ARTICLE 6.4 MECHANISM

A6.4-SB005-AA-A08

Information note

Compilation of inputs received in response to the “public consultation: Requirements for the development and assessment of mechanism methodologies” and related literature

Version 01.0

United Nations
Framework Convention on
Climate Change

COVER NOTE

1. Procedural background

1. The Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA), at its third session, requested the Supervisory Body for the mechanism established by Article 6, paragraph 4, of the Paris Agreement (Article 6.4 mechanism) to elaborate and further develop recommendations, for consideration and adoption by the CMA at its fourth session (November 2022), on the application of the requirements referred to in chapter V.B (titled ‘Methodologies’) of the rules, modalities and procedures for the mechanism established by Article 6, paragraph 4, of the Paris Agreement (RMP).[1]

2. The CMA, at its fourth session, requested the Supervisory Body to elaborate and further develop recommendations, for consideration and adoption by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement at its fifth session (December 2023). It further requested the Supervisory Body, while developing the recommendations, to consider broader inputs from stakeholders provided in a structured public consultation process. [2]

3. The Supervisory Body, at its fourth meeting, considered the draft recommendation “Requirements for the development and assessment of mechanism methodologies” (hereinafter referred as SB 004 inputs),[3] and agreed that an informal working group on this matter comprising its members and alternate members as well as the secretariat would prepare an information note taking into account the guidance and questions contained in annex 3 to its meeting report,[4] for consideration by the Supervisory Body at its fifth meeting. It further requested the secretariat to launch a call for public input based on those questions, with a view to seeking further input from stakeholders.

2. Purpose

4. The purpose of this document is to provide a literature review of the context of carbon markets and a compilation of public inputs received in response to the “Structured public consultation: Requirements for the development and assessment of mechanism methodologies”. The compilation is done to facilitate the work of the Supervisory Body in developing recommendations on the application of the requirements referred to in chapter V.B. (methodologies) of the RMP as contained in the Information Note ‘Draft elements for

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[1] See decision 3/CMA.3, paragraph 6(d), for the request, and the annex to 3/CMA.3, for the Rules, modalities and procedures for the mechanism established by Article 6, paragraph 4, of the Paris Agreement, contained in document FCCC/PA/CMA/2021/10/Add.1 available at: https://unfccc.int/documents/460950.

[2] See decision 7/CMA.4, paragraphs 21 and 22, for the request, contained in document FCCC/PA/CMA/2022/10/Add.2 available at: https://unfccc.int/documents/626570.

[3] See annex 10 of the annotated agenda of the fourth meeting of the Supervisory Body (A6.4-SB004-AA-A10), available at: https://unfccc.int/event/Supervisory-Body-4.

[4] See annex 3 of the meeting report of the fourth meeting of the Supervisory Body (A6.4-SB004-A03), available at: https://unfccc.int/event/Supervisory-Body-4.

the recommendation on requirements for the development and assessment of mechanism methodologies’ (A6.4-SB0005-AA07). In doing so, this document aims to respond to guidance and questions contained in annex 3 to SB004 meeting report.

5. The secretariat synthesised, paraphrased and grouped the information in the submissions for easy readability and flow of information. In that process, despite the best efforts, some relevant information may have been unintentionally omitted or not correctly represented. Also, it was difficult to fit some information under the prevailing elements and categories. Readers are encouraged to consult the full submissions available at the link included under footnote 5 to fully understand the background and context in which proposals are made in the submissions. These are also listed under the appendix of this document.

3. Current work

6. The call for inputs from stakeholders was open from 16 March to 11 April 2023. A total of 17 inputs were received as shown in table 1.[5]

Table 1. List of stakeholders who responded to the call for public input[(a)]

No.	Submission date	Stakeholder
1	4-Apr	Ambachew F. Admassie (AA)
2	5-Apr	Unite to Light (UL)
3	5-Apr	Cambridge Centre for Carbon Credits, University of Cambridge (CCC)
4	5-Apr	44.moles GmbH (44M)
5	6-Apr	Carbon Market Watch (CMW)
6	6-Apr	Perspectives Climate Research (PCR); International-Initiative-for-Development-of-Article-6-methodology-tools ((II-AMT)
7	6-Apr	Sylvera (SR)
8	6-Apr	CCS+ Initiative (CCSI)
9	6-Apr	California Air Resources Board (CARB)
10	10-Apr	Microsoft (MS)
11	11-Apr	Carbon Engineering (CE)
12	11-Apr	44.01 (44.01)
13	11-Apr	Cibola Partners (CP)
14	12-Apr	World Bank (WB)
15	12-Apr	Global CCS Institute (GCI)
16	13-Apr	Puro.earth (PE)
17	13-Apr	International Emissions Trading Association (IETA)

[(a)] In-text citations in this document (e.g. AA) reference stakeholder comments/inputs made to the call for public inputs

[5] Details of the call for public input and the full submissions are available at: https://unfccc.int/process-and-meetings/the-paris-agreement/article-64-mechanism/calls-for-input/sb004-requirements-methodologies.

4. Subsequent work and timelines

7. Further work will be carried out based on the guidance that will be received from the Supervisory Body.

5. Recommendations to the Supervisory Body

8. The Supervisory Body may wish to consider this document and provide guidance for any further work.

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1. Procedural background

1. The Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA), at its third session, requested the Supervisory Body for the mechanism established by Article 6, paragraph 4, of the Paris Agreement (Article 6.4 mechanism) to elaborate and further develop recommendations, for consideration and adoption by the CMA at its fourth session (November 2022), on the application of the requirements referred to in chapter V.B (titled ‘Methodologies’) of the rules, modalities and procedures for the mechanism established by Article 6, paragraph 4, of the Paris Agreement (RMP).[1]

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2. Context

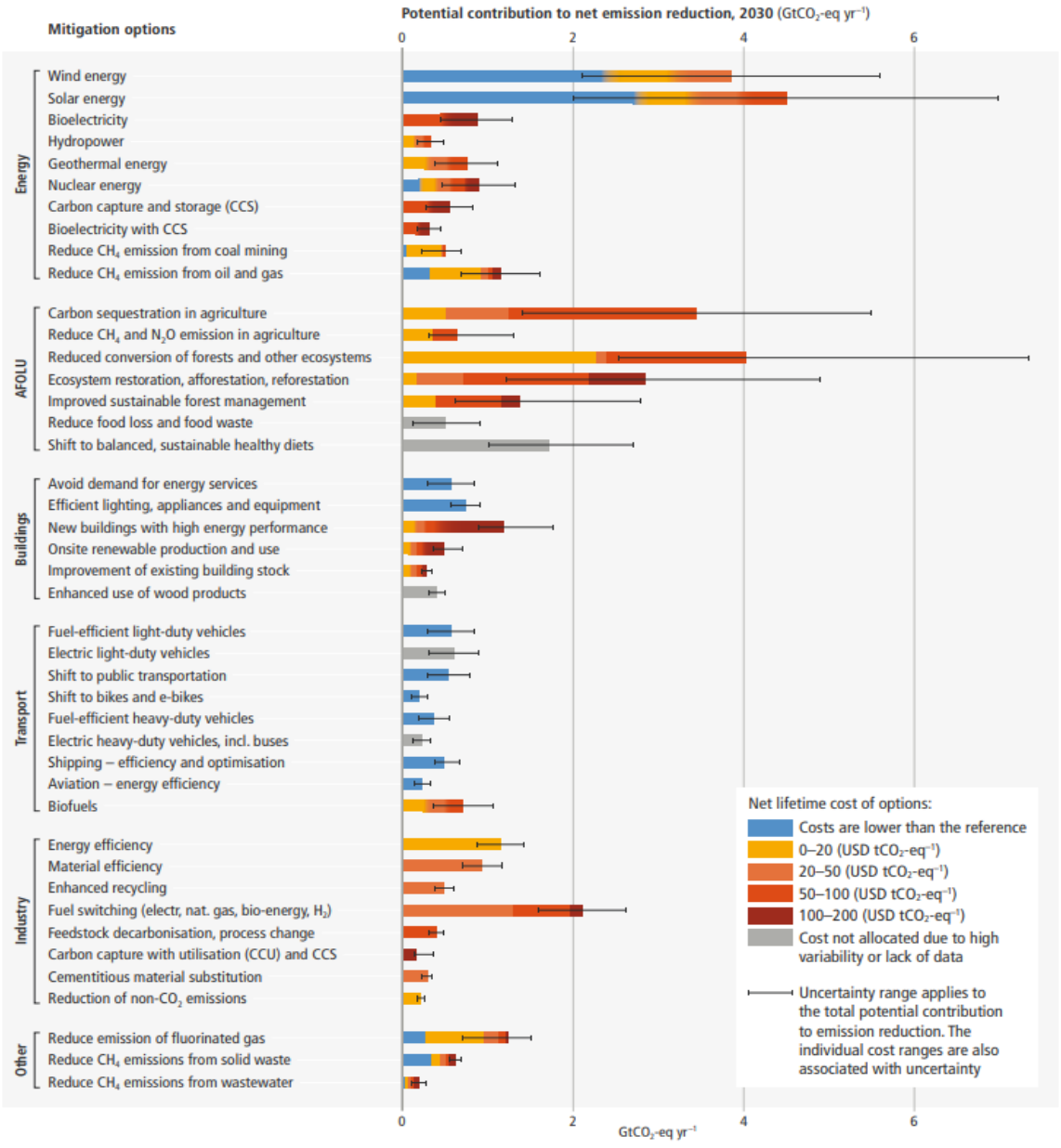
4. The 6th assessment report from the IPCC Working Group III – AR6 (IPCC, 2023), emphasizes that effective action to close the mitigation ambition gap requires concerted and sufficient finance. Based on a detailed sectoral assessment of mitigation options, the IPCC estimated that mitigation options costing 100 USD/tCO_2e or less could reduce global GHG emissions by at least half of the 2019 level by 2030 (options costing less than 20 USD/tCO_2e are estimated to make up more than half of this potential). For a smaller part of the potential, deployment leads to net cost savings. Large contributions with costs less than 20 USD/tCO_2e come from solar and wind energy, energy efficiency improvements, reduced conversion of natural ecosystems, and CH_4 emissions reductions (coal mining, oil and gas, waste). The mitigation potentials and mitigation costs of individual technologies in a specific context or region may differ greatly from the provided estimates. The assessment of the underlying literature suggests that the relative contribution of the various options could change beyond 2030.

