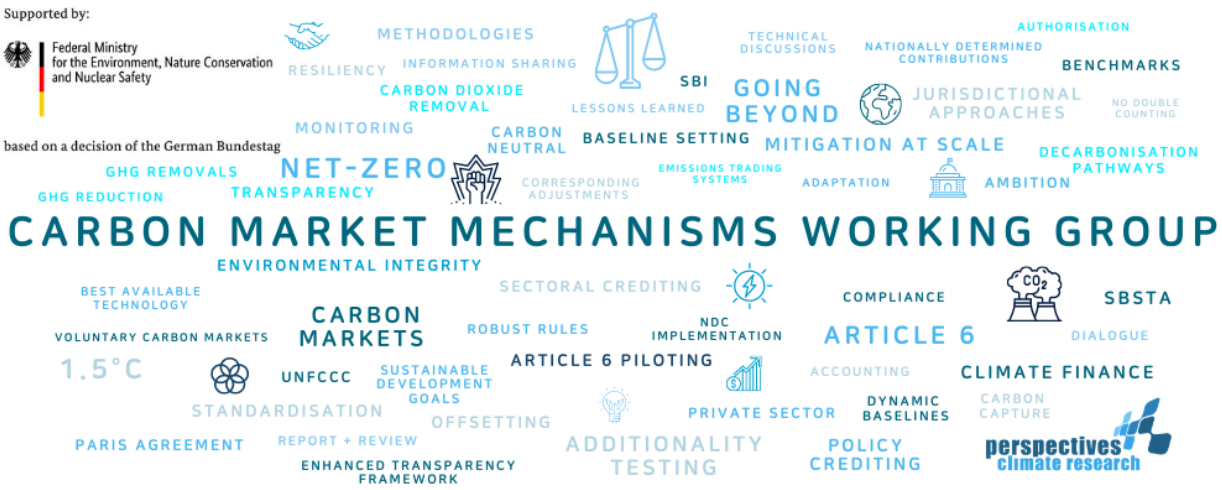

Setting crediting baselines under Article 6 of the Paris Agreement

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Discussion Paper

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The CMM-WG is chaired by PCR and is funded and coordinated in close collaboration with the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. The CMM-WG focuses on technical aspects of programmatic and upscaled crediting mechanisms in Article 6 of the Paris Agreement as well as results-based climate finance. The working group aims to facilitate a continuous dialogue on technical issues among key carbon market stakeholders. For more information go to:
https://www.carbon-mechanisms.de/en/news-details/poa-working-group-1

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Key messages

- Crediting baseline must be set in a way to secure NDC achievement of the host country. While Article 6 cooperation shall also lead to higher ambition in mitigation, conservative baselines do not lead automatically to higher ambition in mitigation action of the host country.

- Article 6-compatible baseline setting approaches share a number of common aspects. For instance, the reference scenario should be in line with Paris Agreement objectives, key parameters should be regularly updated and the period of validity should be consistent with NDC implementation timeframes. However, there is no singular one-size-fits all approach.

- An important challenge in Article 6 baseline setting is the trade-off between accuracy of the baseline through ex-post validation of parameters and investment security.

- CDM methodologies can be important methodological modules for Article 6 project and programme activities (with revisions as needed) but need to be complemented by approaches to ensure the consideration of host country policies and NDC targets in crediting baselines. Also, baselines should not result in crediting against a 'business-as-usual' scenario that assumes the absence of the Paris Agreement.

- In the long term, Article 6 baselines must be in line with net-zero pathways, while also acknowledging differences in country contexts and capacity levels. New baseline setting approaches must be developed to credit greenhouse gas removal activities.

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1. Introduction

Crediting baselines set the reference level against which the volume of mitigation achieved is calculated. Thereby, they de-facto define what is credited as mitigation and thus available for (international) transfer through carbon markets or as proof for achieved mitigation in the context of climate finance. Baselines are 'counterfactuals' by nature and therefore there is no single 'true' approach to setting a baseline. The further we look into the future; the more diverse possible baselines can become. Baselines are crucial to:

1. safeguard environmental integrity[1] of the crediting mechanism and to ensure the mechanism promotes the achievement of long-term goals of the Paris Agreement. Thereby, baselines also safeguard the credibility of the NDC or voluntary mitigation target of the buying party or entity.
2. safeguard the host countries' NDC achievement while potentially contributing to ambition raising through incentivising transformational activities beyond those planned under the host countries' political commitments[2].
3. determine the (economic) attractiveness of the mechanism (assuming a meaningful demand for mitigation credits). The lower the volume of credits generated by an activity, the higher the price for these credits needs to be in order to generate a revenue that exceeds the mitigation cost.

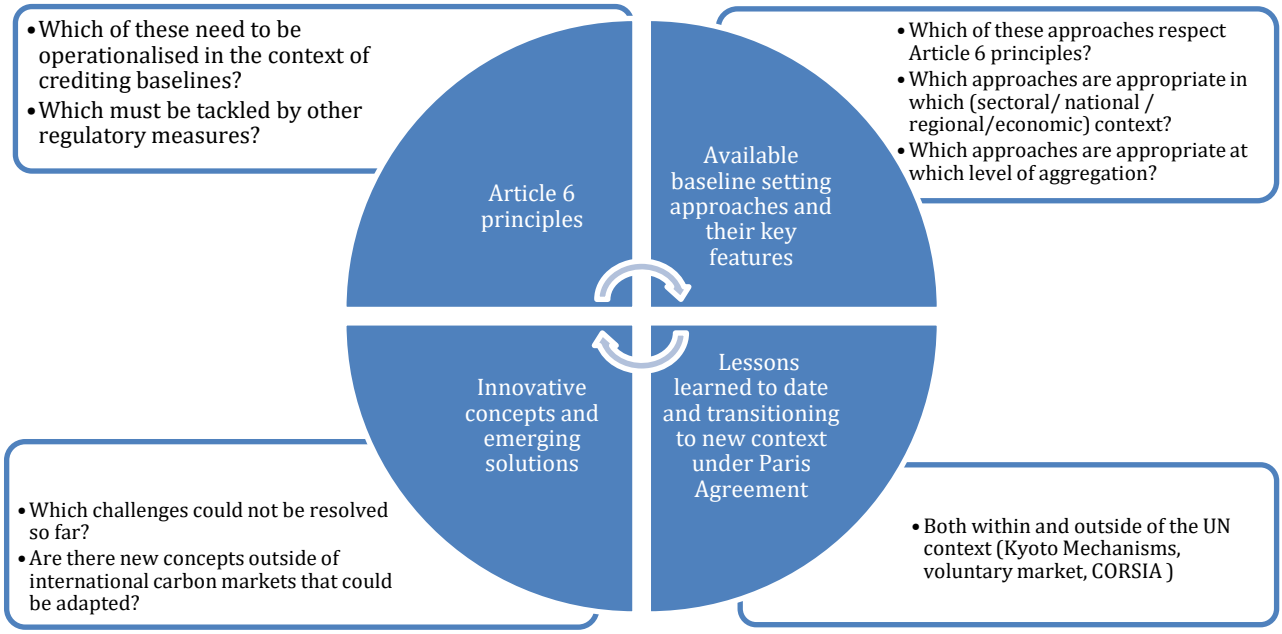
In conclusion, rules on baseline setting approaches must aim at striking the right balance between conservativeness to ensure environmental integrity on the one hand and generating incentives for investment in low-emission and GHG removal technologies on the other, both of which are crucial to contributing to ambition raising.

