

TOOL FOR ROBUST BASELINE SETTING



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REVISED TOOL

International Initiative for Development
of Article 6 Methodology Tools

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International Initiative for Development of Article 6 Methodology Tools (II-AMT)

In January 2022, the II-AMT was launched with the aim of developing methodological tools that guide the revision of existing carbon market methodologies when applied to mitigation activities implemented in the context of Article 6 of the Paris Agreement. These tools cover additionality determination, baseline setting and monitoring, reporting and verification (MRV) of emissions, reductions and removals, while a guidance document covers aspects related to Nationally Determined Contributions (NDCs). Perspectives Climate Research convened an international team of leading baseline and monitoring methodology experts from different regions to develop the set of “Article 6 methodology tools”.

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Introduction

Background

1. A crediting baseline sets the reference level of greenhouse gas (GHG) emissions for an Article 6 activity. The difference between the baseline emissions and the activity emissions defines the volume of mitigation outcomes generated by the activity. Carbon markets have developed various approaches to creating 'counterfactual' scenarios for the baseline. Often, the baseline has been set to represent the scenario that most likely would have occurred in the absence of incentives from carbon crediting, i.e., "business as usual" (BAU). There have, however, also been cases where crediting baselines have been set below BAU. The estimation of BAU emissions is inherently subject to uncertainty.
2. In the context of the Clean Development Mechanism (CDM) and Joint Implementation (JI), similar but not identical baseline guidance was enshrined in the Marrakech Accords agreed in 2001. Under CDM and JI, baseline-related principles comprised transparency, conservativeness, internal consistency, appropriate and adequate calculations/assumptions, accuracy, measurability and reliability of data and limited uncertainties. Under the CDM, crediting baselines should be set in line with one of the following options: (a) existing actual or historical emissions, (b) emissions from a technology that represents an economically attractive course of action, taking into account barriers to investment or (c) average emissions of similar project activities undertaken in the previous five years, in similar social economic, environmental and technological circumstances, and whose performance is among the top 20 % of their category¹. As a safeguard against artificially high baseline scenarios and to prevent that the CDM generate perverse incentives against ambitious national mitigation policies and measures, the CDM Executive Board agreed on the so-called "E+ and E- policies" rules. Policies that increased emissions ("E+ policies") would not be considered in the baseline if introduced after 1997, while policies that reduced emissions ("E- policies") would not be considered in the baseline if introduced after 2001. The Joint Implementation Supervisory Committee (JISC) specified three valid approaches to baseline setting including a JI-specific approach, a methodology for baseline setting approved by the CDM Executive Board or an approach already taken in comparable JI projects.
3. In the context of the Kyoto Mechanisms, crediting baselines have often taken the form of intensity-based baselines, usually linked to BAU emission paths. In these cases, baseline parameters have been denominated in tonnes of GHG emissions per unit of production of an output or service which implied that absolute emissions of an activity, or the sector in which that activity is implemented, could increase if production grew more quickly than emissions intensity fell. Such absolute emission increases in host countries are not aligned with the Paris Agreement's temperature goal². In fact, carbon market cooperation in the context of the Paris Agreement will need to contribute to a net *reduction* of global GHG emissions which implies, for example, setting a crediting baseline that is lower than low-end estimates of BAU emissions.
4. Under the Paris Agreement, all Parties have mitigation targets in place and are urged to increase their Nationally Determined Contribution (NDC) ambition every 5 years to reach global net-zero emissions in the second half of this century. In addition, Article 6 cooperation has the explicit aim to contribute to higher ambition in Parties' mitigation and adaptation actions. In this context, the Article 6.2 guidance and the Article 6.4 rules, modalities and procedures (RMP) specify methodological principles and, in the case of the RMP, specific requirements for robust baseline setting.

Objectives

5. This methodological tool provides robust approaches to baseline setting under Article 6 of the Paris Agreement. A robust approach needs to be practical and applicable to various activity types while ensuring the environmental integrity of emissions credits generated. The development of this tool is guided by lessons learned from baseline setting practices in

¹ Option c might be below BAU since it is derived from the top performers only.

² Referring to Article 2 of the Paris Agreement where it states that the objective is to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels.

