



## CALL FOR INPUT

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| Document reference number and title: (Recommendation from the MEP to SBM020)<br>Draft mechanism methodology: Energy efficiency measures in household cooking (version 01.0) |                                               |                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                           |                                                                                                                                                                                                            |
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| Item                                                                                                                                                                        | Section no.<br>(as indicated in the document) | Paragraph/Table/Figure no.<br>(as indicated in the document)                                                                                                                                                                                                                                                                                                                                 | Comment<br>(including justification for change)                                                                                                                                                                                                           | Proposed change<br>(including proposed text)                                                                                                                                                               |
| 1                                                                                                                                                                           | COVER NOTE                                    | General                                                                                                                                                                                                                                                                                                                                                                                      | The points raised in the following comments in general apply to a number of clauses in the Draft Document. They have not all been individually pointed out because it would be tedious. Changes should be made where they are relevant in other sections. | N/A                                                                                                                                                                                                        |
| 2                                                                                                                                                                           | COVER NOTE                                    | Page 3/101 has “applicability conditions”, paragraph 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.” | Urban use of charcoal in developing countries is ubiquitous. There are major improvements in modern charcoal stove designs that are applicable to this cohort. The method should not be limited to “rural areas” only.                                    | “This mechanism methodology applies to activities that distribute and operate improved biomass cookstoves in all households where the target population is at or below an applicable poverty threshold...” |

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| 3    | COVER NOTE                                    | Page 3/101 has “applicability conditions”. The text of paragraph 9 regarding “higher thermal efficiency” is noted. “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.” | ISO 19867-1:2018 has not been widely accepted as published. In those few countries that have adopted it, almost none accepted the 2018 text in toto. Further, the 2018 version has been cancelled by the ISO and is being replaced by a significantly edited version, ISO 19867-1:2026 (?).                                                                                                                                                                                                                            | All references to ISO 19867-1 should be changed to the new version. Further, the document is required so it must be listed in the Normative References. |
| 4    | COVER NOTE                                    | The references standard ISO 19867-1 (known as Part One) ISO 19867-1 contains numerous conceptual and mathematical errors. They include:                                                                                                                                                                                                                                                                                                                             | The test sequence employed by this standard in no way represent “cooking” in any particular community or in general. The performance ratings for emissions and fuel consumption are not generally related to the performance of the product in use, which is the whole point of rating a stove’s performance. In order to comply with section of the Draft page 3, “3.1 (11) which requires that stoves “shall be appropriate to local cooking needs and be uniquely identified and traceable to the household level”. | Evaluations of performance and subsequent assignment of a Tier rating have to be contextual and relevant to the community.                              |

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| 5    | COVER NOTE                                    | The references standard ISO 19867-1 (known as Part One) Continued | A general misunderstanding of the term “thermal efficiency” has created problems for projects which have over-claimed potential fuel reductions. This has resulted in reputational harm to funding organizations, project implementers and carbon trading in general. The direct cause is confusion over the multiple definitions of “thermal efficiency. The required reporting metrics in ISO 19867-1 include two incompatible versions. One represents fuel consumption (“thermal efficiency without char”) while the other is an “exergy efficiency” (“thermal efficiency with char”). The meaning is explained on page 32 of the ISO document in the note explaining Equation 8. This latter case does not represent fuel savings and use of this metric should be specifically denied for Article 6.4 projects. A proposed text is provided however, please also note: Thermal Efficiency Without Char is a valid metric, but the testing protocol as given in the 2018 version is not, because the burn sequence bears no relationship to cooking behaviour. | Any claim for fuel saving as defined in 3.1 (9) “...where emission reductions are achieved through higher thermal efficiency...” must reference only the metric “Thermal Efficiency Without Char” in the ISO 19867-1 document. |