[1] See decision 3/CMA.3, paragraph 6(d), for the request, and the annex to 3/CMA.3, for the Rules, modalities and procedures for the mechanism established by Article 6, paragraph 4, of the Paris Agreement, contained in document FCCC/PA/CMA/2021/10/Add.1 available at: https://unfccc.int/documents/460950.

[2] See decision 7/CMA.4, paragraphs 21 and 22, for the request, contained in document FCCC/PA/CMA/2022/10/Add.2 available at: https://unfccc.int/documents/626570.

[3] Details of the call for public input and the full submissions are available at: https://unfccc.int/process-and-meetings/the-paris-agreement/article-64-mechanism/calls-for-input/sb004-requirements-methodologies.

Figure 1. Overview of mitigation options and their estimated ranges of costs and potentials in 2030 (Source: IPCC, 2023)



5. In accordance with IRENA (2023), there is a need for substantial scaling up of modern use of bioenergy (direct use), renewables-based district heat generation, passenger electric cars on the road, green hydrogen production and consumption and, all removal technologies to achieve the 2030 targets.

6. Similarly, the IEA (2023) identified four key pillars that are vital to delivering the climate goals:

   (a) The first pillar highlights the need for decarbonising electricity, accelerating energy efficiency and electrification in the energy sector;

(b) The second pillar addresses the land-use sector and the report stresses the importance of reducing deforestation to net zero by 2030;

(c) The third pillar targets non-CO_2 emissions (e.g. HFCs, N_2O, CH_4);

(d) The fourth pillar involves carbon capture and storage and atmospheric carbon dioxide removal.

7. Literature review indicates that cooperative implementation through carbon markets can reduce the total cost of implementing NDCs by 2030 between USD 250 billion (IETA, 2019) and USD 300 billion (Edmonds et al., 2021).

8. According to the 2022 NDC Synthesis Report (UNFCCC, 2022), 76 per cent of all NDCs included the use or intention to use at least one type of voluntary cooperation, such as cooperative approaches (Article 6.2) or the mechanism (Article 6.4).

9. Currently about 95% of international public climate finance[4] is provided upfront before a project is operational. On the other hand, Results-based climate finance (RBCF) are payments made once pre-agreed emission reductions or removals have been met. The emission reductions are retained by the country that has generated them and can count towards that country's national climate target or NDC (World Bank, 2022).

10. As explained by Kachi and Day (2020), a key strength of using aspects of carbon market mechanisms for results-based climate finance is their ability, when properly implemented, to provide a unit that is quantified, monitored, reported, and verified in a relatively standard comparable metric – CO_2e. Further advantages include provision of the infrastructure to "crowdfund" mitigation or removals projects by connecting multiple small donors with projects on the ground with some measure of transparency.

11. The World Bank has identified three areas that are particularly well-suited to RBCF (World Bank, 2022):

(a) Natural climate solutions focused on agriculture, forestry, land-use, oceans, and other sectors;

(b) Sustainable infrastructure in energy, water, transport, urban, and other sectors. This could also include for example accelerated phase-out of coal-fired power plants by monetizing, in the carbon markets, the Emission Reductions Credits generated by the transition away from coal. This monetization would help crowd in private finance, support additional clean energy capacity;

(c) Fiscal and financial solutions that directly or indirectly provide or mobilize resources for climate action. Examples include carbon taxes, the removal of harmful subsidies, like fossil fuel subsidies.

[4] Exhaustive listing of sources of potential demand and supply for the carbon market credits is not the focus of this document. The Supervisory Body has been discussing the topic in their strategic vision sessions, taking into account related literature and public inputs (e.g. OECD assessments available at https://www.oecd.org/climate-change/finance-usd-100-billion-goal/, reports of High-level Advisory Group on Climate Change Financing available at https://www.iatp.org/sites/default/files/451_2_107756.pdf and Report of the Independent High-Level Expert Group on Climate Finance available at https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2022/11/IHLEG-Finance-for-Climate-Action.pdf envisage a role for carbon market in the broader discussion around financing of the climate action at scale)

12. The speed at which the Green Climate Fund’s (GCF) results-based payments were exhausted in recent years is an indicator that international public finance, let alone GCF, will not be able to finance all eligible emissions reductions. Mobilisation of private finance at scale, including through carbon markets, will be essential to closing the gap (GCF, 2022).

13. According to the IPCC Sixth Assessment Report (IPCC, 2023), the pathways that limit global warming to 1.5°C and 2°C involve rapid and deep and, in most cases, immediate GHG emission reductions in all sectors, and the strategies include:

    (a) Transitioning from fossil fuels without carbon capture and storage (CCS) to very low- or zero-carbon energy sources, such as renewables or fossil fuels with CCS;

    (b) Demand side measures and improving efficiency;

    (c) Reducing non-CO_2 emissions; and

    (d) Deploying carbon dioxide removal (CDR) methods to counterbalance residual GHG emissions. For scenarios that limit global warming to 1.5ºC, the total cumulative net negative CO_2 emissions including CDR deployment between 2020 and 2100 is estimated to be between 20 and 660 $GtCO_2$ and; for scenarios that limit global warming to 2ºC for the same period, the removals from CDR is estimated to be between 0 and 290 $GtCO_2$.

14. IPCC AR-6 also indicates that achieving global net-zero emissions means 5–16 GtCO2 of emissions from some sectors are compensated for by net negative CO2 emissions in other sectors i.e. the AFOLU sector, via reforestation and reduced deforestation, and the energy supply sector reach net zero CO2 emissions earlier than the buildings, industry and transport sectors. The figure 2 below illustrates the different combinations of sectoral mitigation strategies to achieve a balance between emissions and removals (global net-zero emissions) through different Illustrative Mitigation Pathways (IMPs).

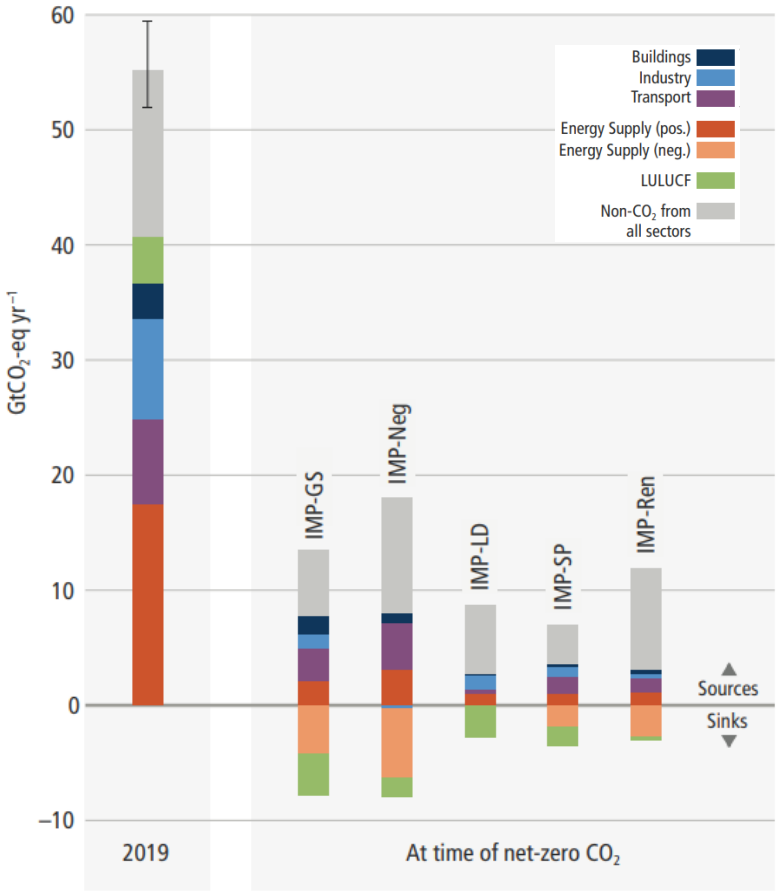


Figure 2. Sectoral GHG emissions at the time of net-zero CO2 emissions, compared to modelled 2019 emissions (source: IPCC, 2023).