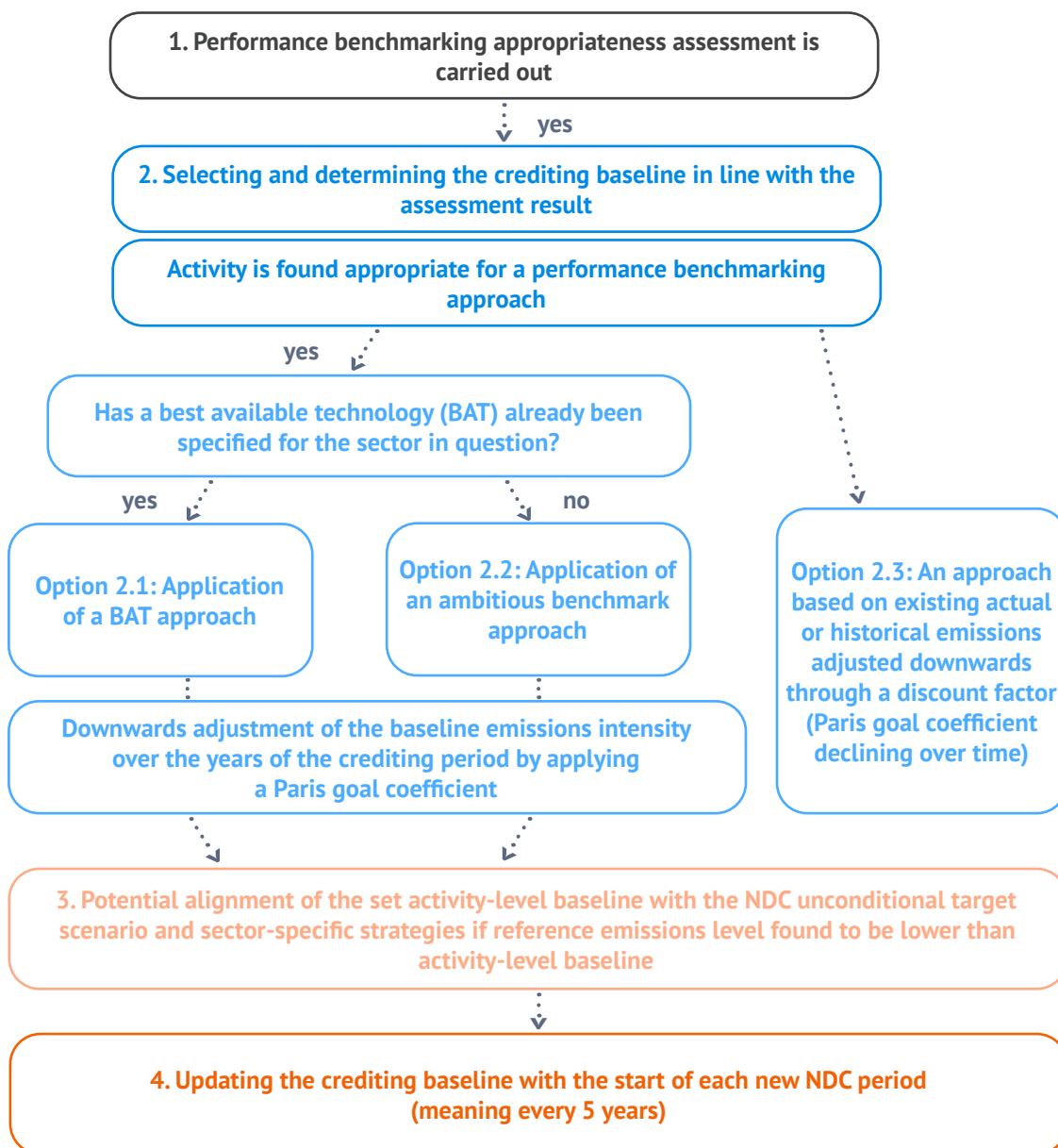
the CDM and JI context and conceptual considerations in light of the new Paris Agreement context. The methodological tool aims to contribute to the operationalisation of the Article 6.4 principles and rules, and also to inform governments and other entities engaging in cooperative approaches under Article 6.2.

Scope and Applicability

6. This TOOL02 provides a stepwise approach to setting a crediting baseline for **projects** and **programmatic** approaches (collectively called “mitigation activities”) that is both in line with the Article 6.2 guidance and the Article 6.4 RMP, the latter offering more detail on how to set crediting baselines under Article 6. The relevant rules and principles referred to in the development of this tool are presented in the section before the annex. It is not applicable to mitigation activities on a higher level of aggregation such as sectoral approaches or policy-based crediting.
7. Certain elements of this stepwise tool are not applicable to **removal activities** at this stage. Further research is needed to clarify, for example, how baselines for removal activities might be aligned with the long-term goals of the Paris Agreement, for example when countries have to engage in net removals and thus a baseline for removals would already have to factor in such removal.
8. In validating the application of this tool to a specific activity, independent designated operational entities are to carefully assess and verify the reliability and creditability of all data, rationales, assumptions, justifications, and documentation provided by activity participants to support the setting of robust baselines. In this context, the designated operational entities also need to **identify and cross-check available independent sources and documentation**. The elements checked during this assessment and the conclusions shall be documented transparently.
9. This TOOL02 includes detailed guidance for a stepwise approach for setting a robust, below BAU crediting baseline, in line with the three approaches outlined in the Article 6.4 ‘rules and principles’ section, summarised in Figure 1 and outlined in detail in paragraphs 13-20. The different steps entail:
 - a. **Assessing the appropriateness** of performance benchmarking for the sector and sub-sectors targeted by the proposed activity, which then determines which baseline setting approach is used;
 - b. **Selecting the crediting baseline** according to one of the three approaches:
 - i. best available technologies;
 - ii. an ambitious benchmark; and
 - iii. downward adjustment of existing actual or historical emissions;
 - c. **Adjusting the selected activity-level baseline** according to national/sectoral reference scenarios (NDC alignment); and
 - d. **Regularly updating** the baseline.
10. The tool thereby further operationalises the Article 6.4 requirements, meaning that some steps refer to potential future decisions to be taken by relevant actors such as the Article 6.4 Supervisory Body. The tool therefore clearly indicates whether the elements build on existing decisions, or could inform future decisions.

³ The II-AMT experts recommend exploiting the benefits of digitisation in Article 6 cooperation in this context. Governments participating in cooperative approaches could agree to keep information on data, assumptions and benchmarks in a database that designated operational entities can access to cross-check information provided in mitigation activity design documentation.

