THE INTEGRITY COUNCIL
FOR THE VOLUNTARY CARBON MARKET

OBSERVATIONS IN RELATION TO CATEGORY ASSESSMENT
EFFICIENT COOKSTOVES AND HOUSEHOLD BIODIGESTERS
FEBRUARY 2025

1. Purpose of these observations

The Governing Board (the Board) of the Integrity Council for the Voluntary Carbon Market (ICVCM), when considering the assessment of methodologies related to efficient cookstoves and household biodigesters, identified that it would be beneficial to make available the Integrity Council's observations for the purpose of supporting the future development of methodologies in these Categories.

These observations are non-binding and do not impact or form any part of the Assessment Framework, Assessment Procedure, or any Decision (as defined under the Assessment Framework) and are published by the Integrity Council for the purpose of information only.

The Integrity Council may, from time to time, publish other observations for other Categories where it considers this may be useful for CCP-Eligible Programs and other stakeholders and may update and revise its observations from time to time based on further assessment processes or information. Observations are not an exhaustive set of views of the Integrity Council, and not all aspects addressed in assessment processes are included. No reliance may be placed on observations, as they are for the purpose of information only, and observations published are without prejudice to other ongoing assessments.

The Governing Board would like to express its gratitude to the experts and other stakeholders engaged in the assessment process, who provided input to the ICVCM regarding these Categories.

Category Details

Efficient cookstoves and household biodigester methodologies are designed to measure the amount of fuel saved in mitigation activities[1] (i.e. projects) that target households, commercial premises or institutions using dirty and polluting fuels such as charcoal, wood and kerosene. The focus of projects is usually on the fuel used for cooking purposes, although earlier methodologies may address fuel used for other purposes, for example fuel used to boil water Projects can take various forms; the project can simply introduce a new device, or it can introduce a new device along with a new fuel (for example a household biodigester using biogas replacing a wood burning stove). Given the variety of possible project types, it is common for methodologies to offer several different ways of measuring fuel savings as options within them. The predominant fuels targeted by cookstoves and household biodigester projects are wood and charcoal – this fuel typically

[1]See ICVCM Definitions: Mitigation activities - an umbrella term for activities that may be implemented at different scales, including projects, programmatic approaches, policies, jurisdictional REDD+ programs etc. The term *project* is generally used in this document for clarity, as this is the most common cookstoves and household biodigester mitigation activity.

comes from mixture of renewable and non-renewable sources, accounting for which is an important component of all methodologies (see 2.1).

2. Robust Quantification

A crucial consideration in strengthening the integrity of the voluntary carbon market is ensuring that GHG emission reductions or removals are robustly quantified, which means based on conservative and complete approaches and using sound scientific methods. The Governing Board considered the following issues when taking the Decisions for the methodologies in these two Categories.

2.1. Fraction of non-renewable biomass (fNRB)

In general terms, biomass used in cookstoves and household biodigesters is typically a mix of renewable and non-renewable biomass (renewable biomass is from a source from which will naturally regrow, whereas non-renewable biomass will not be naturally regrown)

The fraction of non-renewable biomass (fNRB) represents the portion of the woody[2] biomass fuel used in cookstove and household biodigester projects that is non-renewable. Only the non-renewable portion of biomass can be considered in calculations of emissions reductions as biomass fuel that simply regrows, or renews, implies no net saving of carbon dioxide emissions.

The values calculated for fNRB are known to be highly variable and have long been subject to scrutiny. Reflecting this, definitions and calculation approaches of fNRB have undergone revisions over time and projects have had to adapt to evolving expectations. The assessment process carefully considered the different viewpoints on fNRB and identified the need for alignment towards a consistent, sector-wide approach that can support high integrity going forward. The Governing Board concluded that values obtained from the "Modeling fuelwood savings scenarios" (MoFuSS) tool from 20 June 2024 onwards and the Clean Development Mechanism (CDM) default value for fNRB meet the Assessment Framework.

The assessment process noted that the cross sector, independently run MoFuSS model aims to guarantee high integrity, but it remains in development as it is still undergoing minor refinements and improvements. The MoFuSS model is currently the most accurate way of estimating fNRB, even though it has yet to be formally adopted by carbon crediting programs. Carbon crediting programs will need to adopt or approve and implement guidelines on how to use the MoFuSS model to generate consistent and comparable outputs. For example, the carbon crediting program will need to specify how to choose a national, regional or project-specific area in the Model interface.

The CDM, established under the Kyoto Protocol, set a default value of 30% which has been available for use since 2017. The ICVCM assessment process considered it to still be a conservative default value.