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| 6           | COVER NOTE                                           | The references standard ISO 19867-1 (known as Part One) Continued   | Projects submitted for CDM approval have in the past been using the term “thermal efficiency” and “energy efficiency” interchangeably with “fuel efficiency”. The ISO 19867-1 metric “Thermal efficiency with char” is actually the exergy efficiency, as explained on page 33 of the ISO document. This metric is used by engineers to analyse internal heat movement, but it is not representative of fuel consumption nor thermal efficiency applied as a proxy for fuel consumption. Versions of AMS-II.G make reference to a “Water Boiling Test” as a method of rating stove performance, without specifying a formal method or source document. One common interpretation of this term is the Berkeley WBT:2003 or various adaptations of it promoted by multiple institutions. There are two important considerations for the Working Group: none of these “WTB’s” have been published for peer review, and all of the report the exergy efficiency, not the thermal efficiency. Invariably the exergy value is higher than the thermal efficiency when applied using WBT calculations. | All references to “water boiling tests” should be replaced with a reference to the ISO metric “Thermal Efficiency Without Char”. |
| 7           | COVER NOTE                                           | The references standard ISO 19867-1 (known as Part One) Continued   | The average efficiency calculation used in the 2018 version of the ISO test method is not valid. This has been replaced during a recent review with a completely different and correct calculation that significantly changes the efficiency rating of a stove. It is contained in the Committee Draft presently issued for a vote by ISO TC-285 member countries.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | The average efficiency rating of stoves tested to ISO 19867-1:2018 should not be used to rate performance tiers.                 |

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| 8 | COVER NOTE | Paragraph 13, Table 1, last line        | <p>There is a requirement of Article 6.4 is that the technologies “meet local cooking requirements”. This is not possible using the testing method provided in ISO 19867-1. There is no relationship between the burn sequences employed in the ISO test and meeting local cooking requirements. To correct this requires the testing agent to understand what the local cooking requirements are, and to create a burn sequence to be applied during the measurement of performance. This is called a “contextual test sequence”. A methodology for doing this is provided for World Bank projects called the CSI test method which incorporates the Heterogeneous Test Protocol (University of Johannesburg, 2013). This method has been used in multiple countries for stove projects since 2010. In spite of the high precision and accuracy and relevance of this test protocol, it is disallowed by the text of the ISO test method through the prescriptive nature of the test equipment. The Draft Methodology should either provide that the CSI/HTP method be referenced or a description of the necessary accuracy and precision be included in the relevant documentation. As is, the ISO text permits the use of only one set of lab equipment that is incapable of confidently placing a stove in all six Tiers (Tier 0 to Tier 5). When combined with the inappropriateness of the burn sequence, this undermines the confidence anyone can have in a Tier rating. Any method’s references in the Draft must be examined for scientific validity, precision and accuracy. The ISO standard provides some useful metrics but fails on several counts: the equipment specifications permit the use of instruments that are incapable of determining performance accurately; the burn sequences are unlike cooking, the referenced version of the ISO document has serious deficiencies with regard to calculating the average performance.</p> | <p>References to the ISO 19867-1 technical aspects should be changed to the World Bank’s CSI/HTP test method, to be used together with a contextual test sequence determined according to the CSI protocol for the social anthropology portion. The relevant portions of the ISO document include all equipment specifications and the use of a contextual test sequence construction and evaluation methods protocols.</p> |
| 9 | COVER NOTE | Paragraph 3.1, 11) and para 13) Table 1 | <p>Charcoal stoves are to be rated according to ISO 19867-1. There is a dedicated section of the ISO document that refers to testing charcoal stoves. The test sequence for charcoal stoves is seriously defective. The whole evaluation requires starting and stopping the combustion 15 times, each with</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p>All references to charcoal stove performance or CO2 emissions should be to the CSI/HTP test method with a contextual test sequence representing typical use in the target community, however delineated.</p>                                                                                                                                                                                                             |

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|      |                                               |                                                                  | a 30 minute burn. None of these brief tests evaluate the performance of a charcoal stove when cooking, grossly misrepresenting CO emissions. Essentially, all the charcoal stove ISO test outputs are irrelevant for the purposes of Article 6.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 10   | EMISSION REDUCTIONS                           | See paragraph 3.12, Emission Reductions; para 45) and Section 11 | <p>The stated purpose of Article 6.4 projects is to reduce CO<sub>2</sub> and CO<sub>2</sub>e emissions. It is here noted that the ISO test does not evaluate and report the CO<sub>2</sub>e emitted by stoves. To do so requires significant changes to the ISO test method and to require that a carbon balance (emitted v.s. detected mass of carbon) be applied. The ISO document allows the carbon balance to be wrong by 20% before correcting action is taken to identify errors in measurements. This is hopelessly inadequate. Many stoves burning biomass create residual char which is unusable as fuel. It is discarded, unburned – usually left to mix with the soil. Technically, this is “biochar” and can be applied using a sequestration argument. Stoves tend to create a consistent amount of residual char, though this varies considerably with design. Rocket stoves create far more char than a Vesto stove with a grate, while top-lit updraft gasifiers are purposefully designed to maximise the amount of residual char. The CO<sub>2</sub>e of a TLUD gasifier is considerably less than a three stone fire – as much as 80% less even though its fuel consumption might be 60% less. This is not considered at all by the test methods mentioned in the Draft. At present, actual comparative fuel efficiency is using a thermal efficiency as a proxy for carbon emissions. This is slightly inaccurate for ordinary biomass stoves, but grossly inaccurate for biochar making gasifiers which are growing in popularity.</p> | <p>The considerable interest in the creation of biochar using cooking appliances and the concurrent development of international standards classifying biochar (ISO TC 238 and its ISO 17222 (all parts) and ISO 16995) suggests that Article 6.4 projects be provides with references to test methods that assess the net CO<sub>2</sub>e of clean cooking appliances and charcoal producing cooking stoves.</p> |