This discussion paper aims to inform ongoing discussions in the context of the Carbon Market Mechanisms Working Group. After a short introduction into the subject, the paper summarises the discussions of technical experts held on October 7th, 2020. Building on that, it identifies key issues for further discussion and research. The stakeholder consultation focused on the following issues relating to baselines (see Figure 1):

[1] Environmental integrity strongly depends on the additionality of an activity generating credits. Generally, assessment of additionality is separate from the determination of a baseline (see Michaelowa et al. 2019). An additionality test can be integrated in baseline determination. For non-additional activities, the activity emission levels are equal to the baseline emission levels. See also discussion in section 2.

[2] It should be noted that the contribution to ambition raising is not automatic but depends on decisions of policymakers. See detailed discussion in section 2.

Figure 1: Issues discussed at the stakeholder consultation with regard to baselines



Source: authors

2. Background and context information

There are 20 years of experience with baseline setting in the context of the Kyoto Protocol's market-based mechanisms, the Clean Development Mechanism (CDM) and Joint Implementation (JI). From 2001 onwards, based on three generic approaches defined in the Marrakech Accords, over 250 activity type specific baseline methodologies have been approved under the CDM.

Baselines can be set following different generic approaches, some of which have been applied in the past while others are yet to be tested. The selected approach determines the baseline emissions levels as well as the assumptions regarding and calculations of key parameters. Depending on the activity context, different baseline setting approaches can result in different mitigation volumes. Approaches have advantages and disadvantages regarding conservativeness, incentives for mitigation and the ease of application, which may differ from sector to sector, and across host countries.

Baseline setting approaches may rely more on top-down determination of parameters (e.g., benchmarks, standardised baselines) or on bottom-up estimations (e.g., emissions factor of a technology currently used at the site of an activity). In the CDM, a mix of different baseline setting approaches was often applied in the context of the same methodology (Lo Re et al. 2019).

While there is extensive experience with baseline setting for projects and programmes, baseline setting for upscaled activities (at a sectoral level, for policy instruments) is still technically challenging, as GHG emission developments, in the absence of the intervention, depend on many influencing factors (Wooders et al. 2016). Furthermore, baseline setting to date has focused on emission reductions and there is limited experience with baseline setting for removals.

To safeguard environmental integrity, baseline methodologies, including key parameters used, must be revised regularly to reflect to technological changes (Michaelowa et al. 2019). Here, a balance needs to be struck between adjustment of parameters to take into account autonomous technological changes and economic cycles on the one hand and predictability of mitigation outcomes for the activity implementer on the other.

In the negotiations on the 'Article 6 rulebook', which is due to be adopted in November 2021, parties are negotiating methodological principles for all cooperative approaches under Article 6.2 as well as eligible baseline setting approaches under the Article 6.4 mechanism. As of 2020, parties agree that different baseline setting approaches may be appropriate for different activities but have not yet agreed on which principal approaches to accept (Sharma et al. 2020). The Article 6 rulebook will have to strike a balance between clear principles and flexibility so that developers can operationalise the principles in different activity contexts and at different aggregation levels. In addition, the rulebook will give guidance and orient the revisions to CDM methodologies that are needed to make them applicable to Article 6.4 activities. There is not yet explicit agreement on the principle of regular updates of key baseline parameters. Thus far, it is foreseen that Article 6.4 activities would be required to update baseline parameters at the point of crediting period renewal. Crediting periods are foreseen to be of five years and renewable twice or ten years non-renewable, however, they may be longer in the context of forestry and land use activities.

3. Summary of discussions with technical experts

In October 2020, Perspectives Climate Research undertook a stakeholder consultation with technical experts from a wide variety of countries, governments, and institutions. Further inputs were provided in a CMM-WG meeting in November 2020. The following overarching issues were addressed: (1) what characterises Article 6-compatible baselines; (2) in developing these baselines how to build on experience and lessons learned from the past and (3) looking ahead - what new solutions need to be developed?

Insights from these conversations and inputs are summarised in this chapter.

3.1. Article 6-compatible crediting baselines - a conceptual discussion

At first, discussions focused on the new context of the Paris Agreement and its Article 6 and what this means for baseline setting. This includes which principles of international cooperation can and should be operationalised through baselines and which principles are better addressed through other elements of activity designs. It extends to what would then constitute an Article 6-compatible baseline in theory and what is needed to make them implementable in practice.

3.1.1. Operationalising Article 6 principles through crediting baselines

The following overarching principles were identified by experts as relevant Article 6 principles in the context of international market-based cooperation:

- Environmental integrity.
- 'No double counting', where one technical expert stressed that it is part of the broader principle of 'robust accounting' which goes beyond the avoidance of double counting.
- Overall mitigation of global emissions (OMGE)[3].
- NDC achievement
- Ambition raising.
- Sustainable development.

Some technical experts considered environmental integrity [4] to include OMGE, NDC achievement and ambition raising. Others considered these to constitute separate principles.

There were different opinions regarding which of these principles should be operationalised through baselines and which should better be operationalised through other regulatory measures or elements in activity design.

Most experts agreed that environmental integrity should be operationalised through baseline setting, with some stressing that environmental integrity cannot be resolved through crediting baselines alone. There was also one view that overarching environmental integrity should be addressed elsewhere in activity design, while baseline setting should only focus on estimating mitigation achieved in a conservative manner. Others highlighted that baseline estimations should be as representative of the 'real' emissions as possible.

Most experts agreed that avoidance of double counting and sustainable development cannot be implemented through baselines. However, there were different opinions on whether OMGE should be (partially) operationalised through baselines.

Discussions focused on the principle of 'ambition raising' as a key principle of Paris Agreement cooperation, which builds on a collective ratcheting-up of ambition over time in order to reach the long-term goals. There are different views on how ambition raising would happen: through crediting or through NDC revision.

In the first case, crediting would be limited to activities that raise ambition beyond baseline activity levels or to crediting against 'ambitious' baselines that would credit significantly less emission reductions compared to crediting against the 'real' baseline. Experts also identified other options, such as shorter crediting periods or sharing of issued credits between buyer and seller. Following this first interpretation, the increase in ambition is supported by any participant in crediting. However, some experts pointed out that while this leads to less mitigation *credited*, it does not automatically result in higher ambition. Higher ambition depends on the political choices of the host or buyer Party and cannot be generated by the baseline alone.

[3] The operationalisation of this principle is contested in negotiations. Also contested is its applicability to all Article 6 activities, or only to activities implemented through the Article 6.4 mechanism.

[4] It should be noted that environmental integrity is not defined by the Paris Agreement nor the UNFCCC and Parties have different understandings of this concept in the context of Article 6 rule-setting.

If an 'ambitious baseline' leads to more mitigation in the host country, the host country government can now either decide to increase the ambition of its NDC by this amount of the (uncredited) mitigation, or to reduce mitigation efforts in other sectors by this amount. The latter would leave ambition unchanged. Some experts also cautioned against the perception that upscaled crediting per se leads to higher ambition, as there may be perverse incentives that come to play for the host country (e.g., not expanding the coverage of the NDC or delay the adoption of mitigation policies to maximise revenues through international carbon markets).

Following the second interpretation, ambition increase could relate to both the seller or buyer NDC, assuming government-to-government cooperation. In the case of the host country, ambition could be increased through reinvesting funding mobilised in additional mitigation action. In the case of the buyer (assuming the use of the ITMO towards NDC achievement), purchasing ITMOs could be used as a possibility to increase national targets beyond the level that is (politically and/or technically) feasible with domestic measures. In this case, ambition raising would *not* directly be related to baseline setting, but to other regulatory measures that secure mitigation outcomes beyond current levels of national commitments and that ensure there is no double claiming of mitigation, for instance in the context of the voluntary carbon market.