Obs 1: Energy supply (neg.) includes BECCS and DACCS. DACCS features in only two of the five IMPs (IMP-REN and IMP-GS) and contributes

Obs 2: The details of the IMPs are:

IMP-Ren: place greater emphasis on renewables;

IMP-Neg: deployment of carbon dioxide removal that results in net negative global GHG emissions;

IMP-LD: efficient resource use as well as shifts in consumption patterns globally, leading to low demand for resources, while ensuring a high level of services and satisfying basic needs;

IMP-GS: less rapid introduction of mitigation measures followed by a subsequent gradual strengthening;

IMP-SP: how shifting global pathways towards sustainable development, including by reducing inequality, can lead to mitigation

3. Baseline setting

15. The SB 004 information note calls for a discussion of what is understood by the following elements, from paragraph 33 of the RMP, and how they could be operationalized. Mechanism methodologies shall:

(a) Encourage ambition over time;

(b) Encourage broad participation;

(c) Be real, transparent, conservative, credible, below ‘business as usual’;

(d) Avoid leakage, where applicable[5];

(e) Recognize suppressed demand;

(f) Align with the long-term temperature goal of the Paris Agreement;

(g) Contribute to the equitable sharing of mitigation benefits between the participating Parties;

(h) In respect of each participating Party, contribute to reducing emission levels in the host Party, and align with its nationally determined contribution (NDC), if applicable, its long-term low- greenhouse gas (GHG) emission development strategy if it has submitted one and the long-term goals of the Paris Agreement.

16. The following sub-sections present an overview of the feedback received from the public call for input, focusing on the elements listed in paragraph 15 above. The submitting organizations are identified by their acronyms as shown under the cover note. A complete list of references is included under the Reference section of this document.

3.1. Encouraging ambition over time

17. Below is a summary of public inputs received.

18. While the market-based mechanisms of Article 6 must increase ambition in mitigation and adaption, it is the purpose of the Article 6.4 mechanism to enable Parties to both achieve their NDCs and deliver more mitigation. To ensure integrity and ambition, it is imperative that the emissions baseline is set such that the relationship between the activity and the fulfilment of the NDC is clear. The mechanism should encourage ambition over time by generating positive climate impacts that remove barriers to the deployment of clean technologies, reduce the cost of decarbonization and unlock investment in low-carbon solutions (IETA)[6].

19. The Article 6.4 mechanism should update any inputs for baselines using the latest science and data every 5 to 10 years, or other known interval (but not too often). New projects should be compared against a new landscape of action and options (CARB).

20. This element speaks to innovating more accurate, stringent methodologies to extend the reach of project-based mitigations. Achieving continual improvement of methodologies, in alignment with current research could be encouraged through revision of methodologies, assessing their stringency and accuracy in relation to alternatives on a regular basis. Ensuring methodologies are public, understandable, and reviewed regularly is at the core of creating a transparent, ever-improving framework for future offsets (44M).

21. Default discounting of baseline emissions by an appropriate factor in the existing methodologies and country-specific discounting of baseline emissions linked to a country’s NDC and associated targets from the host country may be considered to encourage ambition (WB).

[5] This sub-section is covered under the workstream for leakage.

[6] In-text citations in this document, reference stakeholder comments/inputs made to the call for public inputs.

22. In specific areas such as grid connected electricity generation, adjustment of emission factor could be considered, for example in the grid emission factor determination, taking different weightage for operating margin (OM) and build margin (BM); BM determination makes sense for future projection and appears aligned with the below-business as usual (BAU) goal (WB).

23. Article 6.4 activities can only increase ambition if they broaden the scope of what is considered “possible” today, i.e. support transformational projects as opposed to incremental benefits against BAU by focusing on improvements that can transform an entire sector and excluding continued use of fossil fuel infrastructure. Conservative baselines not only help mitigate the risk of over-crediting but also serve as an additional safeguard to allow host Parties to benefit from a share of the mitigation benefits from Article 6.4 activities. Baselines must evolve with time. For most activities, this means achieving (near) absolute zero emissions by 2050 or earlier. Robust baseline contraction factors, depending on the sector, geographical location and level of uncertainty should be developed and applied (CMW).

24. The NDC “ratcheting up” cycle plays a part in encouraging ambition over time. Additionally, progressively conservative science-based pathways that lead to the 1.5-degree target could be considered based on 2030 and 2050 goals. Additional measures, such as applying a technology improvement factor over time, limiting eligibility of a baseline technology/benchmark to a few years, taking into account registered carbon market project activities in the baselines, reassessing baselines at renewal of crediting period, digitization of some methodology elements, as part of monitoring to avoid human error through automation, could be considered (AA).

3.2. Encouraging broad participation

25. Below is a summary of public inputs received.

26. Mechanism methodologies should encourage broad participation across all regions and participants by avoiding excessive complexity (IETA).

27. Examples from existing compliance programs that were established after the CDM should be used. The voluntary programmes provide important insights, but with caveats, since those crediting programmes vary across a large range and are not as accountable towards government-established targets or the balancing of considerations common to regulatory-grade programmes (CARB).

28. Alignment with Integrity Council for the Voluntary Carbon Market guidance and other voluntary methodologies (Gold Standard, Verra, American Carbon Registry, etc.) is highly encouraged to facilitate greater participation, particularly from the private sector. Failure of the Article 6.4 mechanism to align with various existing methodologies is likely to result in a fragmented market with perverse incentives for entities to select methodologies with the lowest transaction cost (MS).

29. To allow broad participation, it is important that the Mechanism covers as many sectors as possible, including the land-use sector. In that context, all of the performance-based approaches identified in paragraph 36 of the RMP should be considered under the Article 6.4 mechanism (WB).

30. Enabling application of standards, process and institutional arrangements in different country contexts, provision of options for data sets to enable multiple data sources and

addressing data gaps, particularly for lesser developed countries, including the use of defaults and use of benchmarking data from comparable regions can support broad participation (AA).

31. This element speaks to the need for accessibility (i.e. simple but highly accurate methodologies), where a wide range of project developers globally can apply methods and requirements irrespective of the scientific infrastructure and financial resources available to them. Using accessible, and affordable methods, such as terrestrial laser scanning, allows small-holder farmers to participate in mitigation efforts globally (44M).

32. To support broader participation, issues like the risk of overselling reductions, and hence the risk of a Party not meeting its NDC targets, should be well understood by countries and addressed with practical solutions (WB).

33. Mechanism methodologies should find a balance between being stringent and allowing the maximum participation possible (SR).

3.3. Being real, transparent, conservative, credible, below business as usual

34. Below is a summary of public inputs received.

35. Baselines should be real, transparent, conservative, credible, below BAU by adopting robust, open, and user-friendly measurement, reporting and verification (MRV) systems (IETA) and by using performance standards that are data driven and made publicly available (CARB).

36. This element speaks to the quality of methodologies and their need to demonstrate concrete change in GHG levels and show each step in the process, including the scientific calculations. Methodologies need to build upon and improve established scientific methods and not overestimate results (44M).

37. Adopting life-cycle approaches and considering embodied emissions, aggregation at a broad level, such as national boundaries, choosing the lowest emitting baseline when multiple sources of data are available, choosing better performing vintages for baselines when multiple options are available and avoiding double counting risks are some of the approaches to be real, transparent, conservative and credible (AA).

38. Business as usual can be a technology or practice that has significantly penetrated (more than 20 per cent share of usage) in a territory and would continue similarly due to a mandatory requirement or other reasons (AA).

3.4. Recognizing suppressed demand

39. Below is a summary of public inputs received.

40. Suppressed demand is related to baselines scenarios other than the current immediately visible scenario due to service not being available in an acceptable manner whereas project activity proposes a low carbon option to deliver the service (e.g. thermal comfort to population using low carbon technology currently living with health hazards due to poverty, drinking river water versus drinking boiled water, per capita electricity below a minimum specified level, overpopulated buses or trains, limited geographic coverage of an electricity system in LDCs/SIDs) (AA).

41. Literature on supressed demand in the energy sector refers to the situation where the energy demand is insufficient or not satisfied, due to barriers such as low income or lack of energy infrastructure. To operationalize this concept, it is necessary to consider other elements, for instance, a satisfied demand or the income effect. A satisfied demand conveys the idea of a minimum level of energy services, such as electricity supply, lighting or heating. The income effect addresses the idea that incomes grow over time, energy service demand and consumption would increase, so that even without access to electricity it is likely that energy consumption in the 'without-project scenario' would rise over time. Further investigation is needed on how to measure the level of energy services and, ultimately, how to determine whether there is a supressed demand (CCC).

3.5. Contributing to the equitable share of mitigation benefits between participating Parties

42. Below is a summary of public inputs received.

43. The Article 6.4 mechanism contributes to the equitable sharing of mitigation benefits between participating Parties by design, owing to short-crediting periods and the promotion of a ‘share of proceeds’ for adaptation. Further credit sharing arrangements may be considered by Designated National Authorities (DNAs), within reasonable limits so as not to undermine the economic viability of projects and/or the competitiveness of the Article 6.4 mechanism in relation to other crediting programmes (IETA).