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| 11          | DEMONSTRATION OF ADDITIONALITY                       | Page 6/101, para 21) Page 93/101, para 12) etc                      | The Draft text cites two efficiency thresholds of “16.6 per cent for fuelwood and 23.6 per cent for charcoal”. The definition of “efficiency” is not provided. Further, based on previous CDM documentation, these figures are probably based on defective WBT calculations providing the exergy efficiency and over-rate the actual values. The penalizes clean cooking stoves that were tested using valid measures.                                                                                                                                                                                                                                 | Baseline Efficiency targets shall be assessed using a CSI/HTP methodology with a contextual test sequence.                                                                                                                    |
| 12          | BASELINE SCENARIO                                    | Paragraph 3.4 24)                                                   | It is required to show “a functional cooking technology that is assessed to have the same or a higher efficiency as the project cookstoves.” This assessment must be made using a contextual test sequence. An unrelated “lab test” with no relevance to how the stoves are actually used will inevitably lead to over-claims for future fuel saving by candidate stoves, or “fail” the community because the stoves in use are assumed to meet the “improved” standard and to have penetrated more than 4.5% of the market. These two targets cannot be met using the ISO lab test. It is too divorced from reality to meet the Draft’s requirements. | The assessment showing “a functional cooking technology that is assessed to have the same or a higher efficiency as the project cookstoves” shall be made using a contextual test sequence relevant to the project community. |

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| 13   | BASELINE SCENARIO                             | Paragraph 3.9.1, 35)                                         | <p>The text reads: “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.” (Emphasis added) This is not true in the ISO test method was used. The thermal efficiency is calculated using energy values, however this is reported using the “Thermal efficiency without char”. The old CDM reference methods report the exergy efficiency (see the ISO document p.32-33) using energy released from fuel, not the mass of fuel fed. This section 3.9.1 needs to be rewritten to accommodate the modern testing metrics. It should also be noted in 3.9.1 that the Kitchen Performance Test (KPT) is not a stove test. It is an observational assessment of the total fuel mass used by a family after the intervention. Families frequently change their fuel consuming and cooking behaviours when present with a high performance stove. The Draft text refers in a number of places to the KPT as if it provide a fuel consumption rating of a stove. This is only true if the family does not change their cooking patterns. A CDM rule not mentioned in the Draft permits projects that fail to reduce emission as projected by the project documents. This is known as suppressed demand. The suppressed demand rules have been abused in the past to cover for the over-rating of performance using bad test methods (especially the WBT) and behaviour undetected modifications has undermined the reputation of clean cooking projects. Most claims for suppressed demand are actually covering for methodological failures up the chain. While it might truly be classified as suppressed demand, there are stringent requirements already provided for any project wishing to make suppressed demand claims.</p> | <p>“The KPT is not a stove test and evaluation of a stove’s thermal efficiency should rely more on a context lab test than field observation of fuel mass consumed.” The KPT questions could be altered to include behaviour changes such as whether food is kept warm for an extended period of time because there is more fuel available.</p> |