FIGURE 1: FLOWCHART OF PROPOSED STEPWISE PROCESS FOR ROBUST BASELINE SETTING



Source: II-AMT (2023)

11. In addition to the broad conceptual description, this TOOL02 also includes sector/activity type-level guidance, disaggregated to the extent possible to:

- a. support the identification of sectors/activity types for which performance benchmarking is appropriate;
- b. inform sector/activity type-specific approaches for determining the appropriate ambitious benchmark percentiles; and
- c. inform the development of sector/activity type-specific discount factors under baseline setting option 3.

Terms and Definitions

12. The following terms and definitions are used in this tool.

- a. **Activity emissions scenario:** Estimated GHG emissions associated with the proposed activity for the entire lifetime of the technology/ duration of the activity, independent of the length of the crediting period.
- b. **Best available technology:**
 - i. **Technology** is defined in a broad sense, not only covering equipment, but also covering “techniques” i.e., considering the usage pattern of equipment.
 - ii. **Available:** Technologies exist or can be accessed or applied on a scale which allows implementation in the relevant sector, under commercially 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 techno-economic lifetime.
 - iii. **Best:** Most effective in achieving a high general level of protection of the climate e.g., most effective in practical reduction of emissions.
- c. **Commercially viable:** For all kinds of technologies, the technology will provide sufficient returns to cover investment costs for a reasonably well managed company operating it. This does not mean that it needs to be financially viable for all companies under all circumstances. Moreover, for household technology, the cost of purchasing the technology is less than 10 per cent of the household annual income⁴.
- d. **Emissions lock-in:** The proposed mitigation activity leads to the adoption of, or the prolongation of the lifetime of an emissions intensive practice/technology.
- e. **Environmentally sound:** The activity is in line with national laws and regulation on environmental protection.
- f. **Emissions intensive practice/technology:** A technology/technique that has a GHG emissions intensity per unit of production/consumption that exceeds the intensity of the lowest emitting, technically feasible and commercially available⁵ production pathway for the product, service, or output delivered.
- g. **Crediting baseline:** Activity specific reference emissions scenario, against which the volume of mitigation outcomes achieved by the activity is calculated. The difference between the activity’s crediting baseline and the measured activity emissions determines the volume of mitigation outcomes generated by the activity.
- h. **Crediting period:** Period within which the mitigation outcomes of a given activity can be credited.
- i. **NDC baseline scenario:** National level reference emissions scenario described in the NDC of the host country.
- j. **NDC unconditional target scenario:** Mitigation scenario associated with meeting the unconditional NDC targets, i.e., what a country specifies it could implement based on its own resources and in-country capabilities, as described in host country NDC and underlying technical reports.

⁴ Aligned to definition from the “Concept note: Guidelines for the implementation of methodological principles, approaches and methods for the establishment of baseline and additionality” from A6.4SB-001

⁵ “Commercially available” means it can be obtained in the country where the mitigation activity takes place, either off-the-shelf or via a bidding process or direct contracting process.

k. Similar social, economic, environmental and technological circumstances:

- i. “Economic circumstances” are deemed similar if key economic parameters (market interest rate, inflation rate) do not differ by more than 50%.
- ii. “Environmental circumstances” are deemed similar if key environmental parameters (intensity levels of pollution of key air, soil and water pollutants, biodiversity index) do not differ by more than 50%.
- iii. “Technological circumstances” are deemed similar if the penetration rate of technologies relevant for the sector where the activity takes place does not differ by more than 50%.

Methodology Procedure

STEPWISE APPROACH TO SETTING THE CREDITING BASELINE

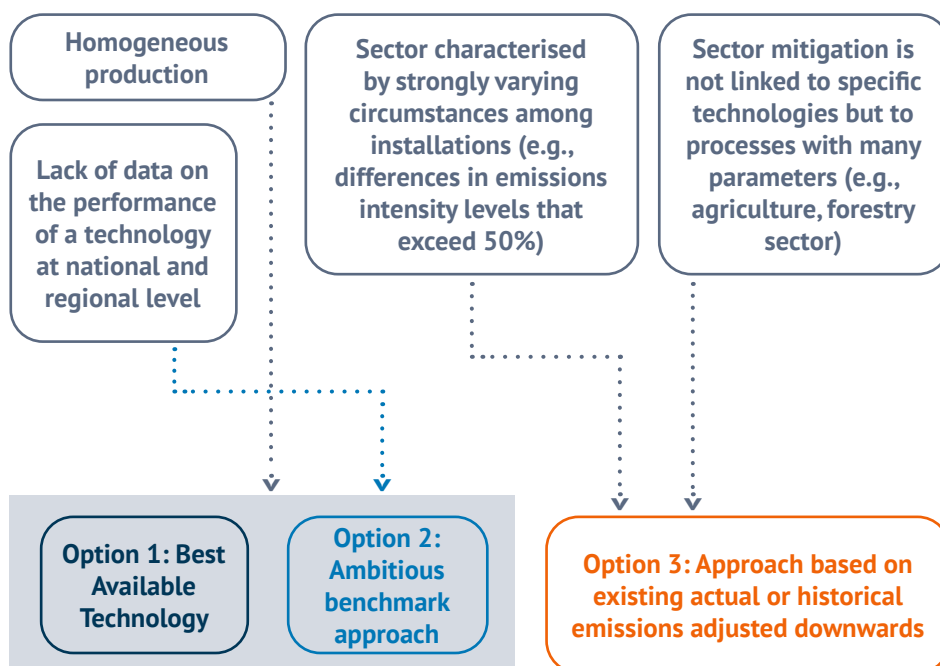
13. This section outlines a stepwise approach for determining the baseline in line with the three “below BAU” baseline setting approaches defined in the Article 6.4 RMP. The steps outlined below shall ensure that the activity and resulting mitigation outcomes do not lead to a net increase in emissions across participating Parties between NDC implementation periods.