Furthermore, in the context of linking baselines to NDCs, the question is whether assuming the presence of national targets, additionality testing can be integrated in baseline setting or should be done separately. Some experts are of the opinion that additionality testing and baseline setting should be clearly separated. One expert elaborated that determining a baseline *scenario* can be combined with additionality testing but determining the baseline *emissions* is a separate consideration that does not inform the additionality of a mitigation outcome.

Several experts define additionality to include the requirement for mitigation to go beyond the host country commitments. For some, this means that this 'aspect' of additionality determination is embodied in baseline setting, since baselines need to reflect host country NDCs. However, some experts stress that determining additionality to the NDC for a single activity may be separate from an assessment of the NDC, which is formulated on a higher scale. A few experts share the opinion that additionality determination can be integrated in baselines if – and only if – the NDC is 'ambitious', i.e., significantly below business as usual (BAU). Related to this, some experts propose positive lists of technologies that are considered additional to the NDC, or performance benchmarks.

Baseline setting and additionality testing are considered important aspects in activity design through which the host country can safeguard against 'overselling' mitigation outcomes that it would have needed to comply with its international commitments. It is in the interest of the host country to ensure that activities that lead to ITMO transfers mobilise mitigation that would not have been achieved by (unconditional) NDC measures nor is necessary to achieve the NDC targets.

3.1.2. Article 6-compatible baseline setting approaches

In light of the principles that were identified as relevant for baselines, discussions focused on identifying key elements that would render a baseline 'Article 6-compatible', noting that different general approaches will be appropriate for different activity types, scales of activities, sectors and national contexts. Based on inputs of different experts, the following list of key elements can be complied:

- Conservativeness
- Reference scenario being compatible with the Paris Agreement, including considering a 'net zero pathway'.
- Crediting baseline to be consistent with the NDC. In this context, some experts added the following elements:
    - the crediting baseline to consider existing policies, and even planned policies and activities;
    - wide boundaries that also include demand effects (e.g., in electricity production).
- Frequent/regular updates of baselines, and/or 'dynamic' baselines, where key parameters are calculated with robust assumptions ex ante and validated ex post.
- A period of validity of baselines (or crediting period) that is consistent with the NDC implementation timeframe.
- Transparency on data used and high data quality for the calculation of baselines.

As NDCs are formulated by each government in a bottom-up manner, and many of them are not communicated as multi-year 'carbon budgets' this complicates the need to align multi-year baselines with the host Party's NDC. Most experts concurred that aligning baselines with NDCs will require strong engagement by the host country. Ideally, baseline setting would be informed by the host-countries' adopted NDC implementation strategies and strategies on the engagement in international carbon markets.

If baselines are to be aligned with the host countries' NDC, NDC will also inform the period of validity of a baseline and the crediting period. If baselines are required to reflect NDCs but the activity starts at a relatively late date in the NDC implementation period, even a short crediting period will be longer than the remaining time of the NDC implementation period. Potentially, baselines or at least specific parameters would require updating at the time of a new NDC implementation period. This would, however, introduce a potentially large element of uncertainty for activity owners and buyers on the carbon market.

Conservative baselines lead to a higher implicit mitigation benefit accruing to the host country and thereby supporting its NDC achievement. Conservativeness ensures that more actual emission reductions are achieved than credited and accounted for by corresponding adjustment. The uncredited mitigation automatically accrues to the host country, as long as the mitigation is reflected in the emission balance of sources and sinks covered by the NDC, and thus counts towards the host country's NDC.

Some experts discussed the applicability of 'suppressed demand' in the context of the Paris Agreement. Under current carbon markets, suppressed demand has been an important element to facilitate carbon market participation of countries with low emission levels due to an insufficient availability of basic services for the population. However, suppressed demand conflicts with the principle of ambition increase and the element of conservativeness as it presumes *higher* emissions in the reference scenario as compared to the real-life context. Considering suppressed demand may only be compatible with Article 6 in the context of Least Developed Countries and for a transitional period.

3.1.3. Practicable baseline setting approaches

Regarding the 'practicality' of Article 6-compatible baselines, the following issues were discussed:

- What are the main challenges in ongoing Article 6 pilot activities?
- What is the 'negotiation bandwidth' in baseline setting when Parties cooperate under Article 6?
- How to simplify baseline setting?
- Who should lead and finance the development of methodologies and what is the role of (international) oversight?

Article 6 pilot activities face several challenges regarding baseline setting. Two challenges were stressed by experts: First, the trade-off between the *accuracy* of the baseline, ensured through dynamic elements (only quantified ex post) and through frequent updates, and the *investment security* of project participants.

Securing both the financial viability of an activity through the generation of mitigation outcomes and considering (rapid) technological innovations and political changes must be balanced in the construction of the baseline. Regular updates of baselines to reflect rapid technological change increase the risk of the investor not receiving the amount of mitigation outcomes initially foreseen. In some cases, baseline revisions may even lead to a programme ceasing to generate emission reductions.

A closely related challenge is the fact that baselines and baseline parameters are often calculated against assumptions, due to widespread lack of access to reliable and up-to-date data ex ante. Baselines should be tested against other data or knowledge from third sources, as a plausibility check. In the medium term, improving the data and constructing baselines against the background of reliable data is important to improve the robustness of baseline setting.

Another challenge consists of deriving elements of the baseline from the host country's NDC, which is often not detailed enough, and to evaluate whether the NDC targets are in line with the ambition levels required under the Paris Agreement. In this context, it is also necessary to develop good ways to relate baseline setting to host countries' long-term low GHG emission development strategies (LT-LEDS)[5] or a 1.5°C compatible pathway.

[5] Article 4.19 of the PA calls for Parties to "strive to formulate and communicate" LT-LEDS and decision 1/CP.21 states that Parties "should strive" to communicate these "mid-century" LT-LEDS to the UNFCCC by 2020. While NDCs are mandatory for all Parties, LT-LEDS are voluntary and identify opportunities or pathways for low-

In addition, crediting baselines that consider NDC targets can be a tool to safeguard that *corresponding adjustments* do not jeopardise NDC achievement. However, they cannot guarantee the host countries' NDC achievement as this is beyond the control of the activity owner. Baseline setting can therefore not remove the investment risk that activity owners and buyers face on Paris Agreement carbon markets. Instead, in a mature market with sufficient standardisation – which could be delivered by the Article 6.4 mechanism – approaches to price and manage these risks could be developed in the financial markets.

Article 6 pilot activities will also advance a better understanding of how to negotiate baselines in international cooperation. As mentioned above, baseline setting was identified by some experts as an important tool to support host country NDC achievement. Achieving a consensus on the baseline that both buyer and seller are comfortable with, is therefore to a certain extent an issue of negotiations. This has already been demonstrated in practice under the Joint Crediting Mechanism (JCM).

Several experts defined the 'negotiation bandwidth' to be in the range of 'ensuring there is no hot air' as a minimum and a level of stringency that discourages the mitigation action as such as the upper limit. The level of stringency chosen was described as a 'policy choice', based on achieving a balance of cost-effectiveness and long-term incentives for transformation.

Several experts expressed the minimum requirement for a baseline to be 'below BAU' and a most stringent approach to be based on best available technologies.