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| 14   | BASILINE SCENARIO                             | Paragraph 3.9.5, 41) Wood to charcoal conversion             | This paragraph makes no reference to the use of char-creating stoves which according to the definition in 41), should be classified as “artisanal production of charcoal”. There are secondary considerations and the charcoal produced might be sequestered as biochar, and there is no provision for these existing and future projects.                                                                | Add a section dealing with the deliberate production of biochar using cooking stoves when it is a design function.                                                                                                             |
| 15   | BASILINE SCENARIO                             | Paragraph 3.13, 46) Uncertainty                              | The CO <sub>2</sub> e emissions produce while making charcoal in a TLUD gasifier are considerably less than during artisanal production because the gases are used to cook.                                                                                                                                                                                                                               | The must be a method added to the Draft that permits the including of emission reduction work distributing char-making stoves. The benefits are considerable, particularly when the char is used for agriculture.              |
| 16   | DEFINITIONS                                   | Paragraph 2.2, 7 (b)                                         | Definition of Artisanal charcoal                                                                                                                                                                                                                                                                                                                                                                          | Insert an additional definition of artisanal charcoal, being the production of biochar while cooking using a gasifier that reaves at least 20% of the initial carbon in recoverable, solid form.                               |
| 17   | NORMATIVE AND INFORMATIVE REFERENCES          | Paragraph 3                                                  | Several references are made to the ISO 19867-1 test method as a requirement, but it is not listed in this section. If it is added, it must reference the new version. If the old 2018 version is referenced, a caution must be given that its calculations are defective and the updated ones substituted. As the CSI/HPT protocol is also recommended for inclusion in the Draft, it should be included. | Add Normative References to the ISO 19867-1, the voluntary performance targets ISO/TR 19867-3 and at a minimum, the University of Johannesburg’s Heterogeneous Test Protocol, (2013) if its methods are used.                  |
| 18   | APPLICABILITY                                 | Page 21/101, 4.13 (a) to (c)                                 | Updating necessary                                                                                                                                                                                                                                                                                                                                                                                        | This should be updated to include biochar making stoves of all sizes. Also, and section that refers to CO <sub>2</sub> e must consider the actual emissions, not carbon calculated from fuel mass fed into the stove per year. |
| 19   | PROJECT BOUNDARY                              | Page 24/101, Paragraph 5, 18) Table 1                        | This table provides guidance as to what emissions from stoves should be measured when reporting the CO <sub>2</sub> e reduction by a cooking technology.                                                                                                                                                                                                                                                  | The test used for stove performance should require the reporting of relevant emissions, not CO <sub>2</sub> values calculated from fuel assumed to be burned because it was fed into the stove.                                |

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| 20   | BASELINE SCENARIO                             | Page 30/101, Paragraph 7.3.1, 49) (b) (iii) and (c) (i) Procedure for the identification of the baseline scenario  | A manufacturer's reported thermal efficiency value for a gasifier, forced or natural draft which is producing charcoal is likely to have been calculated using a WBT or ISO Thermal Efficiency With Char formula. These can be grossly misleading because they actually report the exergy efficiency. Lab reported values have been found to be 2 to 3 times their actual fuel consumption-related values. By this is meant, fuel mass consumed is avoided in favour of a "released energy" denominator in the efficiency calculation. This creates an opportunity for cheating. | This caution should be specifically mentioned and the test method(s) given so stoves using great amounts of fuel are not credited with efficiencies that belie their biomass harvesting demand. |
| 21   | BASELINE SCENARIO                             | Page 53/101, Paragraph 15, 122) Data / Parameter table 2 Procedure for the identification of the baseline scenario | Editing and updating required                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | This must be updated to align with the comments above concerning problems with ISO 19867-1:2018.                                                                                                |
| 22   | APPENDIX 1                                    | Page 70/101, Appendix 1, paragraphs (e), (f) and (g)                                                               | These three metrics, efficiency, PM and CO, cannot be determined reliably if the carbon balance during the test is incorrect. There must be a requirement that the test quality meet some standard and provision made for correction of final outputs based on the deviation of the carbon balance number either side of 100%. Test reports have been circulating with carbon balance values of from 50% to 475% all based on the ISO 19867-1 test method. The ISO test has no requirement to invalidate or correct these gross inaccuracies.                                    | The carbon balance should be a reportable metric and an acceptable range provided for acceptance of the resulting Tier rating.                                                                  |
| 23   | APPENDIX 5                                    | Page 83/101, Appendix 5, 1. Overview, 1.                                                                           | As the KTP is provided as the universal assessment of fuel consumption, a modification is required to the methodology which assesses the deliberate production of biochar when cooking. There are already clean stove projects with carbon funding using such stoves, but Article 6.4 does not permit them.                                                                                                                                                                                                                                                                      | An additional metric is required for the KPT which is the mass of biochar produced by the family, not only the mass of fuel consumed from the source.                                           |