14. Step 1 (Mandatory): Selection of baseline approach⁶

- a. If the sector is characterised by homogeneous production i.e., if there are comparable outputs of produced goods or services, then choose option 1 if a BAT has been specified for the sector in question; if a BAT has not been specified, then choose option 2.
- b. Choose option 3 if:
 - i. there are 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.
- c. In case the methodology already applies a benchmark approach to baseline setting, it needs to be assessed whether a BAT has been specified for the respective activity. If this is not the case, then step 2, option 2 is to be followed.

⁶ Over the longer term, the appropriateness of benchmarking for specific activity types should be assessed and determined by the Article 6.4 Supervisory Body based on a future decision to be taken.

FIGURE 2: ASSESSMENT OF THE APPROPRIATENESS OF PERFORMANCE BENCHMARKING FOR SECTORS



Source: II-AMT (2023)

15. Step 2, Option 1: Setting the baseline in relation to best available technologies (BAT)

- a. Define the technology category to which the activity technology belongs, starting from the good/service provided by the activity.
- b. Define the potential baseline technologies that produce an equivalent output of a good/service and deemed available⁷ in the host country, i.e., the technologies need not have been implemented in the host country already, but the regulatory, service provider, and financing conditions are available for their implementation.
 - i. Recognising the special circumstances of LDCs and SIDS, in the case of these countries, consider as “available” only technologies that have already been implemented in the country.
- c. Determine which of the identified potential baseline technologies are commercially viable (see definitions), given the circumstances of the host country.
- d. Identify the potential baseline technologies that are environmentally sound, i.e., in line with national laws and regulations on environmental protection.
- e. Determine the emissions performance parameters and values of the best technology among the commercially and financially viable baseline technologies for the Article 6 activity in the national context, or in the regional context in case there are 3 or fewer national facilities with the given technology. Thereby, a standardised approach is to be applied for large technologies beyond 10,000 t CO₂e annual emissions, where a generic BAT emissions coefficient is to be provided by the host country designated national authority (DNA) and a more tailored process for smaller technologies where the activity developer proposes a performance parameter for approval by the host country DNA.

⁷ To demonstrate availability, activity developers could provide information on the following: a list of technologies that produce an equivalent output to that of the project activity and that have a significant market share; the performance parameters for these technologies, including efficiencies and emissions rates/emissions factors; market share of these technologies.

- f. Downward adjust the baseline emissions intensity over the years of the crediting period to ensure it is in line with the long-term goal of the Paris Agreement⁸. This is done through the application of a “Paris goal coefficient”, set by the Supervisory Body for Article 6.4⁹ 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. The Paris goal coefficient would be set at 100% in 2021 and at zero in 2050 for a country whose net-zero target date is 2050. For countries without a net-zero target, the Article 6.4 Supervisory Body would specify the year in which the Paris goal coefficient reaches zero.
- g. Baseline parameters are to be monitored across the crediting period and regularly updated in line with Step 4.

16. Step 2, Option 2: Setting the baseline through an ambitious benchmark

- a. Determine a performance distribution curve using the most up-to-date data (not more than 3 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.
- b. 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.
- c. Calculate the average emissions intensity of the benchmark group selected in the previous sub-step (the “benchmark emissions intensity”).
- d. 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 Agreement¹⁰. This is done through the application of a “Paris goal coefficient”, set by the Article 6.4 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.
- e. Monitor the baseline parameters across the crediting period and regularly update in line with Step 4.

17. Step 2, Option 3: Setting the baseline based on existing actual or historical emissions adjusted downwards

- a. This option can only be chosen by activity developers for activities in host countries that have communicated a net-zero pathway/target and/or an LT-LEDS¹¹, unless the country is an LDC or SIDS. If the eligibility criterion is satisfied, the following steps are to be taken:
- b. Determine an actual or historical emissions baseline based on existing methodologies used under the Kyoto mechanisms.
- c. Adjust baseline downwards through a discount factor (“Paris goal coefficient”) to the actual or historical emissions intensity, declining over time:

⁸ Suppressed demand is explicitly not factored into the crediting baseline as it does not deliver the absolute emission reductions required for achieving the Paris Agreement’s long-term targets. This will avoid a situation where a host country transfers more ITMOs than the actual reduction in the NDC-covered GHG inventory. We suggest that suppressed demand is addressed by approaches outside baseline setting that address development needs and special circumstances. Examples would include partial authorisation (i.e., sharing mitigation outcomes) or higher ITMO prices.

⁹ The Supervisory Body has not (yet) agreed on the application of such a coefficient. In fact, no decision has been taken on operationalisation any of the methodological requirements. The application of such a coefficient thus entirely emerges from the initiative’s experts.

¹⁰ Suppressed demand is not factored into the crediting baseline as it does not deliver the absolute emission reductions required for achieving the Paris Agreement’s long-term targets. This will avoid a situation where a host country transfers more ITMOs than the actual reduction in the NDC-covered GHG inventory. There are other approaches that provide actual benefits to countries with special circumstances, for example partial authorization or higher ITMO prices which could be considered instead of allowing suppressed demand.