Some experts stressed that implementing the Article 6 rules (in particular the principle of robust accounting) already presents numerous challenges to piloting actors and carbon market experts. They pleaded to not burden baseline setting with too many principles and requirements, in particular to require baselines to contribute to ambition raising. Instead, some experts suggested a learning-by-doing approach, where baselines should be set based on best available knowledge, including on the NDCs of the host country, and where transparency on data should be the most important requirement, rather than the operationalisation of new principles. Rules and processes for baseline setting should be refined over time, also as more information on NDCs and more granular NDC implementation plans become available. This raises the questions on who will be in charge of developing these baselines and who will be overseeing their integrity, particularly in the context of Article 6.2.

A third of the experts participating in the virtual consultation event supported the assumption that public authorities will have a strong role in determining baselines, as they will need to reflect NDC characteristics. Here, an increasing importance for standardised baselines was recognised by many experts. However, several experts cautioned that host countries may lack the capacities to lead this work and/or there may be risks for public authorities due to situations of asymmetric information vis-à-vis the costs associated with mitigation measures.

Some experts referred to experiences under Joint Implementation, where host countries with targets that contained 'hot air' (i.e., their emission budgets were higher than their BAU emissions) had a perverse incentive to issue emissions credits against baselines with 'hot air', leading to the issuance of a significant volume of credits that were not underpinned by real, additional emission reductions and thereby to an overall increase in emissions (see below).

emission development in the context of broader socio-economic goals (for a discussion of alignment between NDCs and LT-LEDS, see Falduto and Rocha 2020)

Therefore, while of advantage to host countries, linking crediting baselines to NDC parameters and reference scenarios can also represent a risk for activity owners and buyers to import 'hot air' into their methodologies. It can be very difficult (both technically and politically) to assess whether an NDC target is below a credible BAU scenario.

In the context of bilateral cooperation under Article 6.2, one expert expects that host and buyer Party will designate a group of experts to develop baselines consistent with principles identified by the participating Parties as relevant. Following this assumption, the buyer Party would fund the expert work.

As baselines are expected to be subject to negotiations among Parties, one expert stressed the necessity to establish at least some degree of international oversight on the aggregate impact of Article 6 cooperation on Parties' efforts to achieve the targets of the Paris Agreement through the global stock take. If the UNFCCC Secretariat were mandated with a report on the integrity of baselines applied in Article 6.2 cooperation, loopholes and concerns with integrity at the aggregate level could be identified and potentially addressed by the CMA through further rules.

It is unclear if and where there would be a niche for private actors and bottom-up development of baselines, which (a) proved to be an important source of innovation in the past – the majority of large-scale CDM methodologies was developed in that way – and (b) presents an important financing opportunity through the increasing interest in voluntary carbon markets. However, at least in sectors included in the NDC (and/or NDC implementation plans) where quantified data is available, host countries must be included in the baseline setting process. Some experts proposed that private actor-led methodological work could be recognised (and supervised) through the Article 6.4 mechanism that (partly) represents host countries' interests and also coordinates with host country authorities.

3.2. Building on the past

Lessons learned

Against the background of the conceptual considerations, experts discussed how to build on existing methodologies for baseline setting in developing Article 6-compatible baselines. Lessons learned with international market-based cooperation in the context of the CDM, JI, REDD+ and JCM were identified. Experts then discussed how to revise the body of CDM methodologies, so that these can be used in an Article 6 context. This includes the revision of CDM methodologies to obtain approval under the Article 6.4 mechanism.

- Regarding JI, both positive and negative lessons learned were identified by experts. Some experts stressed that some host countries secured significant contributions to domestic mitigation efforts by setting the crediting baseline well below the level required by regulation (e.g., Finland). New Zealand combined baseline setting with incentives for the private sector through reverse auctioning of emission reduction units (ERUs) to private sector players, bidding for the highest discount rate from emission reductions achieved to ERUs issued. Other experts highlighted that in some host countries with 'hot air' in their targets, in the absence of international oversight, crediting was based on inflated baselines that were set above realistic BAU levels.
- One expert reported that under the JCM, the reference emissions scenario is calculated below BAU, presenting plausible emissions in providing the same outputs

or service level of the proposed JCM project in the partner country. Thereby, JCM aims to ensure a net decrease and/or avoidance of GHG emissions.

Box 1: Baseline setting examples under the JCM

In the context of JCM projects, the reference emission level is set below business-as-usual emissions, at a level that represents conservative, yet plausible emissions in providing the same outputs or service levels in the country context.

Political, economic, and technical conditions in the partner country are considered, such as related laws and regulations, standards, technologies available in its local market, and existing prevalent technologies. However, there is no explicit link to NDC targets.

This conservative reference emission level is then the crediting baseline, generating **net emission reductions relative to business-as-usual**.

Examples for conservative but plausible parameter determinations include:

- In the context of a highly efficient chiller project, the reference coefficient of performance (COP) would be set at the most efficient COP value of inverter type centrifugal chillers available in the national market for this size class, not the average of new equipment sales.
- In the context of a solar PV system, the crediting baseline emission factor would be set at the level of the most efficient power plant supplying power to the national grid and not at the national grid emission factor, calculated based on the CDM tool.
- When, in a solar PV project, the business-as-usual would not be specified, the reference level would be set at the value which is above the highest efficiency achieved by the world's leading diesel generator.

The **credits generated against the crediting baseline are shared between Japan and the partner country**. While the share is usually set at 50% of the credits generated, the share may be adjusted based on contributions from each side, such as finance. Both non-credited emission reductions (i.e., the net emission reductions) and the host country's share of the credits can contribute to the host country NDC achievement. Highlighting and ensuring such contributions to the host country NDC promotes the host country's interest in and support for the cooperation and protect against overselling.

Source: Fuijoka and Koakutsu (2020)

- One expert shared the conclusion from experience with REDD+ that uncertainty on future deforestation rates, and thereby the reference scenario, is often larger than the expected mitigation through activities, thereby making any crediting baseline in this sector highly uncertain.
- One expert shared the experience that, in the context of voluntary standards, overly conservative methodologies developed by the standard bodies are not used in practice by private sector participants, illustrating the trade-off between conservativeness and investment interests.

Most experts engaged in the discussion regarding lessons learned under the CDM. Several experts emphasised that CDM baseline methodologies are a relevant reference in international markets and the natural starting point for baselines under Article 6. They stressed that there is no need to 'reinvent the wheel' and that the work that went into developing these methodologies 'should not go to waste'.

Experts stressed that many CDM methodologies set a high standard. However, some experts highlighted that there was an uneven spread in methodology use and that there is a need to reduce the complexity and associated transaction costs in applying these methodologies.

The technical experts participating in the discussions agreed on at least some needs for adapting CDM methodologies to the new context of the Paris Agreement. Many experts concurred that the E+/E- rule[6] could not be upheld, as now all Parties have international mitigation commitments. When a corresponding adjustment must be undertaken by the host country, the government no longer has an interest in approving methodologies that exempt recent policies from the baseline scenario. One expert noted that it may not suffice to only consider existing policies in baselines, but that also certain planned policies should be considered, as the anticipation of policies may induce behavioural change.

Some experts raised the question whether a distinction between policies and measures associated with conditional and unconditional NDC targets should be made in baseline setting.

In addition, some experts emphasised that most CDM baselines are calculated based on deviation from a 'business-as-usual' scenario and that under Article 6, baselines should be significantly more stringent. One expert stressed the need to change the underlying rationale of crediting mechanisms to compensate emissions with emission reductions towards alignment with the Paris Agreement's long-term goal to achieve a balance of emissions and removals in the second half of the century. To be in line with the well below 2°target, this is now often interpreted to be around 2050. This would impose a very different reference scenario.

