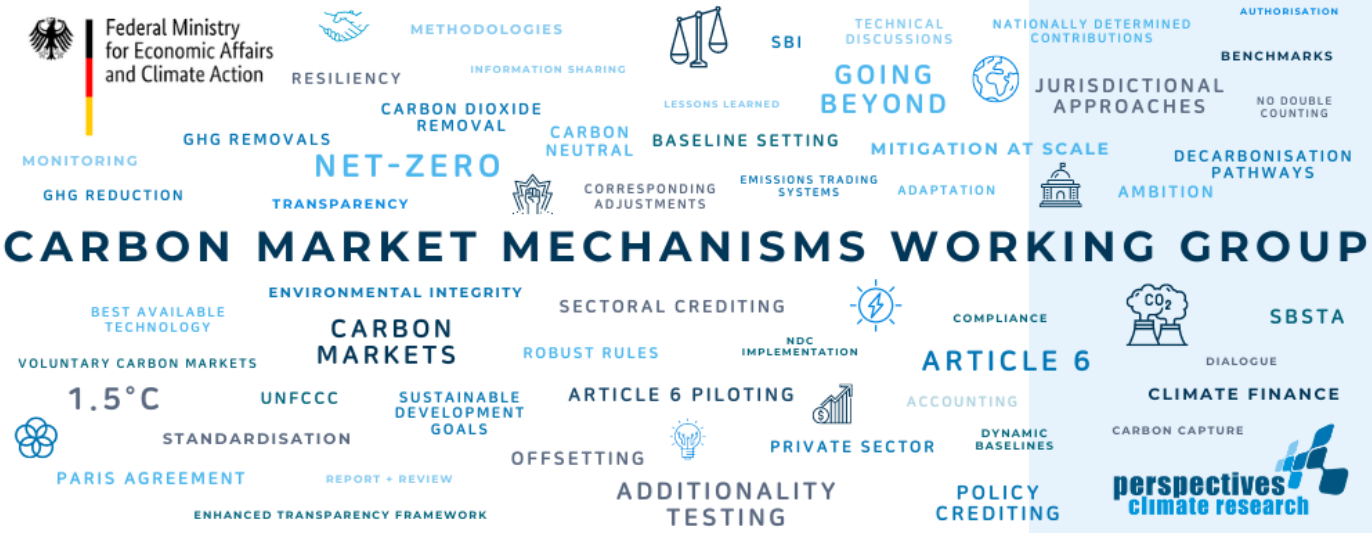
Methodological challenges of policy crediting under Article 6 of the Paris Agreement

December 2024



Discussion paper

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1. Introduction

Policy crediting involves issuing carbon credits for greenhouse gas (GHG) emissions reductions or removals – collectively referred to as mitigation outcomes – resulting from the implementation of one or more policy instruments, rather than from individual projects or programmes.

Efforts to promote policy crediting as a viable approach are driven by its potential for scale and transformative impact toward achieving net-zero emissions. Implementing policy instruments, such as technology mandates or carbon taxes, typically yields higher mitigation outcomes than individual projects and can induce structural changes in host countries. Unlike single activities, a policy approach involves multiple actors to drive sectoral transformation. Also, policy instruments can systematically direct carbon market incentives to overcome barriers faced by individual activities. For instance, by offering subsidies for mitigation, policymakers can provide access to upfront financing – a common barrier – and ensure a predictable revenue stream for individual projects.

Policy crediting differs from sectoral crediting in that it evaluates individual policy instruments and their direct mitigation outcomes, while sectoral crediting assesses the overall emissions of a sector and focuses solely on mitigation outcomes, irrespective of the number of specific policies or their actual effectiveness. While sectoral approaches rely on inventory data for crediting, policy crediting generally does not require connections to national inventories.

Although discussions on policy and sectoral crediting have been ongoing since 2009 (see Schneider and Cames 2009; Okubo et al. 2011), practical experience with policy crediting approaches remains limited. Interest in policy crediting is increasing, particularly as Article 6 of the Paris Agreement permits the crediting of such upscaled approaches compared to the market mechanisms of the Kyoto Protocol. In this paper, we focus on policy crediting, while also acknowledging that sectoral crediting approaches are currently under consideration (see Text Boxes 1 and 2).