¹¹ The implication of this rule being that activity types that are not appropriate for benchmarking cannot be undertaken in countries where there is no long-term strategy or net-zero goal that gives indication about the long-term downward adjustment of the baseline.

- i. The historical emissions level of the first year needs to be adjusted downwards by at least 5%. Historical data shall not be older than five years and represent at least a three-year historical time series.
- ii. For the duration of the current NDC period, derive the “Paris goal coefficient” based on actual or historical emissions baseline adjusted downwards in line with a path consistent with the unconditional NDC target (see II-AMT GUIDE01). This is done to ensure the baseline:
 - (i) conservatively considers absolute emission reduction/removal target of the NDC (if applicable).
 - (ii) conservatively considers the intensity target of the NDC (if applicable).
 - (iii) conservatively considers all metrics potentially used in NDCs including non-CO₂e metric targets¹² of the NDC (if applicable).
- iii. For periods beyond the current NDC period, derive the “Paris goal coefficient” based on the actual or historical emissions baseline adjusted downwards in line with one of the following options:
 - (i) A path consistent with the national LT-LEDS.
 - (ii) A linear path towards the point in time the host country anticipates achieving a net zero target or zero emissions if this is consistent with the long-term goal of the Paris Agreement. For LDCs and SIDS that have not communicated a net-zero pathway/target and/or an LT-LEDS, this is deemed to be 2050 with the downward trend beginning in 2030.
- iv. Monitor the paths used to derive the ambition coefficient and update them every five years in line with step 4.

18. Step 3: Assessment of the activity-level baseline set as per step 1-2 for alignment with the NDC unconditional target scenario and sector-specific strategies (NDC alignment)

- a. Compare the stringency level of NDC/sectoral reference scenario and activity level crediting baseline and downward adjustment of crediting baseline if needed:
 - i. Option 1: if there is a sector-specific NDC unconditional target scenario or other relevant sector strategy (e.g., international strategies of the cement sector), downscale it to the activity level in a conservative manner, building on the share of the activity in total sectoral production of goods/services. If that downscaled reference emissions level is found to be lower than the activity level baseline set under steps 1 or 2, then it will be applied as baseline emissions level.
 - ii. Option 2: if there is no sector-specific NDC unconditional target scenario or relevant sectoral strategy but an unconditional target on the national level, as a conservative proxy, apply a downscaling by the share of the sector in total economic activity multiplied with the share of the activity in total sectoral production of goods/services. If the resulting downscaled reference level is lower than the activity level baseline set under steps 1 or 2, then it will be applied as baseline emissions level.

19. Step 4: Regular updates to the baseline

- a. Update the crediting baseline with the start of each new NDC period assuming the common timeframes decision is interpreted in the way that a new NDC period starts every 5 years (see II-AMT GUIDE01), regardless of when in the preceding NDC period the activity did start. At that point, the baseline of activities that are becoming part

¹² E.g., introduction of policy, installed RE capacity

of the unconditional NDC becomes equal to the activity emissions, effectively ending the generation of credits (see II-AMT GUIDE01). To ensure that activities starting late in an NDC period are not disincentivised due to the risk of the downwards baseline adjustment at the start of the next NDC period, apply a “baseline protection” that guarantees that the baseline does not fall below 50% of the current baseline level, barring restrictions due to changes in additionality of the activity (see II-AMT TOOL01).

- b. The update of the baselines can never lead to a baseline becoming less stringent over time. This will incentivise early movers and ensure ambition increase.

20. Step 5 (optional): Setting the baseline in a more conservative manner than this tool

- a. Further adjust the crediting baseline downwards to increase the share of emission reductions counted towards the host country's NDC and LT-LEDS targets (see II-AMT GUIDE01).

Rules and Principles

21. This tool is developed based on the following principles enshrined in the decision 2/CMA.3 and 3/CMA.3 adopted by the Parties to the Paris Agreement [bold added to highlight key terms and provisions]:

22. Guidance on cooperative approaches referred to in Article 6, paragraph 2, of the Paris Agreement

“18. [...] The initial report shall contain comprehensive information to: [...]”

(h) Describe how each cooperative approach ensures environmental integrity, including:

*(ii) Through robust, transparent governance and the quality of mitigation outcomes, including through **conservative reference levels, baselines set in a conservative way and below ‘business as usual’ emission projections** (including by taking into account all existing policies and **addressing uncertainties** in quantification and potential leakage);”*

(the same wording is taken up again in paragraph 22)

(Decision 2/CMA.3, Annex, paragraph 18, 22)

23. Rules, modalities, and procedures of the Article 6.4 mechanism

*“33. Mechanism methodologies shall encourage **ambition over time**; encourage broad participation; be real, transparent, **conservative, credible, below ‘business as usual’**; avoid leakage, where applicable; **recognize suppressed demand**; **align to the long-term temperature goals of the Paris Agreement**, contribute to the equitable sharing of mitigation benefits between Parties; and, in respect of each participating Party, **contribute to reducing emission levels in the host Party; and align with its NDC, if applicable, its long-term low GHG emission development strategy** if it has submitted one and the long-term goals of the Paris Agreement.”*

*“34. Mechanism methodologies shall include assumptions, parameters, data sources and key factors and take into account uncertainty, leakage, **policies and measures**, and **relevant circumstances including national regional or local, social, economic, environmental and technological circumstances** and address reversals where applicable.”*

“35. Mechanism methodologies may be developed by activity participants, host Parties, stakeholders or the Supervisory Body. Mechanism shall be approved by the Supervisory Body where they meet the requirements of these rules, modalities and procedures and the requirements established by the Supervisory Body.”