Transition of methodologies to be used under Article 6

Many experts suggested a 'modular approach' to transitioning CDM and other baseline methodologies when developing Article 6 baselines. CDM methodologies could be applied to determine emission reductions of single unit emission reductions, but the reference scenario must be developed based on a sector or country-wide pathway on the road to NDC implementation or even – at least in the future – on the road of full decarbonisation. CDM baseline methodologies would become one component of a wider baseline setting 'package'.

[6] The consideration of domestic policies of the host country in additionality determination and baseline setting under the CDM was a central controversy. As host countries in the CDM had no international climate policy commitments to fulfil, considering mitigation policies in crediting baselines could have led to a perverse incentive for host countries not to adopt these policies. Therefore, the CDM EB adopted the so-called E+/E- rule on the consideration of policies in baseline setting: Policies that provide a comparative advantage to more emission-intensive technologies (E+) were only taken into account if their adoption predated the adoption of the Kyoto Protocol in 1997. The rationale was to prevent countries from artificially inflating the baseline, it did not, however, also give host countries an incentive to eliminate fossil fuel subsidies. Policies that provide a comparative advantage to less emission-intensive technologies (E-) were only taken into account if adopted prior to the adoption of the Marrakech Accords in 2001. The rationale behind this rule is to prevent a perverse incentive not to adopt mitigation policies (Shishlov and Bellassen 2012).

In the context of the Article 6.4 mechanism, the Supervisory Body would oversee the development of complementing 'modules' as well as the revision of existing CDM methodologies. Several experts supported the view of a 'case-by-case' assessment of the integrity of CDM baseline methodologies before integrating them in an Article 6 baseline. For the Article 6.4 mechanism, one expert suggested the Supervisory Body to focus on the revision of the most widely applied methodologies/methodologies that represent the highest share in issued CERs first. Other experts also recognised the importance of such an internationally supervised revision process. However, as members of the CMM-WG pointed out, the transition of methodologies must be accomplished without challenging the sovereignty of host countries.

While the Supervisory Body can develop (conservative) methodologies, the host country will need to consider the methodologies' implications for its NDC achievement after corresponding adjustments, before granting authorisation to an activity. Experts discussed whether these considerations should be done in a reactive manner (in response to applications but prior to authorisation) and/or whether the host country should define guardrails in advance.

3.3. Looking ahead

Finally, discussions focused on the necessity, potential and approaches to spur innovation in baseline setting. Experts discussed how to set baselines in a manner to support 'transformational change'.

While incremental changes in existing methodologies may be sufficient for projects and programmes under Article 6, there will also be a need to develop new methodological approaches for upscaled mitigation approaches. Also, overlaps of jurisdictional or sectoral approaches with projects and programmes in the same sector/jurisdiction must be dealt with.

Some experts highlighted that innovation does not come overnight. Hoping for better approaches to set baselines in the future, should not discourage engagement in international carbon markets now. As one expert highlighted, the coming decade is crucial to incentivise large-scale emission reductions. Innovating baseline setting must be pursued in parallel to applying existing methodologies. Another expert also cautioned against the desire to innovate everything and instead suggested to focus on key risks of environmental integrity, notably additionality assessment.

Box 2: TCAF approach to reflect NDC targets in baseline setting

Under TCAF, sectoral or jurisdictional activities and policy instruments are being implemented. Half of the funding provided is results-based climate finance, the other half of funding aims to lead to ITMO transactions. While there will be different pricing approaches for the two uses of mitigation outcomes, they will be generated based on the same methodology.

In crediting baselines, NDC targets are being reflected. The lower of business-as-usual and unconditional NDC target trajectory is broken down to the level of the TCAF program. The crediting baseline is then set well below the resulting trajectory to address uncertainties. This allows the host country to have a buffer to ensure NDC achievement, while also setting incentives to exceed the level of mitigation pledged in the unconditional NDC. Accounting for the conditional NDC target is done according to an attribution approach differentiating between revenues from TCAF and other public climate finance received. The attribution is done proportionally to the level of financial contribution assessed in grant equivalent.

Reflecting NDC targets in sectoral or jurisdictional level crediting can be relatively straightforward if the NDC specifies a target for this sector/jurisdiction. For these approaches, it is possible to define a baseline ex-ante with safeguards to account for business cycle fluctuations or economic crises. It is even possible, at a low level of complexity, to include some parameters to be quantified ex-post, using an approach that is determined ex-ante.

Setting baselines for policy instruments, however, is more complex. In order to determine the mitigation outcomes, there is need to apply a modelling. When the policy itself is to be credited, it is not required to be incorporated into the crediting baseline alongside other existing or planned policies.

Source: Oppermann (2020)

Experts identified different issues that pilot activities could focus on in the near term and thereby contribute to moving towards 'Article 6-compatible baselines':

- Conceptualising the link to NDC targets, in particular where NDC targets are not quantified or related to a specific sector.
- Define appropriate frequencies of updating baselines in the context of NDC cycles.
- Define the 'reference scenario' that is compatible with the long-term goals of the Paris Agreement at the country level, on which Article 6 baselines can be defined against.

Regarding the last point and as a long-term requirement for innovation in baseline setting, some experts stressed the need to move away from the 'offsetting' logic that characterised international carbon markets in the Kyoto Protocol era, a result of crediting against business-as-usual scenarios. Instead, baselines should be calculated against a reference scenario aligned with the 1.5°C temperature goal and a greening of international finance flows. These pathways, determined on a country level, would go beyond even an 'ambitious' business-as-usual scenario to represent transformational change. Discussions ensued over the question who defines transformational change, in particular in the context of different country contexts.

Against the background of an increasing number of commitments to reach carbon neutrality or net zero emissions between 2030 and 2050 (industrialised countries) and between 2050 and 2060 in developing countries, one expert asked whether this can be interpreted as an international consensus on the timeframe to move towards decarbonisation.

In addition to the definition of the reference scenario, the question of how to relate the crediting baseline to this scenario was asked. Some experts suggested to have different baselines, derived from the NDC and a net-zero pathway and to use Article 6 crediting baselines to 'shift' actual emission levels from the NDC scenario to the net-zero pathway scenario. If carbon markets are to contribute to the long-term objective of balancing anthropogenic emissions and sinks, they will have to include financing of negative emission technology solutions through enhancement of natural sinks and technological approaches for greenhouse gas removal from the atmosphere. Several experts concluded that it is necessary to consider how to set baselines for negative emission approaches and in particular on how to relate baselines to negative emission targets of countries for the second half of the century. In the context of negative emission technologies, currently not really available, baseline emissions may be set at zero in a transitional period. Once they are implemented by countries under their national targets, emission reference scenarios may even become negative.

4. Reflecting on ongoing UNFCCC negotiations and future rule-setting

In the ongoing Article 6 negotiations, discussions on baseline-setting mostly relate to eligible baseline setting approaches in the context of to the rules, modalities, and procedures of the Article 6.4 mechanism. However, some key principles on Article 6 baseline setting are also included in the reporting requirements established by the Article 6.2 guidance for Parties participating in a cooperative approach.

With regard to Article 6.4, negotiations focus on two aspects: First, principles to guide methodology development (and thereby also baseline setting). Second, specific baseline setting approaches that should be approved for use under the mechanism.