[2] Woody biomass is distinct from other sources of biomass (e.g. crops, leaves, dung) as it is not renewed rapidly by normal growth cycles

The Governing Board notes that the CDM Executive Board (EB) is in the process of reviewing the CDM methodological approach to fNRB, and this may inform the work under the Paris Agreement Crediting Mechanism (Article 6.4) Supervisory Body. The ICVCM will closely monitor these developments.

2.2. Wood to charcoal conversion factor

Charcoal is made by heating wood in the absence of oxygen, a process that is called pyrolysis. Charcoal is energy dense and therefore very useful as a fuel but requires a large amount of wood to make. Charcoal is produced in developing countries using different techniques that range from heating wood in a trench covered with soil through to brick or metal kilns; each of which has a different theoretical conversion efficiency. The theoretical conversion efficiency is also impacted by other factors such as size, species and moisture content of wood. Even the way in which the kiln operative works may be a significant variable in wood to charcoal conversion efficiency.

It is an established methodological practice to account for charcoal in terms of the wood emissions needed to create it by multiplying it by a wood-to-charcoal conversion factor, which differs across methodologies. The assessment process noted that a conversion factor of 1:4 is conservative and that values up to 1:6 may not always lead to an overestimation, which is confirmed by emerging research[3]. However, in the absence of a standardised protocol to control all relevant variables, the Governing Board concluded that either a wood-to-charcoal conversion factor of 1:4 or a direct charcoal emission factor meet the Assessment Framework. The Governing Board will be attentive to any new research or evidence that may become available that can guarantee a conservative outcome for values above 1:4.

2.3. Baseline fuel consumption measurement

The baseline fuel consumption of household energy devices in cookstove and biodigester projects is a vital metric in accurate calculation of emission reductions. it is well established that the amount of fuel consumption differs according to fuel availability, climate and cultural practices, among other variables.

The assessment process considered the different ways in which fuel consumption is determined in methodologies and concluded that approaches that can be cross-checked against credible, relevant and independent data manage potential risks of overestimation and thus meet the relevant criteria and requirements of the Assessment Framework. A Kitchen Performance Test (KPT) sampling campaign that is conducted correctly was highlighted as the most accurate way of estimating household fuel consumption. Notably, for efficient cookstoves, a KPT can accurately capture any potential leakage due to a displacement of the heating effect of adopting a more efficient cookstove, as well as the rebound effect (a tendency for increased use of a more efficient device to not lead to an overall decrease in energy use)

It was noted that default baseline consumption values, including efficiency, offered as approaches in methodologies do vary but are generally conservative. However, there appears to be little evidence of projects applying such default fuel consumption values. The assessment

[3] https://aprovecho.org/wp-content/uploads/2025/01/Charcoal-Conversion-Efficiency-Protocol.pdf

process concluded that approaches within methodologies that rely solely on simplistic water boiling tests, or local literature and surveys to estimate fuel consumption without cross checks did not meet the relevant criteria and requirements of the Assessment Framework.

More recent versions of existing methodologies versions appear to be better at ensuring claimed baseline fuel consumption values are consistent with other relevant independent information, such as official publications, or official statistics from government entities or other credible agencies or are within stated threshold amounts. The ICVCM considers that such controls on potential overestimation in methodologies are necessary for meeting the Assessment Framework.

The Governing Board notes that baseline fuel consumption claimed by projects varies according to country or region and recommends that the ICVCM Continuous Improvement Work Program (CIWP) on validation and verification bodies consider potential market wide approaches to increase effectiveness of VVB in this context.

2.4. Ongoing usage

Estimating the extent to which project devices are being used and are replacing traditional cooking are important concepts in cookstove and biodigester projects and may be subject to unintended bias. It is a known risk that households who take part in surveys or studies may change their behaviour, or volunteer information that may not be consistent with their normal practices. The assessment process carefully reviewed practices across methodologies and concluded that, where surveys are used, these surveys must be robustly designed (e.g., combine questions with visual checks and other objective information to cross-check reported information) and conducted on a frequent basis for the methodology to meet the Assessment Framework. In addition, the methodologies that the Governing Board has approved also undertake other specific approaches to ensure a conservative outcome; for example, capping measured usage rates at a predetermined level (based on a combination of the robustness of study design and the level of training and engagement offered by the project).

Products that measure and monitor cookstove use (stove use monitors/continuous stove monitors (SUMS/CSMs) were also specifically highlighted as an emerging method to use in parallel with, or instead of, surveys for the most accurate usage measurement. It was further noted that adequate sampling in terms of approach and size of sample, are crucial for statistical validity and sampling must be conducted in a way that seeks to eliminate bias.

The Governing Body notes the importance of third-party assessment and independent oversight[4] of this complex area to ensure that good practices are upheld. The Governing Board notes that the ICVCM Continuous Improvement Work Program (CIWP) on VVBs will consider how to share best practices in validation and verification.

