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Abstract: In the context of crediting mechanisms for emission reduction projects, methodologies define how to set the crediting baseline, to test additionality, and to monitor and quantify emission reductions. They are therefore crucial for ensuring the environmental integrity of the carbon credits issued. The over 250 methodologies approved under the Clean Development Mechanism (CDM) of the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) constitute the most important body of knowledge in this regard. Therefore, these methodologies are often used as a starting point in pilot activities for the use of market mechanisms under Article 6 of the Paris Agreement (PA). Given the absence of agreed rules on Article 6, it is unclear to what extent CDM methodologies will be formally transitioned into the Article 6.4 mechanisms. Under Article 6.2, countries can choose freely what methodologies to apply. Given that the CDM methodologies were developed prior to the adoption of the PA, they must be adapted or combined with new approaches to ensure that the underlying activity promotes an increase of mitigation ambition and does not jeopardise the achievement of the host country's Nationally Determined Contribution (NDC). Moreover, given the lack of mandatory rules under the CDM to consider Agenda 2030 and its Sustainable Development Goals (SDGs), reporting and monitoring requirements for sustainable development (SD) contributions are generally absent. Under Article 6, cooperating Parties may wish to see stronger consideration of SD in the activity design and monitoring, reporting and verification (MRV) of SD impacts.

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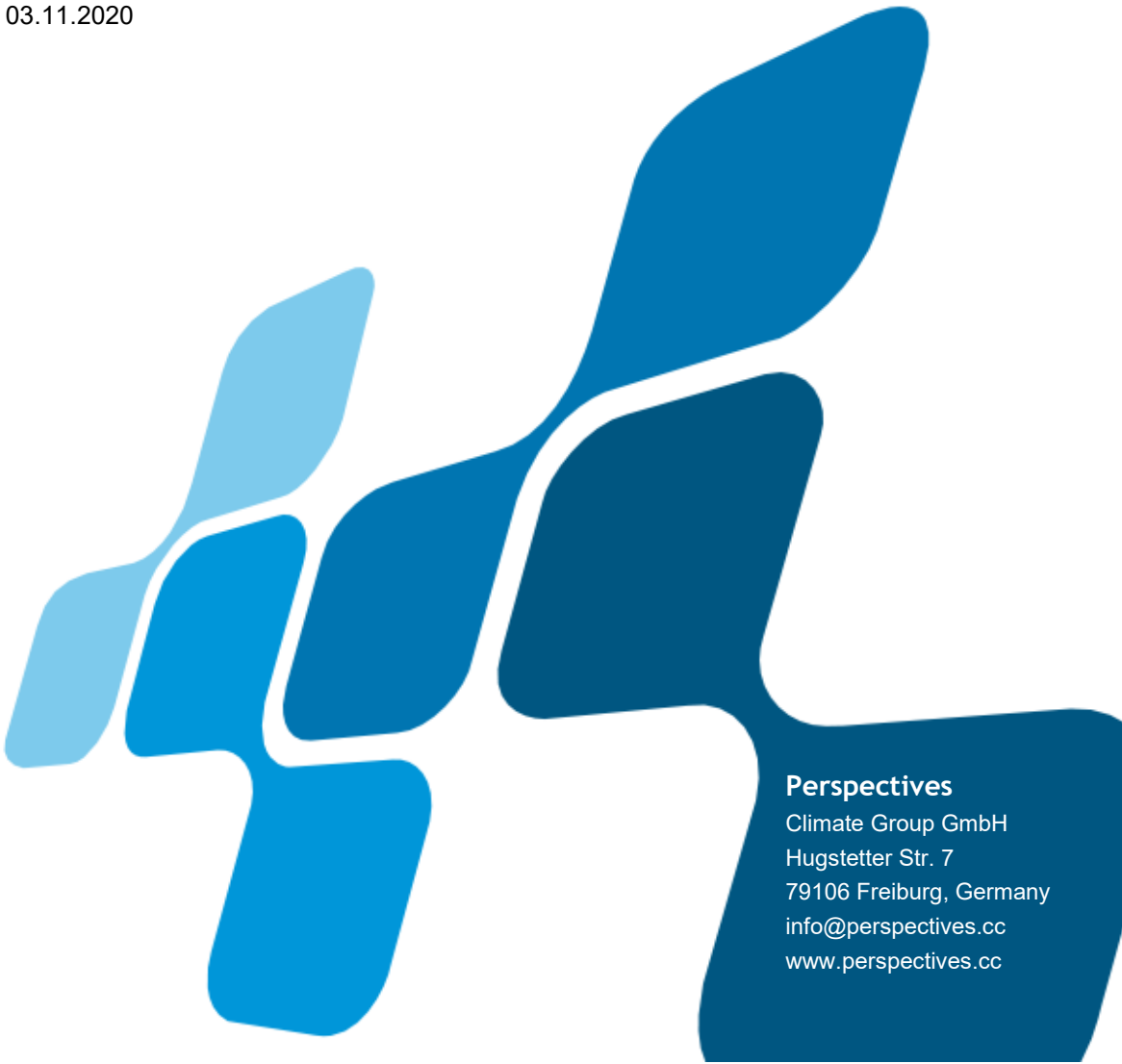

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This work has been commissioned by the Swedish Energy Agency (SEA) in the context of a framework project on analysis and method development regarding Article 6 of the Paris Agreement. Please note that the views expressed in this report are those of the authors and do not represent any official position of the SEA.

Abbreviations

BAT	Best available technology
BATNEEC	Best available techniques not entailing excessive costs
BAU	Business as usual
CDM	Clean Development Mechanism
CCB	Climate, Community & Biodiversity
CME	Coordinating/managing entity
DNA	Designated National Authority
DTU	Technical University of Denmark
EB	Executive Board
EE	Energy efficiency
ETF	Enhanced Transparency Framework
fNRB	fraction of non-renewable biomass
GHG	Greenhouse gas
GS	Gold Standard
IPCC	Intergovernmental Panel on Climate Change
ITMO	Internationally Transferred Mitigation Outcome
IRR	Internal rate of return
kWh	kilowatt-hour
LDC	Least Developed Country
LEDS	Low Emission Development StrategyStrategy
MRV	Monitoring, Reporting and Verification
MWh	Megawatt hour
NAMA	Nationally Appropriate Mitigation Action
NDC	Nationally Determined Contribution
NGO	Non-governmental organization
PA	Paris Agreement
PDD	Project Design Document
SD	Sustainable development
SDGs	Sustainable development goals
SEA	Swedish Energy Agency
tCO_2e	Tons of carbon dioxide equivalent
TJ	Terajoule
TPDDTEC	Technologies and Practices to Displace Decentralized Thermal Energy Consumption
UN	United Nations
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard

Executive Summary

In the context of crediting mechanisms for emission reduction projects, methodologies define how to set the crediting baseline, to test additionality, and to monitor and quantify emission reductions. They are therefore crucial for ensuring the environmental integrity of the carbon credits issued. The over 250 methodologies approved under the Clean Development Mechanism (CDM) of the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) constitute the most important body of knowledge in this regard. Therefore, these methodologies are often used as a starting point in pilot activities for the use of market mechanisms under Article 6 of the Paris Agreement (PA). Given the absence of agreed rules on Article 6, it is unclear to what extent CDM methodologies will be formally transitioned into the Article 6.4 mechanisms. Under Article 6.2, countries can choose freely what methodologies to apply.

Given that the CDM methodologies were developed prior to the adoption of the PA, they must be adapted or combined with new approaches to ensure that the underlying activity promotes an increase of mitigation ambition and does not jeopardise the achievement of the host country's Nationally Determined Contribution (NDC). Moreover, given the lack of mandatory rules under the CDM to consider Agenda 2030 and its Sustainable Development Goals (SDGs), reporting and monitoring requirements for sustainable development (SD) contributions are generally absent. Under Article 6, cooperating Parties may wish to see stronger consideration of SD in the activity design and monitoring, reporting and verification (MRV) of SD impacts.

In this context, we evaluate selected CDM baseline and monitoring methodologies - covering on-grid renewable energy, biomass utilisation, methane recovery, landfill gas avoidance and utilisation, and energy efficiency on the demand side and in industry - with regard to their appropriateness for use under Article 6 of the PA. These methodologies also cross-reference various tools to determine key parameters applied in the methodology as well as the additionality of the activity. Over time the relevance of these tools has increased, leading to a modular "toolbox" where some tools - assessing additionality, calculating the emission factor for an electricity system and calculating the fraction of non-renewable biomass - serve as cornerstones of the whole CDM approach. The integrity of a methodology therefore largely depends on the integrity of these underlying tools. Our evaluation builds on an assessment framework that takes into account the current status of negotiations and methodological principles of the Article 6.4 mechanism, as well as lessons learnt from the application and development of CDM methodologies.

The assessment shows that all methodologies (with only a few exceptions) show similar performance when evaluated according to the selected criteria: only minor methodology/tool-specific risks to integrity were identified. To get 'fit-for-Paris' we suggest new cross-cutting solutions – 'Article 6 tools' – that address the link to host country NDCs, ambition increase and the alignment with the Enhanced Transparency Framework (ETF). These tools, embedded in a wider regulatory framework, can ensure the transition of CDM methodologies in a slightly adapted form.

Most importantly, piloting actors must address the following issues with regard to Article 6-compatible methodologies:

- The additionality test must be reformed to include a link to existing policies and regulations. Positive lists for automatic additionality should be updated regularly to reflect market and technology development. To increase investment security, the updates should be undertaken in fixed ex-ante intervals.
- A link to the host countries NDC and related conditional or unconditional targets as well as its sectoral scope (inside or outside the NDC) must be considered.
- Crediting baselines must result in a below-business as usual (BAU) crediting of emission reductions.
- Methodologies should be designed both to increase stringency over time and to preserve investment security.

As most of these revision needs are cross-cutting, we conclude that rather than reviewing CDM methodologies on a case-by-case basis, newly developed 'tools' or overarching guidance should be developed to incorporate the above-mentioned revision needs. Existing methodologies should then be used in conjunction with these new tools and guidance.

Guidance on how to safeguard sustainable development in activity design and MRV for SD impacts could be incorporated into a tool. This tool could then be applied in conjunction with different CDM methodologies. Some tools and guidance documents already exist, such as the ones developed by the Gold Standard. However, there is limited practical experience in using these tools, and further research is necessary to design the interplay of CDM methodologies and potential sustainable development tools.

1. Introduction

1.1. The relevance of CDM methodologies for cooperation under Article 6

In the context of crediting mechanisms, methodologies are used for four different tasks:

- setting the baseline against which mitigation outcomes are measured;
- defining a (or referring to a separate) procedure for testing additionality of an activity;
- calculating activity emissions and leakage, and resulting emissions reductions; and
- defining how monitoring and emission reduction quantification is to be done.

Generally, methodologies are crucial to ensure the environmental integrity of credits issued. Environmental integrity is not explicitly defined by the Paris Agreement and it is thus subject to diverging interpretations. For the purpose of this report, it is interpreted as follows: global greenhouse gas (GHG) emissions do not increase as a result of any baseline-and-crediting mechanism or linking of emissions trading schemes (Spalding-Fecher et al. 2017, p. 1). In the context of Article 6 of the PA, methodologies specifically must be defined in a way so that the activity promotes mitigation ambition and safeguards the contribution of activities to the NDC achievement of the host country. In addition, methodologies can be designed to promote SD through both, the monitoring of sustainable development contributions and the performance of safeguards against potential adverse impacts.

Experience under the CDM has shown that the development of methodologies is a highly technical, time-consuming and costly exercise. Our experience is that the development of one methodology can take between one and two years and usually comes at a cost of approximately 0.1-0.2 million €. Therefore, the most efficient option is for Article 6 to build on the large body of knowledge built under the CDM over the last 15 years. This is why CDM methodologies are often the starting point for Article 6 pilot activities.

Currently, 252 CDM methodologies have been approved. However, only some of these have been used frequently. Some of the more widely used methodologies have been revised repeatedly; some even up to 20 times. Revisions generally tend to increase conservativeness of the methodologies. CDM methodologies often reference specific methodological tools of which 42 have been approved so far. Such tools address overarching issues (e.g. testing additionality, calculating a grid emissions factor, defining standardised baseline parameters) relevant for several activity types (or countries in the case of standardised baselines). They are used as elements ‘feeding into’ several methodologies, which formally reference them. This then means that the user of a methodology must apply the referenced tool for a certain step in the methodology. Methodologies thus cannot be seen independently from tools that are referenced in them. Any assessment of methodologies needs to include the relevant tool(s) as well. We therefore consider them an integral part of the CDM methodologies.

CDM methodologies, tools and standards can be taken as a basis for the development of methodologies applicable to Article 6 market-based cooperation. However, they must be transformed to reflect the regime change from the Kyoto Protocol to the PA. This refers most importantly to the necessity for market mechanisms to support the promotion of the transformational change necessary to reach the long-term temperature goal of the PA in the context of sustainable development.

For the purpose of this report, we will deploy the following working definition of transformational change in the context of carbon markets, in line with the interim results of an ongoing research project of the UNEP DTU Partnership, Perspectives Climate Research and First Climate:

"Transformational change is a fundamental, sustained change of a system that occurs in a dynamic manner, ends established high-carbon practices and contributes to a zero-carbon society, in line with the Paris Agreement goal to limit global warming to 1.5–2°C and the United Nations SDGs, through the deployment of clean technologies and capital in combination with long-term, yet adaptive policies" (Holm Olsen et al. forthcoming).

This relates to promoting an increase in mitigation ambition through:

- putting the host country on a development trajectory in line with the long-term targets of the PA
- applying methodologies that incentivise technologies that would not be implemented under BAU and to stop calculating emissions reductions once a technology has become BAU.

Closely linked is the necessity to consider new climate policies and NDC implementation in host countries, without providing disincentives to limit ambition, and to adapt methodologies so they can reflect NDC implementation in host countries with strongly differing characteristics. Furthermore, inducing transformational change requires a significant upscaling of mitigation action that should be promoted through the lowering of transaction costs in methodologies. In order to ensure that the transformation of our societies is environmentally and socially sound, climate action must consider the interlinkages with broader sustainable development and specifically with the achievement of the SDGs. These aspects of transformational change, tailored towards market-based cooperation on mitigation, will be considered in the following section.

1.2. Context and scope of the study

The Swedish Energy Agency (SEA) works to create a portfolio of Article 6 activities under the PA. This work currently includes an evaluation of possible emission reduction activities, that have been submitted to the SEA. Proposed activities often refer to CDM methodologies. Perspectives Climate Group, First Climate and Climate Focus were tasked to support SEA in understanding how relevant CDM methodologies could be used and transformed for their use in an Article 6 context.

Between June and October 2020, the consortium undertook an evaluation of selected CDM methodologies to determine their applicability for Article 6 market-based cooperation and potential needs for revision. This report outlines the approach of the project team and summarises the main findings. The report furthermore seeks to support ongoing discussions in Article 6 pilot activities on how to promote methodologies and underlying tools that set high standards for environmental integrity, strengthen ambition and sustainable development.

In the context of this study, the consortium developed an assessment framework to allow for a standardised, internally consistent and comparable assessment of selected CDM methodologies and tools (see Chapter 2). The tools and methodologies were subsequently analysed against the identified criteria in order to identify revision needs. The results of this analysis are summarised in Chapter 0. The analysis of methodologies mostly focuses on *ambition in mitigation action* as an important driver of transformational change, *additionality* to ensure that Article 6 action is limited to technologies that have a transformational character, as well as a regular *re-assessment* of policies that incentivise the technologies. However, market-based cooperation under Article 6 must also foster sustainable development. Therefore, the project team identifies and describes some sustainable development tools that can be considered in the context of Article 6 activity design (see Chapter 4). The study concludes with recommendations, taking into account methodological limitations, and the identification of further research needs (see Chapter 5).

2. Defining an assessment framework for CDM methodologies

The project team developed an assessment framework to enable a comparable and consistent assessment of different CDM methodologies The assessment framework therefore had to strike a balance in being broad enough to cover different activity types and methodological approaches, but specific enough to allow for the development of clear conclusions on their applicability under Article 6. Two dimensions were considered in its development:

- the current status of negotiations on methodological principles of the Article 6.4 mechanism; and
- lessons learnt from the application and development of CDM methodologies.

The assessment framework has been used to assess the eligibility of specific methodologies in an Article 6 context. In addition, it should be noted that the assessment framework focuses on evaluating the environmental integrity of methodologies in the context of mitigation action. As promoting SD is a key principle of Article 6 cooperation, methods for including appropriate processes, monitoring tools and methodologies in mitigation activities are discussed in Chapter 4.

2.1. Current status of Article 6.4 negotiations on methodologies

2.1.1. Overarching methodological principles

Detailed international rules for methodologies are currently negotiated by the Parties to the PA in the context of the Article 6.4 mechanism. Key principles for methodologies currently discussed include:

- Transparency
- Conservativeness
- Consideration of uncertainty and leakage
- Consideration of relevant national policies
- Consistency with NDCs, long-term low GHG emission development strategies and PA long-term targets (and thereby contribution to long-term transformation)
- Contribution to reducing emissions in host Party
- Encouraging an increase in ambition over time

2.1.2. Eligible baseline setting approaches

More specifically, Parties are negotiating the eligibility of specific approaches to baseline setting. Parties did agree that different baseline setting approaches may be appropriate for different activities but could not agree on which principal approaches to accept. The available options are included in the draft negotiation text in its iteration dated December 14th, 2019 but were excluded from the draft rules, modalities and procedures in the draft text version of December 15th as no agreement seemed possible.