44. Significant heterogeneity of NDCs makes it challenging to derive broadly applicable approaches on how best to share mitigation benefits and ensure NDC alignment through selecting the most suitable mitigation activities for Article 6 carbon market transactions and through baseline setting. Early experiences so far have shown that flexibility in activity selection is needed to enable buyer-seller matches, and even more so in a piloting and early market phase. Deriving NDC aligned baselines requires a similar degree of flexibility, and cases are rare where unconditional NDC targets would be directly translatable in crediting baselines. It seems therefore preferable to encourage Parties to use the existing flexibility under Article 6.4 to come up with tailor-made solutions according to their respective circumstances. This is not meant to discourage offering of default solutions but to caution against aiming for prescribing a pre-defined set of exclusive options (WB).

45. Setting baselines that are well below business-as-usual, including via the application of a baseline contraction factor is an effective way to ensure that Article 6.4 contributes to the equitable sharing of benefits for host Parties and to the reduction of emission levels in the host Party. Such baseline setting, regardless of how stringent any hypothetical contraction factor might be, must be dynamic. In most sectors and for most activities, this means achieving (near) absolute zero by 2050 or earlier. Fewer credits also mean higher prices, which leads to higher revenues for both the developers taking action, and the Host countries selling their reductions More stringent methodologies should hence not be seen as a difficulty to be overcome for market actors and Host countries. On the contrary, it will benefit these actors and better reflect the principle of “equitable sharing of mitigation benefits” (CMW).

46. Supervisory Body or the Designated National Authorities should not regulate sharing formulation (AA).

47. Guidance is needed if co-benefits are also included in the context of equitable sharing (MS).

48. It is difficult to have a standardised framework in practice - this will be linked, among other aspects, to carbon rights in the country, however, a general guidelines of minimum sharing requirements per project type could be drafted (SR).

3.6. Aligning with NDC of each participating Party, if applicable and LT-LEDs, if it has submitted one

49. Below is a summary of public inputs received.

50. It is important to clarify the relationship between an Article 6 mitigation activity and the host country’s conditional and unconditional NDC achievement, as well as LT-LEDS compatibility. However, NDCs can take widely differing forms, and it may not be immediately clear whether a mitigation activity within the scope of country’s unconditional NDC target is nevertheless surplus to that target (PCR).

51. Mitigation activities that fall within the scope of a country’s conditional NDC may be considered automatically surplus. For those within the scope of country’s unconditional NDC, the guidance document prepared by II-AMT outlines options for activity developers to ensure that Article 6 activities falling within the scope of a country’s unconditional NDC are target surplus, and therefore are in line with, and do not compromise, host countries’ achievement of their NDCs. It also outlines options to ensure mitigation activities simultaneously contribute towards the achievement of a host county´s NDC (PCR).

52. The following definitions are proposed for target plus (PCR):

    (a) **Target surplus:** An activity provides target surplus if it goes beyond what can reasonably be expected to be part of the host Party´s unconditional NDC measures.

53. Host countries have pledged to implement the measures necessary to achieve their unconditional NDC. Consequently, if a proposed mitigation activity can reasonably be expected to be part of the host-country’s measures to reach its unconditional NDC, the activity does not provide a “target surplus”. Therefore, the activity developer needs to evaluate whether implementation of the mitigation activity type may be deemed an expected part of the host country efforts to achieve the unconditional mitigation target of the NDC, even if the activity or mitigation is, per se, not yet mandatory by host country regulation (PCR).

54. The following assessments may be done resulting in “target surplus” when the outcome is affirmative (PCR):

    (a) Assess whether the proposed activity type has been previously identified by the host country to go beyond its efforts for achieving its unconditional NDC (e.g. included in a published host country approval list or in another formal communication of the relevant national Article 6 authority or specified in its NDC implementation plan).

    (b) Assess whether the degree of implementation of the mitigation action specified in the NDC for the time frame in question to which the proposed activity belongs to has been exceeded

    (c) Assess if the propose activity goes beyond the mitigation trajectory of implementation needed for the NDC target.

(d) Assess if the marginal costs of the proposed activity are beyond a threshold based on marginal abatement costs of various measures needed for the implementation of the NDC.

55. This element speaks to the need for each methodology to contribute to the goals of the host Party's NDC. This can be demonstrated by the creation of public accounting systems in each national Party. These systems would work in combination with the Article 6.4 global registry. It is crucial to transparently account for mitigation funded by private entities, to encourage contribution towards a nation's NDC (44M).

56. It is required that the sector represented by the Mechanism activity be within the host Party's conditional NDC. Otherwise, Art 6.4 income could act as an incentive to keep certain sectors "outside" a Party's goals, so that it could continue to create revenue without affecting the targets within its NDC (SR).

3.7. Aligning with long-term temperature goals of the Paris Agreement

57. Below is a summary of public inputs received.

58. Align with the long-term temperature goals of the Paris Agreement by considering emission reductions and removals that deliver mitigation in this decade and avoid creating perverse incentives and/or reward low-ambition NDCs (IETA).

59. Eligible technologies should be those that enable decarbonizing at least half of the baseline emission/emission intensity until 2030 and that enable 99 per cent (net zero) decarbonization potential for crediting years extending after 2030 (AA).

3.8. Taking into account policies and measures and relevant circumstances

60. Below is a summary of public inputs received.

61. The guidance should be developed to consider local conditions. For example, the determination of waste products from industrial processes or the market penetration for new technologies should be based on local, relevant circumstances (PE).

62. While the current Article 6.4 rules, modalities and procedures require taking into account policies in baseline setting and demonstration of additionality, it does not rule out crediting of new policies. Further guidance on Article 6.4 could look at modalities for eligibility of policy crediting under Article 6 to set the right incentives for increasing ambition and achieving mitigation at large scale (WB).[7]

63. The approaches for crediting the introduction of policies is inherently different to crediting of projects or programmes (PCR).

3.9. Requirements on baselines

64. Below is a summary of public inputs received.

65. When assessing the economic feasibility of Best Available Technologies (BAT), the cost of ownership as a percentage of average household annual income may not be suitable

[7] See input submitted by the World Bank, available at https://unfccc.int/sites/default/files/resource/Methodologies_requirements_input_WorldBank.pdf.

to all activities. A penetration rate (in absolute terms or as a fraction to uptake of the technology in the most mature markets) or other metrics may be used in some cases. Furthermore, when applying an approach based on existing actual or historical emissions adjusted downwards, it would be important to have multiple options for downward adjustment depending on activity types and local circumstances (IETA).

66. Economic feasibility should be determined by tools (example CDM Additionality tool). Environmental soundness takes into account the mandatory local emission/pollution limit when considering which technologies are included among those considered “best performing” (AA).

67. The following definitions are proposed for BAT (PCR):

    (a) Technology is defined in a broad sense, not only covering equipment, but also covering “techniques”, i.e. considering the usage pattern of equipment;

    (b) Available technologies exist or can be accessed or applied on a scale which allows implementation in the relevant sector, under commercially (less restrictive) and financially (more restrictive) viable conditions, taking into consideration costs and benefits, whether the technologies are used or produced within the territory of that Party, as long as they are reasonably accessible to the operator of the facility as determined by that Party. Accessibility relates to the technology and the availability of human resources to install and operate the technology according to its specifications throughout its technoeconomic lifetime;

    (c) Best available technologies are those most effective in achieving a high general level of protection of the climate, e.g. most effective in practical reduction of emissions.

68. For an ambitious benchmark, determine a performance distribution curve using the most up-to-date data (not more than three years old) of all technologies providing similar outputs or services in similar social, economic, environmental and technological circumstances as the proposed activity in the host country. If host-country specific data are not available, data from the region to which the host country belongs are to be used. Determine an ambitious benchmark, at minimum at the 20th percentile of the performance distribution curve if the characteristics of the distribution curve show that these percentiles are conservative. Calculate the average emissions intensity of the benchmark group selected in the previous sub-step (the “benchmark emissions intensity”). Downwards adjust the benchmark emissions intensity over the years (i.e. after the first year) to ensure it is in line with the long-term target of the Paris Agreement. This is done through the application of a “Paris goal coefficient”, set by the Supervisory Body and by the host country for Article 6.2, which ensures that baseline emissions fall linearly over time, reaching net zero at the time of the host country’s net-zero target (PCR).

69. For existing actual or historic emissions adjusted downwards, determine an actual or historical emissions baseline based on existing methodologies used under the Kyoto Protocol mechanisms. Adjust baseline downwards through a discount factor (“Paris goal coefficient”) to the actual or historical emissions intensity, declining over time. The historical emissions level of the first year needs to be adjusted downwards by at least 5 per cent. Historical data shall not be older than five years and represent at least a three-year historical time series (PCR).

70. Public input (PCR) suggests as follows[8]:

    (a) Choose BAT if the sector is characterised by homogeneous production i.e., if there are comparable outputs of produced goods or services, provided a BAT has been specified for the sector in question;

    (b) If a BAT has not been specified for the sector, then choose the ambitious benchmark approach;

    (c) Choose approach based on existing actual or historical emissions[9], adjusted downwards:

        (i) if there is no publicly available data on the emissions performance of technologies at the entity-level in the country;

        (ii) the sector shows strongly varying circumstances among installations such as differences in the emissions intensity levels that exceed 50%;

        (iii) the sector has characteristics where the mitigation is not linked to specific technologies but to processes with many input parameters, like in the agriculture of forestry sectors.

