CLEAN DEVELOPMENT MECHANISM

CDM-EB111-A04

Concept note

Improving clarity and consistency of methodological products

Version 01.0

United Nations
Framework Convention on
Climate Change

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1. Procedural background

1. The Executive Board of the clean development mechanism (CDM) (hereinafter referred to as the Board), at its 110th meeting (EB 110)[1], noted that there is scope for further improving the editorial quality, clarity and consistency of draft methodologies, methodological tools and other methodological standards recommended for its consideration. The Board requested the secretariat to prepare a concept note proposing measures and options for addressing this issue, for consideration by the Board at a future meeting.

2. Purpose

2. The purpose of this concept note is to identify issues pertaining to editorial quality, clarity and consistency of methodological products based on past feedback provided by the Board. Following a root-cause analysis, options for making improvements are assessed and recommendations are made for consideration by the Board, in accordance with the mandate from the Board at EB 110.

3. Key issues and proposed solutions

3.1. Analysis of the issues

3. As part of the consideration of the methodological products on the agenda of its past meetings, the Board has provided general observations and feedback on specific methodological products recommended by the Methodologies Panel (MP), through its meeting reports, or by the secretariat as part of the annotated agenda of the Board meetings. They are categorized and summarized as follows:

(a) **General observations on areas for improvement:**

(i) Improved editorial quality (e.g. avoiding typos, incomplete sentences and grammatically incorrect sentences);

(ii) Consistent treatment of emission sources under the applicability conditions, baseline, project and leakage sections;

(iii) Consistent structure of the methodologies[2] (e.g. sequencing of baseline, project/leakage emissions);

(iv) Cross-referencing within a methodology and cross-referencing to other methodologies using a consistent method;

(v) Consistent use of can/may/should/shall terminology to appropriately convey requirements, recommendations and possibilities;

(b) **Revisions:** Amendments in revised methodologies could be improved to enable a better understanding of the purpose of the revision and the options and

[1] CDM-EB110, paragraph 34.

[2] Reference to “methodologies” or “methodololgical products” in this document includes large-scale and small-scale CDM methodologies, tools, standards and guidelines.

requirements, through a better flow of information, i.e. revisions are proposed, keeping in mind they need to be comprehensible to qualified people who have not participated in their preparation;

(c) **Equations:** Clarity through distinct equations is missing in some cases (e.g. for emissions from fossil fuel sources vs. biogenic sources), while in other cases separate equations for minor differences in parameters with insignificant impact on emission reductions are presented, leading to redundancies. Moreover, notations and terminology/nomenclature/definitions are inconsistent (e.g. for the same parameter different definitions are provided or different notations for the same parameter are used);

(d) **Monitoring tables in the methodologies**: Descriptions of data sources, measurement methods and calibration requirements, Quality Assuarance/Quality control (QA/QC) and cross-check procedures are inconsistent; for the same/similar parameters, requirements are differently worded in different methodologies belonging to the same class (e.g. distributed activities covering residential applications);

(e) **Cover notes to methodological products recommended to the Board**: The rationale for the choices made for the emissions sources (e.g. baseline in accordance with paragraph 48 of the CDM Modalities & Procedures), vintage and source of data, default values, and choice of tools in the context of proposed applicability conditions is not always fully explained;

(f) **Holistic approach**: Related products are not always harmonized as a package to facilitate the consideration of overall impact (e.g. new and/or changes to the definitions/glossary of terms, new approaches for additionality or emissions reduction estimates do not always accompany corresponding modifications in impacted methodologies);

(g) **Conservativeness:** At times, proposed default values are either not conservative in comparison to published literature or sufficient explanation is not provided to justify the value that is less conservative (e.g. the Board cited the paper published in *Nature* to mandate the work to improve the provisions for determining the fraction of non-renewable biomass under the cookstove methodologies);

(h) **Mandate for top-down development/revision of methodological products**: Mandate requests for the top-down development of methodological products are not always accompanied by corresponding detailed justifications covering stakeholder needs, gaps in the current methodologies, risks and opportunities, and timelines.

3.2. Possible root causes

4. The above comments from the Board do not apply to all methodological products. For some methodological products, the Board has expressed satisfaction and, on occasions, commended the methodological product. In analysing those methodological products where the Board expressed satisfaction in the quality of the product, it was generally observed that work on the product had begun well in advance of the MP meeting in which the product was finalized and that MP members, particularly the small group assigned to the case, together with the secretariat, had fully engaged in the case from the early stages

of assessment. Furthermore, securing competent and timely external expertise facilitated the advancement of such cases. For example, MP 84 recommended the revision of transport methodologies to improve the provisions on the survey requirements, preceded by several iterations by the MP and the secretariat with able assistance from external experts in survey statistics. The MP also made specific efforts to identify and address editorial clarity and consistency issues besides the substantive issues. The proposed solutions in this concept note aim to build on such positive outcomes to identify and document good practices for continued implementation in preparing draft methodological products for consideration by the Board.

3.3. Literature review of measures by other standard-setters

5. Appendix 1 includes relevant extracts from practices and guidelines of standard-setting bodies, such as Interrnational Standards Organisation (ISO) and International Social and Environmental Accreditation and Labelling Alliance (ISEAL), (https://www.isealalliance.org/defining-credible-practice/iseal-codes-good-practice), to ensure consistency of methodological products. It is acknowledged that the context of these standards is not the same as that of the CDM; nevertheless, the compilation is done with view to identify good practices that may be useful to consider in the context of improving the editorial quality, clarity and consistency of CDM draft methodologies, methodological tools and other methodological standards.

3.4. Feedback from the Methodologies Panel

6. Appendix 2 includes inputs provided by the MP members during MP 85. Separately, the appendix also includes comments received from the MP members on this document.