Option 1: Baselines must be 'below BAU' and consider relevant national, regional or local circumstances. The baseline approach chosen must be justified. Eligible approaches are based on best available technology assessments, performance benchmarks, and other benchmarks. Only where these approaches are not economically and technologically viable, baselines can be based on projected or historical emissions (UNFCCC 2019a, annex, paragraph 38).

Option 2: Baselines must "contribute to emission reductions and/or removals", be consistent with the implementation of the host Party's NDC and the long-term goals of the PA, and take into account other relevant circumstances. Relevant circumstances include national, regional or local social, economic, environmental and technological circumstances. The default baseline approach is a performance-based approach, where the baseline is set "at least at the average emission level of the best performing comparable activities providing similar outputs and services within a defined scope and boundary in the past three years and where the host Party may determine a more ambitious level at its discretion" (UNFCCC 2019a, annex, paragraphs 40-41). Where such an approach cannot be applied, an alternative (in line with general principles) can be proposed, accompanied by a justification (ibid).

The text will have to strike a balance between clear principles and flexibility so that developers can operationalise the principles in different activity contexts (and at different aggregation levels). Experience under the CDM shows that baselines often rely on a mix of different baseline setting approaches.

2.1.3. Additionality determination

In the current negotiations, there seems to be consensus that existing laws, regulations or any other legally binding mandate must be considered when determining additionality –in deviation from the CDM– (UNFCCC 2019a, annex, paragraph 46).

But there are other principles and issues still in brackets that relate to the following questions:

- What is the link to the NDC? Must the activity be complementary to or going beyond the activities associated with or explicitly listed in the unconditional part of the NDC? What is the difference between these two qualifiers? Does the host Party determine which measures are associated with the NDC? Does this only include existing policies or also measures that are planned to contribute to NDC achievement?
- Should there be a link to a long-term Low Emission Development Strategy (LEDS), where available? What would be the nature of this link?

Hitherto not addressed in UNFCCC negotiations, is the difference between conditional and unconditional NDC targets and how to treat NDCs that do not include a set of policies and measures for (all or part of) the sectors.

It is unclear how and if UNFCCC carbon market regulators will have to deal with the issue of perverse incentives not to adopt mitigation policies in order to be able to increase the share of additional mitigation activities in the country. Rules introduced under the CDM to prevent perverse incentives (see Box 1 below) were highly controversial. While one could argue that the existence of an international obligation to increase ambition in NDCs every five years overrules any potential perverse incentives through carbon markets in a post-2020 world, it is yet unclear how this will play out in practice.

Box 1: The consideration of host country policies in the CDM

As host countries in the CDM had no international climate policy commitments to fulfil, considering mitigation policies in crediting baselines could have led to a perverse incentive for host countries not to adopt these policies. Therefore, the CDM Executive Board (EB) adopted the so-called E+/E- rule on the consideration of policies in baseline setting: Policies that provide a comparative advantage to more emission-intensive technologies (E+) were only taken into account if their adoption predated the adoption of the Kyoto Protocol in 1997. Policies that provide a comparative advantage to less emission-intensive technologies (E-) were only taken into account if adopted prior to the adoption of the Marrakech Accords in 2001.

Source: Shishlov and Belassen (2012)

2.2. Description of the assessment framework

2.2.1. Principles included to be in line with general Article 6 principles

The transformation of tools and methodologies for use in an Article 6 context must address the following challenges linked to the international regime change from Kyoto to Paris:

The comparability of mitigation outcomes across different NDC types

In the reference to national parameters, the methodologies should include safeguards to avoid perverse incentives and opportunities for gaming for both host countries and activity developers. Methodologies should be applicable in different country contexts and reduce risks of gaming with relation to the amount of emission reductions achieved.

Include links to host country's NDC targets

In the context of widely varying NDC characteristics, a clear link to different NDC targets cannot be established at the level of generically applicable methodologies[1]. However, Article 6 compatible methodologies should refer to such a consideration of NDC targets, ideally there would be further (international) guidance available to activity participants in the future.

Links to NDC implementation in the host country should be established on a case-by-case basis, at least if the current situation of the heterogeneity of NDCs prevails at international level. However, there will be some comparable information on NDCs of Parties to the PA in the context of the ETF that may be referenced at a generic level in the context of methodologies:

Table 1: Information Parties must submit on their NDC under the ETF

Item	Description
Information to submit to describe the NDC	▪ Targets and description, including target type(s): economy-wide absolute emission reduction, emission intensity reduction, emission reduction below a projected baseline, mitigation co-benefits of adaptation actions, economic diversification plans, policies and measures, other ▪ Target years or periods, single-year or multi-year targets ▪ Reference points, levels, baselines, base years or starting points and respective values ▪ Time frames and/or periods for implementation ▪ Scope and coverage, including: sectors, categories, activities, sources and sinks, pools, gases

[1] Not included in this analysis are the different options available for safeguarding host country NDC achievement, although there are overlaps. For a discussion of this issue, please refer to Carbon Limits et al. (2020).

Item	Description
Qualitative and quantitative indicators to communicate in order to track progress against these indicators	▪ These indicators could be: net GHG emissions and removals, percentage reduction of GHG intensity, hectares of reforestation, percentage of renewable energy use or production etc. ▪ For each selected indicator, the Parties must provide the relevant reference points, levels, baselines bases years or starting points. ▪ For each indicator, the Party needs to describe how the indicator is relevant for the NDC
A description of methodologies used in the context of NDC targets and indicators, including in cooperative approaches[2]	▪ Key parameters, assumptions, definitions, data sources and models ▪ Intergovernmental Panel on Climate Change (IPCC) guidelines used ▪ Metrics used ▪ Any sector-, category- or activity specific assumptions, methodologies and approaches ▪ Any conditions and assumptions relevant to the achievement of the NDC

Source: UNFCCC (2018)

Raising ambition over time

As per the negotiation text, Article 6 methodologies should "encourage an increase in ambition over time" (UNFCCC 2019b, annex, paragraph 35). There are different ways of how market-based cooperation under Article 6 can contribute to that principle, not all of them directly linked to additionality determination and baseline setting.

One way to increase ambition is to increase stringency of the NDCs through the availability of Article 6. For instance, investing Parties may require that activities be included in the unconditional NDC targets after the end of the crediting period. Thereby, the continuation of the mitigation activity beyond the crediting period would be secured.

Another approach is the explicit cancellation of emission reduction credits (i.e. a voluntary contribution to overall mitigation in global emissions). These 'add-on' options are not included in the methodology-specific assessment framework.

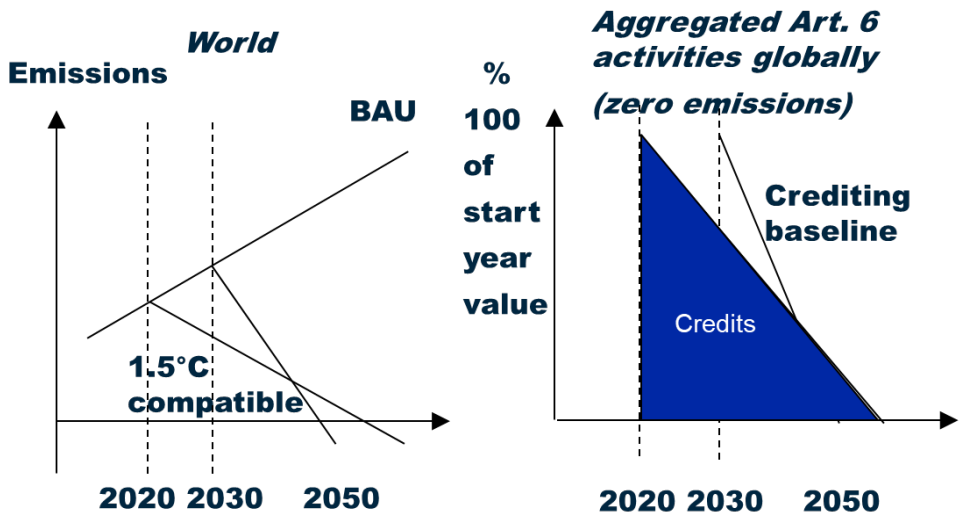
Baseline methodologies cannot directly contribute to an increase in ambition, as the stringency of the baseline only determines the allocation of emission reductions of an activity to participating countries, assuming that all emission reductions generated are transferred to the buying country. Unless buyers decide not to buy 'low ambition' credits, a loose baseline leads to a high volume of Internationally Transferred Mitigation Outcomes (ITMOs) transferred, with no emission reductions remaining in the

[2] If the resulting mitigation outcomes are used against the Party's NDC

host country. A stringent baseline leads to a small volume of ITMOs transferred, with the rest of the emission reductions accruing to the host country.

Also, baselines can be dynamically rendered more stringent over time and even aligned with a sectoral or national decarbonisation pathway consistent with the 1.5°C long term temperature goal of the PA (Hermwille 2020, Michaelowa and Michaelowa 2020). This requires the setting of a 'normative' future reference level and the definition of a transition parameter acknowledging the transition necessary to set the sector or country on a low-carbon development pathway (see Figure 1 below).

Figure 1: Concept of dynamic baselines consistent with the long-term ambition of the Paris Agreement



Source: Michaelowa and Michaelowa (2020)

Such a 'dynamic' baseline must strike a balance between the investment security for project owners and a diminishing return regarding the volume of credits it will generate. Increasing ambition of the baseline can indeed generate environmental benefits, but on the other hand project developers will see a reduction of the credit volume they can achieve, and hence a reduction of the potential revenues from the sales of credits. This would result in a lower financial attractiveness for certain measures (especially those with a longer lifetime). If the dynamic baseline is linked to the decarbonisation pathways, and these change unexpectedly over time, this would generate uncertainty for private investments, and thus reduce willingness to invest.

Apply an eligible approach to baseline setting

Applicable approaches may likely be:

- A baseline setting approach based on best available technologies (BAT) in a similar/comparable context, which would only allow projects performing better than the BAT to generate credits. Obviously, the interpretation of what is BAT differs widely. It can be subject to the economic characteristics of the technology or mean the best technology that exists anywhere on the world. The latter, more stringent interpretation would exclude the generation of credits. The former interpretation, also known as "Best available techniques not entailing excessive costs" (BATNEEC) would be close to the classical business as usual approach.
- A performance-based approach, setting the baseline at the average emission level of the best performing comparable activities, providing similar outputs and services within a defined scope and boundary in the past three years. The critical aspect here is the percentage level defining 'best performing' on the performance distribution curve. Often it is set at 10 to 20% of the cumulative distribution.
- A baseline setting approach based on projected or historical emission levels, if it can be reasonably argued:
    - that another approach is not feasible for the activity type; and
    - if the projections/historic emission levels are well below BAU emission levels (and the BAU scenario is credibly constructed).

Increase stringency in additionality assessment

When assessing additionality determination, existing and newly introduced mitigation policies in host countries need to be considered. Moreover, it needs to be ensured that NDCs with a low ambition do not allow the issuance of many ITMOs. This can be prevented by always requiring a stringent additionality test.

2.2.2. Further, general methodological principles

In addition to 'new' methodological principles introduced through Article 6, eligible methodologies must continue to respect the following generic principles that were already valid in the context of the CDM:

- Transparency
- Conservativeness
- Internal consistency
- Appropriateness and adequacy of calculations and assumptions
- Accuracy, measurability and reliability of data
- Limitation of uncertainties

In the context of additionality determination, besides to the consideration of existing policies, the additionality tools and tests should reflect current technology-related costs, meaning for instance that positive lists must be regularly updated[3]. Also, differences in risk taking between economic actors should not lead to a non-conservative outcome. For example, the choice of a threshold for the internal rate of return (IRR) should not be based on the decision of the most risk averse firm – which would require a very high IRR to invest in a project would use as threshold for its investment decision – but on the IRR that a firm with an average degree of risk aversion would apply.

Regarding the use of positive lists under Article 6, it should be clarified that they are not prohibited by the PA text, the draft Article 6.2 guidance, nor the draft modalities, procedures and guidelines of the Article 6.4 mechanism. Generally, they are an effective tool to reduce transaction costs and allow for upscaling of the mitigation measures. However, the issues associated with them, especially with the procedures and timeline for the regular update of the lists, must be considered also from a political perspective. In the context of a multilaterally governed Supervisory Body (for instance of the Article 6.4 Mechanism), Parties may have different domestic interests on the definition of positive list technologies and on how to perform the updates. This will paralyse decisions on updates of positive lists and thus lead to a 'stickiness' of the lists. Such stickiness is detrimental for environmental integrity, given that costs of maturing mitigation technologies generally decrease over time, and technologies regularly will become non-additional. In fact, the CDM EB has been unable to revise positive lists for renewable energy technologies for several years while voluntary carbon market standards, such as Gold Standard and Verra, have put most renewable energy technologies on a negative list from 2020 onwards due to lack of additionality.

In the assessment, the trade-off between fully implementing the principles and keeping transaction costs for activity developers and governments low, must be taken into account and a reasonable balance must be achieved. As the 'implementability' of a CDM methodology only becomes apparent in practice, the assessment framework leaves space for the introduction of expert judgements based on long-standing practical experiences.

[3] So far, positive lists and their applicability under Article 6 market-based cooperation have not been discussed in international negotiations. It is unlikely that general rules in this regard will be included in the Article 6.2 guidance. As for the Article 6.4 mechanism, the decision to use or not to use positive lists will most likely be taken by the Supervisory Body.

2.2.3. Methodology components to assess

The following key elements will be assessed for the different methodologies and tools:

- **Applicability conditions:** where possible, the evaluation assesses the consistency of mitigation outcomes across different types of countries. Gaming with regards to increasing production of goods/services, leading to an increase in absolute emissions, needs to be prevented. Methodologies should also avoid overlaps in applicability and have a clear definition of their scope.
- **Additionality determination:** the main element evaluated is the stringency of the additionality assessment. Methodologies are required to demonstrate additionality from existing and newly introduced mitigation policies. Positive lists are developed in a way that they reflect generic expert understanding of additionality of a certain technology, and are required to be regularly updated. Furthermore, the provision of additionality criteria that require the check of specific activity-related parameters is assessed.
- **Baseline scenario determination:** the methodological principles of the methods for baseline determination to be evaluated include appropriateness, conservativeness, and limitation of uncertainties. In order to do so, the evaluation includes an analysis of: (i) the type of baseline setting approach and the linkages to existing situation and policies in the host country; (ii) level of conservativeness of the principles to include or exclude emission sources from project boundaries; (iii) the level of conservativeness of principles to select baseline technology/fuel. Additionally, one criterion considers the provision of guidance on the periodic revision of the requirements to update the baseline for the inclusion of the newest policy developments.
- **Emissions reductions calculation:** like the analysis for the baseline determination, the analysis of the calculation of emissions reductions evaluates conservativeness and the level of limitation of uncertainties, as well as the adequacy of calculations and assumptions. The criteria defined for this purpose include: (i) the level of conservativeness of the principles to include or exclude emission sources from project boundaries; (ii) the level of conservativeness of principles to estimate baseline and activity emissions; (iii) the level of conservativeness of principles to select emission factors for electricity systems; (iv) the level at which uncertainties in the calculations are addressed; and (v) the approach for estimation of leakages. Another element evaluated refers to the avoidance of double counting. This is assessed through a criterion looking at the availability of guidance to ensure unequivocal allocation the mitigation results.
- **Monitoring approach[4]:** the evaluation of the monitoring approach aims at evaluating the level of transparency, data reliability and the level at which monitoring systems are aligned with the

[4] In the context of this assessment, monitoring approach refers to the MRV elements for tracking and reporting mitigation impacts due to the project activity. We did not assess monitoring of sustainable development parameters beyond mitigation, as this was

ETF. Criteria to be evaluated include: (i) comprehensiveness of the monitoring requirements, including calibration of equipment; (ii) definition of reporting and verification requirements in line with the ETF; and (iii) reporting frequency in line with the ETF. The assessment also covers the requirements for tracking financial flows and technology transfers.

Table 2 presents the main elements of the assessment. It identifies the specific component of the methodology that will be assessed and it highlights the key methodological principle to be evaluated and the criteria that are used for the evaluation.

Table 2: Main components of the assessment

Methodology element	Methodological principle to be evaluated	Evaluation criteria
Applicability conditions	**Consistency of outcomes**	Outcomes do not differ between host countries with similar ambition.
	Avoidance of gaming	Safeguards to avoid/minimise perverse incentives to increase production of goods / services and thereby absolute emission levels.
	Clarity of the methodology scope	Clearly defined applicability conditions and definition of project types that are eligible under the methodology.
Additionality determination	**Stringency in additionality assessment**	Demonstration of additionality, considering existing and newly introduced mitigation policies and other international commitments by the host country.
		Provision of clear and robust additionality demonstration approaches requiring check of activity-specific parameters.
		Definition of positive list of technologies automatically additional and consistent with generic expert judgement and definition of the updating process of the list over time to reflect market and technological evolution.
	Linkages with NDC	Provision of guidance on how to consider the NDC targets when determining additionality.
Baseline scenario determination	**Appropriateness**	Eligible baseline setting approach (the methodology should include at least one of the following approaches): - BAT - Performance benchmark - Projected but below BAU
		Clear definition of the baseline scenario, considering current situation and existing/planned policies, including NDC targets (unconditional).
	Conservativeness	Provision of guidelines for the regular update and/or validation of the baseline to consider new policy developments.

not mandatory under the CDM and is unlikely to be mandatory under Article 6 forms of cooperation. However, monitoring of SD parameters is discussed in Chapter 4.