71. A different approach for nature-based solutions is proposed in a public submission. Building on financial additionality as defined by the CDM in the "Tool for the demonstration and assessment of additionality", the baseline will be set according to the forest owners financial alternatives at the point of credit issuance i.e. the price of timber and offsets are compared to check if a financial incentive is present, exclusively due to the offset project. The BAT approach in methodologies should be applied as a whole covering measurement and verification to ensure project developers select the best available measurement technology, reducing the risks of overestimation (44M).

3.10. Standardized baselines

72. Below is a summary of public inputs received.

73. Unless Parties wish to apply standardized baselines regionally or globally, for the measurement and cost benefits, such approaches should be determined country-by-country. While standardized baselines can make a mechanism more easily accessible to a broader range of stakeholders by reducing the cost of proving additionality and determining crediting baselines, the inevitable conservativeness of such simplified procedures, may rule out some projects that would otherwise be considered additional. Therefore, Parties should have the option to allow projects facing specific circumstances to forgo use of these standardized tools and establish additionality and baseline emissions for the individual project (IETA).

74. Using standardized baselines, i.e. performance benchmarks or default values, has reduced transaction costs and increased the transparency of CDM project activities:

[8] Further implementation details are provided in the submission from PCR.

[9] PCR suggests that this option can only be chosen by activity developers for activities in host countries that have communicated a net-zero path way/target and/or an LT-LEDS, unless the country is an LDC or SIDS.

baselines are not set on a project-by-project level but can be determined for entire project types and sectors (CE).

4. Additionality

75. Below is a summary of public inputs received.

76. Mechanism methodologies should require counterfactual analysis based on realities on the ground and demand clarity on what is required by law or regulation for emission reductions or removals in a given jurisdiction by providing evidence that the activity goes beyond those requirements to ensure it is ‘representing mitigation that exceeds any mitigation that is required by law or regulation’ (IETA).

77. Only legally binding and widely enforced requirements should be considered; overarching policy targets or generic plans without specified instruments or means of implementation are not considered (PCR).

78. Mechanism methodologies should require an assessment of how the activity promotes low-emission and sustainable development pathways aligned with the long-term goals of the Paris Agreement to ensure the activity is ‘taking a conservative approach that avoids locking in levels of emissions, technologies, or carbon-intensive practices incompatible with paragraph 33 of the RMP’ (IETA).

79. The existence of ambitious high-level targets enshrined in legislation but not backed up by incentive or enforcement mechanisms should not necessarily disqualify some activities as non-additional and enforcement rates should be included in the assessment of additionality. Otherwise, there will be perverse incentives that penalize countries putting in place ambitious policies and favour those that do not (IETA).

80. There should be no requirement for a demonstration of enforcement actions. If the rule or law exists, it should be considered enforced. That puts the local regulator on point to follow through on their laws and rules and makes implementation cleaner for additionality tests (CARB).

81. The level of enforcement should not be relevant in the eligibility assessment (including additionality testing) of activities (CMW) (PCR).

82. A check that no legal requirements agreed but not yet implemented that would trigger the activity once they go into effect during the activity’s forthcoming crediting period are in place should be implemented. If forthcoming legal requirements are identified, then the crediting period shall be limited until the date the legal requirements requires the implementation of the activity (PCR).

83. New laws and regulations enforced during the crediting period should be considered at the time of renewal of the crediting period to avoid compromising the financial viability of projects (IETA). Investors will want some confidence in the return of their investment. Hence, crediting periods should be guaranteed until such time as a renewal of enforcement occurs in the middle of a crediting period (CARB).

84. “Investment Analysis”, using the CDM “Tool for the Demonstration and Assessment of Additionality” provides a good basis to demonstrate additionality (44M).

85. Projects that use outdated methodologies, producing inaccurate results, can deliver lock-in usually identifiable by large up-front costs but low mitigation. With forest-based projects the application of traditional carbon measurement leads to inaccurate data. Using more effective, accurate and cost-effective technology should be encouraged. This would eliminate barriers for project development and thus encourage broad participation (44M).

86. A positive list to make carbon crediting robust and efficient is recommended based on market penetration for a new technology because all sectors need to transition to new technologies consistent with net-zero emissions (PE).

87. A crediting period of less than five years could be feasible with an equivalent permanence approach. This approach requires that buyers must at a single point in time purchase sufficient credits to deal with the damage caused by an emission (CCC).

88. With respect to carbon capture and storage/bioenergy with carbon capture and energy storage /direct air carbon capture and storage activities, careful consideration of whether engineered/technology mitigation technologies, such as CCS and certain carbon removal methods, might warrant differential treatment of baselines relative to other types of creditable reduction activities under Article 6.4. This should be explored as the only source of revenue in this case is carbon market revenue (IETA).

89. By assessing whether the only source of revenue or savings of the activity is that from the sale of mitigation outcomes whether an investment analysis is required or not should be determined. If the activity type is implemented (frequently) without incentives from the mechanism, then an investment analysis step should be mandatory and otherwise no investment analysis needs to be carried out (PCR).

90. The investment analysis requires the identification of what is a financially viable and realistic alternative(s) to the mitigation activity in similar social, economic, and regional contexts. The value of the economic assessment parameter (e.g., internal rate of return (IRR), payback period) at which a mitigation activity would not be deemed economically or financially feasible, considering all revenues and savings generated by the mitigation activity can be the basis of investment analysis (PCR).

91. A practice/technology that has GHG emissions intensity per unit of production/consumption that exceeds the intensity of the lowest emitting, technically feasible and commercially available production pathway for the product, service or output is considered emission intensive practice/technology. An activity that leads to the prolongation of the lifetime, of an emissions-intensive practice/technology delivers lock-in of emissions levels (PCR).

92. Once a methodology is established, a minimum of 5-10 years crediting should be provided. That would ensure investment return lock-in, and after that time period a reassessment of the technology and actions for remaining eligible projects could be undertaken to ensure higher emissions technologies are not locked in for a long time (CARB).

93. When assessing “lock-in” levels, instead of promoting negative lists, a broader assessment should be conducted focused on how the activity promotes low-emission and sustainable development pathways aligned with the long-term goals of the Paris Agreement (IETA).

94. Technologies with lifetimes that go beyond 2030 but which do not allow for net zero emissions will result in emissions lock-in (AA).

95. Carbon dioxide removal and sequestration, whether mechanical or biological (forestry) should be considered with longer timeframes of up to 25 years as those actions can also help address legacy emissions already in the atmosphere and recognize the longer timeframes for meaningful benefits such as forest growth (CARB).

96. The Supervisory Body should establish, and regularly update, a list of activities that are deemed to have a low likelihood of additionality, as well as activities that are fundamentally incompatible with reaching the long-term goals of the Paris Agreement, and thus are excluded (e.g. renewable energy projects in most regions of the world, as these are cost-competitive and highly unlikely to be additional; activity types that further the world’s reliance on fossil fuels, such as increasing the efficiency of fossil fuel powered power plants; capturing leaks from fossil fuel transport infrastructure or from fossil fuel extraction sites) (CMW).

97. The secretariat, in collaboration with host Parties, should develop a region-specific positive list of activity types that should be prioritized, i.e. with a very high likelihood of additionality (CMW).

98. Activities that avoid combustion of fossil fuels and emissions of short-lived climate pollutants should be on the positive list pending any additionality and permanence criterion being satisfied. Carbon removal should be on a positive list (CARB).

99. If the technology is deemed as emerging with little deployment globally, or potentially regionally, those could be positive for additionality pending all other tests for additionality are satisfied (e.g. based on data on the deployment of actions and technology that is less than 10 per cent). If the project type only partially avoids combustion of fossil fuels or emissions, it will be important to re-evaluate the technology or actions periodically to ensure there is continued progress away from combustion of fossil fuels or drastic reductions in short-lived climate pollutants (CARB).

100. Global and country-specific positive lists should be developed to reduce administrative burdens. Sectors outside the host Party’s NDC and high-abatement-cost activities are some broad activity types that Parties might want to include in positive lists. Given the need to balance between stability and the dynamic nature of policy and technology developments, positive lists should be subject to periodic reviews at predictable intervals (e.g. every 5 years). Such lists should not preclude other activities being allowed under the Article 6.4 mechanism (IETA).

101. Positive lists for additionality should be developed based on inputs from experts, public consultation and independent assessment and validation of the outcomes of the development process (PCR). Relevant considerations for positive list could include:

    (a) Activity types that, under all contexts, can show that their net present value of costs significantly (e.g., by at least 25%) exceeds revenues and savings without carbon finance are eligible to be put on a global positive list of “low risks to financial additionality”;

    (b) Activity types are eligible to be put on a national positive list if they, in their national context, can show that:

        (i) their costs significantly exceed revenues and savings so that their IRR is negative under conservative assumptions regarding the discount rate; or

(ii) their levelized costs of delivering a product or service are more than 25% higher than the industry average; or

(iii) their marginal abatement cost exceeds a country-specific benchmark value;

(iv) a combination of very low penetration rates (e.g., less than 2%) and objectively justified non-financial barriers shows that they cannot be implemented without carbon revenue and that carbon revenue can overcome these barriers.

102. Financial additionality is complex and there may be instances where one incentive is insufficient to motivate an action given the pace and scale of action needed. Financial stacking of incentives may be necessary in some cases. If additionality is determined through a performance test in the methodologies, periodic updates to the methodologies would ensure older and now common technologies are no longer eligible as new project types (CARB).