3.5. Proposed solutions

7. With regard to options for solutions, the following may be considered by the Board:

   (a) **Additional thorough checks by the MP members, secretariat staff and external experts:** For each product, a drafting team led by an MP member will sign off at relevant milestones including the final publication confirming that the editorial quality, clarity and consistency has been addressed. For identified products, a final editorial check will be done by an editor (e.g. by one of the editors currently engaged to provide editorial inputs on meeting reports of the MP);

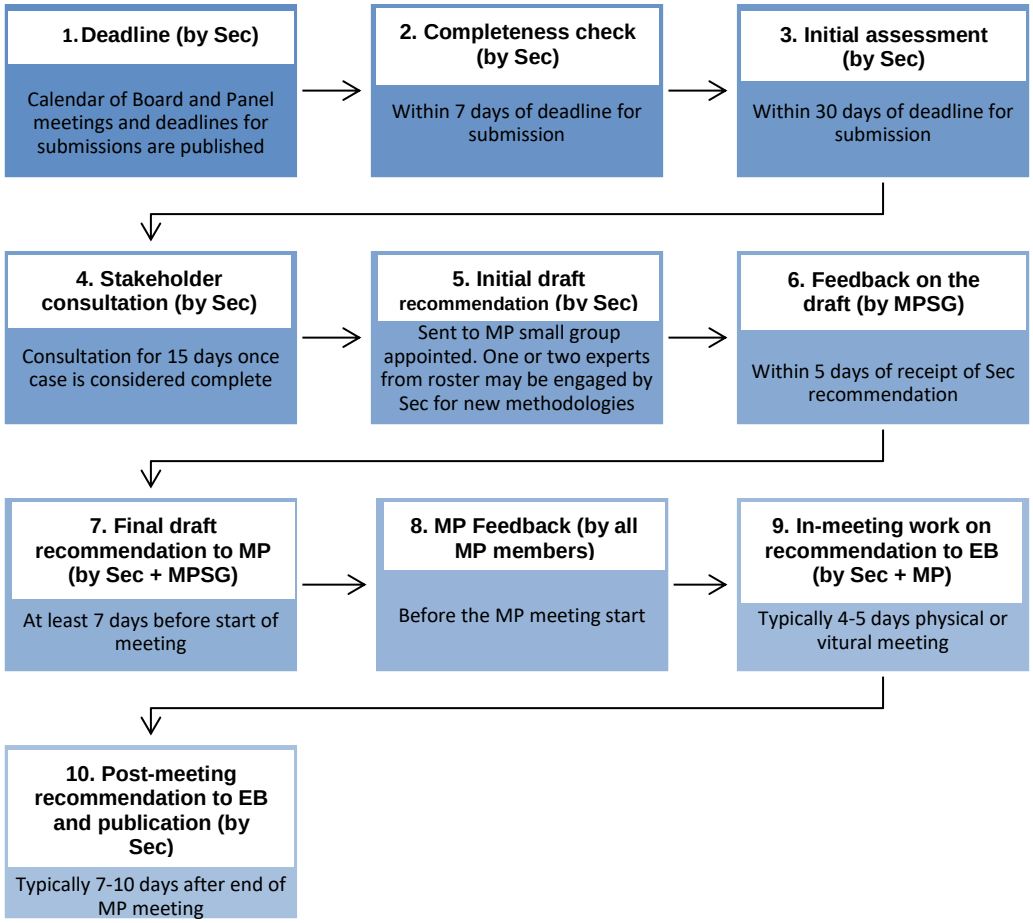
   (b) **Ensuring sufficient time for processing of products through more disciplined implementation of established deadlines:** This measure will not create additional processing time for the delivery of the products but is intended to ensure that deadlines are implemented in a disciplined manner, allowing for more time to receive comments systematically and to address them transparently. Figure 1 shows the processing steps and timelines in the current procedure for the bottom-up cases.[3] While the secretariat and MP members make efforts to meet the timelines outlined in figure 1, experience has shown that, in a small number of cases, deadlines are missed due to various reasons, resulting in a situation where the MP members and the secretariat need to pay attention to multiple and complex

[3] Procedures do not include detailed steps and timeline for the diverse set of top-down cases mandated by the Board, but the proposed changes will equally benefit the top-down cases.

tasks simultaneously during the MP meeting week and the subsequent weeks. Consequently, any new substantive issues arising during the MP meeting are not ruled out, adding additional time pressures and complexities to complete the product. It is to be noted that, similar to established CDM procedures, other standard-setting systems, such as the ISO, require that stakeholders respect the drafting deadlines and timetables and ensure that the technical standpoint is made clear at an early stage of development of the products and that any new substantive comments at the working group meetings are not tabled. It is recommended that the processing cycles already in place be strengthened to ensure that deadlines are met, as illustrated in figure 2 (steps 1-5 remain unchanged and steps 6-10 are strengthened)[4]. Under the proposal in figure 2, the MP meeting duration is devoted to addressing the comments from MP members and the secretariat staff received before the meeting, ideally in a standard template. Measures to ensure that the inputs on draft products are received on time will be strengthened. This may include, for example, follow up and tracking of deadlines (e.g. based on internal reports of the MP or procedural requirements) for the inputs by the secretariat and by the assigned members of the MP. Similarly, ex-post sign-off of MP meeting annexes will be undertaken within two weeks after the MP meeting, taking into account input from editors as necessary. Telecons among assigned members of the MP and guidance from the MP Chairs are used as necessary to ensure that milestones are reached.The proposed changes will allow MP members to provide focussed and undivided attention to products during the meeting, resulting in improved substantive content and editorial quality of products;