Box 1: Sectoral crediting approach: The Climate Action Teams

The Climate Action Teams (CAT) model developed by the Environmental Defense Fund, Motu Economic and Public Policy Research, UC Global Change Center and Perspectives Climate Group aims to facilitate agreements among a small group of cooperating governments under Article 6.2 (CAT 2021). CAT's approach to crediting is economy-wide or covers multiple sectors. Key elements include a multi-year emissions crediting baseline that starts with the host country's Nationally Determined Contribution (NDC) ambition, a pre-agreed price range for credit payments, a commitment from partners to provide funding for generated credits, quantification of mitigation outcomes based on the host's national GHG inventory and results-based payments from partners to the host. To date, the CAT model has not yet been implemented.

Box 2: Sectoral crediting approach: The Energy Transition Accelerator

The Energy Transition Accelerator (ETA) is a platform that leverages carbon finance to support earlier and more substantial emission reductions in the electricity sector in line with keeping 1.5°C within reach (ETA 2023a). ETA forms a coalition of sellers including countries, governments, and private entities and buyers. The goal is to support countries in achieving their NDCs and enabling just energy transitions. To this end, a sector-scale crediting standard is developed by Environmental Resources Trust (ERT), a subsidiary of Winrock International (ETA 2023b). It is essentially a form of crediting for the results of sectoral policy implementation, a 'no-lose' sectoral emissions target. Host countries are rewarded for verified emissions reductions in the electricity sector (e.g., grid and other transmission improvements, early coal plant retirement), using an ambitious performance standard as the basis. Consequently, countries are rewarded by exceeding an ambitious declining performance standard for continuous reductions in emissions intensity. The goal is to develop a standardised approach with built-in flexibility that recognises different power systems and stages of progress in the just energy transition. It is differentiated between countries where emissions have peaked, those with high energy demand growth and those with significant energy access needs.

The standard's minimum criteria regarding environmental integrity include the use of appropriate tools to prevent emissions leakage and to meet stringent performance standards for validating additionality, the accurate reflection of actual impacts on emissions in line with reliable and science-based data and the setting of business-as-usual (BAU) baselines with downward adjustments as needed to align with long-term goals (ETA 2023b). Additionally, the standard aims to align with the principles of Article 6 of the Paris Agreement, the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) Emission Unit Eligibility Criteria and the core carbon principles (CCPs) of the Integrity Council for the Voluntary Carbon Market (ICVCM). The sectoral standard does not foresee a dedicated additionality test beyond steps review and the prior consideration requirement. There will be regular reviews of the performance standard to ensure alignment with the Pairs Agreement temperature goals over time. Downward adjustments of crediting levels are also to take place regularly to ensure consistency with national targets (NDC, long-term low GHG emission development strategy (LT-LEDS)) and the Paris Agreement temperature goals. A safeguard mechanism is the foreseen crediting adjustment for rapid electricity demand to incentivise energy efficiency investments.

Concerns persist regarding policy crediting, particularly in cases in which the policy approach is not defined stringently. Methodological shortcomings could then lead to the generation of a high number of low-quality credits. Some experts argue that setting policy boundaries and baselines may prove excessively challenging. Others remain skeptical about policy crediting due to the highly differing characteristics of non-monetary barriers often encountered in the political process of introducing mitigation policies.

The objective of this discussion paper is to provide stakeholders with an understanding of the operational challenges involved in implementing policy crediting approaches and to explore options for stringent methodological approaches in line with Article 6 of the Paris Agreement. We begin with examining the suitability of various policy instruments for crediting. Next, we assess the challenges and operationalisation options for determining the additionality of policy instruments and for robustly quantifying the mitigation outcomes achieved. The paper concludes by offering recommendations for robust operationalisation strategies.

2. Policy instruments and their suitability for crediting

Crediting policies is complex, particularly due to methodological challenges related to determining additionality and establishing a crediting baseline. Policy crediting can generally be considered in two scenarios: The introduction of an entirely new policy instrument or the enhancement of an existing one (Wooders et al. 2016).

To be creditable, the mitigation outcomes must be directly attributable to the implementation of the policy instrument (causality) amidst the influence of various factors such as macroeconomic and social trends (Michaelowa et al. 2019). If significant attribution gaps exist, the policy instrument becomes less suitable for crediting.

Therefore, the feasibility of crediting depends on the specific characteristics of the policy instruments (Okubo et al. 2011). In its fourth assessment report (AR4), the Intergovernmental Panel on Climate Change (IPCC) categorised policy instruments in the following types: regulations and standards, taxes and charges, subsidies and incentives, tradable permits, information instruments and research and development (see Figure 1).