“36. Each mechanism methodology shall require the application of one of the approach(es) below to setting the baseline, while taking into account any guidance by the Supervisory Body, and with justification for the appropriateness of the choices, including information on how the proposed baseline approach is consistent with paragraphs 33 and 35 above and recognizing that a host Party may determine a more ambitious level at its discretion:

A performance-based approach, taking into account:

- (i) **Best available technologies** that represent an **economically feasible** and environmentally sound course of action, where appropriate;
- (ii) An ambitious benchmark approach where the baseline is set at least at the **average emission level of the best performing comparable activities** providing similar outputs and services in a defined scope in similar social, economic, environmental and technological circumstances;
- (iii) An approach based on existing **actual** or **historical emissions, adjusted downwards** to ensure alignment with paragraph 33 above.”

“38. Each mechanism methodology shall specify the approach to demonstrating the additionality of the activity. Additionality shall be demonstrated using a robust assessment that shows the activity would not have occurred in the absence of the incentives from the mechanism, taking into account all relevant national policies, including legislation, and representing mitigation that exceeds any mitigation that is required by law or regulation, and **taking a conservative approach that avoids locking in levels of emissions**, technologies or carbon-intensive practices incompatible with paragraph 33 above.”

(Decision 3/CMA.3, Annex, paragraph 33, 34, 35, 36, 38)

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UNFCCC (2021b): Decision 3/CMA.3. Rules, modalities and procedures for the mechanism established by Article 6, paragraph 4, of the Paris Agreement. UNFCCC, Glasgow

Annex

Example 1.

A mitigation activity in the waste sector of Country A is defining its baseline emissions level for participation in the Article 6.4 mechanism. It already defined an activity-specific baseline using Step 2, Option 1, for which it determined that the BAT was a well-managed sanitary landfill without methane capture. The baseline emissions were then downward adjusted over the two planned 5-year crediting periods linearly toward reaching zero in 2050, which is the time of Country A's net zero target (see column 2 of Table 1).

TABLE 1: ACTIVITY LEVEL BASELINE AND DOWNSCALED BASELINE

Year	Activity level baseline (tCO ₂ e)	Step 3 downscaled baseline (tCO ₂ e) (see explanation in text below Table 1)
2020	200.000	200.000
2021	193.333	197.120
2022	186.667	194.240
2023	180.000	191.360
2024	173.333	188.480
2025	166.667	185.600
2026	160.000	182.720
2027	153.333	179.840
2028	146.667	176.960
2029	140.000	174.080
2030	133.333	171.200

Country A has an unconditional, economy-wide NDC target of 30% reduction in 2030 versus a reference scenario of 20% growth in emissions from 2020 to 2030 (Figure 3). Country A's GDP is 200 billion USD. Its waste sector represents 1% of GDP. The planned mitigation activity is located in the second largest city of Country A in a service area that represents 8% of the total tonnes of municipal solid waste processed by the sector per year. The share of the waste sector in achieving the economy-wide NDC target is calculated as 1% of the complete commitment, based on its share in total economic activity represented by GDP. Then, the share of the mitigation activity is based on its contribution to the total service level of the sector (8% of total processed waste) (Table 2).