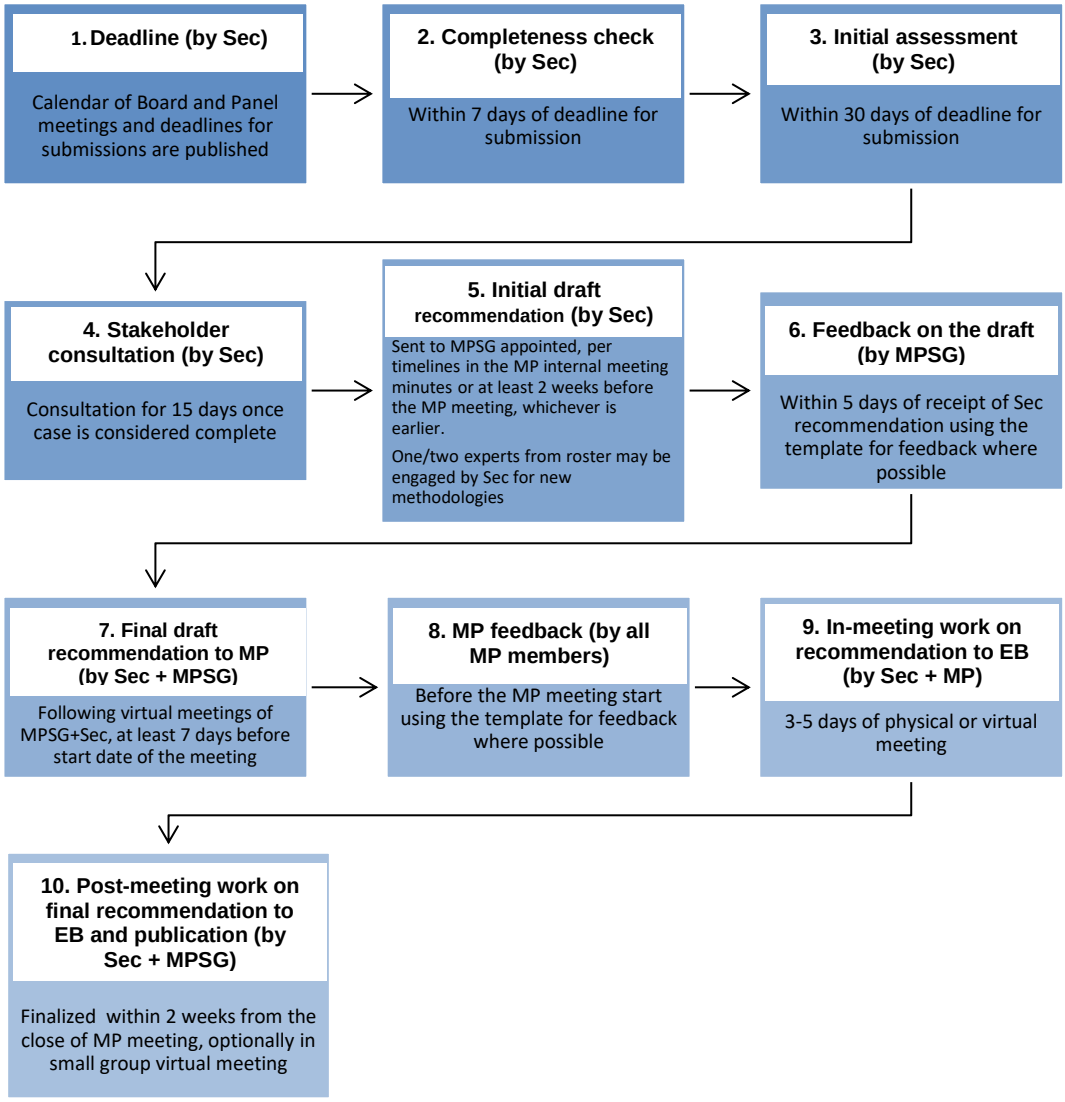
[4] No change in related procedures is envisaged.

Figure 1. Processing cycle for new methodologies and revisions (bottom-up)



*Sec- secretariat, MPSG-MP Small group, EB-Executive Board

Figure 2. Proposed processing cycle for methodological products



(c) **Ensuring transparency of commenting process, for increased efficiency and better monitoring of processing steps:** It is recommended that a *commenting template for methodological products* be prepared and used for receiving input from the MP members and the secretariat where applicable, as illustrated in table 1;

Table 1. Commenting template for methodological products

MP xx		Line No/Section/ Paragraph/ Figure/Table	Type of Comment (Editorial, Substantive)	Comments	Proposed Change or additional analysis identified	Observations of the drafting team (Sec + MPSG)

(d) **Avoidance of duplication and unnecessary deviations:** It is proposed, similar to the CDM glossary of terms, that a reference, "database of data/parameters", be produced to ensure standardization and consistency across all methodological products in relation to descriptions, definitions, data units, notations, monitoring frequency, QA/QC/calibration and source of data.[5] Appendix 3 includes more details on this aspect.

8. Additionally, the secretariat will strengthen other existing processes and practices such as the following:

(a) Internal checks and sign-offs will be strengthened for monitoring at different stages in the product development cycle;

(b) The methodology drafting template be improved to ensure a consistent structure, including a standard method for cross-referencing within the methodology and across methodologies, specifying requirements for equations (e.g. notations, summations, parameter definitions);

(c) Outlines for the cover notes will be improved with the aim to include consistent and clearer information;

(d) In the case of seeking new mandates, the outline of the cover note will include more information on the justification, including: the expressed need by stakeholders; documentation of gaps in existing standards; and information on opportunities for increased efficiency and, where relevant, any potential risks and options to mitigate them.

3.6. Additional methodological issues and solutions

9. Some of the observations and feedback on specific methodological products provided by the Board (e.g. see paragraphs 3(g) or 3(h) above) are related to substantive issues and research and analysis. Based on pertinent publicly available literature, on occasions the Board has mandated work that led to enhanced trust in the outcomes (e.g. improvements to fraction of Non Renewable Biomass values in the estimation of emission reductions from clean cookstove projects). The Board may wish to consider whether to regularize this work, to check consistency with the published literature, to enable timely action. For instance, the MP may be mandated to scan recent related literature every year or every alternate year to identify methodological issues that affect the accuracy or conservativness of the emission reduction estimates on the one hand, or affect the practical implementation of the projects on the other. Based on such an analysis, the MP may recommend specific issues for the consideration of the Board for any further potential action. Identified organisations/institutions may be invited to provide inputs.

10. The Board may also wish to consider the issue of consistency of default values in the large-scale and small-scale methodologies. Most of the methodological products, including the default values contained within these products, undergo updates on regular

[5] Also a recommended practice under ISO process; please see paragraph 8 of appendix 1.

basis[6] due to the existing mandates from the Board.[7] However, a small number of default values in methodologies that are applied in many implemented CDM activities have not undergone updates for more than a decade; consequently, they are no longer conservative estimates. For example, this is the case for the default emission factors for baseline off-grid diesel generators, where the factors indicated for part load use are as high as 1.4 kgCO_2/kWh, which is not realistic or conservative under present cirumstances.[8] It is also not consistent with the values indicated in Tool 07 i.e. Tool to calculate the emission factor for an electricity system.The Board may wish to consider mandating the MP to assess default factors in methodologies which are applied in registered projects and which have not been assessed/updated in the last five years.[9]

11. For future methodological products that are recommended by the MP, a note could be included under the last section of the product, i.e. “document information”, indicating the parameters that will need reassessment for update on a periodic basis. More details on this issue are included in Appendix 4.

