved PACM Standard for Setting the Baseline in Mechanism Methodologies (***v01.0***). This Baseline Standard provides the blueprint PACM methodologies should follow for baseline setting, which is central to the estimation of carbon credits.

To arrive at the baseline emissions, the stepwise approach outlined in the PACM Baseline Standard was used as a reference point. The approach taken is elaborated below:

Step 1 – Baseline Scenario Selection: The "actual or historical emissions" approach was chosen for baseline setting (*Baseline Standard*, ***Paragraph 19, Para 56-58***). BAT and benchmark approaches were not applied, given affordability and access barriers for BAT in rural settings and the heterogeneity of sector data. Baseline technology is traditional charcoal stoves and baseline scenario is the continued use of non-renewable fuel in inefficient traditional cookstoves (coal pots) by households.

Step 2 – Application of Selected Baseline Approach (before downward adjustment): A literature review of recent cookstove methodologies was undertaken to identify parameters that are conservative, market-calibrated, and accuracy-based. These represent values already embedded across current methodologies. Project-specific parameters were taken from a reference project that is registered and verified under one of the carbon standards. Main parameter choices applied in the analysis are provided below:

1-Baseline stove efficiency: 20% (legacy, ***AMS-II.G v12.0***) → 25% (current & PACM, ***Tool 33 v03***; ***CLEAR***).; 2-Project stove efficiency: 31% (*Reference project*); 3-Continued use of old devices: 87% adjustment factor (refrence *project*); 4-fNRB: 75% (legacy, refrence project calculation based on ***Tool 30 v04***) → 35% (current & PACM, ***Tool 33 v03***); 5-WtC conversion factor: 6 kg wood/kg charcoal (***AMS-II.G v12.0***, legacy only); 6-Charcoal NCV: 0.0295 TJ/tonne (*Gold Standard-**TPDTEC v4.0***; Verra-***VM0050***); 7-Charcoal EF CO_2: 165.22 tCO_2e/TJ (*Gold Standard-**TPDTEC v4.0***; Verra-***VM0050***)); 8-Charcoal EF non-CO_2: 44.83 tCO_2e/TJ (*Gold Standard-**TPDTEC v4.0***; Verra-***VM0050***)); 9-Projected fossil fuel EF: 73.2 tCO_2e/TJ (legacy only, ***AMS-II.G v12.0***); 10-Wood NCV: 0.0156 TJ/tonne (legacy only, ***AMS-II.G v12.0***); 11-Annual woody biomass use (without project): 180 kg/person/year (*reference project based on FAO 2017 Report*); 12-Average household size: 5 (reference *project*); 13-Number of stoves: 20,000 improved charcoal stoves (*Assumption*).

Step 3 – Application of Downward Adjustment: In the absence of PACM guidance on determining uncertainty, a 25% downward adjustment was applied as a proxy. This follows a 75% ER threshold if KPTs are conducted without SUMs, to account for Hawthorne effects, and as is defined in the CLEAR methodology (***version 1, submitted for approval under PACM***). In our interpretation, this 25% operates as a correction factor for such uncertainty. In line with PACM rules (***Paragraphs 64, 68, 71***), a 1% annual baseline reduction was also applied from Year 2 onward. However, if the lower bound of uncertainty determined in Step 3 is greater than 25%, that lower bound should be applied in line with the PACM Baseline Standard. (***Paragraphs 64, (a)***)

Step 4 – Identification of Conservative Business-as-Usual Baseline: A "conservative BAU" baseline could not be robustly defined due to a lack of clarity on integrating technology and policy developments, as outlined in ***paragraphs 75, 76***. We note that the CLEAR methodology's submission to PACM treated Step 2 and Step 4 as equivalent.

Step 5 – Comparison and Selection of Crediting Baseline: As Step 4 could not be applied, the downward-adjusted baseline was selected as the crediting baseline.

On this basis, the **Conservative Market Practice Scenario** corresponds to Step 2 of the PACM steps. The **PACM Scenario** then applies Steps 3–5 on top of this, introducing structural adjustments without changing parameter values. For comparison, an additional **Legacy Scenario** was calculated using CDM methodology AMS-II.G ("Energy efficiency measures in thermal applications of non-renewable biomass," Version 12.0). AMS-II.G is obsolete and ineligible under most standards, but was included to illustrate the relative scale of reductions. Emission reductions were calculated for 20,000 improved charcoal stoves, with 31% stove efficiency, within the small-scale project threshold of AMS-II.G. As AMS-II.G credits are based on fuel savings, project emissions do not require separate calculation. Leakage was addressed by applying an adjustment factor of 0.95. We note that actual reductions may vary depending on how Step 4 (conservative BAU) is ultimately defined and how downward adjustment/uncertainty is treated in future PACM guidance.

In our results, this shows that the additional ~27% reduction in credits arises entirely from PACM's structural adjustments to ensure conservativeness. The cumulative effect is a 76% reduction versus legacy, highlighting that while methodologies and standards are already taking steps to self-correct through parameter level adjustments, PACM rules risk layering conservativeness twice—creating over-correction without commensurate integrity gains.

In the process of applying the PACM baseline standard, several challenges were encountered in interpreting and applying PACM baseline requirements, particularly around defining Step 4 when parameters in Step 2 already integrate conservative principles, and in determining uncertainty for Step 3. These challenges are outlined in the following pages.

Disclaimer: This analysis is based on a single improved cookstove test case and does not claim sector-wide applicability. The parameter values used are not prescriptive defaults and should not be interpreted as universally applicable. Actual project parameters may vary depending on context, data availability, and methodology requirements. Proxy assumptions (e.g., for downward adjustment) were applied in the absence of PACM guidance and illustrate application challenges. Results should therefore be read as indicative of potential impacts rather than definitive outcomes. The purpose is to highlight interpretive and feasibility issues in applying the PACM Baseline Standard.