Methodology element	Methodological principle to be evaluated	Evaluation criteria
Emissions reductions calculation	Conservativeness	Conservativeness of the principles to define the project boundaries and emission sources to be included/excluded.
		Conservativeness of principles to estimate baseline and activity emissions.
		Conservativeness of principles to define emission factors for electricity systems.
		Conservativeness of the approach for estimation of leakage.
	Limitation of uncertainties	Procedures to identify uncertainties in the calculations and to minimise them.
	Avoidance of double counting	Provision of clear guidance on how to avoid potential double counting, where applicable and ensure unequivocal attribution of mitigation results to a certain mitigation activity (i.e. avoidance that the same emission reduction is claimed by two different activities).
MRV approach	Transparency	Comprehensiveness of the monitoring requirements, including accuracy requirements of the monitoring equipment and calibration requirements (where applicable).
		Requirements for the definition of a robust reporting and verification framework with clear allocation of roles and responsibilities, and definition of relevant reporting procedures.
	MRV of finance	Requirements on tracking financial flows.
	MRV of technology transfer	Requirements on tracking of technology transfer.
	Alignment with the enhanced transparency framework (ETF)	Monitoring and reporting requirements compatible with the ETF, including contribution to the achievement of the NDC targets.
		Reporting frequency in line with the ETF requirements.

Source: authors' elaboration

2.2.1. Evaluation process

In order to provide a clear indication on the result of the assessment for each criterion used, the following colour coding is proposed:

Table 3: Colour coding used for the assessment

Colour coding	Justification
	Fully aligned/no need for major revisions
	Not fully aligned, changes are required
	Not aligned/fully missing/major revisions required

Source: authors' elaboration

Where needed, also light green colour is used to identify areas where the methodology (or tool) is not fully aligned with the criterion, but changes would be minimal. Similarly, an orange shading is used to identify those elements that require significant revisions but are at least partially aligned. It is also worth highlighting that in some cases certain criteria were not applicable to tools and methodologies. In this case they are marked with N/A and left blank. The following section provides a summary of the key findings, while the full details and supporting justifications of the assessment are available in Annex B- Results of the methodology as well as Annex C- Results of the assessment of tools.

3. Identified revision needs of CDM methodologies

The project team assessed renewable energy methodologies in the context of on-grid renewable energy (ACM0002) and biomass (ACM0006, ACM0018). In the context of methane reduction activities, the project team assessed methodologies for methane recovery (AMS-III.D., AMS-III.AO) and landfill gas activities (ACM0001). A third set of methodologies was assessed in the context of energy efficiency (EE) activities, in energy demand (AMS-II.G., AMS-I.E.) and in industry (AMS-II.S., AMS-II.N.).

In addition, the project team assessed some key tools applied across different CDM methodologies in the context of assessing additionality (TOOL01, TOOL32), calculating the emission factor for an electricity system (TOOL07) and the fraction of non-renewable biomass (TOOL30).

The assessment of CDM methodologies and tools provided useful insights on the alignment of the these with the PA requirements. It resulted in two different outcomes: one set of findings is applicable in general to all methodologies and tools, as the issues identified are valid across all (or a large majority); a second set of finding is specific for only certain methodologies and tools. A brief summary of the assessment and results is provided in Section 3.1.

3.1. Summary of the assessment

Applicability conditions

Regarding the applicability conditions, there is a general comparability of all methodologies and tools. The assessment of the ‘consistency of outcomes’ shows that some element of uncertainty, although limited, exists and it mainly related to the grid emission factor (and grid losses, for the EE in industry methodologies) as this reflects the country ambition and previous policies, resulting in different outcomes. The methodologies related to the EE – Energy demand (i.e. AMS-I.E. and AMS-II.G.) are also only partially aligned due to the use of one variable, i.e. the fraction of non-renewable biomass (fNRB), that varies from one country to another, and results in higher baselines for countries where use of non-renewable biomass is higher. As the ambition of the country is usually not linked to the current fNRB and one can even say that countries with high ambition should have a low fNRB, differences in fNRB are not consistent with alignment of ambition.

All methodologies are fully aligned with the requirements on the avoidance of gaming. Only the methodologies related to grid-connected energy generation (i.e. ACM0002, ACM00006 and ACM0018) may have only some very limited risk for gaming. As long as credit revenue per kWh is not exceeding normal electricity sales revenue, there is no risk of perverse incentives. Otherwise there could be an incentive to produce electricity solely to generate credit revenue, even in absence of demand/grid capacity. Such effects have been observed in the context of industrial gas projects, but not in electricity production.

Also, the Tool 30 for the calculation of the fNRB shows some risks of potential inflation of the baseline emissions depending on how the fNRB is calculated (the Tool also provides a conservative value of 0.3 for the fNRB). For ACM0001, grid-connected energy generation is also captured in the methodology, but as this is a subordinated source of emissions reductions in this methodology, we rated the risk of gaming as low.

Additionality determination

Regarding the additionality determination, all methodologies are not aligned with the two criteria that evaluate the inclusion of existing/planned policies, international commitments and NDC targets. It must be clarified that none of the CDM methodologies and tools have been designed to include such policy developments, which must be considered only when they represent legally binding requirements. This is not in line with the requirements from the PA. In addition, the concept of NDC did not exist at the moment of designing the CDM framework, thus no methodology or tool could refer explicitly to NDC targets.

The criterion on the robust additionality demonstration, including checking activity specific parameters, shows general alignment with only AMS-II.G, AMS-I.E. and AMS-II.S., offering also the option of using a positive list (e.g. technologies that have a penetration lower than 5% are additional) along with other options that require the check of activity specific parameters. The criterion for the assessment of positive lists resulted in the need for revisions, although no major issue (i.e. red) has been identified. Adjustments are mainly needed to include clear guidance on the periodic update of the list, which could be done in a centralised manner, if the list is defined as a distinct Tool.

The criteria looking at the additionality determination are only applicable to the Tool 32, which is generally not aligned with the requirements, and partially to the Tool 01.

Baseline scenario determination

The determination of the baseline scenario in CDM methodologies is generally not aligned with the PA requirements. This is the case for the criterion “Eligibility of the baseline approaches”, where no methodology is aligned, since baselines are set considering projected emissions but there is no requirement to go below BAU. An exception is represented by the methodologies AMS-I.E. and AMS-II.G.

In this case, although similarly to other methodologies, there is no explicit requirement to go "below BAU", the fuel emission factor that is provided is not the actual factor for fuelwood (i.e. 112 tCO_2e/TJ), but the one of a fossil fuel equivalent, ranging from 57.8 to 85.7 tCO_2e/TJ. Although not explicitly mentioned, the methodologies thus result in below BAU emissions.

A similar result is observed when considering the provision of guidance for a regular update of the baseline. The methodologies are not all aligned, because a revision or update of the baseline is only considered at the end of the first crediting period.

With regard to tools, the criteria for the baseline scenario determination are only applicable to the evaluation of the Tool 07, for the calculation of the emission factor for an electricity system. Here, the results show a misalignment of the tool to the criteria, as the baseline does not take into account NDC targets and also is not updated after application of the Tool to a project during the crediting period.

Emission reductions calculation

All CDM methodologies and tools perform well regarding the need for a conservative approach to defining the project boundary and estimating the baseline, project and leakage emissions. We identified minor issues with the methodologies utilising the Tool 07. Applying the tool may lead to a non-conservative emission factor for an electricity system, mainly due to of the option not to use 0 tCO_2e/MWh as the emission factor for the electricity imports to one electricity system (e.g. one country) if the imports stem from non-Annex-I countries. This can lead to different grid emission factors used in the same country context. In addition, the methodology results in different outcomes, depending on past ambition of countries to decarbonise their electricity grid. Countries with a low ambition in the past, have a high grid emissions factor and thus generate more credits than countries that had high ambition and thus how have a high share of renewable electricity generation.

For AMS-III.D. and AMS-III.AO. (covering methane recovery measures), the lack of guidance on the update of the default parameters provided calls for a revision. General alignment is observed when looking at the methods to reduce uncertainties and avoidance of double counting for all methodologies. As Tools only address certain elements of baseline setting, most of them cannot be assessed regarding the generic aspects of emissions reduction calculation.

MRV approach

The assessment of the MRV approach provides similar results for all methodologies. There is very low risk associated with the comprehensiveness of monitoring requirements and the definition of clear and robust reporting systems and procedures provided by the methodologies and tools. The latter is not directly covered by methodologies and it is addressed by other documents providing guidance and defining the requirements for projects/programmes, such as the CDM Project Standard, the Project Design Document (PDD) template and the CDM Validation and Verification Standard.

When taking into account the ETF, on the other hand, it can be seen that not all methodologies are fully aligned with it. The reason is that the overarching framework, in which methodologies have been designed, did not include the ETF as it is defined by the PA (it did not exist when the CDM framework was designed). Hence MRV systems are not directly linked to the ETF, however, data collected and stored through the MRV systems can be used in the reporting under the ETF and can provide useful information on the implementation of the NDC. Thus, all methodologies have been assigned 'yellow' for the two criteria related to the ETF and only minor revision would allow a full alignment.

The assessed methodologies received a 'red' colour code when considering the tracking of financial flows and the tracking of technology transfers. The PDD template allows for the provision of certain information on these two elements, e.g. the description of the technology used and whether this is imported, or whether the public finance from Annex I countries is contributing to the project, but no real tracking is required. Again, the assessment is not applicable for most of the tools.

The following table presents a summary for the assessment with the colour codes used. The full table with the results of the assessment is provided in Annex B- Results of the methodology assessment as well as Annex C- Results of the assessment of tools.

Table 4: Summary of the assessment

Methodology element	Methodological principle to be evaluated	Evaluation criteria	ACM0002	ACM0006	ACM0018	AMS-III.D	AMS-III.AO	ACM0001	AMS-II.G.	AMS-I.E.	AMS-II.S.	AMS-II.N.	TOOL01	TOOL32	TOOL07	TOOL30
Applicability conditions	Consistency of outcomes	Outcomes do not differ between host countries with similar														
	Avoidance of gaming	Safeguards to avoid/minimize perverse incentives to increase production of goods / services and thereby												N/A		
	Clarity of the methodology scope	Clearly defined applicability conditions and definition of project types that are eligible under the methodology														N/A
Additionality determination	Stringency in additionality assessment	Demonstration of additionality considering existing and newly introduced mitigation policies and other international													N/A	N/A
		Provision of clear and robust additionality demonstration approaches requiring check of activity-specific parameters													N/A	N/A
		Definition of positive list of technologies automatically additional consistent with generic expert judgement and definition of the updating process of the list over time to reflect market and technological evolution		N/A	N/A								N/A		N/A	N/A
	Linkages with NDC	Provision of guidance on how to consider the NDC targets when determining additionality													N/A	
Baseline scenario determination	Appropriateness	Eligible baseline setting approach (the methodology should include at least one of the following approaches): - BAT -Performance benchmark -Projected but below BAU											N/A	N/A		N/A
		Clear definition of the baseline scenario, taking into account current situation and existing/planned policies, including											N/A	N/A		N/A
	Conservativeness	Provision of guidelines for the regular update and/or validation of the baseline to take into account new policy developments												N/A		N/A
Emissions reductions calculation	Conservativeness	Conservativeness of the principles to define the project boundaries and emission sources to be included/excluded											N/A	N/A		N/A
		Conservativeness of principles to estimate baseline and											N/A	N/A	N/A	
		Conservativeness of principles to define emission factors for electricity systems								N/A				N/A		N/A
		Conservativeness of the approach for estimation of leakage											N/A	N/A	N/A	N/A
	Limitation of uncertainties	Procedures to identify uncertainties in the calculations and to minimize them											N/A	N/A	N/A	
	Avoidance of double counting	Provision of clear guidance on how to avoid potential double counting, where applicable and ensure unequivocal attribution of mitigation results											N/A	N/A	N/A	N/A
MRV approach	Transparency	Comprehensiveness of the monitoring requirements, including accuracy requirements of the monitoring equipment and calibration requirements (where applicable)											N/A	N/A		
		Requirements for the definition of a robust reporting and verification framework with clear allocation of roles and responsibilities, and definition of relevant reporting procedures											N/A	N/A		N/A
	MRV of finance	Requirements on tracking financial flows												N/A	N/A	N/A
	MRV of technology transfer	Requirements on tracking of technology transfer											N/A	N/A	N/A	N/A
	Alignment with the enhanced transparency framework (ETF)	Monitoring and reporting requirements compatible with the ETF, including contribution to the achievement of the NDC targets											N/A	N/A		N/A
		Reporting frequency in line with the ETF requirements											N/A	N/A		N/A

Source: authors' elaboration

3.2. Identified cross-cutting revision needs - Methodologies

Revisions across all methodologies

In the context of this assessment, CDM methodologies have a good performance regarding 'applicability conditions', 'emission reduction estimations' and 'MRV approaches'. For these three methodology elements (and associated criteria), only minor revision needs are identified for some of the selected methodologies. Regarding the MRV, more alignment with the ETF can be achieved but the underlying data and information to be collected under the selected methodologies can contribute to the national reporting obligations. The tracking of financial flows and technology transfers will require a more significant alignment that is still completely missing. All methodologies have the same rating regarding the latter criterion.

Regarding 'additionality determination', CDM methodologies will require a significant revision for the inclusion of the existing/planned policies and to refer to existing NDC mitigation targets. The different framework represented by the PA, compared to the one of the Kyoto Protocol, will have to be reflected in full. It is important to highlight that other documents such as CDM Project Standard, the PDD template and the CDM Validation and Verification Standard, provide guidance on how project documents should be filled and the type of information that must be provided. A transition of the CDM into the PA will require an evaluation of how these documents, and in general the overall CDM framework, will have to be adapted to the new principles of the PA. As demonstrated by this assessment, considering only methodology revision will not be sufficient for a transformation of CDM methodologies and principles to become 'fit-for-Article 6'.

Another area where CDM methodologies show the need of major revision is the 'baseline setting determination'. Despite two cases of 'in-built' below BAU baseline definitions (as in the case of AMS-I.E. and AMS-II.G.), none of the assessed methodologies requires to go below BAU. It should be noted that this is the case with other CDM methodologies, for example in the context of industrial gas projects. Some industrial gas methodologies, like the one for N_2O abatement from nitric acid production facilities (ACM0019) have introduced a technology specific benchmark value for the baseline, based on the assumption that the specific emissions would decrease during the crediting period, as (i) technology would require improvements and old plants may be refurbished and get more efficient, and (ii) new technologies, like catalysts, which have emission reducing gauzes, will be cheaper and hence used also in the baseline scenario. The same was the case for N_2O reduction from adipic acid (AM0021) and HFC-23 reduction from HCFC-22 production (AM0001). The CDM regulators were willing to go beyond BAU for these technologies as they saw a need to reduce perverse incentives for production increase and felt that the revenue from credit sales was so high that the baseline could be set in a more stringent manner than for other project types.

Revision in this regard will have to be significant and would have to redesign the way the baseline scenario is identified. A larger use of BAT would require a clear agreement on the 'shade' of BAT to be applied. A BATNEEC approach would be akin to today's approach of additionality testing, whereas a stringent BAT on a global scale would prevent generation of all credits. Performance benchmarks must be balanced with technical/practical limitations that have been faced already by CDM over time. Certain measures (e.g. mitigation measures in complex sectors, such as cement of other metal productions) will not be suitable to use such approaches due to difficulties in practical identification of the required thresholds and values on a country basis, and associated transaction costs (including for periodic updates). There is clear guidance for the determination of the baseline scenario, and the scenario takes into account the current situation, however existing/planned policies are not mentioned. Thus, minor adjustments to the methodologies would be required to ensure full alignment. Similarly, CDM methodologies do not contain any requirement or guidance on how to regularly increase ambition. Recalculation and re-validation of the baseline is required only at the end of each crediting period, if at all. Many CDM projects have a crediting period of seven years that is renewable twice. Alternatively, CDM projects can have a ten-year non-renewable crediting period, while Programs of Activities can enjoy a crediting period of up to 28 years (afforestation/reforestation programs can reach 60 years). This timeframe provides private investors with certain predictability on their investments and the associated returns. While revisions of the baseline could be further improved to allow for increasing ambition, and aligned to the NDC revision cycles for instance, the impacts on the attractiveness of project investments in a fast-changing environment, subject also to political decisions and uncertainties, may discourage private investments. A revision of the baseline associated with the NDC update cycle would imply that the volume of credits can change during the crediting period, as NDCs are to be updated every five years and realistically only few activities (if any at all) would be aligned with this cycle. In the real world, registration of the projects/programmes and their implementation may occur anytime during this five-year period and does not necessarily happen in the first year after the NDC update, resulting in an insufficient period over which the investors would have certainty on the credit volume and associated revenues. In addition, uncertainty regarding the political decisions on how the NDC will be updated and on which policies and measures will be included/excluded, will represent an additional barrier for private investments.

Revision requirements for large-scale/small-scale methodologies

We identified no specific linkage between the size of the methodology and its alignment to the PA principles. Both weak spots and areas where methodologies have a better performance are not associated with the size of the methodologies.

Revision requirements for methodologies applicable to the same sector

Overall, CDM methodologies that target one sector/measure have a similar performance in the assessment. No particular deviation is observed.

3.3. Identified cross-cutting revision needs – Tools

One of the important findings of the assessment is, that many of the criteria identified are not applicable to the tools. This is not a surprise, given that tools are in many cases used to determine one variable or for the demonstration of additionality, and have a different scope than methodologies. Alignment is generally good for the 'applicability conditions', except for Tool 30, where some risks are identified related to potential inflation of the baseline. 'Additionality determination' criteria are partially applicable only to Tool 01 and Tool 32 (both deal with additionality) with rather negative results. Regarding the remaining areas of assessment, criteria are only partially applicable to Tool07 with alternate results.