4. Impacts

12. The measures proposed above will improve the editorial quality, clarity and consistency of methodologies, methodological tools and other methodological standards as well as improve conservativeness and accuracy of the methodological products. Such improvements will facilitate the work of the project developers, designated operational entities (DOEs) and other stakeholders. It may also contribute to achieving improved efficiency for the approval process of the methodological prodcuts.

5. Subsequent work and timelines

13. Subject to the guidance from the Board on the proposed measures, subsequent work will include the following:

    (a) Measures to strengthen the operational aspects of the existing provisions that aim to ensure compliance with timelines for product delivery;

    (b) Measures to ensure that responsibilities for sign-off on MP products are more inclusive;

    (c) Editorial improvement of methodological products by professional editors;

    (d) Creation of a repository of “data/parameters” tables that methodologies and tools can cite;

[6] Most methodological products are updated within the five years prescribed by some standard-setters, as detailed in appendix 1 of this note.

[7] For example, positive lists for additionality are updated by the MP every three years based on the latest available data in response to an existing mandate from the Board.

[8] Similarly, the default emission factor for baseline kerosene lamp usage for lighting is in urgent need of an update. Likewise, specific default factors in the agriculture sector (e.g. AMS-III.BK) and personal transportation (e.g. AMS-III.BM.) have been identified for updates to ensure that emission reduction estimates are not overestimated.

[9] Number of such factors in need of assessment is likely to be less than 10.

(e) Mandate to the MP to update the default factors in methodologies that are found to be not conservative in accordance with the latest science;

(f) Process to identify improvements to methodological products based on published literature.

6. Recommendations to the Board

14. The Secretariat recommends that the Board consider the concept note and provide further guidance, including on items mentioned in paragraph 13.

Appendix 1. Process for development of standards by other standard-setting bodies

1. This section includes relevant extracts and a summary of the process followed by other standard setting bodies: ISO, ISEAL, Verra and Gold Standard.

1. ISO

2. ISO standards are developed by groups of experts from all over the world that are part of larger groups called technical committees. These experts negotiate all aspects of the standard, including its scope, key definitions and content. The life cycle of an ISO standard comprises the following stages:

   (a) Under the **Proposal stage,** a new work item is proposed and voted for acceptance and it results in a **New work item proposal (NP);**

   (b) Under the **Preparatory stage,** a working group is set up comprising experts and a convener and it results in a **working draft (WD);**

   (c) Under the **Committee stage,** comments from National Bodies are taken into consideration with a view to reaching consensus, and results in the **committee draft (CD);**

   (d) **Enquiry stage, Approval stage and Publication stage** are the final stages. At the Approval stage, only editorial comments and obvious errors, if any, are addressed.

3. For the above process, ISO insists on important disciplines from the participating members as follows:

   (a) Ensure discipline with respect to deadlines and timetables;

   (b) Ensure that the technical standpoint is made clear at an early stage of the work;

   (c) Not to table substantial comments at meetings;

   (d) Provide comments, using the template for comments (see below):

Template for comments and secretariat observations

Date:	Document:	Project:

MB/ NC[1]	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment[2]	Comments	Proposed change	Observations of the secretariat

4. **The ISO/IEC Directives, Part 2**[1] contains **rules for the structure and drafting of International Standards** to ensure that they are clear, precise/unambiguous, consistent and accurate. Rules for the standards include the following:

   (a) They are written using all **available knowledge about the state of the art,** taking into into **account the current market conditions** and noting that there is sometimes a tension between what is technically feasible and what the market actually requires and is prepared to pay for;

   (b) A framework for future technological development is provided;

   (c) They are comprehensible to qualified people who have not participated in their preparation.

5. **Performance principle**: Whenever possible, **requirements** shall be expressed in terms of **performance rather than design characteristics,** allowing maximum freedom for technical development and reducing the risk of undesirable market impacts (e.g. limiting development of innovative solutions). For example, a work table shall have four wooden legs (a design requirement) versus the work table shall be constructed such that when subjected to … [stability and strength criteria] (a performance requirements).

6. **Verifiability**: Only those requirements that can be verified shall be included. Phrases such as "sufficiently strong" or "of adequate strength" shall not be used because they are subjective statements. **The stability, reliability or lifetime of a product shall not be specified if no test method is known that can verify the claim in a reasonably short time**. A guarantee by the manufacturer is not a substitute for such requirements. Guarantee conditions shall not be included because they are commercial or contractual, rather than technical, in nature.

7. **Consistency:** Consistency should be maintained within each document and within a series of associated documents:

   (a) The structure of associated documents and the numbering of their clauses should, as far as possible, be identical;

   (b) Identical wording should be used to express identical provisions;

   (c) The same terminology should be used throughout, and the use of synonyms should be avoided;

   (d) Consistency is particularly important to help the user understand documents or series of associated documents. It is also important when using automated text processing techniques and computer-aided translation.

8. **Avoidance of duplication and unnecessary deviations**: Documents should avoid duplication. This is particularly important in test methods, which are often applicable to more than one product, or type of product**. Before standardizing any item or subject, the writer shall determine whether an applicable standard already exists**. If it is necessary to invoke a requirement that appears elsewhere, this should be done by reference, not by repetition. If a test method is, or is likely to be, applicable to two or more

[1] Available at https://www.iso.org/sites/directives/current/part2/index.xhtml#_idTextAnchor054, accessed on 12 July 2021.

types of product, a document shall be prepared on the method itself, and each document dealing with a given product shall refer to it (indicating any modifications that are necessary). This will help to prevent unnecessary deviations. In some fields, it can be desirable to write a document specifying generic requirements applicable to a group of items or subjects. If it is considered necessary to repeat a requirement from an exterior source, the source shall be referenced precisely.

9. **Verbal forms for expressions of provisions**: The user of the document shall be able to identify the **shall** requirements he/she is obliged to satisfy in order to claim conformance to a document. The user shall also be able to distinguish these requirements from other types of provision, i.e. recommendations (**should)**, permissions (**may**), possibilities and capabilities (**can**).