4.1. Methodological principles

Several principles already finds the approval of most Parties in negotiations. Generally supported was the principle of transparency on emission sources and in calculating emission reductions as well as the requirement to estimate emission reductions consistently with IPCC guidance, in a conservative manner and considering uncertainty.

The requirement of establishing baselines that are below emissions/removals of activities that provide similar outputs and services in absence of the activity was also generally supported. However, the notion of taking into consideration relevant elements of the NDCs as well as LT-LEDS of the host Party was still contentious among the negotiators.

Not contentious was the principle of considering existing policies and measures of the host Party as well the requirement to minimise the risk of leakage and of non-permanence. Also, not contentious was the principle of taking into account relevant national, regional, or local circumstances, including special circumstances of LDCs and SIDS.

While it was agreeable that methodologies should aim to contribute to the reduction of emission levels in the host Party, the principle of consistency with NDCs and LT-LEDS was contentious in this context. Furthermore, the principle of 'where appropriate' to maintain or enhance the level of ambition over time when updating or submitting new baselines was not supported by all.

The operationalization of the principle of consistency with NDCs and LT-LEDS may prove difficult. Tying a baseline to an NDC will lead to a baseline that is non-reviewable for the Supervisory Body, as an NDC is nationally determined and therefore not to be assessed by another international body. Transparency requirements on how participating Parties relate methodologies of approved activities to their NDC and related ambition, may be a possible way to create oversight through peer review, where international supervision is not possible. The Global Stocktake could also play an important role to look into questions of ambition in NDC and integrity of market mechanisms.

In discussions at the CMM-WG, experts discussed the question of 'balance' and interlinkages of Articles 6.2 cooperative approaches and the Article 6.4 mechanism: One expert stressed that if the rules, modalities, and procedures are very strict on baseline setting under the Article 6.4 mechanism, this will set incentives to shift project and programme-based international market-based cooperation under cooperative approaches. Other experts highlighted that there will be a convergence and mutual learning between Article 6.2 approaches and the Article 6.4 mechanism in the long term.

4.2. Eligible baseline setting approaches

At COP25, Parties did agree that different baseline setting approaches may be appropriate for different activities but could not agree on which principal approaches to accept. Some options are included in the draft negotiation text in its iteration from December 14th, 2019 (UNFCCC 2019b) but were excluded from the draft rules, modalities, and procedures in the draft text version of December 15th as no agreement seemed possible (UNFCC 2019c):

Option 1: Baselines must be "below BAU" and take into account relevant national, regional or local circumstances. The baseline approach chosen must be justified. Eligible approaches are based on best available technology assessments, performance benchmarks, or other benchmarks. Only where these approaches are not economically and technologically viable, baselines can be based on projected emissions or historical emissions.

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

(UNFCCC 2019b, paragraphs 38-41)

It should be noted that the negotiation text proposals do not distinguish between quantification of reference levels and crediting baselines. Here, being more precise may help to find compromising proposals between the 'ambition' that is targeted and the real-life situation at the start of activity implementation.

Some experts suggest focussing within the rulebook more strongly on key principles of methodology development, rather than prescribing concrete baseline setting approaches. These principles would then constitute the 'safety net' and guardrails for the future development of methodologies. Also, some experts do not want to 'lock-in' certain approaches to baseline setting but let room for future innovative approaches or new best practices.

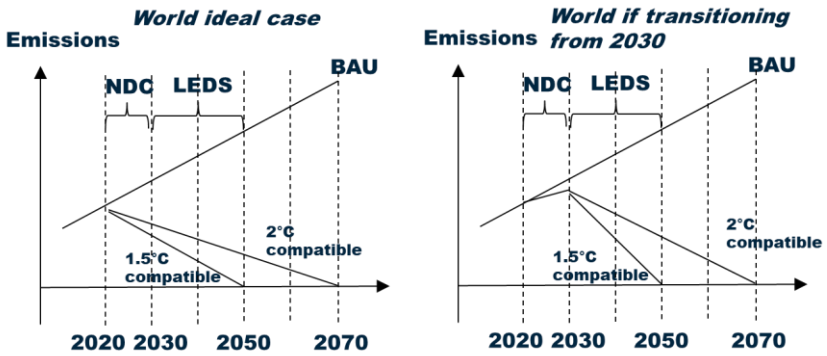
5. Key issues identified for further discussion and research

5.1. Ambition and link to NDC/LT-LEDS

The country-specific emissions pathways associated with NDCs under the Paris Agreement should represent real mitigation relative to the BAU emissions pathway in the absence of the Paris Agreement. The five- or ten-year NDC pathways should lead into an emissions pathway until 2050 defined in long-term low emission development strategies (LT-LEDS). To be in line with Paris Agreement objectives, LT-LEDS pathways should aim to be consistent with limiting temperature rise to "well below" 2°C (some say 1.5°C) and achieving a balance between sources and sinks of greenhouse gas emissions globally between 2050 (for 1.5°C, see IPCC 2018) and 2070 (for 2°C, see UN Environment 2019).

However, the combined emissions pathway of current NDCs is far away from a smooth trajectory towards the 1.5°C or the 2°C target; the projected trajectory is aiming towards a warming of 3-3.5°C (UN Environment 2019). Furthermore, LT-LEDS are largely missing to date, covering less than ¼ of global emissions. Even if they exist, they are often not clearly or consistently linked with the NDC. Reaching the targets would require a massive transition from 2030 onwards. Figure 2 shows this in a stylised manner for the first NDC implementation period, where the BAU scenario would not consider the implementation of the Paris Agreement[7].

Figure 2: The emissions pathways in different timeframes globally

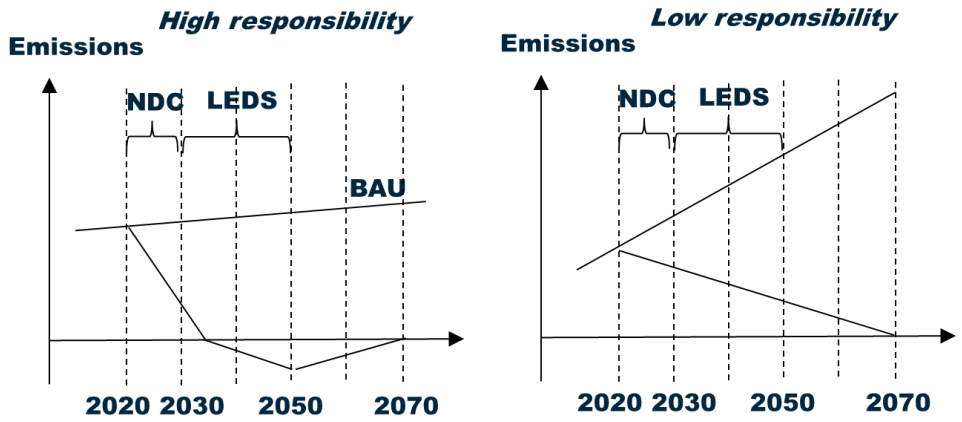


Source: Michaelowa and Michaelowa (2020)

[7] The BAU scenario will change over time as adopted policies and measures take effect. The graph depicts here a consideration from a 2020 point of view.

Obviously, the exact dates for reaching the balance will differ between countries given the principle of common but differentiated responsibilities and respective capabilities, as shown in Figure 3 below with stylised ideal pathways for a typical high and low responsibility country.