103. A crediting period should at least test for additionality taking into account any new laws and regulations coming into force since the previous crediting period began. The crediting period should also reflect any technical updates to protocols, such as updates to protocols that remove recognition of older technology in favour of newer less GHG intensive technologies that serve the same function (CARB).

104. Crediting periods of less than 5 years only make sense if analysis demonstrates that the technology or action will pay back on any capital investment in the project and that there would be ongoing financial paths to continue to pay for the maintenance and operation of the technology. This would prevent stranded assets and backsliding on emission reductions. It is also important to provide space for regulations to be implemented once the technology or action is cost effective. Regulations are designed to deliver all reductions where applicable, while seeking credits is voluntary. One cannot lose sight of the need to push crediting especially where there may be some market or scaling barriers. Once those barriers are addressed, regulations are a direct tool available to governments to deliver the maximum reductions for a project type (CARB).

105. Barriers should be reassessed at the renewal taking into account whether large upfront investments were made (CMW).

106. A one-off technology that is being installed, regulatory surplus should be considered at initial registration and at the renewal of crediting period. For technology that is deployed over a period, regulatory surplus should be considered at time of enforcement (AA).

107. Direct Air Carbon Capture and Storage projects are inherently additional and should be included in the positive list of technologies for additionality. Methodologies should use a cradle-to-grave approach for life cycle assessment (CE).

108. The key in setting requirements is a data-focused approach to show why an additional type of screen is needed to support projects in a region or of a specific type (see CARB forestry and rice cultivation protocols as examples). There can be a role for nested projects within a larger approach (e.g. California Tropical Forest Standard). External agencies may have key data to inform the evaluations needed to conduct assessments for establishing performance standards for baselines and additionality. These agencies are not necessarily the appropriate ones to make the final decisions on crediting methodologies as they often have different charges and less familiarity with the implications of specific

decisions. Host countries should publicly provide robust data, where available, to set up any screens specific to their regions (CARB).

109. The baseline setting (BAT, ambitious benchmark) should take into account region or country-specific circumstances. In addition, Adjustment factor (BCF/PAC) should take into account national factors (PCR).

110. There should not be any changes regarding activities driven by programmatic approaches. Approaches for crediting the introduction of policies are however inherently different to crediting of projects or programmes. Policy crediting should relate to the cost-benefit ratio of the introduction of policies. This will be influenced by the policies that are already in place (PCR).

111. The same methodologies and requirements need to be applied without making distinctions based on the country and sector in which the activity is hosted (44M).

112. Carbon credits created from Article 6.4 methodologies should differentiate between avoided/reduced and removed CO_2 emissions and need to include industrial carbon removal methods (PE).

5. Leakage

113. Below is a summary of public inputs received.

114. Carbon leakage has two definitions: (1) it can refer to the relocation of emission-intensive activities from jurisdictions with a higher cost to emit CO_2 to jurisdictions with a lower cost to emit, and (2) it can refer to an increase in fossil emissions outside the boundary of the project caused by the project activity itself. The Article 6.4 mechanism should be focused on minimizing any potential increase in fossil emissions outside the boundary of a project (with respect to the second definition of carbon leakage, above). In the case of removals, guidance on leakage can be specified as “Removal supplier shall assess all potential sources of leakage (i.e. increase of fossil emissions) outside of the project activity boundary but due to the activity as specified in the methodology. In the case where leakage potential is identified it shall be quantified and deducted from the CO_2 removals” (PE).

115. Leakage describes a situation where a project activity has impact outside of its boundary. This impact can be physical, economic, or social (44M).

116. The Article 6.4 mechanism should minimize the increase in emissions outside the activity boundary. Nesting of activities and jurisdiction-level crediting are proving to be effective approaches. A thorough lifecycle assessment of the impact of an activity should be the starting point to address the risk of leakage. Robust MRV systems and integrated registries are also key to identifying carbon leakage and reducing such risks across different types of activities and countries (IETA).

117. Leakage should be avoided where possible and discounts should apply when leakage risk exists. Methodologies can determine certain discount factors attached to different leakage risks. Jurisdictional approaches can help tackle leakage within the borders of a territory. Market leakage is seen by economists as inevitable for any genuinely additional project, suggesting issuing entities must seek to accurately quantify and account for (i.e. apply discounts for) this (SR).

118. Innovation is needed to improve estimation of leakage, to better avoid leakage, such as increased emissions elsewhere due to displacement of food or timber production to non-project areas. At present many leakage assessments focus on rough estimates of local-scale (or “direct”) leakage and ignore or greatly underestimate longer-range (“market”) displacement of forgone production (CCC).

119. For forestry-based solutions, the greatest risks of negative leakage occur when a nation’s timber industry policies do not account for the industry’s intersection with the carbon market. On the other hand, a strong benefit of positive leakage is a shift in sustainability trends of the timber market. With lower barriers to entry, carbon projects provide an alternative to low-grade timber harvesting (44M).

120. On the project level, leakage can be addressed by thorough inspection of the area surrounding a project. Some project developers create a “leakage belt” to assess this element of a project over time and account for it through discounting of offsets. Providing foresters with a cost-effective alternative to timber harvesting reduces leakage in the long run (44M).

121. Activity carbon leakages should be addressed in cases where the effect is negative to the jurisdiction with less stringent climate policies. This is often the case when project developers from Annex I countries create projects in Non-Annex I countries, of a lower quality than they otherwise would. Stricter national policies outlining the parameters for which carbon projects by foreign entities can exist could help with this. Another approach, on a larger scale, could be to increase cross-national policies or matching commitment agreements as proposed by the authors of “Combating climate change with matching-commitment agreements” (44M).

122. Leakage involves the risk of displacing activities that cause GHG emissions from the project site to another geographic location (including across international boundaries) for economic reasons. Economic leakage occurs when the market demand for an emitting activity is sustained despite the development of a carbon dioxide removal project. Note: these concepts are distinct from physical leakage (reversals), which occur when carbon that is stored throughout the course of a carbon offset project is re-released into the atmosphere through either avoidable (for example, a failure to maintain sequestration wells) or unavoidable (for example, extreme weather events) means (MS).

123. Leakage occurs when efforts to reduce GHG emissions in one country or sector lead to an increase in emissions in another country or sector. This can happen, for example, if a country imposes a tax on carbon emissions, which leads to the relocation of carbon-intensive industries to countries with less stringent regulations. In this case, the emission reductions achieved in the country that imposed the tax is offset by the emissions increase in the country where the industries have relocated. The greatest risks of leakage occur when mitigation policies are implemented in a way that is not globally coordinated or when there is a lack of global cooperation on climate change. For example, if a group of countries agree to reduce their emissions under the Paris Agreement, but other countries do not follow suit, the emission reductions achieved by the first group of countries could be offset by emission increases in the nonparticipating countries. Another risk of leakage occurs when mitigation policies are not comprehensive and do not cover all sectors of the economy or all types of emissions. For example, if a country imposes a tax on carbon emissions from electricity generation but does not regulate emissions from transportation or agriculture, emission reductions in the electricity sector may be offset by emissions increases in the other sectors (CP).

124. Emissions from the construction phase should be counted as project emissions (CCC).

125. The emissions from the construction phase should be considered part of the project emissions in the Life Cycle Assessment (PE).

126. Appendix to this document includes more details regarding the current practices to address leakage.

6. Non-permanence and reversals

127. Below is a summary of public inputs received.

128. With respect to carbon capture and storage/sequestration, methodologies should take into account the specific attributes of mineralization (CO_2 elimination through subsurface mineralization) and separate the requirements appropriate for mineralization as opposed to conventional storage in geological reservoirs (44.01).

129. Article 6.4 mechanism should address the risk of non-permanence and reversals through the implementation of pooled buffers, which should be based on the actual risk for each specific activity and in each geographical area (IETA).

130. In REDD+, generally emission reductions are considered as non-permanent when the reported emissions are higher than the baseline at any time after units are issued. In REDD+, this risk is generally addressed through the use of buffers. For Article 6, it is important that a consistent approach is taken across all sectors when it comes to defining non-permanence and requiring addressing the risks (WB).

131. The 2005 Special Report on Carbon Dioxide Capture and Storage by the IPCC states that appropriately selected and managed geological reservoirs are ‘very likely’ to retain over 99 per cent of the sequestered CO_2 for longer than 100 years and ‘likely’ to retain 99 per cent of it for longer than 1,000 years. A variety of monitoring technologies have been successfully deployed to measure, monitor and verify injected CO_2 in the subsurface. Monitoring a CO_2 storage site occurs over its entire lifecycle from pre-injection to operation to post-injection. Operational and research experience over several decades demonstrates that injected CO_2 can be monitored to confirm its containment (CCSI).

132. Leakage risk is higher in nature-based credits, especially activities where the supply of particular goods is reduced by the GHG mitigation activity. Nature-based projects should be sited in areas with lower risk of reversal, when possible. Physical risks such as fires, hurricanes and droughts threaten nature-based projects. Siting carbon removal projects according to IPCC projections for climate impacts is key to reducing the risk of physical reversals in face of a globally changing climate. Buffer pools to account for non-permanence should be maintained throughout the duration of low-durability project lifetimes as should monitoring for reversals. Tonne-year accounting is not advised for low durability or nature-based carbon removals. Tonne-year accounting cannot be used to support an equivalence to permanent removal (MS).