2. ISEAL

10. **ISEAL Alliance** is a non-governmental organization **aiming to strengthen sustainability standards and systems for the benefit of people and the environment.**[2] The ISEAL Standard-setting Code defines how a standard should be developed, structured and improved over time and addresses multi-stakeholder consultation and decision-making, taking into account related documents from ISO, World Trade Organisation, European Commission and others. Key requirements include:

    (a) As part of the **credibility principles,** ISEAL requires that "Standards are reviewed and revised regularly to integrate learning about sustainability, good practices and results of monitoring and evaluation activities. The standard-setting organization shall conduct a **regular review** of its standard-setting procedures, taking comments from stakeholders into account". "Regular" is defined here as being **at least every five years OR before the next review of the standard, whichever is sooner**;

    (b) The standard-setting organization seeks to avoid duplication and to be consistent with standards that have overlapping scopes, while not limiting innovation and improvement. At the outset of a new standards development process, the standard-setting organization shall:

        (i) Inform organizations that have developed similar international standards of its intention to develop a new standard;

        (ii) Seek input from them on the terms of reference; and

        (iii) Encourage their participation in its development.

11. At the outset of a new standards development process and as needed thereafter, the standard-setting organization **shall develop or update the terms of reference** (TOR), which shall include the following elements:

    (a) The proposed scope of the standard and the intended geographic application;

    (b) A justification of the need for the standard, including: an assessment of the most important sustainability issues falling within the scope of the standard; an

[2] Available at https://www.isealalliance.org/sites/default/files/resource/2017-11/ISEAL_Standard_Setting_Code_v6_Dec_2014.pdf, accessed on 12 July 2021.

explanation of whether the proposed standard will meet an expressed need; and documentation of other standards operating or in development that meet all or part of the expressed need;

(c) Clear social, environmental and economic outcomes that the standard seeks to achieve and how those are linked to the organization's intended change;

(d) An assessment of risks in implementing the standard and how to mitigate these, including: identification of factors that could have a negative impact on the ability of the standard to achieve its outcomes; unintended consequences that could arise from its implementation; and possible corrective actions that could be taken to address these potential risks; and

(e) Developed or updated lists of sectors that have an interest in the standard and key stakeholder groups within those sectors, based on the standard's scope and its social, environmental and economic outcomes.

12. **Stakeholders have the information they need to determine whether and how to participate by making publicly available a summary of the process** that shall include:

(a) A summary of the TOR for the standard, including the proposed scope, objectives and justification of the need for the standard;

(b) Steps in the standard-setting process, including timelines and clearly identified opportunities for contributing; and

(c) Decision-making procedures, including how decisions are made and who makes them.

13. **The Public Summary** is a concise overview for stakeholders to understand whether and how to engage, and to ensure that stakeholders have sufficient time and opportunity to provide input on the standard and can see how their input has been taken into account.

(a) The public consultation phase for standards development or revision shall include at least one round of **60 days for comment submissions** by stakeholders;

(b) For new standards development, **a second round of consultation of at least 30 days shall be included**. A second round of consultation is necessary for new standards development to ensure that stakeholders have an opportunity to provide feedback on whether their comments were understood and taken into account, and to gather input on substantive, unresolved issues.

3. VERRA

14. The methodology approval process in the Verified Carbon Standard follows two main steps:[3] the Methodology Concept Note and the Methodology Development.

15. **Step 1 - Methodology Concept Note:** The Note shall indicate basic elements of the methodology (eligible types of projects, draft set of applicability conditions, demonstration of additionality, calculation of emission reductions and monitoring). VERRA may propose

[3] Methodology Approval Process, v4.0 available at https://verra.org/wp-content/uploads/2019/09/Methodology_Approval_Process_v4.0.pdf, accessed on 12 July 2021.

to reject, askem additional clarifications or recommend the development of a full methodology.

16. **Step 2 - Methodology Development:** To ensure that the documentation is of sufficient quality (free from typos and grammatical errors, well-structured and clearly written, and logical and technically consistent within its text), there are two stages of document check:

    (a) At the time of submission of the full methodology and before the publication for public consultation, VERRA conducts a review of the documentation;

    (b) After approval of the methodology, the Validation and Verification Body (equivalent to a DOE in the CDM) can propose a review of the methodology to address minor modifications, edits or clarifications within two years of its approval.

4. The Gold Standard

17. The methodology development process under the Gold Standard[4] includes the following elements:

    (a) The Gold Standard secretariat targets key stakeholder groups, which include those who will be directly impacted by the implementation of the Standard and those who are indirectly affected;

    (b) The Gold Standard offers consultation period of 30 days to seek comments from the stakeholders;

    (c) The outcome of any public consultation is published on the Gold Standard website within six weeks of the closure of consultation period;

    (d) In order to seek public input on all new Standards or major revisions to Standards, the Gold Standard publishes a TOR document on its website. This document includes:

        (i) Background and rationale for the development of the Standard, including links to the Gold Standard Vision, Mission and Theory of Change;

        (ii) The scope and the intended outcomes and impacts that the Standard aims to achieve;

        (iii) An overview of governance and decision-making and how the Standard will be approved;

        (iv) A high-level workplan including reference to consultation periods;

        (v) Complaints and grievance contact details and protocol;

        (vi) Opportunities for engagement and consultation in Standards development; and

        (vii) Any risks associated with the proposed Standard or its development;

[4] Available at https://globalgoals.goldstandard.org/standards/000.1_V2.1_Gov_Standards-Setting-Procedure.pdf, accessed on 12 July 2021.

(e) The TOR will be published no later than one month prior to the first public consultation round. A robust workplan should be designed and published. Relevant standards bodies will also be notified of the proposed development as per the Stakeholder Mapping and Consultation Process, which includes contacting key stakeholder groups;

(f) The Gold Standard secretariat announces any new Standard or Module development by posting to the Gold Standard website. Such notices are also included in outreach material such as Gold Standard newsletters;

(g) Technical Advisory Committee members are expected to commit at least 5 per cent of their time to Gold Standard activities.

Appendix 2. MP inputs

1. Summary of MP member comments on the concept note

1. The following feeback is received from the MP members, the number of comments against each issue is included in parenthesis.