Common areas for revision cannot be identified easily, due to the different nature of the tools and scope they are designed for. Again, this calls for a more comprehensive understanding of the revisions that are needed for the overall CDM framework, i.e. beyond tools and methodologies, to ensure a smooth transition towards the PA and a full alignment with its general principles.

3.4. Identified methodology-specific revision needs

Limited specific revisions to methodologies, in addition to the general ones provided in Section 3.2, have been identified.

The use of the fNRB variable in the case of AMS-I.E. and AMS-II.G can lead to higher baselines for countries where the use of non-renewable biomass is high, thus penalising countries that already managed to introduce stringent forest protection policies, as saving one tonne of wood generates less credits in these countries, than saving one tonne in a country with a lenient forest policy (the methodologies target the energy demand side). The issue is relevant also for Tool 32 which is used for calculating the value for the fNRB. This imbalance is very similar to the one observed for the methodologies targeting grid connected electricity generation (i.e. ACM0002 for renewable energies; ACM0006 and ACM0018 for biomass-based electricity & heat and electricity-only generation) and the associated Tool 07. Previous efforts of the country to decarbonise the electricity system are not rewarded, as countries that still have a rather carbon-intensive electricity grid may benefit from higher baselines and potential larger emissions savings.

For the fNRB, a maximum value should be set by the mechanism or activity regulator (i.e. the Article 6.4 Supervisory Body or the Article 6.2 cooperating parties) for country groups with a similar development status, with periodic reduction steps, to ensure that baseline emissions go below BAU, assuming a more stringent scenario for the baseline than it may actually be.

A discounting mechanism could be introduced in the tools to ensure that lack of ambition is not rewarded, for instance considering a default 'decarbonisation' factor that has to be applied to the grid emission factor as calculated by Tool 07. A mechanism for rewarding ambitious countries where electricity systems have a very low-carbon intensity is less simple to be identified. While many developing countries have a significant share of fossil based generation, used as back-up and in off-

grid contexts that is not accounted for under current application of the tool, inclusion of the back-up capacity to the grid emission factor calculations may provide a more accurate representation of certain countries. This requires extensive data on back-up capacity and their utilisation, which can be challenging to collect.

3.5. Identified tool-specific revision needs

Tool 01: Tool for the demonstration and assessment of additionality

Revisions are required regarding the 'additionality determination' as national policies and NDC targets are not reflected in the current version of the Tool. Other criteria are not applicable. An alternative option would be to develop a new Tool that provides guidance on how to consider both, existing policies and NDC targets, and reflect them in the baseline identification and additionality demonstration.

Tool 07: Tool to calculate the emission factor for an electricity system

In addition to the general alignment to the 'applicability conditions', the only other relevant section identified in the assessment of this tool is the 'baseline scenario determination'. However, here the tool results are not aligned with the requirements regarding the baseline setting (i.e. below BAU) and the periodic revision of the baseline.

Tool 30: Calculation of the fraction of non-renewable biomass

See the assessment for Tool01. Minor or no revisions are identified for the remaining applicable criteria.

Tool 32: Positive lists of technologies

The criteria used for the assessment are generally not applicable to this Tool. Main revisions are those identified for other tools. A certain degree of alignment is observed regarding overall conservativeness and MRV approach.

A suggested revision of this Tool would comprise the provision of guidelines on the update process for the positive list, to ensure that latest market trends are fully reflected in the list. Balance between stringency of the list, including the revision process, and certainty for the investors is necessary. Frequent revisions of the list should not affect registered projects before the end of a crediting period.

Box 2: The potential issues with "Tool to calculate the emission factor for an electricity system": the case of Ethiopia

The Tool 07 is used under the CDM for the definition of the grid emission factor of an electricity system. In many instances, the electricity system is defined with the host country boundaries, unless the geographical extension is significant and thus sub-national systems are defined. This is the case for instance in China. In principle, the procedure for the determination of the grid emission factor are considered as robust and conservative, and lead to the estimation of a value that is a rather accurate approximation of the carbon intensity of one electricity systems through the consideration of newly built plants and existing cohort. Latest development in the grid energy mix are thus reflected in the calculations. However, application of these estimations in real life conditions may results in situation that discourages implementation of clean energy projects.

One example is provided by Ethiopia. Like other Least Developing Countries (LDCs), Ethiopia has a rather small but clean electricity system, being dominated by large hydropower plants (World Bank 2018). However, the actual situation is different: as electricity supply suffers from interruptions and is not stable, many customers even in grid connected areas utilize diesel generators as captive plants. These emissions are not captured by the CDM tool. Own calculations conducted for the design of Nationally Appropriate Mitigation Action (NAMA) in the energy sector in the country based on the volume and size of diesel generators imported in the country in the period 2003-2014, showed that the electricity produced from captive generator sets in grid connected areas reached approx. 66% of the total electricity produced from renewable sources. This indicates that the CDM tool (and methodologies applying the tool) cannot capture these significant emissions that are not accounted for, penalizing the country with a very low grid-emission factor that is not reflecting the real situation in the country. As a result, investors willing to expand the grid, where still only 45% of the population has access to energy (World Bank n.d.), would not be able to claim emission reductions and thus would not benefit from the revenues associated with the sales of credits in the carbon market.

3.6. Review of alternative improved efficiency cook stove methodologies

Both the Gold Standard (GS) and the VCS (Verified Carbon Standard) program allow the use of approved CDM cookstove methodologies. While the VCS has not developed own methodologies for this type of project, the GS has developed several methodologies applicable to improved cookstove activities. The methodologies are summarised in Table 5. Here we outline the advantages and disadvantages of these methodologies relative to CDM methodologies.

Table 5: Overview of approved GS methodologies for improved cookstoves

#	Title	Version, approval date	Description
1	Technologies and Practices to Displace Decentralized Thermal Energy Consumption (TPDDTEC)	Version 3.1, August 2017	Applicable to activities that displace GHG emissions from thermal energy consumption in households and non-domestic premises. It covers a wide range of technologies including improved efficiency cookstoves, ovens, dryers, space and water heaters, heat retention cookers, solar cookers, bio-digesters, safe water supply and treatment technologies and thermal insulation in cold climates.
2	Simplified methodology for efficient cookstoves	Version 1.1, April 2020	Applicable to microscale activities introducing new wood fired cookstoves that reduce biomass use or switch to using renewable biomass to meet thermal energy needs for household cooking.
3	Programme, baseline and monitoring methodology for the introduction of an alternative ignition technique as measure to improve the energy efficiency of domestic coal fires	Version 01, June 2010	Applicable to activities that introduce an alternative ignition technique for coal fires in households. Only two project developers have ever applied the methodology, across 12 projects.
4	Thermal energy from plant oil for the user of cooking stoves	Version 1.0, no date	Applicable to activities that use plant oils in stoves for cooking and water heating, in households or small enterprises like restaurants or breweries. Only one project has ever applied the methodology

Here we focus our analysis on the TPDDTEC (V 3.1) and Simplified methodology for efficient cookstoves (V1.1). The ignition methodology (methodology No. 3 of Table 5) applies to a technology that is not covered by the CDM methodologies AMS-II.G and AMS-I.E considered in this report, and has hardly ever been applied. The plant oil methodology has also only ever been used once, for a single standalone project.

The TPDDTEC methodology was the first GS methodology approved for efficient cookstoves. It refers to CDM methodologies and approaches in several sections, including the approach to calculating the fraction of non-renewable biomass. Relative to AMS-II.G and AMS-I.E, the *main differences* are that it:

- **Is a long and cumbersome methodology**, since it covers a very wide range of technologies (see Table 5). In practice, this means the level of effort (and associated costs) of applying the methodology are typically higher than those of applying the AMS-II.G and AMS-I.E methodology.

- **Offers higher emission reductions**. This is due to the methodology applying the true emissions factor for biomass, at 112 tCO_2e/TJ rather than the fossil fuel equivalent applied under the CDM, which is almost half this amount. While the CDM's approach is more conservative, it presents an artificially low baseline by applying an incorrect emissions factor (due to the political history of CDM EB members being opposed to the mechanism supporting any emission reduction achieved from avoided deforestation or forest degradation).

- **Allows the consideration of suppressed demand**. This allows the development of an artificial baseline calculated based on the amount of biomass technology users *would have* used in the absence of the project, had they reached reasonable living standard benchmarks relative to peers. For example, a household may use very little fuel in the baseline as they are unable to afford enough cooking or heating fuel to meet their cooking needs. Accounting for suppressed demand allows projects in areas of very low development to benefit from carbon finance. However, it is not conservative and risks compromising the environmental integrity of issued credits as the baseline is artificially inflated.

- **Requires more frequent monitoring of the usage rate of project technologies**. Usage must be monitored at least annually and must be carried out per age group of project technology. This monitoring approach differs from the approach to monitoring other parameters in the methodology (which do not consider the technologies' age group), resulting in higher monitoring costs and a more complex sampling design. AMS-II.G requires monitoring only once every two years, but does consider age via monitoring a 'batch' of devices (defined as a population of the same type of devices commissioned during a certain period of time in a year).

- **Allows more uncertainty in sampling requirements**. AMS-II.G and AMS-I.E require that sampling meets at least 90/10 confidence precision for all parameters monitored, including the annual quantity of woody biomass used in tonnes per device during the project.[5] The TPDDTEC methodology requires 90/10 confidence precision for some parameters, but allows 90/30 confidence precision level when determining the amount of fuel used in the baseline and project scenarios via a Kitchen Performance test.

In conclusion, the TPDDTEC methodology offers no clear advantages over AMS-II.G in the context of transitioning methodologies to Article 6.

[5] The 90/10 requirement is not explicitly stated in Parameter table 17 of AMS-II.G, but in practice, this sampling requirement must be met. This requirement is stated in the CDM Standard for Sampling and Surveys, to which AMS-II.G references.

The Simplified Methodology for Efficient Cookstoves was first published in 2017, with the explicit intention to lower transaction costs for project developers seeking carbon finance in support of improved cookstove technologies. However, we think that the transaction costs actually increase, as discussed below. It is applicable only to microscale activities, although this can be somewhat circumvented by registering a PoA and including many individual project activities under it. It refers to CDM methodologies and approaches in several sections, including the approach to calculating the fraction of non-renewable biomass. Relative to AMS-II.G and AMS-I.E, the *main differences* are that it:

- **Offers higher emission reductions.** This is due to the methodology applying the true emissions factor for firewood, at 2.277 tCO_2e/tonne, rather than the fossil fuel equivalent applied under the CDM (see discussion above).

- **Offers an emission reduction calculation tool,** version 2.1 of which was published in March 2020. This has potential to significantly reduce errors and transaction costs by streamlining approaches to calculating emission reductions. This reduces project developers' costs by foregoing the need to design a spreadsheet from scratch and has potential to reduce validation and verification costs.

- **Requires more frequent monitoring** of the usage rate of project technologies, and other parameters. Monitoring must be carried out at least annually and per age group of project technology. AMS-II.G requires monitoring only once every two years, but does consider age via monitoring a 'batch' of devices (defined as a population of the same type of devices commissioned during a certain period of time in a year).

The primary benefit offered by the Simplified Methodology for Efficient Cookstoves is that is offers an emission reduction calculation tool. Since the scope of the methodology is narrower than that of AMS-II.G and AMS-I.E, it is also simpler to apply, thereby lowering upfront transaction costs.

4. Approaches to tracking contributions to sustainable development

The CDM certifies that projects achieve emission reductions. The PDD template contains a section on SD benefits, but monitoring of SD contributions is not required. Confirmation that projects contribute to SD in the host country is instead outsourced to Designated National Authorities, who must issue a Letter of Approval to confirm that the activity contributes to SD. While some countries have procedures, checklists and guidance documents in place to confirm SD benefits (e.g. Brazil, Indonesia, Malaysia, Peru, Rwanda, Uruguay), others do not require any assessment at all before authorising CDM projects (Michaelowa et al. 2020).

The CDM EB emphasises in its methodology booklet that some methodologies have the "particular potential to directly improve the lives of women and children"[6]. However, these methodologies lack emphasis on the SD effects of their emission reduction measures (UNFCCC 2012). To address this weakness, the CDM released an SD tool in 2012 to showcase the SD benefits of a project[7].

In 2015, the United Nations agreed on a common vision for SD –the Agenda 2030 – which also guides the implementation of the PA. As a result, cooperation under Article 6 is to promote sustainable development, in addition to raising ambition. The Agenda 2030's SDGs and overarching vision of a holistic approach to economic, social and ecological development must be considered when designing high-integrity market-based cooperation under Article 6 in order to induce transformational change. However, the current Article 6.2 negotiation text does not contain strong provisions on safeguarding or promoting SD. The only requirement for all participating Parties is to report whether the cooperative approaches that they engage in "[are] consistent with the sustainable development objectives of the host Party, noting national prerogatives" (UNFCCC 2019c, annex, paragraph 22g).

The draft rules, modalities and procedures of the Article 6.4 mechanism foresee that the host Party "shall, prior to participating in the mechanism, ensure that […] it has indicated publicly how its participation in the mechanism contributes to sustainable development, while acknowledging that the consideration of sustainable development is a national prerogative" (UNFCCC 2019b, annex, paragraph 26). In addition, the approval of activities through the host Party shall include "[C]onfirmation that and information on how the activity fosters sustainable development in the host Party" (UNFCCC 2019b, annex, paragraph 39a).

In order to induce transformational change, and in contrast to the CDM that does not require the monitoring of identified SD contributions, Parties cooperating through the Article 6.4 mechanism or an Article 6.2 pilot activity could put a stronger emphasis on promoting SD by requiring activities to carry out a thorough and standardised ex-ante assessment of potential SD contributions and risks. Ideally, the host Party would require reporting in line with national processes from entities that implement activities on the ground. However, there is also the risk that a host Party turns to a less ambitious buying Party unless compensation for the additional effort is offered. In addition, Article 6.2 or Article 6.4 standards and methodologies could include the monitoring of SD parameters relevant to the activity type as well as their quantification, which would lead to the verification of positive impacts achieved.

[6] From the CDM methodologies preselected by SEA, this applies to ACM0002, AMS-III.AO., ACM0001, AMS-II.G. and AMS-I.E. (see Annex A)

[7] The tool can be accessed here: https://www4.unfccc.int/sites/sdcmicrosite/Pages/SD-Tool.aspx

SD tends to play a bigger role in voluntary carbon markets. Buyers typically seek to not only offset their GHG emissions in the most cost-effective way, but also find value in activities that consider overall societal and environmental benefits (Michaelowa et al. 2020). This is especially the case for buyers seeking credits certified by the GS, where requirements for certification include an active engagement with SD principles throughout the entire project cycle. Projects must demonstrate positive contribution to the SDGs prior to registration, and mitigation of any negative impacts through project design. Any positive or negative SDG impacts must be monitored and go through validation and verification by a third party. Furthermore, the Climate, Community & Biodiversity (CCB) Standards criteria (administered by Verra) require that projects demonstrate net positive climate and community and biodiversity benefits. Specific methodologies for the identification, monitoring, reporting, verification and sometimes even certification of SD benefits have been developed with further methodologies still in development.

This chapter, therefore, identifies and describes SD tools that could be considered for the tracking of SD contributions of Article 6 activities.

4.1. Promoting sustainable development in activity design

The Gold Standard requires that certified activities actively embed SD principles throughout the entire project cycle. This differs markedly from the CDM's approach and requires more time and effort to be invested when pursuing certification. The Gold Standard's approach offers several possible options that could be considered for a future Article 6.4 mechanism, namely:

- **Demonstration of positive contribution to the SDGs.** The Gold Standard's sustainable development framework is aligned with the SDGs. This is useful as it aligns with the internationally agreed framework for the tracking of sustainable development. Since the SDGs were designed to monitor national progress, the GS has adjusted the indicator framework to be applicable to project-level approaches. All projects seeking GS certification of any kind are obliged to demonstrate a clear and direct contribution to, and positive impacts on, SDG 13 Climate Action and at least two other SDGs (Gold Standard 2019a).
- **Adherence to safeguarding principles in project design**. Projects seeking certification must conduct an upfront safeguarding principles assessment, which outlines safeguarding principles that a project is required to meet and must prove conformity to these (Gold Standard 2019b). This ensures that projects do no harm. The safeguarding requirements are grouped into the following categories:
    - Social: human rights; gender equality and women's rights; community health; safety and working conditions; cultural heritage; indigenous peoples, displacement and resettlement; and corruption.
    - Economic: labour rights and negative economic consequences.
    - Environmental/ecological: climate and energy; water; and environment, ecology and land use.