133. Mitigation activities that lead to short-term sequestration of carbon should not be eligible to issue offsets under Article 6.4. This includes activities such as forest protection, afforestation, reforestation, soil carbon management, improved forest management, etc. (CMW).

134. Storage methods and products suited to utilizing CO_2 are heterogeneous. CO_2 stored in the biosphere is characterized by low permanence, while methods such as geological storage potentially lock away CO_2 for longer timescales. Similarly, utilization of CO_2 in some products (e.g. in fizzy drinks) lead to almost immediate re-emission, while others (e.g. in cement) are long-term. Storage and utilization methods including a high risk of re-emission must be treated carefully for real emission reductions to be achieved (CCSI).

135. Verra´s Non-Permanence Risk Tool for Geologic Carbon Storage establishes procedures to assess a project’s non-permanence risk and determine the project’s contribution to Verra´s buffer pool reserve for geological carbon storage. Depending on the risk assessment, a share of credits generated by the project is deposited in Verra’s Geological Carbon Storage buffer pool reserve to be available to equalize re-emissions should they occur (CCSI).

136. Carbon dioxide removal methods have different risks of reversal, thus biological and geological carbon cycles should be managed separately. Different approaches for carbon accounting shall ensure that carbon removed is not re-emitted at a later stage and that it leads to effective climate mitigation. Temporary storage will always have a climate benefit, even if reversals were to happen at a later point in time. There may be a need to calculate an “equivalence period”, after which storage for that period is deemed equivalent to an emission reduction. After the calculated period has expired the reversal would be no longer considered to have a negative impact on the climate (PCR).

137. Equivalence periods to emission reduction: many baseline and crediting mechanisms apply a 100-year period based on the global warming potential (GWP) for GHGs that is used in the Kyoto Protocol and Paris Agreement. However, other ranges have been suggested: from as little as 30 years (TSVCM 2021) to 55 years (Moura Costa and Wilson 2000) and even as far as 1,000 years (Carbon Plan 2021) (PCR).

138. CARB has adopted two approaches for permanence in situations where there could be a potential reversal. All projects in this category contribute to a buffer pool. For intentional reversals, the party that surrendered a credit is obligated to replace any reversed credits to maintain environmental integrity. For unintentional reversals, the credits are replaced from the buffer pool to maintain environmental integrity (CARB).

139. Nature based solutions have avoidable and unavoidable reversal risks. Current approaches can be improved. Nature Based Solutions should make use of the data, technologies and methodologies that are fast emerging that take account of reversals risk and non-permanence. Companies buying credits to offset the damage of an emission should purchase sufficient credits upfront to achieve equivalent permanence (CCC).

140. Forest-based project reversals are typically dealt with through buffer reserves to mitigate the issue on the buyer end. In addition, legal paths for reversals should be made available to foresters. Bringing more transparency to the issue and providing support to the foresters would deter reversals in the long run (44M).

141. In the forest-based project sphere, the risks for non-permanence and reversals often lie in the duration of projects and the lack of collective accountability around the way reversals are handled (44M).

142. The physical longevity of carbon storage over time, or durability, can be grouped as low (fewer than 100 years), medium (100 to 1000 years) and high (thousands of years or longer). Each durability category has its own benefits and challenges, and the

development of all three categories are needed to have a chance at achieving global net-zero goals by mid-century (MS).

143. When it comes to **buffer pools**, which are currently the most common way to purportedly address impermanence, the contribution rates are not necessarily scientifically robust and can risk leading to undercapitalisation of the pool. Research of California’s buffer pool suggests it is heavily undercapitalised. In addition, for buffer pools to work, one would need to monitor the project area well beyond the end of the crediting period (over 100 years) in order to actually detect any reversals, which is difficult (if not unrealistic) to guarantee and which also raises real questions of liability: reversals could occur many decades later (the project developer could be out of business), they could be on a huge scale (beyond the ability of a project developer to compensate for even if they’re required to do so in principle), they may not be detected (even by national GHG inventories depending on granularity of measurement), and it may not be possible for the Supervisory Body to legally require proponents to address reversals if they refuse. These issues raise significant integrity questions regarding the long-term viability of buffer pools to address impermanence of credits used to offset actual emissions (CMW).

144. Some projects on today’s voluntary carbon market operate without any permanence-risk mitigation measures despite presenting real permanence risks. That is the case, for example, of many cookstove activities which often aim to reduce the combustion of biomass. These activities aim to reduce forest degradation/deforestation levels and bear non-permanence risks since the credited emission reductions entail sequestration in natural ecosystems that are vulnerable to various reversal risks. The non-permanence risk tied to cookstove projects are typically not accounted for, however. Cookstove project developers on the voluntary market (Verra and Gold Standard) and on the CDM do not need to contribute to a buffer pool. More generally, for efficient cookstove project types, the CDM, Verra and Gold Standard do not have “approaches for accounting and compensating for reversals [or] approaches for avoiding or reducing non-permanence risks” (Source: Carbon Credit Quality Initiative (May 2022) (CMW).

145. **Tonne-year accounting** must not be included under Article 6.4 as a method of addressing non-permanence since it creates a false equivalence between temporary carbon storage and (permanent) reductions or removals and is at odds both with the IPCC and the Paris Agreement’s long-term temperature goals (CMW).

7. Other issues- Short Lived Climate Pollutants

146. Below is a summary of public inputs received.

147. Short-lived climate pollutants (SLCPs) have significant potential impacts on climate change during the next 20 years. However global warming potential (GWP) is ill-suited to represent the climate impacts of non-gaseous and short-lived pollutants such as black carbon (BC) and organic carbon (OC) that have large regional variability in radiative forcing. While CO2 resides in the atmosphere for centuries, the lifetime of BC and OC in the atmosphere is on the scales of days to weeks. A key source of SLCPs is the burning of kerosene in single wick lamps. CDM methodology AMS-III.AR: Substituting fossil fuel based lighting with LED/CFL lighting systems may be updated to include SLCPs to more accurately account for the climate impacts and potentially drive more funding into the effort, thereby reducing the usage of kerosene lamps and reducing SLCPs (and carbon emissions) (UL).

148. There are still uncertainties but based on the uncertainty bounds given by Bond et al. (2011), when we factor in both CO2 and BC, the resulting range goes from 33.5kg of CO2e up to 110.1kg per month per household. Taken on its own (without factoring in BC) switching a kerosene lamp with a solar lamp removes 3kg CO2 per month (UL).

149. Thus, a mechanism for crediting reductions in aerosol emissions is lacking in existing carbon market frameworks and future carbon market frameworks should be encouraged to include it. According to Lighting Global/ESMAP, et all, up to 240 million people will be left behind by the current solar market. These are people in “last mile” communities who are most likely to use kerosene lamps and are the least likely to be able to afford to switch to solar (UL).

8. References

8.1. Stakeholder inputs

Table 2. Stakeholders that responded to the call for public input

No.	Submission date	Stakeholder
1	4-Apr	Ambachew F. Admassie (AA)
2	5-Apr	Unite to Light (UL)
3	5-Apr	Cambridge Centre for Carbon Credits, University of Cambridge (CCC)
4	5-Apr	44.moles GmbH (44M)
5	6-Apr	Carbon Market Watch (CMW)
6	6-Apr	Perspectives Climate Research (PCR)
7	6-Apr	Sylvera (SR)
8	6-Apr	CCS+ Initiative (CCSI)
9	6-Apr	California Air Resources Board (CARB)
10	10-Apr	Microsoft (MS)
11	11-Apr	Carbon Engineering (CE)
12	11-Apr	44.01
13	11-Apr	Cibola Partners (CP)
14	12-Apr	World Bank (WB)
15	12-Apr	Global CCS Institute (GCI)
16	13-Apr	Puro.earth (PE)
17	13-Apr	International Emissions Trading Association (IETA)

8.2. Literature references

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Appendix. Treatment of leakage

1. As part of the effort to identify leakage sources and outline possible methodological solutions, this section aims to draw from current practice in CDM and other mechanisms and systems taking into account discussions of the Supervisory Body and Public inputs.

Possible sources of leakage

2. Sources of leakage may include:

   (a) **Equipment transfer:** used equipment transferred outside of the project boundary leading to higher greenhouse gas emissions outside the project boundary;

   (b) **Diversion of resources** from other activities;

   (c) **Activity leakage:** diversion of production or service provision i.e. relocation of emission-intensive activities from jurisdictions with a higher cost to emit CO_2 to jurisdictions with a lower cost to emit;

   (d) **Upstream/downstream emissions:** upstream emissions are owing to the production of products or services, while downstream emissions come from their use and disposal. Emissions associated with the fuel/electricity consumed due to production, processing, transmission, storage and distribution are covered.

Possible solutions for leakage

3. Solutions for leakage may include:

   (a) **Discounting:** deductions from credited volumes possibly taking into account equipment lifetime where relevant

   (b) **Scrapping:** evidence of destruction / decommissioning / disposal of baseline technology

   (c) **Abundancy of resources:** demonstrate surplus availability of resources in the region

   (d) **LCA:** lifecycle assessment

   (e) **Nesting:** may involve integration in higher-level monitoring system and/or standardized higher-level baseline use that are regularly updated

   (f) **Larger-scale implementation:** sectoral, sub-national or national level implementation

   (g) **Harmonized policies:** harmonized cross-national policies, may include matching commitment agreements

4. Table 1 below illustrates the potential sources of leakage, potential solutions and which stakeholder could be in charge of the addressing it.