   (a) Drafting group/small group: May be useful to detail the composition and role(s) of each of the drafting team members to delineate the responsibility(ies) of the lead (one) and member(s), rather than having a shared one [1].

   (b) With reference to 'Step 7 final draft to MP' in figure 1 and 2:

      (i) It is generally agreed that this step needs improvement, inputs two weeks in advance to the meeting for a detailed reading of the materials and to facilitate a written feedback required in step 8 is suggested. This will also help to avoid oral feedback during the meeting [2];

   (c) Regarding a possible pre-meeting chaired session there are different views as follows:

      (i) support a short-chaired session before the MP meeting to have the same level of familiarity among MP member on each case/ issue, it would be a good opportunity to hear other members' views and ideas. Similarly support a post meeting chaired session to finalize products for publications [1].

      (ii) An initial chaired session is not necessary or viable [1].

      (iii) The chaired session 7 days before the MP meeting is a promising innovation. The chaired session can be suitable for MP members to alert each other to details or secretariat to test aspects where they do not suspect issues to appear [1].

   (d) With reference to 'Step 9 in meeting work' in figure 1 and 2:

      (i) Suggest this activity is organized to reserve time for reading of comments and responding to them so that undivided attention can be paid on the ongoing discussion [1].

   (e) Database of data/parameters**:** Very supportive, templates could be part of CDM tools [1].

   (f) Update of default values: Value the task and it may be that in some cases, for some parameters (e.g. agriculture) different default may be adopted for different regions [1].

   (g) Practices of other standards**:** The comparison to Verra and GS potentially reveals important insights, however it is necessary to distinguish differences to CDM that need to remain. To produce a useful comparison CDM methodology development to Verra and GS, one needs to select a small number of methodologies that yield revealing differences based on clear comparability. This is ground-cutting work, time consuming and requires significant resources [1].

(h) Comments before the meeting**:** ISO's rule that there are no substantial comments allowed at meetings would not be helpful in the case of MP. The chaired pre-session itself might increase the care by MP members to add substance at the MP meeting only when really required. However more discipline from MP members would improve efficiency and the commenting template can be a means to achieve this [1].

(i) Commenting template: The commenting template is not an improvement for the current practice of MP writing comments in methodologies. The commenting template might be designed to encourage collecting different views in order to get an overview of the various insights of MP members, and less on requiring a solution from each MP member. Perhaps such a template should be designed only for substantive comments (not editorials) and add another parameter column i.e. the source of improvement, i.e. the commenter believes secretariat should check something in the past of MP work, a particular stakeholder consulted or the matter requires completely new analytical input [1].

2. MP 85 inputs

2. The secretariat provided the below inputs to kick start the brainstorming on the topic:

(a) Checks by multiple eyes is in place to some extent (MP small group, review by multiple secretariat staff), however there is no reliable measurement and recording to understand what improvements happen at what stage and vice versa;

(b) Simple process for monitoring, recording, evaluation and course correction throughout may be included such that it is not a burden to implement it;

(c) MP small group members could play greater role throughout the lifecycle of the product till EB approval;

(d) An independent editor may be engaged;

(e) More standardization of the structure and content of the methodologies may be considered, for example:

(i) Synchronization of large-scale and small-scale meth templates including consistent approach to sequencing of sections (e.g. in ACM0002 project emissions appear before baseline emissions while in almost all small-scale meths and some large-scale meths such as ACM0001 it is the reverse);

(ii) Terms used with the methodologies and tools may be standardized e.g. 'leakage' against leakage emissions;

(iii) Consistent method to cross-referencing;

(iv) Creation of a "database of parameters" to propose consistent definition and nomenclature (acronyms). Methodologies can cite or copy the parameters;

(v) Optionally parameter tables may also be standardized and included in the database (unit, monitoring frequency, QA/QC, source, etc);

(f) After the adoption of the MP report, an enhanced review of the annexes could be conducted by a "Peer Review Team" including MP small group to finalize the peer-

review within a certain number of days. A mandatory short meeting of the peer review team or MP held after certain number of days after the MP meeting where a sign off from each member is recorded. Annex is published only after that:

(i) Project Assessment Unit could be involved in the peer review team to give a fresh eye perspective;

(ii) An external editor can be involved to check the language;

(iii) Stakeholders (public, DOEs and others may also be engaged to crowdsource the improvements, recognition/acknowledgement of inputs received to incentivize may be considered);

(iv) Peer review history and findings summary/ratings is documented throughout;

(g) Between the publication of the MP annexes and the EB meeting (>3 weeks apart) flexibility for further improvements may be included:

(i) MP will appraise the Chair of the MP and to the Board on any corrections done (e.g. green-highlighted version as compared to the MP annex presented to the Board);

(h) For the longer term, consolidation of the existing methodologies and development of more tools may also be proposed;

(i) A flow chart for selection of tools and methodologies may also be proposed.

3. The MP considered editorial consistency of CDM methodological products and the input from the secretariat as above, and provided initial feedback to the secretariat as follows and agreed to provide further inputs to the secretariat on the concept note when it is prepared:

(a) Possible arrangements to address editorial errors and fresh-eye perspective to increase clarity are welcome, as MP, project participants and secretariat members have high technical skills but varying language skills (e.g. an editor can be engaged soon after an MP product is finalized at the meeting). Continuing review of the products after the MP meeting, but before the EB meeting is useful. One member of the MP may be assigned to each case as a case lead, with responsibility to sign off on the editorial and consistency aspects;

(b) Standardization and harmonization of the structure of large- and small-scale methodologies are welcome and could include parameter names, descriptions and monitoring tables;

(c) Maintaining 250 methodologies is challenging. Modularization, consolidation of methodologies and optimum use of standardized baseline are advisable for wider and deeper impact; however, these measures need to be implemented in incremental steps, e.g. more tools developed with corresponding consolidation of methodologies, tool of tools to avoid overlap between tools, consolidation confined to specific sectors (e.g. waste, demand-side efficiency in households, electricity supply/demand);

(d) Digitization could potentially resolve some of the issues faced in the past regarding consolidation (e.g. experience with ACM0006). The development of Excel spreadsheets for equations in parallel with the development of methodological products could be considered. Joint crediting mechanism experience should be taken into account to ensure that the time required for spreadsheets does not constrain the development of the methodology;

(e) The above work should also keep in mind that the “methodology should be fit for the future”, although there is no explicit mandate (i.e. future mechanisms). Given the net-zero goal by mid-century, some methodologies may become redundant over time.