[4] Please refer to ICVCM Assessment Framework 4.1

2.5. Leakage

Leakage refers to material emissions that are caused by the implementation of a project but occur outside its emissions boundary. The assessment process considered that very little research is available on leakage in cookstove and biodigester projects, and the research that is available is inconclusive and does not initially signal that leakage is an area for concern. As a result, the assessment process concluded that current practices of either applying a default adjustment factor to account for potential sources of leakage or undertaking specific monitoring to estimate leakage were sufficient to meet relevant criteria and requirements in the Assessment Framework.

3. Permanence

Mitigation activities with a material risk of reversal are explicitly defined in the Assessment Framework and must comply with a clearly defined set of monitoring and compensation requirements to address potential reversals[5]. Mitigation activities (i.e. projects) that involve displacement of non-renewable biomass, such as cookstove and household biodigesters, must address any identified risks using measures appropriate to that risk.

The assessment process considered numerous viewpoints on this issue and noted that methodologies may not directly measure and address reversal risks because emission reductions are derived from energy displaced or saved, rather than from maintaining biomass stocks. It was noted that biomass stocks (i.e., forests, woods etc) are outside the control of energy displacement and efficiency projects. Were it even possible to control such stocks as part of a project, the location of them (i.e., the source areas of fuel) cannot be determined with certainty; for example, charcoal is frequently sourced from neighbouring countries.

In conclusion, the assessment found that at present there is no reliable way to systematically and comprehensively identify and assess material risk from these activities and so it is not currently feasible to implement appropriate measures to address them. The Governing Board recognises that further research and evaluation would be required to precisely identify material reversal risks and the ICVCM will be attentive to new emerging methods that can manage and account for them.

4. Additionality

Additionality is a central concept for the carbon market. Emission reductions from a cookstove or biodigester project are additional if the project activities reduce emissions at higher levels than would have occurred in their absence.

The assessment process highlighted the high upfront costs of implementing cookstove and household biodigesters and emphasized that carbon credits were critical for recouping these costs. Differences between rural and urban carbon credit projects were discussed at length; rural projects tend to serve households who typically do not pay for either their fuel or their stove. Projects developed in these settings are, therefore, likely additional absent other funding

[5] Please refer to ICVCM Assessment Framework 9.1 (b)

sources. The additionality of projects where households already pay for their fuel and/or their stove are more complex, especially when in receipt of parallel revenue streams.

In particular, the assessment process noted that methodologies that use CDM Tools 1, 2 and 21 do not always have further evidential requirements that would mean that conformity with the requirements of the ICVCM Assessment Framework can be determined with confidence. The Assessment Framework recognizes a number of ways to demonstrate additionality and includes requirements that ensure transparent and robust demonstration of that additionality[6].

Given the above, the Governing Board encourages CCP-Eligible Programs using the above CDM Additionality Tools to consider reviewing and/or updating their methodologies/tools to be in line with Assessment Framework requirements on additionality and to consider introducing specific guidance on the validation of parallel sources of finance such as government or development bank support in cookstove and biodigester projects.

In addition, the Governing Board observes that the Paris Agreement Crediting Mechanism (PACM) (Article 6.4) Supervisory Body is reviewing CDM methodological tools and methodologies, including these CDM Tools for potential use in the PACM. It is noted that projects that seek to issue credits under the PACM must transition away from using CDM methodologies and tools by end of 2025, as these will no longer be valid. The ICVCM will closely monitor those processes and expects CCP-Eligible Programs to remain informed about that work and review and/or revise CDM methodologies and tools in a timely manner.

As part of ongoing oversight and assurance processes, CCP-Eligible Programs submit information to the ICVCM on material changes to their program rules[7]. Revisions to CCP-Approved methodologies must be submitted for assessment against the Assessment Framework if CCP-Eligible Programs want to allow projects using a revised version to have the opportunity of tagging their carbon credits as CCP-Approved. The Governing Board will use the oversight and assurance processes as set out in the Assessment Procedure to ensure that CCP-Eligible Programs review and as needed revise or replace CDM methodological tools and methodologies during 2025.

5. No double counting

Overlapping claims of emission reductions occur when the greenhouse gas accounting boundaries of mitigation activities intersect. Mitigation activities with a material risk of this occurring must ensure that the accounting process, either at program or mitigation activity (i.e. project level), addresses double counting.

The assessment process acknowledged the potential risk of overlap with other mitigation activity Categories but noted a lack of practical examples and empirical evidence demonstrating the occurrence of overlap. The assessment process concluded that methodologies and program level rules are therefore adequate to address the risk.

[6] Please refer to ICVCM Assessment Framework Criterion 8.1: Additionality Demonstration, as well as to Paragraph 3.3 and footnote 6 of the ICVCM Assessment Procedure.
[7] Please refer to Paragraph 5.5 the ICVCM Assessment Procedure.