- **Active engagement of local stakeholders throughout the lifetime of the project.** The GS has strict requirements for the engagement of local and international stakeholders (including of non-governmental organisations (NGOs) throughout the project cycle). While the CDM does require local stakeholder consultation, the GS's requirements for the format of the meeting(s), methods of inviting stakeholders and reporting on the outcomes of the consultation(s) are much more well-defined. Projects must, for example, demonstrate that all the GS's NGO supporters are invited to provide feedback, and that invitations to the local stakeholder meeting were made publicly available. Stakeholders' opinions on the impact of the project on all SDGs must also be sought, ensuring that any (negative) project impacts that a project developer may have overlooked are identified and transparently addressed in the project design. The consultation is also used to establish an ongoing mechanism for feedback for the duration of the project (Gold Standard 2019c). Stakeholders must:
    - Be consulted before the project start date[8] in order to influence the project design, planning and its implementation.
    - Be given the opportunity to comment on how their feedback was considered during project design (termed a 'Stakeholder Feedback Round'). This takes place prior to project implementation (except for retroactive projects)
    - Be given the opportunity to provide feedback throughout the duration of the project through a 'Grievance Mechanism'. This can be done by providing written feedback, calling the project implementer, or communicating through a designated community member/representative of the project. Any feedback received through the grievance mechanism must be reported in each annual verification round[9].
- **Monitoring and reporting of SD impacts.** All activities must include reporting of SD performance as part of their annual Monitoring Report.
- **Independent third-party validation and verification.** All SD impacts must undergo third-party validation and verification.

4.2. Monitoring and reporting of sustainable development benefits

In the following, we describe two available tools for monitoring and reporting SD benefits in the context of project implementation: the CDM's SD co-Benefits Tool and Gold Standard's SDG Tool.

4.2.1. CDM SD co-Benefits Tool

In 2011, in a campaign to improve the reputation of the CDM, the CDM EB sought input from stakeholders on how to enhance SD benefits in CDM projects. UNEP DTU was selected to develop a voluntary SD tool under the guidance of the CDM EB, resulting in release of the CDM SD co-Benefits

[8] Some exceptions are permitted for projects that are seeking certification after their start date, termed retroactive projects.

[9] It should be noted that the Article 6.4 mechanism (successor of the CDM) will include a grievance mechanism as well (in contrast to the CDM) as per current negotiation status.

Tool in 2012. The tool was developed before the SDGs were adopted by the UN and does not reference them (Michaelowa et al. 2020).

The CDM SD co-Benefits Tool is an online platform that enables CDM project developers to report on the expected environmental, social and economic co-benefits of their CDM activities. The tool aims to highlight the additional value that projects can offer beyond emission reductions. The resulting SD reports are submitted to the UNFCCC secretariat and made publicly available online (UNFCCC n.d.).

The tool is designed to be used by project participants and coordinating/managing entities (CMEs) and is not envisaged to be applicable to any other type of market mechanisms outside the CDM. The users are required to provide information on the positive benefits that the project will have on the:

- **environment**, including: air quality, soil quality, water quality and natural resources;
- **society**, including: job creation, health and safety, education and welfare; and
- **economy**, including: economic growth, energy transfer, technology transfer and balance of payment.

The tool requires that project participants and/or CMEs conduct a qualitative evaluation of the expected results across all indicators defined in the three categories above. The scoring system evaluates the partial, slight or high likelihood of impacts occurring, and summarises the results as a table. The tool also requires that users indicate if the information provided has been verified by a third party, or if they could be. It does not, however, offer a comprehensive approach to SD assessment. Some shortcomings of the tool include (Braden and Olsen 2019):

- It is voluntary and the report can be submitted at any time in the project's lifecycle.
- The SD co-benefits of CDM projects are only identified in a simple report, and the tool does not provide guidance on how to quantify or monitor the SD impacts. Monitoring requirements are also not included.
- The absence of any third-party validation or verification requirements over the project's lifetime leads to a limited credibility of the SD claims.
- There are no requirements to identify, assess and mitigate any negative project impacts or potential risks.
- There are no requirements to consult local stakeholders or to consider their views that could complement other risk-minimising strategies like do-no-harm safeguards. The CDM does include global and local stakeholder procedures, but the format of these consultations was never specified and does not cover SD aspects specifically.
- Certification of SD impacts is not envisaged.

The SD tool will need to be updated to demonstrate that the SD co-benefits are 'real, measurable, and long-term', and that negative effects are mitigated throughout the project lifecycle. This would require changes such as the inclusion of monitoring and reporting guidelines, modalities and procedures for

third-party validation and verification of SD claims, enhanced stakeholder requirements and no-harm safeguards (Braden and Olsen, 2019).

4.2.2. The Gold Standard SDG Tool Guidance

In late 2019 the Gold Standard published its 'Guidance for the identification of impacts and indicators for activity level SDG impact reporting'. It presents guidance for projects to report SDG impacts in a consistent, structured and comparable way. The guidance is designed to be used by climate action project developers, verifiers, policy makers, tool developers and other actors such as civil society (Gold Standard 2019d). It can be used for a wide range of mitigation project types, from renewable energy to water and waste management; and even urban development. Besides being applicable to mitigation projects, the guide is also applicable to other types of projects that are focused on adaptation or socio-economic development. In the context of climate action, it is applicable in climate market mechanisms (both voluntary and compliance), voluntary reporting, or for establishing national and subnational MRV systems. Furthermore, the GS envisages that the guidance could be applicable in future mechanisms under Article 6 of the PA.

The guidance employs a stepwise approach to identifying SDG impacts and corresponding monitoring indicators, as follows:

- **Step 1: Create a list of potential impacts of the target project type**: identification of likely, direct and significant (beneficial and negative) impacts of the project activity across the three dimensions of sustainable development, i.e. environmental, social and economic impacts.
- **Step 2: Refine the list of the impacts and map with SDGs and targets**: allocation of each impact identified in Step 1 to its primary, most relevant SDG Goal and SDG Target.
- **Step 3: Identify the monitoring indicators and develop MRV guidance**: definition of monitoring indicators that estimate and enable clear tracking of changes toward the intended impact. Defined indicators should allow monitoring of both ex-ante/ expected impacts and ex-post/actual impacts. Information and guidance on measurement units, quantification approaches and data sources should be included.

The guidance also provides recommendations to avoid 'SDG washing' (i.e. making false or exaggerated claims) by ensuring that safeguards against negative impacts are put in place and that stakeholders are included in the project design process. It also provides guidance on how to evaluate the significance of SDG impacts at project level. Finally, the guidance provides a practical approach to structure standardised SDG impact reporting for different project types.

Because it is a relatively new guidance, published in late-2019, there are no reports evaluating the results of its application and its replicability.

5. Conclusions, recommendations and outlook

5.1. Recommendations and insights

Our assessment of selected CDM methodologies and tools highlights several aspects that are critical for a successful transition of the CDM under Article 6.

Revisions of methodologies and tools will not be sufficient to fully align them to the new principles of the PA in the context of Art. 6.2 collaboration, for which they were not designed. Also, purely revising methodologies and tools will not be enough. Other regulatory documents that define the type of information and data to be provided by project proponents need to be revised. These include the CDM Project Standard, the PDD template and the CDM Validation and Verification Standard. Only a coordinated revision of these basic regulations, together with methodologies and tools, can ensure successful transition into either Article 6.2 or 6.4. Overall, all methodologies (with only few exceptions) show similar performance when evaluated according to the selected criteria: only minor methodology/tool-specific revisions are identified while cross-cutting revisions are more prominent. Elements such as considering national policies and NDC targets need to be added to every methodology. This is not an indicator of bad performance of the CDM, just a recognition that the bases for methodology development have now evolved beyond those existing under the Kyoto Protocol. We suggest the development of a new 'Article 6' tool that covers the inclusion of the unconditional and conditional NDC targets and other relevant national policies so that methodologies can refer to it in the same way they refer to the additionality tool today.

Inclusion of a mechanism in the methodologies, and tools to enhance ambition over time, is more challenging. While conceptually some options are relatively straightforward, e.g. a discount factor, others may result in barriers to investments. While from the perspective of enhancing environmental integrity more ambitious baselines are advisable, investors may not be willing to invest into mitigation measures where ex-ante uncertainty exists regarding the volume of emission reductions and regarding the time-horizon during which credits may potentially be generated. We recommend applying a dynamic baseline, but with ex-ante definition of the parameters that are to be updated. This would reduce investment uncertainty and safeguard investment decisions made at a previous point in time. A dynamic baseline would require the specification of the relevant parameters ex-ante with a concrete value of the parameters being updated at pre-defined intervals. This would partly require a revision of the methodology as well as the development of general guidance on updates. The latter should be linked to the question of considering ambition increase over time.

Tracking of financial flows and technology transfers should also be covered in a generic tool that can be cross-referenced by all methodologies. It is important to consider potential confidentiality issues and avoid excessive reporting burdens.

As a general observation, many of the potential revisions identified in the previous sections can improve environmental integrity, strengthen additionality, increase conservativeness, lower the risks of gaming, and can contribute to the ambition increase mandated by the PA. On the other hand, it is very important to bear in mind the burden of potential associated transaction costs and technical/practical difficulties that would be additionally put on project proponents, for instance the need for frequent data collection and baseline re-evaluation, or defining complex MRV systems.

While there are alternative baseline methodologies for improved efficiency cookstoves approved under the Gold Standard, our analysis showed that these do not offer significant identifiable advantages relative to the CDM methodologies discussed. Also, the Gold Standard methods refer to CDM methodologies and approaches in a number of sections. In the context of monitoring and quantifying SD impacts, Article 6 piloting actors could use Gold Standard tools and guidelines.

Piloting actors that want to anticipate or act in accordance with the Article 6.2 guidance on cooperative approaches, have the responsibility, as well as freedom, to design the overarching regulatory framework of cooperation in an Article 6-compatible manner. Revising CDM baseline and monitoring methodologies to be 'fit-for-purpose' can be one of several steps in designing bilateral or multilateral forms of market-based cooperation:

1. Develop methodologies in line with PA principles and anticipated Article 6 rules.
   a. Define general eligibility criteria for activity types, aligned with PA principles and safeguards to avoid negative impacts on SD in the host country.
   b. Revise CDM tools on additionality determination considering existing regulations and policies.
   c. Revise CDM baseline and monitoring methodologies and tools for emission reduction calculations where risks to environmental integrity were identified.
   d. Develop further rules and guidance to include the CDM methodologies in the Paris regime, in particular regarding the link to host countries' NDCs, increase in ambition over time, as well as alignment with the ETF. We suggest developing specific 'Article 6 tools' to this end.
2. Develop guidance and regulations to ensure mitigation activities foster SD.
   a. Develop guidance on the ex-ante estimation of SD impacts and the identification of safeguards against adverse impacts.
   b. Adopt and/or developd protocols for monitoring, reporting and verification of relevant SD impacts.
3. Design the overarching framework for cooperation.
   a. Develop rules and processes for authorisation of activities, regular reporting and accounting to avoid double counting, in line with Article 6.2 of the PA.
   b. Develop activity documentation and formats for reporting by participating Parties, which refer to the CDM methodologies and further tools and standards to apply.

Developing the full regulation of cooperative approaches from scratch is a time-consuming exercise, however, strongly dependent on the number of Parties involved, the scale of the activities pursued and the resources available. Applying our experience from regulatory development under the CDM, we consider 18 months as the absolute minimum to develop the regulations and documents related to steps 1 to 3 described above. However, these processes can be developed in a stepwise manner while the overarching piloting processes can progress. Ideally, pilot developers would define their processes in a way that allows for revision of their documentation in accordance with the regulation, especially given that the start of the underlying mitigation action usually will be in the future. This would be best linked to a series of milestones agreed between seller and buyer as the pilot evolves.

5.2. Future research needs

As discussed above, revision of methodologies and tools alone does not allow to organise transition that is consistent with the principles of the PA. Further research is needed to explore how generic 'Article 6 compliance tools' could deal with conditional and unconditional parts of the NDC, the inclusion of national policies, the specification of dynamic baseline elements to be in line with the PA ambition and reporting on financial flows.

PA principles on some of the key elements are still evolving. It is necessary to closely follow the development of negotiations to ensure that final principles are understood and applied to CDM methodologies and tools. In turn, this exercise will allow negotiators to understand the linkages (and potential pitfalls) that exist between these key principles and their practical inclusion in a methodology, which ultimately governs their operationalisation in real life. The application of revised CDM methodologies and testing their functioning 'on the ground', coupled with 'Article 6 tools' in the context of Article 6 pilots, will provide useful lessons.

The Article 6 negotiation texts remain very vague regarding promoting sustainable development. Stronger regulations are not expected as they are not included in the draft negotiation texts, but best practice market-based cooperation would put a stronger emphasis on it. Existing tools for use in mitigation projects already address the need to embed the concept of SD along the project life cycle and provide guidance to monitoring and reporting SD benefits.

While lessons learnt from the CDM SD co-Benefits tool are a relevant starting point to promote a standardised evaluation of SD benefits, the Gold Standard approach to promote SD in activity design offers a number of additional procedures for SD assessment that could have application in Article 6 pilot projects. However, there are limited published reviews on experiences with the application of such procedures and guidance documents. In addition, Gold Standard procedures and tools mostly aim at the voluntary carbon market, while an Article 6.2 activity is usually a government-to-government cooperation.

Ideally, an Article 6.2 cooperation would take host country priorities and SDG implementation roadmaps into account, particularly in the context of upscaled forms of market-based cooperation (e.g. sectoral activities or policy instruments). How to embed SD-related processes and tools in Article 6 piloting would require further examination, ideally coupled with case studies. This would also allow for better understanding of the balance of transaction costs and benefits for the quality of the activity implemented. Guidance for piloting actors on how to consider SD in activity design and consequent MRV of the activity could be provided through an 'add-on' SD tool, applied alongside revised baseline methodologies and the above-proposed 'Article 6 tools'.

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Annex A: Overview on selected methodologies and associated tools

Methodology	Classification of the methodology	Tools referenced in the methodology	Other methodologies and guidelines referenced
ACM0002- Grid-connected electricity generation from renewable sources (Version 20.0)	Methodology type: Large-scale consolidated methodology Sectoral scope: Energy industries, renewable energy- electricity generation and supply Activity type: Grid electricity, e.g. retrofit, rehabilitation (or refurbishment), replacement or capacity addition of an existing power plant or construction/operation of a new power plant/unit that uses renewable energy sources and supplies electricity to the grid. *Labelled by CDM EB as having a particular potential to directly improve the lives of women and children*	TOOL01- tool for the demonstration and assessment of additionality (version 07.0.0) TOOL02- combined tool to identify the baseline scenario and demonstrate additionality (version 07.0) TOOL03- tool to calculate project or leakage CO_2 emissions from fossil fuel combustion TOOL05- baseline, project and/or leakage emissions from electricity consumptions and monitoring of electricity generation TOOL 07- tool to calculate the emission factor for an electricity system Methodological tool (10) to determine the remaining lifetime of equipment (Version 01) Methodological tool (11) for the assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period" (Version 03.0.1) TOOL32- positive lists of technologies (Version 02.0)	---

Methodology	Classification of the methodology	Tools referenced in the methodology	Other methodologies and guidelines referenced
AMS-III.D.- Methane recovery in animal manure management systems (Version 21.0)	Methodology type: small-scale methodology Sectoral scope: Waste handling and disposal (also link to agriculture) Activity type: GHG destruction, e.g. replacement or modification of existing anaerobic manure management systems in livestock farms, or treatment of manure collected from several farms in a centralized plant to achieve methane recovery and destruction by flaring/combustion or energetic use of the recovered methane.	TOOL03; TOOL05 (see above) TOOL06- Project emissions from flaring (Version 03.0) TOOL14- Project and leakage emissions from anaerobic digesters (Version 02.0)	AMS-III.AO. (for handling residual waste, projects involving co-digestion of animal manure/other organic matters), AMS-III.G (for projects that recover methane), AMS-III.H. (projects for wastewater treatment), AMS-III.F. (projects for composting of animal manure). Reference to the "general guidelines for SSC CDM methodologies" and "guidelines on the demonstration of additionality of small-scale project activities"
AMS-III.AO.- Methane recovery through controlled anaerobic digestion (Version 1.0)	Methodology type: small-scale methodology Sectoral scope: Waste handling and disposal Activity type: Methane formation avoidance, controlled biological treatment of biomass/other organic matters through anaerobic digestion in closed reactors equipped with biogas recovery and a combustion/flaring system *Labelled by CDM EB as having a particular potential to directly improve the lives of women and children*	TOOL03 (see above) TOOL04- Emissions from solid waste disposal sites (Version 08.0) TOOL06, TOOL07 (see above) "Tool to determine methane emissions from disposal of waste at a solid waste disposal site" (only if residual waste from digestion is stored under anaerobic conditions and/or delivered to a landfill)	AMS-III.D. (projects treating animal manure), AMS-III.H. (projects that recover biogas from wastewater treatment). AMS-III.G (guidelines concerning stockpiles), AMS-III.E (guidelines concerning stockpiles and in case residual waste is treated thermally/mechanically) Reference to the "general guidelines to SSC CDM methodologies, information on additionality and general guidance on leakage in biomass project activities"
ACM0001- Flaring or use of landfill gas (Version 19.0)	Methodology type: Large-scale consolidated methodology	TOOL02, TOOL03, TOOL04, TOOL05, TOOL06 (see above)	---

Methodology	Classification of the methodology	Tools referenced in the methodology	Other methodologies and guidelines referenced
	Sectoral scopes: Energy industries and waste handling and disposal Activity type: GHG destruction, capture of landfill gas and its flaring and/or use to produce energy and/or use to supply consumers through natural gas distribution network of trucks. *Labelled by CDM EB as having a particular potential to directly improve the lives of women and children*	TOOL08- Tool to determine the mass flow of a greenhouse gas in a gaseous stream (Version 03.0) TOOL09- Determining the baseline efficiency of thermal or electric energy generation systems (Version 02.0) TOOL10, TOOL11 (see above) TOOL12- Project and leakage emissions from transportation of freight (Version 01.1.0) TOOL32 (see above)	
ACM0006- Electricity and heat generation from biomass (Version 14.0)	Methodology type: Large-scale consolidated methodology Sectoral scope: Energy industries Activity types: renewable energy, energy efficiency, fuel switch, GHG emission avoidance: generation of power and heat in thermal power plants, including cogeneration plants using biomass. E.g. new plant, capacity expansion, energy efficiency improvements of fossil switch projects	TOOL02, TOOL03, TOOL04, TOOL05, TOOL07, TOOL09, TOOL10, TOOL11, TOOL12 (see above) TOOL16- Project and leakage emissions from biomass (Version 04.0)	---
ACM0018- Electricity generation from biomass in	Methodology type: Large-scale consolidated methodology	TOOL02, TOOL03, TOOL04, TOOL05, TOOL07, TOOL10, TOOL11, TOOL12, TOOL16 (see above)	---