Appendix 3. Consistency of data/parameter tables

1. Opportunities for standardizing the data/parameter tables are illustrated in this section. Listed in the Table 1 below is the data/parameter "Methane content in biogas or Landfill gas (LFG) in year y" extracted from different methodologies that cover biogas or landfill gas requiring the methane content in the gas flow. It is observed that:

    (a) The fraction of methane in the gas (either landfill gas or biogas) is a parameter that is common to methodologies that involve the capture and destruction of methane such as "AMS-III.D.: Methane recovery in animal manure management systems", "AMS-III.G.: Landfill methane recovery", "AMS-III.H.: Methane recovery in wastewater treatment" and "ACM0014: Treatment of wastewater".

2. The requirements to monitor this common parameter among these different methodologies should be ideally similar and consistent in the monitoring table. However, there are some differences:

    (a) The methodologies allow the parameter to be measured continuously or periodically with a 90/10 (small-scale methodologies) or 95/10 (consolidated methodology); however, the frequency is prescribed in different sections of the monitoring table;

    (b) The unit of the parameter in the consolidated methodology (kg_{CH4}/m^3_{gas}) is different from the small-scale methodologies (%);

    (c) The small-scale methodologies contain a requirement about the location of the measurement point that is not indicated in the consolidated methodology;

    (d) The small-scale methodologies contain a requirement preventing the methane content to be estimated based on the measurement of other constituents of biogas (such as CO_2). Such requirement is not indicated in the consolidated methodology;

    (e) AMS-III.D. refers to the "Standard for sampling and surveys for CDM project activities and programmes of activities" if the parameter is determined based on survey whereas the other methodologies do not contain such reference;

    (f) The small-scale methodologies do not contain QA/QC procedures.

3. One methodology widely applicable under the CDM is "ACM0001: Flaring or use of landfill gas" for projects developed in landfills. In the early versions, the methodology included the monitoring provisions to measure the fraction of the methane in the landfill gas (w_{CH4}) that was used to determine the amount of methane destroyed by the project in year y ($MD_{project,y}$). However, since version 12 (approved on 2011), the amount of methane destroyed is determined and measured following the provisions from "TOOL08: Tool to determine the mass flow of a greenhouse gas in a gaseous stream".

Table 1. Monitoring requirements for data/parameter "Methane content in biogas or landfill gas (LFG) in year y"

	AMS-III.D.	**AMS-III.H.**	**AMS-III.G.**	**ACM0014**
Data/ parameter:	w_{CH4}	$w_{CH4,y}$	$w_{CH4,y}$	$\boldsymbol{w_{CH4,biogas,y}}$
Data unit:	%	%	%, volume basis	kg CH_4/m^3
Description:	Methane content in biogas in the year *y*	Methane content in biogas in the year *y*	Methane content in landfill gas in the year *y*	Concentration of methane in the total biogas supply in the outlet of the new digester at reference conditions
Source of data:	-	N/A	N/A	Measured
Measurement procedures (if any):	The fraction of methane in the biogas should be measured with a continuous analyser (values are recorded with the same frequency as the flow), or with periodic measurements at a 90/10 confidence/ precision level by following the "Standard for sampling and surveys for CDM project activities and Programme of Activities"; alternatively, a default value of 60% methane content can be used. The option chosen should be clearly specified in the PDD. It shall be measured using equipment that can directly measure methane content in the biogas. The estimation of	The fraction of methane in the gas should be measured with a continuous analyser or, alternatively, with periodic measurements at a 90/10 confidence/precision level. It shall be measured using equipment that can directly measure methane content in the biogas. The estimation of methane content of biogas based on measurement of other constituents of biogas such as CO_2 is not permitted. The methane content measurement shall be carried out close to a location in the system where a biogas flow measurement takes place.	The fraction of methane in the gas should be measured with a continuous analyser (values are recorded with the same frequency as the flow) or, alternatively, with periodic measurements at a 90/10 confidence/precision level. It shall be measured using equipment that can directly measure methane content in the landfill gas. The estimation of methane content of landfill gas based on measurement of other constituents of landfill gas such as CO_2 is not permitted. The methane content measurement shall be carried out close to the location in the system where the landfill gas flow, temperature and pressure measurements are carried out, and at	Using calibrated continuous gas analyser.

	AMS-III.D.	**AMS-III.H.**	**AMS-III.G.**	**ACM0014**
	methane content of biogas based on measurement of other constituents of biogas such as CO_2 is not permitted. The methane content measurement shall be carried out close to a location in the system where a biogas flow measurement takes place, and on the same basis (wet or dry).		the same humidity content (dry or at known or measured/corrected for humidity content).	
Monitoring frequency:	-	-	-	Either with continuous analyser or, alternatively, with periodic measurement at 95/10 confidence/precision level.
QA/QC procedures:	-	N/A	N/A	The project proponents shall define the error for different levels of measurement frequency. The level of accuracy will be deducted from the average concentration of measurement.
Any comment:	-	-	-	-

Appendix 4. Default values in need of update in CDM methodologies

1. Default baseline emission factors for lighting and other small powered residential loads in an off-grid situation are of relevance to many small-scale methodologies such as "AMS-I.A: Electricity generation by the user", "AMS-I.F: Renewable electricity generation for captive use and mini-grid", "AMS-I.L: Electrification of rural communities using renewable energy" and "AMS-III.BB: Electrification of communities through grid extension or construction of new mini-grids". These defaults are based on assumed kerosene usage under a suppressed-demand scenario and an emission factor of diesel generator including under part load conditions. These defaults are also used outside of the CDM (e.g. several Green Climate Fund projects cite CDM methodologies to estimate the baseline emissions for off-grid electrification projects). This section discusses the accuracy of the factors under the current state of knowledge on these issues.