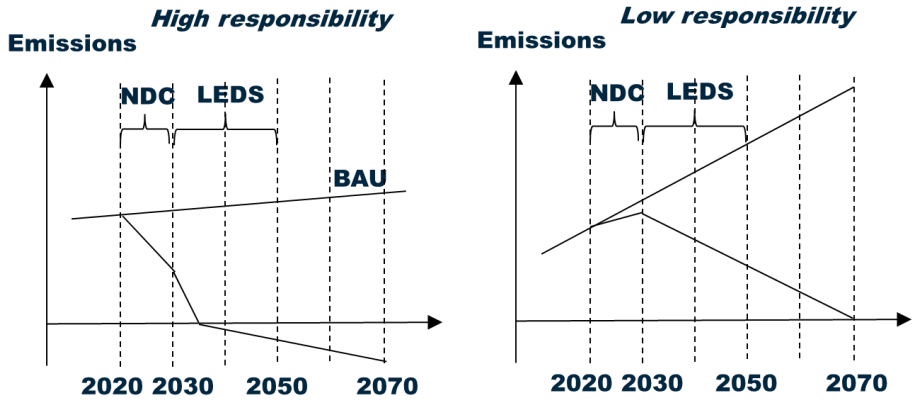
Figure 3: Different ideal emission pathways depending on country responsibilities and capacities



Source: Michaelowa and Michaelowa (2020)

Figure 4 shows more realistic pathways derived from current country behaviour.

Figure 4: Different realistic emission pathways depending on country responsibilities and capacities



Source: Michaelowa and Michaelowa (2020)

In the ideal case, where a host country has already committed to a Paris long-term target-aligned emissions trajectory in its NDC and LT-LEDS, the crediting baseline could be set equal to this NDC/LT-LEDS trajectory - as set in Figure 3 above - without undermining incentives for ambitious unilateral action by the host country. However, in the more realistic case, where the NDC/LT-LEDS is inconsistent with the Paris long-term target as shown in Figure 4 above – and, at worst, above the BAU pathway (i.e. includes "hot air") – crediting baselines would have to be set at a level that is more stringent than the NDC/LT-LEDS pathway.

While baselines following this approach can safeguard the consistency of the credit volume with the ambition levels required by the Paris Agreement, they do not automatically result in higher host country ambition in the short-term, as the host country can just reduce its mitigation in other sectors by the amount of mitigation generated through the activity generating credits and still reach its current NDC target. However, the further the host country moves away from the crediting baseline when deciding on new NDC targets, the more difficult it will be for activities in that country to generate credits in the future. Eventually, no credits can be generated anymore, except from negative emissions technologies.

In this context, the following questions arise:

- How should crediting baselines be set to incentivise and reward ambitious national commitments by host countries and promote the achievement of the long-term balance between sources and sinks? How can crediting baselines support continuous transformation? How to define the normative reference point for crediting baselines for specific activities through 'downscaling' from the NDC: transitioning from a BAU approach towards an 'ought margin' over time, see Hermwille (2020) or applying an 'ambition coefficient' that falls over time and becomes zero when the emissions balance of the host country should become zero?
- How to differentiate between countries, considering common but differentiated responsibilities and respective capabilities, in the light of different national circumstances? How to address the issue of suppressed demand?
- How to address the current, generalised lack of short-medium-term ambition in baseline setting (see differences between Figure 3 and 4)? Just apply more stringent baselines in the future? There is an inbuilt perverse effect in hoping that more stringent approaches can be more easily agreed in the future.
- When applying stringent baselines, what are the preconditions for achieving higher ambition globally as well as in host and buyer countries? What is the political process for NDC revision linked to emission reduction potential mobilised through Article 6 in host countries? What is the political process of NDC revision linked to the cost reduction for attaining NDC targets in buyer countries?
- How could NDCs and LEDS (and associated roadmaps and action plans, and carbon neutrality targets) be used to inform setting of crediting baselines? How to translate single-year NDCs into continuous baseline scenarios? How to reflect stepwise transformation over NDC periods? Can the baseline setting process incentivise and promote the translation of NDCs/LEDS into sector-level roadmaps and action plans?

5.2. Carbon credit types and uses

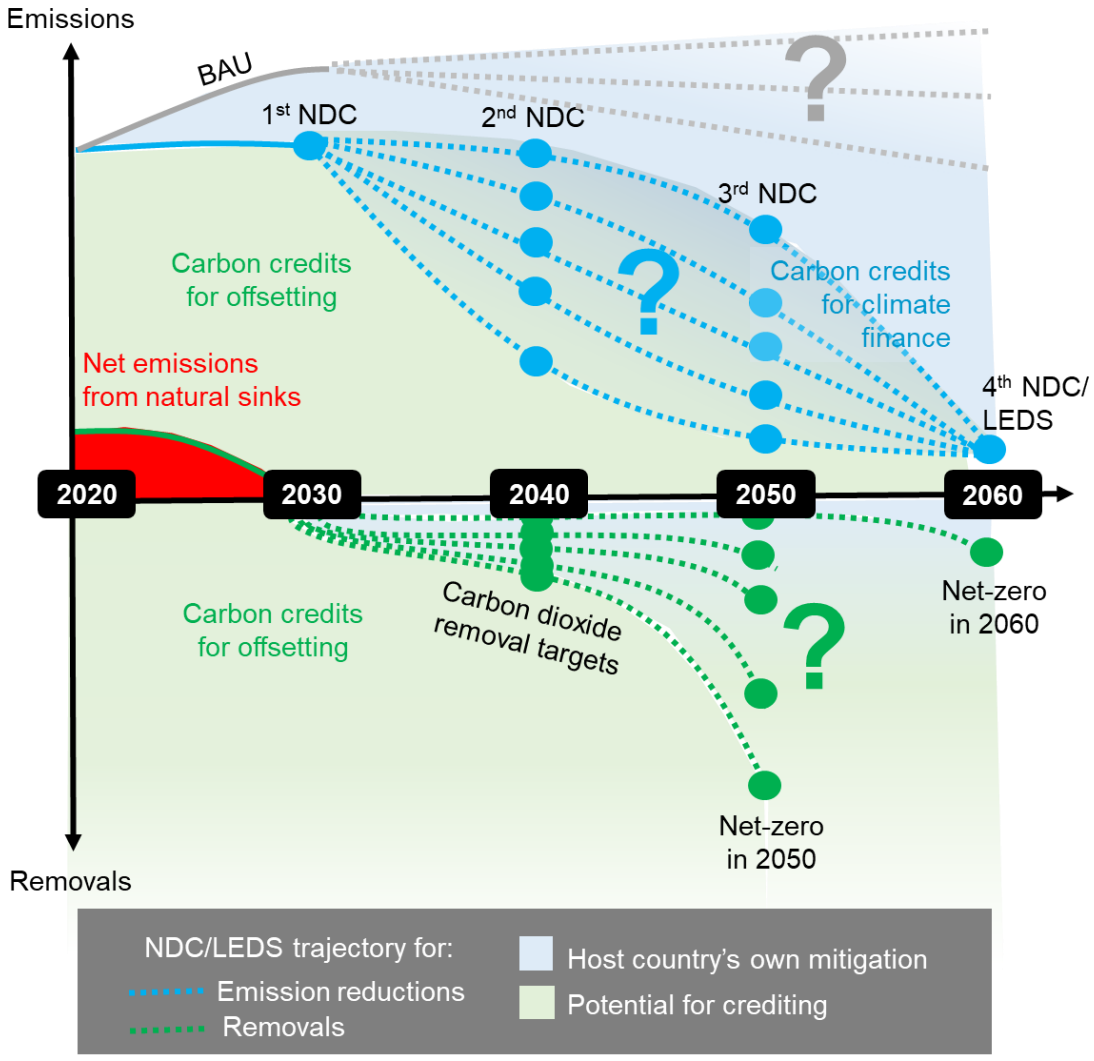
Under the Kyoto Protocol's CDM and JI mechanisms, all emission reductions relative to the crediting baseline are eligible for issuance as carbon credits which, in turn, are eligible for use towards the buyer country's target ("offsetting"), subject to so-called supplementarity. However, contrary to common belief, not all emission reductions achieved by, nor all carbon credits issued for CDM and JI activities are used for offsetting. Carbon credits are also used to overachieve the buyers' Kyoto targets, to deliver results-based climate finance and for voluntary offsetting by non-state actors. Some carbon credits are left unsold and unused, and for some generated emission reductions, issuance as carbon credits was and will never even sought, due to the lack of buyers. Some activities continue to generate emission reductions beyond their crediting periods in host countries without national targets. These emission reductions, if truly additional, represent ambition-raising beyond traditional offsetting[8].