Methodology	Classification of the methodology	Tools referenced in the methodology	Other methodologies and guidelines referenced
power-only plants (Version 4.0)	Sectoral scope: Energy industries Activity types: Generation of power using biomass as fuel, in new biomass based power plants at sites where currently no power generation occurs (Greenfield), replacement or installation of operation units next to existing power plants (capacity expansion projects), energy efficiency improvement projects or replacement of fossil fuel by biomass in existing power plants (fuel switch projects). The biomass based power generation may be combined with solar thermal power generation.		
AMS-II.G.- Energy efficiency measures in thermal applications of non-renewable biomass	Methodology type: small-scale methodology Sectoral scope: Energy demand- energy efficiency Activity types: energy efficiency improvements in thermal applications of non-renewable biomass in the context of fired cook stoves/ ovens/ dryers *Labelled by CDM EB as having a particular potential to directly improve the lives of women and children*	TOOL19- Demonstration of additionality of microscale project activities (Version 09.0) TOOL21- Demonstration of additionality of small-scale project activities (Version 13.0) TOOL30- Calculation of the fraction of non-renewable biomass (Version 02.0)	In the Version 11: • AMS-III.BG (emission reduction through sustainable charcoal production and consumption) • Standard " Sampling and surveys for CDM project activities and programme of activities)
AMS-I.E.- Switch from non-renewable biomass for	Methodology type: small scale methodology	TOOL19, TOOL03, TOOL05, TOOL16, TOOL21, TOOL30 (see above)	• AMS-I.I. (biogas/biomass thermal applications for households/small users), AMS-II.G. (energy efficiency measures in thermal

Methodology	Classification of the methodology	Tools referenced in the methodology	Other methodologies and guidelines referenced
thermal applications by the user	Sectoral scope: Energy industries Activity type: Generation of thermal energy by introducing renewable energy technologies for end users that displace the use of non-renewable biomass, e.g. biogas stoves, bio-ethanol stoves, solar cookers or passive solar homes *Labelled by CDM EB as having a particular potential to directly improve the lives of women and children*		applications of non-renewable biomass), AMS-III.F. (avoidance of methane emissions through composting), AMS-III.G. (landfill methane recovery); AMS-III.H. (methane recovery in wastewater treatment); AMS-III.BG. (emission reduction through sustainable charcoal production and consumption) • Standard: "Sampling and surveys for CDM project activities and programme of activities"
AMS-II.S.- Energy efficiency in motor systems (Version 1.0)	Methodology type: small scale methodology Sectoral scope: Energy demand- Energy efficiency- Energy for industries Activity types: introduction of energy efficient motor or motor system (pumps, fans, compressor) through retrofit/replacements, e.g. water pumping	TOOL05, TOOL10 (see above)	Reference to AMS-I.D.- Grid connected renewable electricity generation Sampling and surveys for CDM project activities and programme of activities
AMS-II.N.- Demand-side energy efficiency activities for installation of energy efficient lighting and/or controls in buildings (Version 02.0)	Methodology type: small scale methodology Sectoral scope: Energy demand- Energy efficiency- Energy for industry Activity types: Energy efficiency, displacement of more GHG intensive service, e.g. retrofits of existing electric lighting fixtures, lamps, and/or	TOOL 11 (see above)	General guidelines for SSC CDM methodologies, information on additionality Guidelines and standard for sampling and surveys for CDM project activities and programme of activities

Methodology	Classification of the methodology	Tools referenced in the methodology	Other methodologies and guidelines referenced
	ballasts with more energy-efficient options or installation of lighting controls		

Source: CDM website and methodology documents, CDM methodology booklet (2019 Version)

Annex B- Results of the methodology assessment

On-grid renewable energy methodology (ACM0002)

Methodology element	Methodological principle to be evaluated	Evaluation criteria	ACM0002	
Applicability conditions	**Consistency of outcomes**	Outcomes do not differ between host countries with similar ambition	Partially aligned: The methodology results in different outcomes, depending on past ambition that influences the grid emission factor (the lower, the higher the ambition). Equal future differences in ambition will result in equal changes of the grid emissions factor	
	Avoidance of gaming	Safeguards to avoid/minimize perverse incentives to increase production of goods / services and thereby absolute emission levels	Low risk. As long as credit revenue per kWh is not exceeding electricity sales revenue there is no risk of perverse incentives.	
	Clarity of the methodology scope	Clearly defined applicability conditions and definition of project types that are eligible under the methodology	Fully aligned	
Additionality determination	**Stringency in additionality assessment**	Demonstration of additionality considering existing and newly introduced mitigation policies and other international commitments by the host country	Fully missing. The methodology does not consider mitigation policies or international commitments. The TOOL02 mentions "... not consider national and local policies that do not have legally-binding status"	
		Provision of clear and robust additionality demonstration approaches requiring check of activity-specific parameters	Mostly aligned. Makes reference to the use of TOOL01: Tool for the demonstration and assessment of additionality and TOOL02: Combined tool to identify the baseline scenario and demonstrate additionality. Certain project types can utilize the TOOL32 Positive list of technologies	
		Definition of positive list of technologies automatically additional consistent with generic expert judgement and definition of the updating process of the list over time to reflect market and technological evolution	The methodology references "Tool32: positive list of technologies". Here, however, no updating process is defined to reflect market and technological evolution.	
	Linkages with NDC	Provision of guidance on how to consider the NDC targets when determining additionality	No consideration of NDC targets. Fully missing	

Methodology element	Methodological principle to be evaluated	Evaluation criteria	ACM0002	
Baseline scenario determination	**Appropriateness**	Eligible baseline setting approach (the methodology should include at least one of the following approaches): - BAT -Performance benchmark -Projected but below BAU	Not aligned (Projected but not below BAU)	
		Clear definition of the baseline scenario, taking into account current situation and existing/planned policies, including NDC targets (unconditional)	Baseline scenario is clearly defined and takes into account current situation, but existing/planned policies and NDC targets are not considered	
	Conservativeness	Provision of guidelines for the regular update and/or validation of the baseline to take into account new policy developments	Not aligned (revision of the baseline is considered only at the time of the renewal of crediting period)	
Emissions reductions calculation	**Conservativeness**	Conservativeness of the principles to define the project boundaries and emission sources to be included/excluded	Fully aligned. Conservative justifications on the emission sources included in or excluded from the project boundary	
		Conservativeness of principles to estimate baseline and project emissions	Fully aligned	
		Conservativeness of principles to define emission factors for electricity systems	Makes reference to TOOL07: Tool to calculate the emission factor for an electricity system. Some issues are identified (see column AC and AD)	
		Conservativeness of the approach for estimation of leakage	Fully aligned. The methodology requires the use of TOOL03: Tool to calculate project or leakage CO2 emissions from fossil fuel combustion, the calculation of project emissions from the operation of binary geothermal power plants due to physical leakage of non-condensable gases.	
	Limitation of uncertainties	Procedures to identify uncertainties in the calculations and to minimize them	Fully aligned. Adjustments to minimize uncertainties are required.	
	Avoidance of double counting	Provision of clear guidance on how to avoid potential double counting, where applicable and ensure unequivocal attribution of mitigation results	Fully aligned. Attribution of mitigation results well defined. Low risk of double counting	
MRV approach	**Transparency**	Comprehensiveness of the monitoring requirements, including accuracy requirements of the monitoring equipment and calibration requirements (where applicable)	Fully aligned	

Methodology element	Methodological principle to be evaluated	Evaluation criteria	ACM0002	
		Requirements for the definition of a robust reporting and verification framework with clear allocation of roles and responsibilities, and definition of relevant reporting procedures	Procedures are provided for recording of certain parameters and their measurement frequency. The methodology does not address roles and responsibilities for reporting, but are to be defined according to the requirements in the CDM Project Standard and in the PDD template. Requirements for validation and verification are mentioned in the CDM Validation and Verification Standards	
	MRV of finance	Requirements on tracking financial flows	Fully missing	
	MRV of technology transfer	Requirements on tracking of technology transfer	Fully missing	
	Alignment with the enhanced transparency framework (ETF)	Monitoring and reporting requirements compatible with the ETF, including contribution to the achievement of the NDC targets	Methodology makes no reference to ETF or NDCs. But, the monitoring values and the data on ERs achieved could be used for reporting contribution to achievement of an NDC target	
		Reporting frequency in line with the ETF requirements	Methodology makes no reference to ETF, but does require annual monitoring of parameters. These could be used in reporting under the ETF	

Biomass methodologies (ACM0006 and ACM0018)

Methodology element	Methodological principle to be evaluated	Evaluation criteria	ACM0006		ACM0018	
Applicability conditions	**Consistency of outcomes**	Outcomes do not differ between host countries with similar ambition	Partially aligned: The methodology results in different outcomes, depending on past ambition that influences the grid emission factor (the lower, the higher the ambition). Equal future differences in ambition will result in equal changes of the grid emissions factor		Partially aligned: The methodology results in different outcomes, depending on past ambition that influences the grid emission factor (the lower, the higher the ambition). Equal future differences in ambition will result in equal changes of the grid emissions factor	

Methodology element	Methodological principle to be evaluated	Evaluation criteria	ACM0006		ACM0018	
	Avoidance of gaming	Safeguards to avoid/minimize perverse incentives to increase production of goods / services and thereby absolute emission levels	Low risk: For projects that use biomass residues from a production process, the implementation of the project shall not result in an increase of the processing capacity of raw input (e.g. sugar, rice, logs, etc.) or in other substantial changes in this process. As long as credit revenue per kWh is not exceeding normal electricity sales revenue there is no risk of perverse incentives.		Low risk: For projects that use biomass residues from a production process, the implementation of the project shall not result in an increase of the processing capacity of raw input (e.g. sugar, rice, logs, etc.) or in other substantial changes in this process. As long as credit revenue per kWh is not exceeding normal electricity sales revenue there is no risk of perverse incentives.	
	Clarity of the methodology scope	Clearly defined applicability conditions and definition of project types that are eligible under the methodology	Fully aligned		Fully aligned	
Additionality determination	**Stringency in additionality assessment**	Demonstration of additionality considering existing and newly introduced mitigation policies and other international commitments by the host country	Fully missing. The methodology does not consider mitigation policies or international commitments. The TOOL02 mentions "... not consider national and local policies that do not have legally-binding status"		Fully missing. The methodology does not consider mitigation policies or international commitments. The TOOL02 mentions "... not consider national and local policies that do not have legally-binding status"	
		Provision of clear and robust additionality demonstration approaches requiring check of activity-specific parameters	Fully aligned. Makes reference to the use of TOOL02: Combined tool to identify the baseline scenario and demonstrate additionality.		Fully aligned. Makes reference to the use of TOOL02: Combined tool to identify the baseline scenario and demonstrate additionality.	
		Definition of positive list of technologies automatically additional consistent with generic expert judgement and definition of the updating process of the list over time to reflect market and technological evolution	N/A	N/A	N/A	N/A

Methodology element	Methodological principle to be evaluated	Evaluation criteria	ACM0006		ACM0018	
	Linkages with NDC	Provision of guidance on how to consider the NDC targets when determining additionality	No consideration of NDC targets. Fully missing		No consideration of NDC targets. Fully missing	
Baseline scenario determination	**Appropriateness**	Eligible baseline setting approach (the methodology should include at least one of the following approaches): - BAT -Performance benchmark -Projected but below BAU	Not aligned (Projected but not below BAU)		Not aligned (Projected but not below BAU). One option for the identification of the baseline efficiency of biomass fired plants is provided based on a benchmark approach	
		Clear definition of the baseline scenario, taking into account current situation and existing/planned policies, including NDC targets (unconditional)	Baseline scenario is clearly defined and takes into account current situation, but existing/planned policies and NDC targets are not considered		Baseline scenario is clearly defined and takes into account current situation, but existing/planned policies and NDC targets are not considered	
	Conservativeness	Provision of guidelines for the regular update and/or validation of the baseline to take into account new policy developments	Not aligned (revision of the baseline is considered only at the time of the renewal of crediting period)		Not aligned (revision of the baseline is considered only at the time of the renewal of crediting period)	
Emissions reductions calculation	**Conservativeness**	Conservativeness of the principles to define the project boundaries and emission sources to be included/excluded	Fully aligned. Conservative justifications on the emission sources included in or excluded from the project boundary		Fully aligned. Conservative justifications on the emission sources included in or excluded from the project boundary	
		Conservativeness of principles to estimate baseline and project emissions	Fully aligned		Fully aligned	
		Conservativeness of principles to define emission factors for electricity systems	Makes reference to TOOL07: Tool to calculate the emission factor for an electricity system. Some issues are identified (see column AC and AD)		Makes reference to TOOL07: Tool to calculate the emission factor for an electricity system. Some issues are identified (see column AC and AD)	
		Conservativeness of the approach for estimation of leakage	Fully aligned. Refers to the TOOL 16 "Project and leakage emissions from biomass"		Fully aligned. Refers to the TOOL 16 "Project and leakage emissions from biomass"	

Methodology element	Methodological principle to be evaluated	Evaluation criteria	ACM0006		ACM0018	
	Limitation of uncertainties	Procedures to identify uncertainties in the calculations and to minimize them	Fully aligned. Adjustments to minimize uncertainties are required (regarding the CH4 emission factor of biomass) .		Fully aligned. Adjustments to minimize uncertainties are required (regarding the CH4 emission factor of biomass) .	
	Avoidance of double counting	Provision of clear guidance on how to avoid potential double counting, where applicable and ensure unequivocal attribution of mitigation results	Fully aligned. Attribution of mitigation results well defined. Low risk of double counting		Fully aligned. Attribution of mitigation results well defined. Low risk of double counting	
MRV approach	**Transparency**	Comprehensiveness of the monitoring requirements, including accuracy requirements of the monitoring equipment and calibration requirements (where applicable)	Fully aligned		Fully aligned	
		Requirements for the definition of a robust reporting and verification framework with clear allocation of roles and responsibilities, and definition of relevant reporting procedures	Procedures are provided for recording of certain parameters and their measurement frequency. The methodology does not address roles and responsibilities for reporting, but are to be defined according to the requirements in the CDM Project Standard and in the PDD template. Requirements for validation and verification are mentioned in the CDM Validation and Verification Standards		Procedures are provided for recording of certain parameters and their measurement frequency. The methodology does not address roles and responsibilities for reporting, but are to be defined according to the requirements in the CDM Project Standard and in the PDD template. Requirements for validation and verification are mentioned in the CDM Validation and Verification Standards	
	MRV of finance	Requirements on tracking financial flows	Fully missing		Fully missing	
	MRV of technology transfer	Requirements on tracking of technology transfer	Fully missing		Fully missing	

Methodology element	Methodological principle to be evaluated	Evaluation criteria	ACM0006		ACM0018	
	Alignment with the enhanced transparency framework (ETF)	Monitoring and reporting requirements compatible with the ETF, including contribution to the achievement of the NDC targets	Methodology makes no reference to ETF, but does require annual or biennial reporting of monitored parameters. These could be used in reporting under the ETF		Methodology makes no reference to ETF, but does require annual or biennial reporting of monitored parameters. These could be used in reporting under the ETF	
		Reporting frequency in line with the ETF requirements	Methodology makes no reference to ETF, but does require annual or biennial reporting of monitored parameters. These could be used in reporting under the ETF		Methodology makes no reference to ETF, but does require annual or biennial reporting of monitored parameters. These could be used in reporting under the ETF	

Methane recovery methodologies (AMS-III.D, AMS-III.AO)

Methodology element	Methodological principle to be evaluated	Evaluation criteria	AMS-III.D		AMS-III.AO	
Applicability conditions	**Consistency of outcomes**	Outcomes do not differ between host countries with similar ambition	Fully aligned		Fully aligned	
	Avoidance of gaming	Safeguards to avoid/minimize perverse incentives to increase production of goods / services and thereby absolute emission levels	As long as credit revenue is not exceeding normal sales revenue from animal products there is no risk of perverse incentives.		There is no need to include safeguards because emission reduction in this methodology is not back calculated and the risk of such perverse incentives is low	
	Clarity of the methodology scope	Clearly defined applicability conditions and definition of project types that are eligible under the methodology	Fully aligned		Fully aligned	
Additionality determination	**Stringency in additionality assessment**	Demonstration of additionality considering existing and newly introduced mitigation policies and other international commitments by the host country	Additionality criteria do not provide guidance to include existing and newly introduced mitigation policies nor international commitments		Additionality criteria do not provide guidance to include existing and newly introduced mitigation policies nor international commitments	
		Provision of clear and robust additionality demonstration approaches requiring check of activity-specific parameters	The methodology has two general provisions on additionality. It also references the “Tool21: demonstration of additionality of small-scale project activities” which includes checks on activity-specific		Methodology references to the "Tool01: tool for the demonstration and assessment of additionality" which includes checks on activity-specific parameters	