FIGURE 3: LINEAR PROJECTION OF EMISSIONS IN REFERENCE AND NDC ACHIEVEMENT SCENARIOS

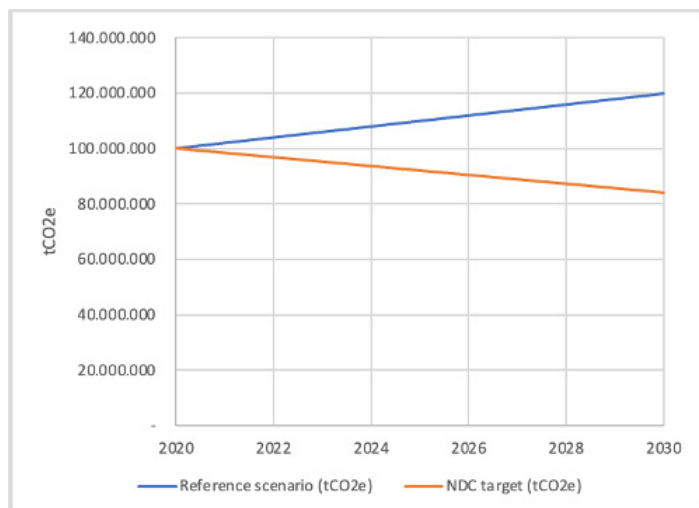


TABLE 2: MITIGATION ACTIVITY'S SHARE IN TOTAL SERVICE LEVEL OF SECTOR

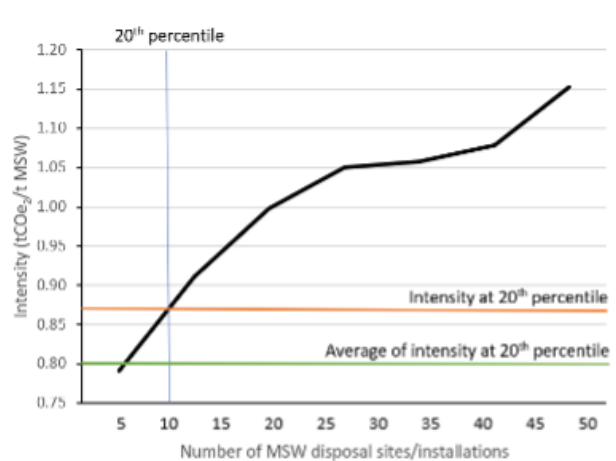
Year	Reference scenario (tCO ₂ e)	NDC target (tCO ₂ e)	Annual reduction to achieve NDC (tCO ₂ e)	Sector share of 1% of GDP (tCO ₂ e)	Mitigation activity share of 8% of sector output (tCO ₂ e)
2020	100.000.000	100.000.000	-	-	-
2021	102.000.000	98.400.000	3.600.000	36.000	2.880
2022	104.000.000	96.800.000	7.200.000	72.000	5.760
2023	106.000.000	95.200.000	10.800.000	108.000	8.640
2024	108.000.000	93.600.000	14.400.000	144.000	11.520
2025	110.000.000	92.000.000	18.000.000	180.000	14.400
2026	112.000.000	90.400.000	21.600.000	216.000	17.280
2027	114.000.000	88.800.000	25.200.000	252.000	20.160
2028	116.000.000	87.200.000	28.800.000	288.000	23.040
2029	118.000.000	85.600.000	32.400.000	324.000	25.920
2030	120.000.000	84.000.000	36.000.000	360.000	28.800

This is compared with the baseline level to give the downscaled baseline according to the NDC economy-wide target (column 3 in Table 1). Since this baseline is higher than the activity-specific baseline determined in the earlier steps, the activity-specific baseline shown in column 2 is applied.

Example 2.

A mitigation activity in the waste sector of Country B is defining its baseline emissions level for participation in the Article 6.4 mechanism. It already defined an activity-specific baseline using Step 2, Option 2, for which it needs to determine an ambitious benchmark based on current waste disposal practices in the country, based on the 50 municipal solid waste (MSW) disposal sites currently operating in the country, which includes a variety of technologies such as waste incineration, sanitary landfilling (with and without landfill gas recovery) and anaerobic digestion. First the country defines the benchmarking unit, which is tCO₂e/t MSW disposed. The country collated all waste disposal and emissions data for the last three years and developed a performance distribution curve for the sector. Based on this curve the average from the 20th percentile (top 10 best performing installations) of this performance distribution curve was determined to be 0.8 tCO₂e/t MSW in 2020 (Figure 4). This is the “benchmark emissions intensity”.

FIGURE 4: PERFORMANCE DISTRIBUTION CURVE FOR THE WASTE SECTOR



Downwards adjustment of the benchmark emissions intensity over the years was then carried out according to Step 2, Option 2d to ensure it is in line with the long-term goal of the Paris Agreement, through the application of a “Paris goal coefficient”. This coefficient ensures that baseline emissions fall linearly over time, reaching net zero at the time of the host country’s net-zero target. In the case of this example, this coefficient is set by the host country for Article 6.2 at a 3% reduction each year compared to the previous year (Table 3).

TABLE 3: DOWNWARD-ADJUSTED BENCHMARK

Year	Downward adjusted benchmark, tCO2e/t MSW	Year	Downward adjusted benchmark, tCO2e/t MSW
2020	0.80	2026	0.67
2021	0.78	2027	0.65
2022	0.75	2028	0.63
2023	0.73	2029	0.61
2024	0.71	2030	0.59
2025	0.69		

Country B has an unconditional NDC target for the waste sector of 30% reduction in 2030 versus a reference scenario of 20% growth in emissions from 2020 to 2030. The planned mitigation activity is located in the largest city of Country B in a service area that represents 10% of the total tonnes of MSW processed by the sector per year. The emissions from the project site where the mitigation activity is to be implemented when calculated using the downward adjusted benchmark is compared to the required emission reduction of the mitigation activity to meet the country’s NDC target for the waste sector (Table 4).

TABLE 4: MITIGATION ACTIVITY’S ANNUAL REDUCTION BASED ON DOWNWARD-ADJUSTED BENCHMARK

1	2	3	4	5	6
	Reference scenario, 20% increase by 2030 (tCO2e)	NDC target, 30% reduction by 2030 (tCO2e)	Waste volume, t/yr (project site)	Project site emissions in line with NDC (tCO2e)	Project site emissions using downward adjusted benchmark (tCO2e)
2020	100,000,000	100,000,000	13,513,514	10,000,000	10,810,811
2021	102,000,000	98,400,000	13,666,667	9,840,000	10,605,333
2022	104,000,000	96,800,000	13,860,252	9,680,000	10,432,889
2023	106,000,000	95,200,000	14,052,739	9,520,000	10,260,444
2024	108,000,000	93,600,000	14,243,875	9,360,000	10,088,000
2025	110,000,000	92,000,000	14,433,392	9,200,000	9,915,556
2026	112,000,000	90,400,000	14,621,006	9,040,000	9,743,111
2027	114,000,000	88,800,000	14,806,420	8,880,000	9,570,667
2028	116,000,000	87,200,000	14,989,317	8,720,000	9,398,222
2029	118,000,000	85,600,000	15,169,365	8,560,000	9,225,778
2030	120,000,000	84,000,000	15,346,212	8,400,000	9,053,333

Table 4 demonstrates that the emissions from the project site where the mitigation activity is to be implemented when calculated using the downward adjusted benchmark (column 6) are higher than the required emission reduction of the mitigation activity to meet the country's NDC target for the waste sector (column 5). The downward adjusted benchmark therefore has to be adjusted further to meet the downscaled baseline (downscaled benchmark), by a factor which can be determined by dividing the emissions in column 5 with those in column 6, and multiplying this factor to the downward adjusted benchmark.