[8] Unlike offsetting by governments, which is generally a zero-sum game in terms of global ambition, voluntary offsetting by non-state actors generally increases global ambition, provided that double-claiming with any host country target is avoided.

Furthermore, some host countries with targets retained a share of the emission reductions or carbon credits as a contribution to the host country's target. All these uses are also conceivable under the Paris Agreement.

Offsetting refers to use of carbon credits, rather than a carbon credit type. Carbon credit use can be divided into compliance use (by governments or private actors to achieve mandatory targets or regulation) and voluntary use (by governments or non-state actors to achieve voluntary goals). Voluntary use can further be divided into carbon neutrality (offsetting) and climate finance (not offsetting) claims, with the former used to balance out the claimants' own emissions, while the latter is used to help the host country with its own mitigation efforts. Carbon credits may also be divided into those associated with emission reductions and those associated with negative emissions. Emission reductions are generated against a positive emission baseline while GHG removals with permanent storage represent negative emissions generated against a zero or negative baseline. Over time, the potential for carbon credits for emission reductions will approach zero, as the host country achieves decarbonisation. By this stage, the crediting potential shifts exclusively to removals (see Figure 5).

Figure 5: Reduction of credits over time, and difference between emission reductions and negative emissions



Source: authors

Figure 5 explains various aspects of baseline setting linked to the ambition of emission reduction and GHG removal pathways of countries that differ regarding their responsibility and capacity. Its elements are described moving from the top to the bottom of the graph. The grey line shows the business-as-usual emissions pathways which will diverge over time. No credits should be generated for reductions from these pathways. The blue lines below show the emissions paths of countries specified in their NDCs and LEDS. The high paths denote poor countries with low responsibility and capacity, the low paths rich countries with high responsibilities and capacity.

The country pathways need to be checked regarding their consistency with the long-term targets of the Paris Agreement. If they are consistent, they serve as baseline for offset crediting. If they are inconsistent, reductions between them and the Paris Agreement-target consistent path can only be used in the context of climate finance. The green lines below the x axis show removal targets of countries linked to their overall strategy to achieve a balance of emissions and sinks. For example, the lowermost green dot in the year 2050 shows removals for a country that wants to achieve a balance and whose emissions are denoted by the uppermost blue dot for 2050. Only removals beyond the green dot can generate offset credits for this country.

Against that background, the following questions arise:

- How to set and apply crediting baselines to serve multiple purposes? Should the same or different crediting baselines be applied for carbon credits intended for 'offsetting' (compliance use/carbon neutrality claims) and for carbon credits not intended for 'offsetting' (results-based financing/carbon finance claims)?
- Should the same or different principles and approaches be applied for baseline setting for emission reductions and for GHG removals/negative emissions? Should baseline setting reflect differences in the potential for natural (e.g. areas available for forests or other vegetation) vs. technical (e.g. mineralisation – availability of basalt rock) sinks in the long term? Would a negative emissions baseline (meaning that only part of removal will be credited) be eventually applied? If yes, on what basis?

5.3. Baseline methodology transition and development

Focusing on the near term, and to ensure continuity of carbon finance for additional mitigation action, piloting actors and UNFCCC negotiators must find ways to transition the current existing baseline approaches to the Paris Agreement context. Several experts suggest a 'modular' approach to such a transition (see chapter 3.2). In this context, the following questions need to be answered:

- How to build on the existing experience on baseline setting? What can continue, what needs to change? This relates to:
  - How to incorporate (unconditional) NDCs in baselines for activities at different levels of aggregation? How to deal with sectors not covered by the NDC (if allowed by Article 6 rules)?
  - What should be the validity period of the baseline? Should the degree of dynamism be linked to the length of the crediting period?
  - Should baselines that are aligned with LEDS have longer validity than baselines derived from shorter-term targets? Should different approaches to baseline setting have different rules for validity (e.g., different frequency of revision for sector-specific benchmarks and activity-specific baselines)?
  - How to strike a balance between certainty for the seller and the need to remain ambitious?
- Who develops and finances baseline methodologies? How to design a process that respects national pathways and priorities and harnesses private sector innovation and engagement?
- How to oversee the integrity of baselines? What is the necessary degree of national oversight (at approval and/or authorisation stage) and international oversight (through expert review, through the Global Stocktake) under Article 6.2?
- What mandate to give to the Supervisory Body in reviewing existing methodologies for their eligibility under the Article 6.4 mechanism? What methodologies to prioritise or 'fast track' to ensure continuity?

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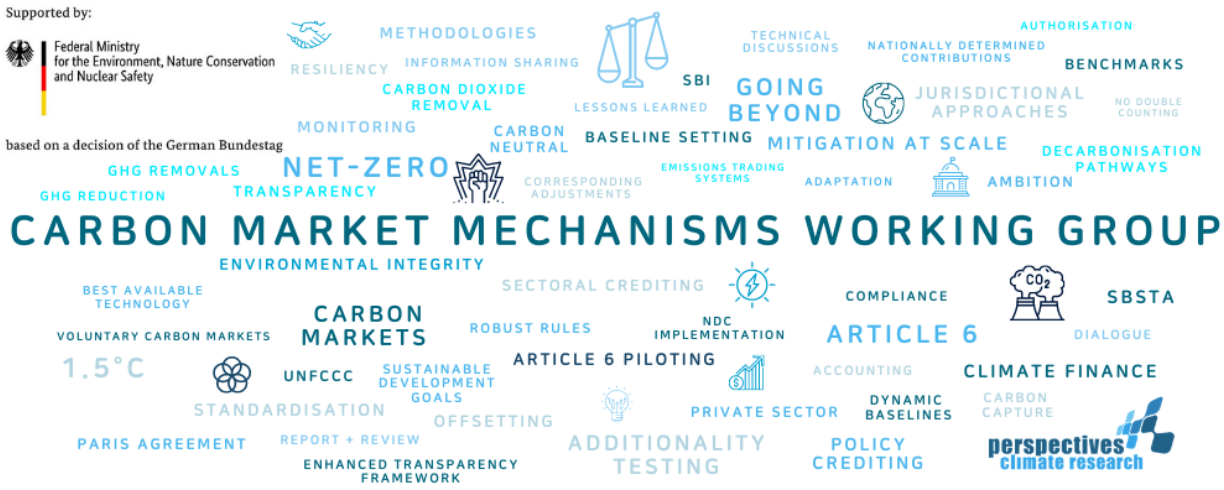

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