Table 1. Practices to address potential sources of leakage

Mechanism	Leakage source	Leakage solution	Who should address	Comments
CDM	Equipment transfer	Discounting, Scrapping	Activity Developer, third party verification	Old equipment transferred from outside of boundary into the project location was considered, transfer of equipment to outside of boundary from the project location was ignored except in a few cases with assumption that equipment that go out displace equipment that are even more emission intensive, only transfers within or between non-annex I countries was considered
CDM	Diversion of resources	Abundancy of resources, discounting	Activity developer, Designated Operational Entity (DOE) validation	Applied in projects for renewable biomass use and low emission products for construction (e.g. bricks). The CDM methodological tool ‘TOOL22: Leakage in biomass small-scale project activities’, classified sources as: (a) Shifts of pre-project activities: Decreases of carbon stocks, for example as a result of deforestation, outside the land area where the biomass is grown, due to shifts of pre-project activities. (b) Emissions related to the production of the biomass (e.g. use of electricity/energy, fertilisers). (c) Competing uses for the biomass. The biomass may in the absence of the project activity be used elsewhere, for the same or a different purpose
CDM	Diversion of non-renewable biomass saved	Discounting, surveys to quantify	Activity developer, DOE validation	An option to discount 5% of emission reduction was applied in cookstove projects in lieu of monitoring of the sources of woody biomass for the cookstoves

Mechanism	Leakage source	Leakage solution	Who should address	Comments
CDM	Upstream/downstream emissions	LCA	Activity developer, DOE validation	The LCA should include the quantity of different fossil-fuels consumed and associated CO2 emission factors associated with the upstream stages (i.e. production, processing, transmission and storage) for 1 unit of the fuel consumed by the activity. Alternatively, conservative upstream default factors per type of fuel could be applied (e.g. values from Table 3 of the CDM methodological TOOL15: Upstream leakage emissions associated with fossil fuel use)
NA	Downstream emissions associated with the final disposal of the activity’s output	LCA	Activity developer, DOE validation	The LCA should include the emissions from the final disposal of 1 unit of the activity’s output at the end of its lifetime.
NA	Activity leakage within national boundaries	Nesting	NA	Activity leakage within national boundaries

5. Included below in Table 2 is more granular information from specific CDM methodologies.

Table 2. Identification and addressing of leakage sources in CDM methodologies

Sector and key measures to address leakage	Extract from the methodology	Any revisions to the requirement and rationale	Implementation in projects
Energy efficient (lighting) Destruction/scrapping of baseline light bulbs	Leakage can be neglected if the lamps replaced are scrapped. The scrapping of replaced lamps should be documented and independently verified (destruction documented via witnessing by local environmental officials or time stamped video records). Scrapped lamps should be stored until such correspondence has been checked. (AMS-II.C. v15, AMS-II.J. v07 AM0046 v02, AM0113 v02)	Requirement holds.	PoA 3223: ICLs were collected by the PP and certificate of handing over/ taking over (“Certificate of Destruction”) were issued by ICL destruction agencies. DOE verified the certificates and boxes where the lamps were stored. PA4056: the number of scrapped lightbulbs has been crosschecked against available records from a local recycling company contracted by the project participants to collect and recycle the metal sockets of the scrapped lightbulbs.
Energy efficiency (equipment in general) Destruction/scrapping of baseline equipment	Leakage can be neglected if the equipment replaced is scrapped. An independent monitoring of scrapping of replaced equipment needs to be implemented which includes a check on whether the number of project activity equipment distributed by the project and the number of scrapped equipment correspond with each other (scrapped equipment should be stored until such correspondence has been checked). (AM0091 v04)	Requirement holds. AM0091 v04 is the latest version.	No project registered applying any version of the methodology.
Energy efficiency (chillers) Destruction/scrapping of baseline chillers	The existing chiller will be scrapped, and scraping will be monitored and certified according to an established monitoring and certification protocol.	Requirement holds. AM0060 v02 is the latest version.	No project registered applying any version of the methodology.

Sector and key measures to address leakage	Extract from the methodology	Any revisions to the requirement and rationale	Implementation in projects
	The destruction must be witnessed, photographed (still and video), and certified by an independent third party, using a standard form of certification that shall make provisions for the unique identification of the existing chiller destroyed. (AM0060 v02)		
Energy efficiency (transformers) Destruction/scrapping of baseline transformer	No leakage is accounted if it can be ensured that the replaced transformers are not used elsewhere through documentary evidence of scrapping. DOE should verify that the replaced transformers have not been distributed at other places. (AM0067 v02)	Requirement holds. AM0067 v02 is the latest version.	No project registered applying any version of the methodology.
Transport (cars) Destruction/scrapping of baseline vehicles	For PoAs only: leakage can be neglected if the equipment replaced is scrapped. An independent monitoring of scrapping of replaced equipment needs to be implemented which includes a check on whether the number of project activity equipment distributed by the project and the number of scrapped equipment correspond with each other (scrapped equipment should be stored until such correspondence has been checked). The scrapping of replaced equipment should be documented and independently verified. (AMS-III.C. v11 and AMS-III.S. v03)	Requirement removed to keep the methodologies simple (from AMS-III.C. v12 and AMS-III.S. v04 onwards)	PoA 2897: A scrapping certificate is issued to owners that hand-over their vehicles to scrapping facilities. This certificate contains the details of the vehicle scrapped, such as the chassis number, and is used by the vehicle owner to get a loan to buy a new and more efficient vehicle.
Transport (buses) Destruction/scrapping of baseline vehicles	The methodology is applicable for the segregated BRT bus lanes or the rail-based MRTS replaces existing bus routes (e.g. through scrapping units or through closing or re-scheduling existing bus routes) operating under mixed traffic conditions.	For projects involving BRTs, the following specific provisions apply: (…) (b) The buses used in the routes that were replaced by the project	No project registered applying version 05 of the methodology. (From ACM0016 v05 and AM0031 v07 onwards)

Sector and key measures to address leakage	Extract from the methodology	Any revisions to the requirement and rationale	Implementation in projects
	(ACM0016 v04, AM0031 v06)	MRTS can be retired or relocated to another part of the network.	Requirement to scrap baseline buses removed to allow the use of baseline buses in other parts of the transport to meet a growing demand to avoid use of even more emission intensive technologies.
Type I methodologies (electricity and/or heat generation) Transfer of equipment	No need to include a requirement to the replaced energy-generating equipment is scrapped and that this scrapping should be independently monitored since the replaced equipment would most likely replace less efficient equipment outside the project boundary.	This is the latest version of the guidelines.	If the energy generating equipment currently being utilized is transferred from outside the boundary to the project activity, leakage is to be considered (AMS-I.C v22).
Biomass for power and/or heat generation Diversion of biomass	Demonstrate that the total quantity of biomass residues annually available in the project region is at least 25 per cent larger than the quantity of biomass residues which is utilized annually in the project region (e.g. for energy generation or as feedstock), including the project facility to conclude that there is an abundant surplus of the biomass residue in the project region which is not utilized. The project region is an area within a radius of 250km around the project activity. (TOOL16 v05)	This is the latest version of the methodological tool.	PA7575: demonstrated using statistics from local government.
Cookstoves Diversion of non-renewable biomass saved	- Leakage related to the non-renewable woody biomass saved by the project activity shall be assessed based on ex post surveys of users and the areas from which this woody biomass is sourced (using 90/30 precision for a selection of samples). The potential source of leakage due to	This is the latest version of the methodology.	Most projects have used discounting (5% of baseline emissions).

Sector and key measures to address leakage	Extract from the methodology	Any revisions to the requirement and rationale	Implementation in projects
	the use/diversion of non-renewable woody biomass saved under the project activity by non-project households/users that previously used renewable energy sources shall be considered. If this leakage assessment quantifies an increase in the use of non-renewable woody biomass by the non-project households/users, that is attributable to the project activity, then $Bold,i,j$ is adjusted to account for the quantified leakage. - Alternatively, $By,savings,i,j$ is multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required. - Project activities switching from baseline device using firewood to efficient project device using charcoal or switching from firewood to efficient project device using processed biomass (briquette, pellets, and woodchips) shall take into account the leakage effects related to the charcoal or processed biomass production. A default value of 0.030 $t_{CH4}/t_{charcoal}$ may be used in accordance with AMS-III.BG. (AMS II.G v 13)		

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07 November 2022	A6.4-SB003-A04 – Information note: Status of current work on the application of the requirements referred to in chapter V B (Methodologies) of the rules, modalities and procedures (version 1.0)
25 October 2022	A6.4-SB003-AA-A05 – Draft recommendation: Requirements for the development and assessment of mechanism methodologies (version 2.0) A6.4-SB003-AA-A06 - *Information note*: Requirements for the development and assessment of mechanism methodologies (version 2.0)
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08 July 2022	A6.4-SB001-AA-A06 - *Concept note*: Guidelines for implementation of methodological principles, approaches, and methods for the establishment of baseline and additionality (version 1.0)