Methodology element	Methodological principle to be evaluated	Evaluation criteria	AMS-III.D		AMS-III.AO	
			parameters (i.e. penetration of technology)			
		Definition of positive list of technologies automatically additional consistent with generic expert judgement and definition of the updating process of the list over time to reflect market and technological evolution	The Methodology references "Tool21: demonstration of additionality of small-scale project activities" which references "Tool32: positive list of technologies". Here, however, no updating process is defined to reflect market and technological evolution.		The Methodology references "Tool21: demonstration of additionality of small-scale project activities" which references "Tool32: positive list of technologies". Here, however, no updating process is defined to reflect market and technological evolution.	
	Linkages with NDC	Provision of guidance on how to consider the NDC targets when determining additionality	No consideration of NDC targets. Fully missing		No consideration of NDC targets. Fully missing	
Baseline scenario determination	**Appropriateness**	Eligible baseline setting approach (the methodology should include at least one of the following approaches): - BAT -Performance benchmark -Projected but below BAU	Baseline emissions are projected but not below BAU		Baseline emissions are projected but not below BAU	
		Clear definition of the baseline scenario, taking into account current situation and existing/planned policies, including NDC targets (unconditional)	The baseline scenario does not consider existing and planned policies nor includes NDC targets		The baseline scenario considers prevailing regulations but does not account for planned policies nor includes NDC targets	
	Conservativeness	Provision of guidelines for the regular update and/or validation of the baseline to take into account new policy developments	Not aligned (revision of the baseline is considered only at the time of the renewal of crediting period)		Not aligned (revision of the baseline is considered only at the time of the renewal of crediting period)	
Emissions reductions calculation	**Conservativeness**	Conservativeness of the principles to define the project	Fully aligned. Conservative justifications on the emission sources		Fully aligned. Conservative justifications on the emission sources included in or excluded from the project boundary	

Methodology element	Methodological principle to be evaluated	Evaluation criteria	AMS-III.D		AMS-III.AO	
		boundaries and emission sources to be included/excluded	included in or excluded from the project boundary			
		Conservativeness of principles to estimate baseline and project emissions	Default values used in the calculations are not subject to regular updates. Hence, some values might not represent the most accurate and/or conservative approach		Default values used in the calculations are not subject to regular updates. Hence, some values might not represent the most accurate and/or conservative approach	
		Conservativeness of principles to define emission factors for electricity systems	Default values used in the calculations are not subject to regular updates. Hence, some values might not represent the most accurate and/or conservative approach		Makes reference to TOOL07: Tool to calculate the emission factor for an electricity system. Some issues are identified (see column AC and AD)	
		Conservativeness of the approach for estimation of leakage	This methodology makes reference to the "Tool14: Project and leakage emissions from anaerobic digesters" which uses several default values not subject to regular updates		The default value used in this methodology does not appear to be conservative	
	Limitation of uncertainties	Procedures to identify uncertainties in the calculations and to minimize them	The determination of baseline emissions is either based on default values, or calculated on parameters determined based livestock-specific values. Uncertainty for an overestimation of the achieved emission reduction is rated low. Nevertheless, uncertainty exists as the baseline is (partly) not determined by measurement.		The determination of baseline emissions is referring to other methodologies, i.e. AMS III.D, III.E and III.H and Tool04. Partly these methodologies rely on IPCCC default vales for the baseline methane emissions, which are deemed to be conservative. Therefore, uncertainty for an overestimation of the achieved emission reduction is rated low. Nevertheless, uncertainty exists as the baseline is (partly) not determined by measurement.	
	Avoidance of double counting	Provision of clear guidance on how to avoid potential double counting, where applicable and ensure unequivocal attribution of mitigation results	No explicit mention of double counting nor guidance on attribution of mitigation results. However, the overarching CDM framework covers this provisions		No explicit mention of double counting nor guidance on attribution of mitigation results. However, the overarching CDM framework covers this provision	

Methodology element	Methodological principle to be evaluated	Evaluation criteria	AMS-III.D	AMS-III.AO
MRV approach	Transparency	Comprehensiveness of the monitoring requirements, including accuracy requirements of the monitoring equipment and calibration requirements (where applicable)	Fully aligned	Fully aligned
		Requirements for the definition of a robust reporting and verification framework with clear allocation of roles and responsibilities, and definition of relevant reporting procedures	Procedures are provided for recording of certain parameters and their measurement frequency. The methodology does not address roles and responsibilities for reporting, but are to be defined according to the requirements in the CDM Project Standard and in the PDD template. Requirements for validation and verification are mentioned in the CDM Validation and Verification Standards	Procedures are provided for recording of certain parameters and their measurement frequency. The methodology does not address roles and responsibilities for reporting, but are to be defined according to the requirements in the CDM Project Standard and in the PDD template. Requirements for validation and verification are mentioned in the CDM Validation and Verification Standards
	MRV of finance	Requirements on tracking financial flows	Fully missing	Fully missing
	MRV of technology transfer	Requirements on tracking of technology transfer	Fully missing	Fully missing
	Alignment with the enhanced transparency framework (ETF)	Monitoring and reporting requirements compatible with the ETF, including contribution to the achievement of the NDC targets	Methodology makes no reference to ETF or NDCs. But, the monitoring values and the data on ERs achieved could be used for reporting contribution to achievement of an NDC target	Methodology makes no reference to ETF or NDCs. But, the monitoring values and the data on ERs achieved could be used for reporting contribution to achievement of an NDC target
		Reporting frequency in line with the ETF requirements	Methodology makes no reference to ETF, but does require annual or biennial monitoring of parameters. These could be used in reporting under the ETF	Methodology makes no reference to ETF, but does require annual or biennial monitoring of parameters. These could be used in reporting under the ETF

Landfill gas methodology (ACM0001)

Methodology element	Methodological principle to be evaluated	Evaluation criteria	ACM0001	
Applicability conditions	**Consistency of outcomes**	Outcomes do not differ between host countries with similar ambition	Fully aligned	
	Avoidance of gaming	Safeguards to avoid/minimize perverse incentives to increase production of goods / services and thereby absolute emission levels	There is no need to include safeguards because emission reduction in this methodology are not back calculated and the risk of such perverse incentives is low	
	Clarity of the methodology scope	Clearly defined applicability conditions and definition of project types that are eligible under the methodology	Fully aligned	
Additionality determination	**Stringency in additionality assessment**	Demonstration of additionality considering existing and newly introduced mitigation policies and other international commitments by the host country	Fully missing. The methodology does not consider mitigation policies or international commitments. The TOOL02 mentions "... not consider national and local policies that do not have legally-binding status"	
		Provision of clear and robust additionality demonstration approaches requiring check of activity-specific parameters	Mostly aligned. Makes reference to the use of TOOL01: Tool for the demonstration and assessment of additionality and TOOL02: Combined tool to identify the baseline scenario and demonstrate additionality. Certain project types can utilize the TOOL32 Positive list of technologies	
		Definition of positive list of technologies automatically additional consistent with generic expert judgement and definition of the updating process of the list over time to reflect market and technological evolution	The Methodology references "Tool32: positive lists of technologies". Here, however, no updating process is defined to reflect market and technological evolution.	
	Linkages with NDC	Provision of guidance on how to consider the NDC targets when determining additionality	No consideration of NDC targets. Fully missing	
Baseline scenario determination	**Appropriateness**	Eligible baseline setting approach (the methodology should include at least one of the following approaches): - BAT -Performance benchmark -Projected but below BAU	Baseline emissions are projected but not below BAU	

Methodology element	Methodological principle to be evaluated	Evaluation criteria	ACM0001	
		Clear definition of the baseline scenario, taking into account current situation and existing/planned policies, including NDC targets (unconditional)	The baseline scenario considers prevailing regulations but does not account for planned policies nor includes NDC targets. Moreover, the Methodology makes reference to the "Combined tool to identify the baseline scenario and demonstrate additionality" which explicitly mentions that national and local policies that do not have legally-binding status are not considered.	
	Conservativeness	Provision of guidelines for the regular update and/or validation of the baseline to take into account new policy developments	Not aligned (revision of the baseline is considered only at the time of the renewal of crediting period)	
Emissions reductions calculation	**Conservativeness**	Conservativeness of the principles to define the project boundaries and emission sources to be included/excluded	Fully aligned. Conservative justifications on the emission sources included in or excluded from the project boundary	
		Conservativeness of principles to estimate baseline and project emissions	In this methodology the estimation of baseline and project emissions are calculated based on several Tools. These Tools are generally on the conservative side, particularly for the determination of methane emissions and its destruction.	
		Conservativeness of principles to define emission factors for electricity systems	Makes reference to TOOL07: Tool to calculate the emission factor for an electricity system. Some issues are identified (see column AC and AD)	
		Conservativeness of the approach for estimation of leakage	No leakage effects are considered under this methodology. However, leakage in this project type are extremely unlikely to occur because all emission sources are within the project boundary	
	Limitation of uncertainties	Procedures to identify uncertainties in the calculations and to minimize them	Uncertainty is rated low, as the baseline emissions are dependent on the actual amount of methane destructed by the project measure. In case more methane is taken out of the landfill, lesser reactive organic substance will remain after the end of the project lifetime and hence lesser emissions will occur in future.	

Methodology element	Methodological principle to be evaluated	Evaluation criteria	ACM0001	
	Avoidance of double counting	Provision of clear guidance on how to avoid potential double counting, where applicable and ensure unequivocal attribution of mitigation results	No explicit mention of double counting nor guidance on attribution of mitigation results. However, the overarching CDM framework covers this provision	
MRV approach	**Transparency**	Comprehensiveness of the monitoring requirements, including accuracy requirements of the monitoring equipment and calibration requirements (where applicable)	Fully aligned	
		Requirements for the definition of a robust reporting and verification framework with clear allocation of roles and responsibilities, and definition of relevant reporting procedures	Procedures are provided for recording of certain parameters and their measurement frequency. The methodology does not address roles and responsibilities for reporting, but are to be defined according to the requirements in the CDM Project Standard and in the PDD template. Requirements for validation and verification are mentioned in the CDM Validation and Verification Standards	
	MRV of finance	Requirements on tracking financial flows	Fully missing	
	MRV of technology transfer	Requirements on tracking of technology transfer	Fully missing	
	Alignment with the enhanced transparency framework (ETF)	Monitoring and reporting requirements compatible with the ETF, including contribution to the achievement of the NDC targets	Methodology makes no reference to ETF or NDCs. But, the monitoring values and the data on ERs achieved could be used for reporting contribution to achievement of an NDC target	
		Reporting frequency in line with the ETF requirements	Methodology makes no reference to ETF, but does require annual or biennial monitoring of parameters. These could be used in reporting under the ETF	

Energy efficiency- energy demand methodologies (AMS-II.G. and AMS-I.E.)

Methodology element	Methodological principle to be evaluated	Evaluation criteria	AMS-II.G.		AMS-I.E.	
Applicability conditions	**Consistency of outcomes**	Outcomes do not differ between host countries with similar ambition	fNRB differs; worse country is benefitting from higher baseline		fNRB differs; worse country is benefitting from higher baseline	
	Avoidance of gaming	Safeguards to avoid/minimize perverse incentives to increase production of goods / services and thereby absolute emission levels	The methodology allows the back-calculation of ERs based on fuel used in the device (e.g. briquettes, pellets, woodchips). In theory the amount of fuel used could be inflated to gain more ERs, but since stove users usually pay for the fuels and are financially limited it is very unlikely they would use more than needed. Conservative approaches to calculating ERs are otherwise applied throughout the methodology.		Very limited/no risks of gaming. Theoretically increase in fossil fuel consumption would lead to larger emission reductions, however due to the financial constraint of the typical users, this is not likely to happen.	
	Clarity of the methodology scope	Clearly defined applicability conditions and definition of project types that are eligible under the methodology	Fully aligned		Fully aligned	
Additionality determination	**Stringency in additionality assessment**	Demonstration of additionality considering existing and newly introduced mitigation policies and other international commitments by the host country	Additionality assessment does not provide guidance to include international commitments		No explicit consideration of international commitments of the host country. Existing policies are considered only to demonstrate that they would lead to higher emissions (according to the tool 21: Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions)	

Methodology element	Methodological principle to be evaluated	Evaluation criteria	AMS-II.G.		AMS-I.E.	
		Provision of clear and robust additionality demonstration approaches requiring check of activity-specific parameters	Positive list requires demonstration of <5% penetration of project technology in the project region. Data cannot be older than 3 years. But, additionality demonstration does not require the check of any other activity-specific parameters to assess additionality, unless applying SSC additionality tool.		Option 1 (Positive list) for additionality demonstration is to look at the penetration rate of a certain technology (i.e. less than 5%). Data cannot be older than 3 years. Option 2 and Option 3 makes use of the TOOL21 “Demonstration of additionality of SSC project activities” And TOOL19 “Demonstration of additionality of microscale project activities” respectively. These tools make reference to activity specific parameters	
		Definition of positive list of technologies automatically additional consistent with generic expert judgement and definition of the updating process of the list over time to reflect market and technological evolution	Positive list requires demonstration of <5% penetration of project technology in the project region for both microscale and SSC additionality demonstration. Data cannot be older than 3 years, but no definition of the „update" process to the positive list over time.		The positive list is not based on a specific technology type but on its dissemination in the country (i.e. less than 5%). This reflects market and technological evolution at least at the moment of validation of the PDD. Future trends and evolution are not reflected in the baseline nor definition of "update" process to the positive list over time is provided.	
	Linkages with NDC	Provision of guidance on how to consider the NDC targets when determining additionality	No consideration of NDC targets. Fully missing		No consideration of NDC targets. Fully missing	
Baseline scenario determination	**Appropriateness**	Eligible baseline setting approach (the methodology should include at least one of the following approaches): - BAT	Methodology employs projected BAU baseline approach (not explicitly below BAU). Since it does not allow for the use of the true emissions factor for fuelwood (112 tCO2e/TJ), and instead requires		Methodology employs projected BAU baseline approach (not explicitly below BAU). Since it does not allow for the use of the true emissions factor for fuelwood (112 tCO2e/TJ), and instead requires the fossil fuel equivalent	

Methodology element	Methodological principle to be evaluated	Evaluation criteria	AMS-II.G.		AMS-I.E.	
		-Performance benchmark -Projected but below BAU	the fossil fuel equivalent (between 57.8 - 85.7 tCO2e/TJ) for meeting similar thermal energy needs, the projected baseline will be below BAU. However, the methodology does not explicitly require that the baseline is below BAU		(between 57.8 - 85.7 tCO2e/TJ) for meeting similar thermal energy needs, the projected baseline will be below BAU	
		Clear definition of the baseline scenario, taking into account current situation and existing/planned policies, including NDC targets (unconditional)	The baseline scenario must take into account the current situation, but does not require consideration of existing/planned policies, or NDC targets		Baseline scenario is clearly defined, but existing/planned policies and NDC targets are not considered	
	Conservativeness	Provision of guidelines for the regular update and/or validation of the baseline to take into account new policy developments	Not aligned (revision of the baseline is considered only at the time of the renewal of crediting period)		Not aligned (revision of the baseline is considered only at the time of the renewal of crediting period)	
Emissions reductions calculation	**Conservativeness**	Conservativeness of the principles to define the project boundaries and emission sources to be included/excluded	Fully aligned. Conservative justifications on the emission sources included in or excluded from the project boundary		Fully aligned. Conservative justifications on the emission sources included in or excluded from the project boundary	
		Conservativeness of principles to estimate baseline and project emissions	Fully aligned		Fully aligned	
		Conservativeness of principles to define emission factors for electricity systems	N/A		N/A	N/A
		Conservativeness of the approach for estimation of leakage	Surveys to estimate leakage, which must be subtracted from overall emission reductions. Alternatively, ERs discounted by 5%. Leakage in fuel production must also be accounted for.		Fully aligned	

Methodology element	Methodological principle to be evaluated	Evaluation criteria	AMS-II.G.		AMS-I.E.	
	Limitation of uncertainties	Procedures to identify uncertainties in the calculations and to minimize them	Uncertainties are quantified through the guidance provided in the Standard for Sampling and Surveys. This requires quantification of uncertainty and discounting if uncertainty is too high. Baseline and project parameters both need to follow the guidelines of the Standard.		Uncertainties are limited and the use of surveys and sampling as defined in the Standard for Sampling and Surveys is required for certain parameters.	
	Avoidance of double counting	Provision of clear guidance on how to avoid potential double counting, where applicable and ensure unequivocal attribution of mitigation results	PDDs must describe method to avoid double counting, "such as unique identification of product or end-user locations". The method for doing so is described in a "non-binding best practice" example.		PDDs must describe method to avoid double counting, "such as. unique identification of product or end-user locations". The method for doing so is described in a "non-binding best practice" example.	
MRV approach	**Transparency**	Comprehensiveness of the monitoring requirements, including accuracy requirements of the monitoring equipment and calibration requirements (where applicable)	Fully aligned		Fully aligned	
		Requirements for the definition of a robust reporting and verification framework with clear allocation of roles and responsibilities, and definition of relevant reporting procedures	Procedures are provided for recording of certain parameters and their measurement frequency. The methodology does not address roles and responsibilities for reporting, but are to be defined according to the requirements in the CDM Project Standard and in the PDD template. Requirements for validation and verification are mentioned in the CDM Validation and Verification Standards		Procedures are provided for recording of certain parameters and their measurement frequency. The methodology does not address roles and responsibilities for reporting, but are to be defined according to the requirements in the CDM Project Standard and in the PDD template. Requirements for validation and verification are mentioned in the CDM Validation and Verification Standards	
	MRV of finance	Requirements on tracking financial flows	Fully missing		Fully missing	

Methodology element	Methodological principle to be evaluated	Evaluation criteria	AMS-II.G.		AMS-I.E.	
	MRV of technology transfer	Requirements on tracking of technology transfer	Not required in methodology, but this a technology description is required in the PDD template (from which in theory this information could be pulled)		Fully missing	
	Alignment with the enhanced transparency framework (ETF)	Monitoring and reporting requirements compatible with the ETF, including contribution to the achievement of the NDC targets	Methodology makes no reference to ETF or NDCs. But, the monitoring values and the data on ERs achieved could be used for reporting contribution to achievement of an NDC target		Methodology makes no reference to ETF or NDCs. But, the monitoring values and output ERs could be used for reporting contribution to achievement of an NDC target	
		Reporting frequency in line with the ETF requirements	Methodology makes no reference to ETF, but does require annual or biennial monitoring of parameters. These could be used in reporting under the ETF		Methodology makes no reference to ETF, but does require annual or biennial reporting of monitored parameters. These could be used in reporting under the ETF	

Energy efficiency- industry methodologies (AMS-II.S. and AMS-II.N.)