1. Kerosene lamp emissions reduction

2. Household kerosene consumption values reported in the literature review are in table 1.

Table 1. Household kerosene consumption

Source	Coverage	liters/year
Mills (2005)	All developing countries	132
Lighting Africa (2010)	Review of 28 surveys from across the globe[1,2]	60 (range: 36-360)
REDS CDM project	Rural India	131
D.Light CDM project	Rural India	83.8
Cambodia (UNDP 2008)	Rural households in Kampong Speu and Svay Rieng	15-23
Tanzania CDM	Sumbawanga Region	36-60
Uganda (Harsdorff and Bamanyaki 2009)	Unelectrified rural households	38

[1] This 2010 report mentions that of the approximately 110 million off-grid households across Africa (encompassing 580 million individuals), more than half employ kerosene lamps as their primary light source, with many needing several sources to fill their lighting needs. Other non-renewable off-grid alternatives include candles, biofuels (e.g. wood, animal dung, crop waste), battery-powered light devices, and diesel generators for the very richest households and small businesses.

[2] It is also stated that beyond the direct impacts of such CO_2 emissions, a nascent set of science on climate change which looks at the impact of black carbon – formed from incomplete combustion of fossil and biofuels and also commonly referred to as soot – has suggested that such emissions from kerosene and biofuel burning could be a major source of warming in the lower atmosphere and play a strong role in the melting of glacial regions. The science on this varies widely, with reports claiming that black carbon is responsible for anywhere from 5 per cent to 50 per cent of the warming caused by CO_2 alone.

3. The literature review showed a wide range of consumption, ranging from 3 to 30 liter/month and amounting to 90 to 900 $kgCO_2$/household/year. Lighting Africa (2010) reported estimated emissions of 150 $kgCO_2$/household/ year based on 5 liter/month and stated, "Our estimate draws on Lighting Africa market research on off-grid populations in five African countries and equates to the use of one kerosene wick lamp or two relatively more efficient kerosene hurricane lamps for three to four hours daily."

4. Applying the concept of suppressed demand, CDM small-scale methodologies covering the switch from fossil fuel-based lighting such as kerosene lamps **assign 6.8 $kgCO_2$/kWh for the first 55 kWh of electricity generated per household, i.e. 374 $kgCO_2$e/ household/year. This amounts to about 150 liters of kerosene** consumption per household per year for lighting, **which is unlikely to be conservative under the current market situation or current state of knowledge on the issue**.

2. Default values for off-grid diesel emission factors

5. Some CDM methodologies (e.g. AMS-I.F.) provide default values for emission factors from use of diesel generators depending on the size of the generator and loading capacity, as seen in table 2, **which reach values as high as 1.4 $kgCO_2$e/kWh under certain circumstances.**

Table 2. Emission factors for diesel generator systems (in $kgCO_2$e/kWh[(a)]) for three different levels of load factors[(b)]

Cases	Mini-grid with 24-hour service	(a) Mini-grid with temporary service (4-6 hours/day); (b) Productive applications; (c) Water pumps	Mini-grid with storage
Load factors [%]	**25%**	**50%**	**100%**
<15 kW	2.4	1.4	1.2
>=15 <35 kW	1.9	1.3	1.1
>=35 <135 kW	1.3	1.0	1.0
>=135<200 kW	0.9	0.8	0.8
> 200 kW[(c)]	0.8	0.8	0.8

(a) A conversion factor of 3.2 $kgCO_2$/kg of diesel has been used (following revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories);

(b) Values derived from figures reported in RETScreen International's PV 2000 model retrieved from: http://retscreen.net/;

(c) Default values.

6. The values in table 2 were approved some 15 years back and have not been updated since (the source cited from Rescreen is no longer accessible). **Also, the literature review, as described below, showed that values above 1.0 $kgCO_2$/kWh under any circumstances of partial loading or size of the diesel generator was unrealistic under current market conditions**.

3. Default values from literature

7. A Joint Crediting Mechanism methodology,[3] "Displacement of Grid and Captive Genset Electricity by a Small-scale Solar PV System, Ver. 01.0" for a project in Palau, estimated that the current emission factor for a diesel generator ranges from 0.631 tCO_2/MWh to 0.805 tCO_2/MWh in the region based on an efficiency range of 33 per cent to 41 per cent. The methodology proposes 0.533 tCO_2/MWh[4] as the baseline emission factor for an efficiency of 49 per cent, which is currently not being achieved but that may be achieved in near future. The rationale was that existing diesel engines for grid electricity may be replaced in the near future upon reaching the end of their lifetime. Also, new capacity may soon be required to meet increasing electricity demand. The choice of technology for such additional/ replacement capacity is likely to be diesel engines due to their proven track record, albeit a highly efficient one.

8. Other useful literature information is as follows:

   (a) There are two primary types of piston engines for power generation: the diesel engine and the spark-ignition gas engine. Of these, the diesel engine is the most efficient, reaching close to 50 per cent energy conversion efficiency ("Power Generation Technologies, 2nd edition", 2014, Paul Breeze);

   (b) In general, diesel engines have efficiencies that range from 30 per cent to 45 per cent ("Handbook of Energy Efficiency and Renewable Energy", 2007, Edited by D. Yogi Goswami);

   (c) Power generation efficiency of diesel engines ranges from 30 per cent to 48 per cent ("Cogeneration Plan and Design Manual, 6th edition", 2008, The Japan Institute of Energy);

   (d) The SU3 and MARK-30B engines have attained generation efficiencies of 44.1 per cent and 46.8 per cent, respectively, which are better than any other diesel engine in the world in this class ("Approach on High Efficiency Diesel and Gas Engine", 2008, Mitsubishi Heavy Industries Technical Review, Vol. 45, No. 1).

   (e) *Mini grid emission tool* from SE4ALL https://www.seforall.org/system/files/2021-08/SEforALL_Carbon-emissions-methodology-cover-note.pdf proposed 0.8 $kgCO_2e$/kWh and 1.0 $kgCO_2e$/kWh for the large and small diesel generators.

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[3] https://www.jcm.go.jp/pw-jp/methodologies/18.

[4] Calculated as [tCO_2/MWh]= (CO_2 emission factor of diesel oil [$kgCO_2$/GJ]/1000*3.6) / (power generation efficiency (lower heating value basis) [%]/100), applying the default value of the CO_2 emission factor of diesel oil (72.6 $kgCO_2$/GJ) from 2006 IPCC guidelines. In other words, 0.2613/efficiency will yield $kgCO_2$/kWh.

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