TABLE 5: DOWNWARD-ADJUSTED BENCHMARK VS DOWNSCALED BENCHMARK

Year	Downward-adjusted benchmark, tCO ₂ e/t MSW	Downscaled benchmark, tCO ₂ e/t MSW
2020	0.80	
2021	0.78	0.72
2022	0.75	0.70
2023	0.73	0.68
2024	0.71	0.66
2025	0.69	0.64
2026	0.67	0.62
2027	0.65	0.60
2028	0.63	0.58
2029	0.61	0.56
2030	0.59	0.55

Example 3.

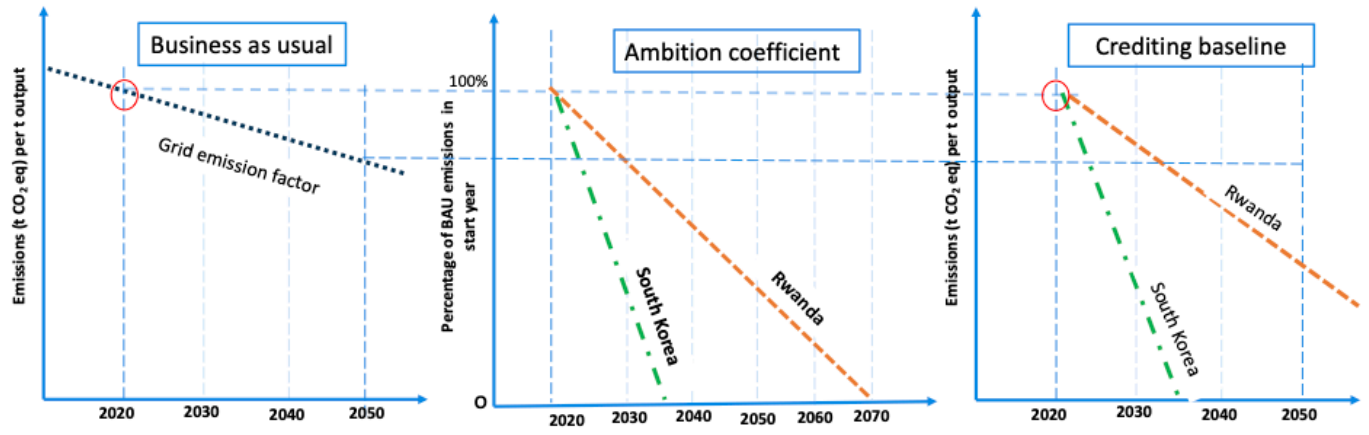
The exemplified mitigation activity is a project that produces renewable electricity for the grid and for saving electricity in South Korea and Rwanda. Assuming the projects start in 2021 and having a crediting period of five years, renewable twice thus running until 2035. Taking the average grid emissions factor as baseline emissions, country-specific Paris goal coefficients are applied. South Korea has publicly declared a net zero target for 2050. As an LDC, Rwanda has a low responsibility in terms of contributing to climate change and therefore 2070 is set as the date when the Paris goal coefficient attains zero. The approach thus reflects the principle of Common but Differentiated Responsibilities and Respective Capabilities (CBDR-RC). Using the determined emission factors (g CO₂/kWh) to calculate the Paris goal coefficient, it reaches 75% in 2025, 50% in 2030 and 25% in 2035 for the case of South Korea, while it reaches 90% in 2025, 80% in 2030 and 70% in 2035 for Rwanda. The resulting baseline emission factors and Paris goal coefficients are shown in following table. The outcome would be that an activity in Rwanda would generate significantly more credits compared to South Korea for a similar type of project from the late 2020s onwards.

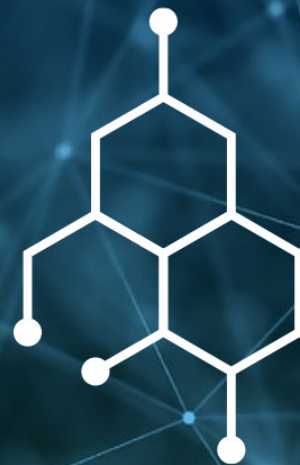
TABLE 6: CALCULATING THE RESPECTIVE BASELINE EMISSIONS

Country	2020	2025	2030	2035
Rwanda	654 g CO ₂ /kWh (100%)	589 g CO ₂ /kWh (90%)	523 g CO ₂ /kWh (80%)	458 g CO ₂ /kWh (70%)
South Korea	626 g CO ₂ /kWh (100%)	470 g CO ₂ /kWh (75%)	313 g CO ₂ /kWh (50%)	157 g CO ₂ /kWh (25%)

FIGURE 5: APPLYING THE “PARIS GOAL COEFFICIENT”

PA-compatible crediting baselines for Rwanda and South Korea





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