Methodology element	Methodological principle to be evaluated	Evaluation criteria	AMS-II.S.		AMS-II.N.	
Applicability conditions	**Consistency of outcomes**	Outcomes do not differ between host countries with similar ambition	Partially aligned: Country with higher grid losses benefits from higher baseline. The methodology results in different outcomes, depending on past ambition that influences the grid emission factor (the lower, the higher the ambition). Equal future differences in ambition will result in equal changes of the grid emissions factor		Partially aligned: Country with higher grid losses benefits from higher baseline. The methodology results in different outcomes, depending on past ambition that influences the grid emission factor (the lower, the higher the ambition). Equal future differences in ambition will result in equal changes of the grid emissions factor	
	Avoidance of gaming	Safeguards to avoid/minimize perverse incentives to increase production of goods / services and thereby absolute emission levels	Fully aligned. Energy efficiency in motor systems projects have low risk of perverse incentives.		Fully aligned. Demand-side energy efficiency activities for installation of energy efficient lighting /controls projects have low risk of perverse incentives.	

Methodology element	Methodological principle to be evaluated	Evaluation criteria	AMS-II.S.		AMS-II.N.	
	Clarity of the methodology scope	Clearly defined applicability conditions and definition of project types that are eligible under the methodology	Fully aligned		Fully aligned	
Additionality determination	**Stringency in additionality assessment**	Demonstration of additionality considering existing and newly introduced mitigation policies and other international commitments by the host country	Fully missing. The methodology does not consider mitigation policies or international commitments.		Fully missing. The methodology does not consider mitigation policies or international commitments.	
		Provision of clear and robust additionality demonstration approaches requiring check of activity-specific parameters	Option 1 (Positive list) for additionality project involves replacement of an inefficient motor. Option 2 makes use of “Tool21: demonstration of additionality of small-scale project activities” which includes checks on activity-specific parameters		The Methodology references the “Tool21: demonstration of additionality of small-scale project activities” which includes checks on activity-specific parameters	
		Definition of positive list of technologies automatically additional consistent with generic expert judgement and definition of the updating process of the list over time to reflect market and technological evolution	The Methodology references "Tool21: demonstration of additionality of small-scale project activities" which references "Tool32: positive list of technologies". Here, however, no updating process is defined to reflect market and technological evolution.		The Methodology references "Tool21: demonstration of additionality of small-scale project activities" which references "Tool32: positive list of technologies". Here, however, no updating process is defined to reflect market and technological evolution.	
	Linkages with NDC	Provision of guidance on how to consider the NDC targets when determining additionality	No consideration of NDC targets. Fully missing		No consideration of NDC targets. Fully missing	
Baseline scenario determination	**Appropriateness**	Eligible baseline setting approach (the methodology should include at least one of the following approaches): - BAT -Performance benchmark -Projected but below BAU	Not aligned (Projected but not below BAU)		Not aligned (Baseline surveys of energy usage but not below BAU)	

Methodology element	Methodological principle to be evaluated	Evaluation criteria	AMS-II.S.		AMS-II.N.	
		Clear definition of the baseline scenario, taking into account current situation and existing/planned policies, including NDC targets (unconditional)	Includes clear definition of baseline scenario and takes into consideration the current situation as well as the remaining lifetime of the baseline motor system. Existing/planned policies and/or NDC targets are not considered in the methodology		The definition of the baseline could be clearer. Existing/planned policies and/or NDC targets are not considered in the methodology	
	Conservativeness	Provision of guidelines for the regular update and/or validation of the baseline to take into account new policy developments	Not aligned (revision of the baseline is considered only at the time of the renewal of crediting period)		Not aligned (revision of the baseline is considered only at the time of the renewal of crediting period)	
Emissions reductions calculation	**Conservativeness**	Conservativeness of the principles to define the project boundaries and emission sources to be included/excluded	Fully aligned. Conservative justifications on the emission sources included in or excluded from the project boundary		Fully aligned. Conservative justifications on the emission sources included in or excluded from the project boundary	
		Conservativeness of principles to estimate baseline and project emissions	Fully aligned		Fully aligned. Sampling required	
		Conservativeness of principles to define emission factors for electricity systems	Makes reference to TOOL07: Tool to calculate the emission factor for an electricity system. Some issues are identified (see column AC and AD)		Makes reference to TOOL07: Tool to calculate the emission factor for an electricity system. Some issues are identified (see column AC and AD)	
		Conservativeness of the approach for estimation of leakage	Fully aligned. Requires the use of the Tool to calculate baseline, project and/or leakage emissions from electricity consumption		Fully aligned. Leakage is not relevant for this project type.	
	Limitation of uncertainties	Procedures to identify uncertainties in the calculations and to minimize them	Fully aligned. Detail approaches for possible interventions of technology/measures.		Fully aligned. The methodology requires to apply the standard for “Sampling and surveys for CDM project activities and programme of activities”.	
	Avoidance of double counting	Provision of clear guidance on how to avoid potential double counting, where applicable and ensure	Fully aligned. Attribution of mitigation results well defined. Risk of double counting very low.		Fully aligned. " the PDD shall also explain how project procedures eliminate any possible double counting of emission reductions"	

Methodology element	Methodological principle to be evaluated	Evaluation criteria	AMS-II.S.		AMS-II.N.	
		unequivocal attribution of mitigation results				
MRV approach	Transparency	Comprehensiveness of the monitoring requirements, including accuracy requirements of the monitoring equipment and calibration requirements (where applicable)	Fully aligned		Fully aligned	
		Requirements for the definition of a robust reporting and verification framework with clear allocation of roles and responsibilities, and definition of relevant reporting procedures	Procedures are provided for recording of certain parameters and their measurement frequency. The methodology does not address roles and responsibilities for reporting, but are to be defined according to the requirements in the CDM Project Standard and in the PDD template. Requirements for validation and verification are mentioned in the CDM Validation and Verification Standards		Procedures are provided for recording of certain parameters and their measurement frequency. The methodology does not address roles and responsibilities for reporting, but are to be defined according to the requirements in the CDM Project Standard and in the PDD template. Requirements for validation and verification are mentioned in the CDM Validation and Verification Standards	
	MRV of finance	Requirements on tracking financial flows	Not required. Fully missing		Not required. Fully missing	
	MRV of technology transfer	Requirements on tracking of technology transfer	Not required. Fully missing		Not required. Fully missing	
	Alignment with the enhanced transparency framework (ETF)	Monitoring and reporting requirements compatible with the ETF, including contribution to the achievement of the NDC targets	Methodology makes no reference to ETF or NDCs. But, the monitoring values and the data on ERs achieved could be used for reporting contribution to achievement of an NDC target		Methodology makes no reference to ETF or NDCs. But, the monitoring values and the data on ERs achieved could be used for reporting contribution to achievement of an NDC target	
		Reporting frequency in line with the ETF requirements	Methodology makes no reference to ETF, but does require annual monitoring of parameters. These could be used in reporting under the ETF		Methodology makes no reference to ETF, but does require annual or biennial monitoring of parameters. These could be used in reporting under the ETF	

Annex C- Results of the assessment of tools

Additionality assessment tools (TOOL01 and TOOL32)

Methodology element	Methodological principle to be evaluated	Evaluation criteria	TOOL01 (additionality assessment)		TOOL32 (positive list)	
Applicability conditions	**Consistency of outcomes**	Outcomes do not differ between host countries with similar ambition	Applied benchmarks are to be selected country specific from national sources: Fully aligned		Fully aligned	
	Avoidance of gaming	Safeguards to avoid/minimize perverse incentives to increase production of goods / services and thereby absolute emission levels	Gaming with additionality argumentation could take place if wrong benchmarks are used. As benchmarks are set in the tool, and conservative, gaming is prevented: Fully aligned		N/A	N/A
	Clarity of the methodology scope	Clearly defined applicability conditions and definition of project types that are eligible under the methodology	Fully aligned		Fully aligned	
Additionality determination	**Stringency in additionality assessment**	Demonstration of additionality considering existing and newly introduced mitigation policies and other international commitments by the host country	Additionality criteria does not provide guidance to include existing and newly introduced mitigation policies nor international commitments		The methodology requires that during the update of the list a review of relevant information on costs, penetration rates and other related information (e.g. regulations) is done. No reference to policies and international commitments is made.	
		Provision of clear and robust additionality demonstration approaches requiring check of activity-specific parameters	Fully aligned		The tool includes: Process, criteria and timeline for the update of the positive lists. N/A for activity-specific parameters	
		Definition of positive list of technologies automatically additional consistent with generic expert judgement and definition of the updating process of the list over time to reflect market and technological evolution	N/A	N/A	The tool includes: Process, criteria and timeline for the update of the positive lists. Here, however, no updating process is defined to reflect market and technological evolution.	

Methodology element	Methodological principle to be evaluated	Evaluation criteria	TOOL01 (additionality assessment)		TOOL32 (positive list)	
	Linkages with NDC	Provision of guidance on how to consider the NDC targets when determining additionality	No consideration of NDC targets. Fully missing		No consideration of NDC targets. Fully missing	
Baseline scenario determination	**Appropriateness**	Eligible baseline setting approach (the methodology should include at least one of the following approaches): - BAT -Performance benchmark -Projected but below BAU	N/A	N/A	N/A	N/A
		Clear definition of the baseline scenario, taking into account current situation and existing/planned policies, including NDC targets (unconditional)	N/A	N/A	N/A	N/A
	Conservativeness	Provision of guidelines for the regular update and/or validation of the baseline to take into account new policy developments	N/A		N/A	N/A
Emissions reductions calculation	**Conservativeness**	Conservativeness of the principles to define the project boundaries and emission sources to be included/excluded	N/A	N/A	N/A	N/A
		Conservativeness of principles to estimate baseline and project emissions	N/A	N/A	N/A	N/A
		Conservativeness of principles to define emission factors for electricity systems	N/A		N/A	N/A
		Conservativeness of the approach for estimation of leakage	N/A	N/A	N/A	N/A
	Limitation of uncertainties	Procedures to identify uncertainties in the calculations and to minimize them	N/A	N/A	N/A	N/A

Methodology element	Methodological principle to be evaluated	Evaluation criteria	TOOL01 (additionality assessment)		TOOL32 (positive list)	
	Avoidance of double counting	Provision of clear guidance on how to avoid potential double counting, where applicable and ensure unequivocal attribution of mitigation results	N/A	N/A	N/A	N/A
MRV approach	**Transparency**	Comprehensiveness of the monitoring requirements, including accuracy requirements of the monitoring equipment and calibration requirements (where applicable)	N/A	N/A	N/A	N/A
		Requirements for the definition of a robust reporting and verification framework with clear allocation of roles and responsibilities, and definition of relevant reporting procedures	N/A	N/A	N/A	N/A
	MRV of finance	Requirements on tracking financial flows	No retroactive tracking of actual financial flows: Fully missing		N/A	N/A
	MRV of technology transfer	Requirements on tracking of technology transfer	N/A	N/A	N/A	N/A
	Alignment with the enhanced transparency framework (ETF)	Monitoring and reporting requirements compatible with the ETF, including contribution to the achievement of the NDC targets	N/A	N/A	N/A	N/A
		Reporting frequency in line with the ETF requirements	N/A	N/A	N/A	N/A

Tools for emission factor (TOOL07) and fraction of non-renewable biomass calculation (TOOL30)

Methodology element	Methodological principle to be evaluated	Evaluation criteria	TOOL07 (emission factor)		TOOL30 (fraction of non-renewable biomass)	
Applicability conditions	**Consistency of outcomes**	Outcomes do not differ between host countries with similar ambition	Partially aligned: The methodology results in different outcomes, depending on past ambition that influences the grid emission factor (the lower, the higher the ambition). Equal future differences in ambition will result in equal changes of the grid emissions factor		fNRB differs as per country policy/ambition; worse country is benefitting from higher baseline	
	Avoidance of gaming	Safeguards to avoid/minimize perverse incentives to increase production of goods / services and thereby absolute emission levels	Low risk. As long as credit revenue per kWh is not exceeding electricity sales revenue there is no risk of perverse incentives.		Potential risk of inflating the fNRB value to increase baseline emissions (unless the conservative default value is used)	
	Clarity of the methodology scope	Clearly defined applicability conditions and definition of project types that are eligible under the methodology	Fully aligned		N/A	N/A
Additionality determination	**Stringency in additionality assessment**	Demonstration of additionality considering existing and newly introduced mitigation policies and other international commitments by the host country	N/A	N/A	N/A	N/A
		Provision of clear and robust additionality demonstration approaches requiring check of activity-specific parameters	N/A	N/A	N/A	N/A
		Definition of positive list of technologies automatically additional consistent with generic expert judgement and definition of the updating process of the list over time to reflect market and technological evolution	N/A	N/A	N/A	N/A

Methodology element	Methodological principle to be evaluated	Evaluation criteria	TOOL07 (emission factor)		TOOL30 (fraction of non-renewable biomass)	
	Linkages with NDC	Provision of guidance on how to consider the NDC targets when determining additionality	N/A	N/A	No consideration of NDC targets. Fully missing	
Baseline scenario determination	**Appropriateness**	Eligible baseline setting approach (the methodology should include at least one of the following approaches): - BAT -Performance benchmark -Projected but below BAU	The approach of this Tool is based on a BAU scenario thus it cannot be below BAU.		N/A	N/A
		Clear definition of the baseline scenario, taking into account current situation and existing/planned policies, including NDC targets (unconditional)	The baseline scenario does not consider existing and planned policies nor includes NDC targets		N/A	N/A
	Conservativeness	Provision of guidelines for the regular update and/or validation of the baseline to take into account new policy developments	Not aligned (revision of the baseline is considered only at the time of the renewal of crediting period)		N/A	N/A
Emissions reductions calculation	**Conservativeness**	Conservativeness of the principles to define the project boundaries and emission sources to be included/excluded	Project boundaries are set by country boundaries, electricity imports are considered with an emission factor of 0 t CO2/yr.		N/A	N/A
		Conservativeness of principles to estimate baseline and project emissions	N/A	N/A	The tool does not address project or baseline emissions, but it provides a conservative default factor (i.e. 0.3) for the fNRB estimate	
		Conservativeness of principles to define emission factors for electricity systems	Some issues regarding chosen emission factors, as outlined above		N/A	N/A
		Conservativeness of the approach for estimation of leakage	N/A	N/A	N/A	N/A
	Limitation of uncertainties	Procedures to identify uncertainties in the calculations and to minimize them	N/A	N/A	Fully aligned. An optional conservative value for the FNRB (i.e. 0.3) is provided. If the fNRB is calculated, the ex-ante calculations require the use of actual data from credible sources. Ex post	

Methodology element	Methodological principle to be evaluated	Evaluation criteria	TOOL07 (emission factor)		TOOL30 (fraction of non-renewable biomass)	
					calculations are to be updated annually.	
	Avoidance of double counting	Provision of clear guidance on how to avoid potential double counting, where applicable and ensure unequivocal attribution of mitigation results	N/A	N/A	N/A	N/A
MRV approach	**Transparency**	Comprehensiveness of the monitoring requirements, including accuracy requirements of the monitoring equipment and calibration requirements (where applicable)	Fully aligned		Fully aligned	
		Requirements for the definition of a robust reporting and verification framework with clear allocation of roles and responsibilities, and definition of relevant reporting procedures	Procedures are provided for recording of certain parameters and their measurement frequency. The methodology does not address roles and responsibilities for reporting, but are to be defined according to the requirements in the CDM Project Standard and in the PDD template. Requirements for validation and verification are mentioned in the CDM Validation and Verification Standards		N/A	N/A
	MRV of finance	Requirements on tracking financial flows	N/A	N/A	N/A	N/A
	MRV of technology transfer	Requirements on tracking of technology transfer	N/A	N/A	N/A	N/A
	Alignment with the enhanced	Monitoring and reporting requirements compatible with the	Tool makes no reference to ETF or NDCs. But, the monitoring values and the data on ERs achieved could		N/A	N/A

Methodology element	Methodological principle to be evaluated	Evaluation criteria	TOOL07 (emission factor)		TOOL30 (fraction of non-renewable biomass)	
	transparency framework (ETF)	ETF, including contribution to the achievement of the NDC targets	be used for reporting contribution to achievement of an NDC target			
		Reporting frequency in line with the ETF requirements	Tool makes no reference to ETF, but does require regular monitoring of parameters. These could be used in reporting under the ETF		N/A	N/A

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