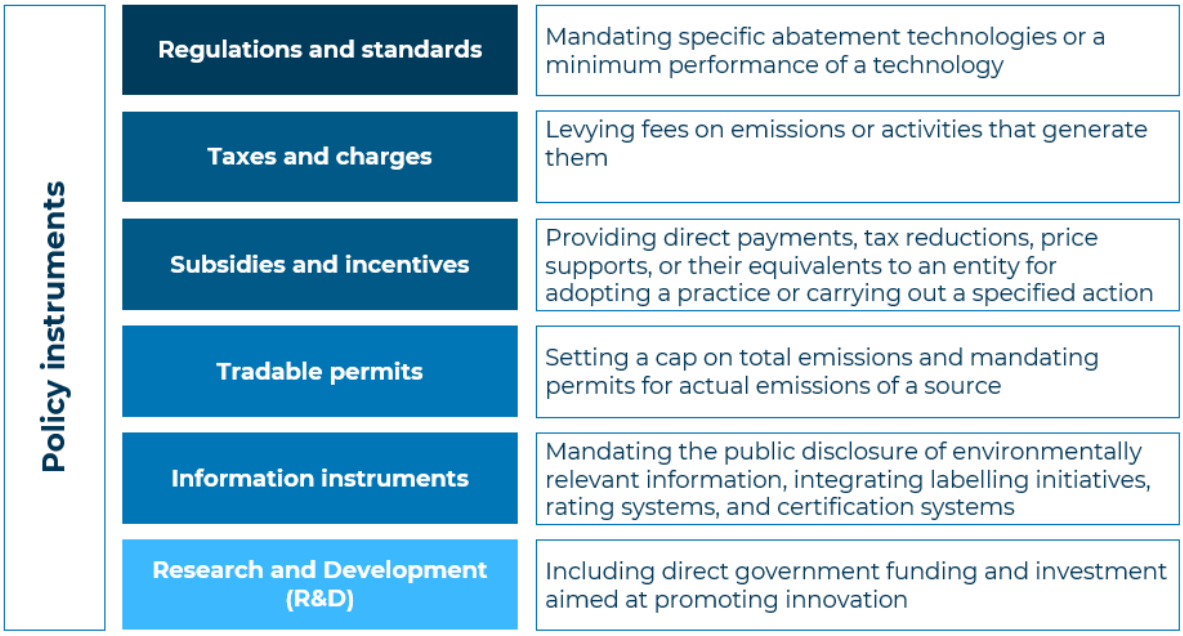

Figure 1: Typology of policy instruments (Source: derived from discussion in Gupta et al. 2007)

Some experts (Okubo et al. 2011) argue that policies allowing for purely 'input-based' MRV, such as research and development – where only the amount of funding generated by the policy is known, but not its emissions-related outcomes – are not suitable for crediting. In contrast, policies that produce quantifiable emissions impacts are more appropriate for this purpose. This suggests that the two types of policy instruments, 'information instruments' and 'research and development', would generally not qualify for policy crediting.

There are push and pull factors for policy crediting in terms of discouraging negative behaviours and promoting positive ones. Building on this idea and the IPCC's typology, we identify three main categories of policy instruments that are suitable for crediting (see Figure 2)

- **Mandates,** which involve the deployment of low-carbon technologies or behaviours, the use of a specific technology, or the exclusion of carbon-intensive technologies or behaviours. Mandates function as direct regulatory tools that enforce compliance with environmental standards or specified technology use, thereby driving the transition to lower carbon footprints.

- **Financial incentives** that aim to encourage the adoption of low-carbon technologies or behaviours by providing financial benefits. Financial incentives can include subsidies, tax benefits, or carbon pricing mechanisms like emission trading schemes (ETS). Similarly, they may also impose financial disincentives to discourage carbon-intensive technologies or behaviours.

- **Elimination of restrictions or prohibitive barriers to mitigation activities** which involves addressing past governance shortcomings by eliminating legislative or regulatory obstacles that hinder mitigation efforts. Such changes may include revising laws to permit the implementation of technologies that reduce GHG emissions or adopting practices that support a transition to low-emission pathways. Examples include regulations that require incumbent electricity monopolies to open their grids to renewable energy sources or updates to building standards that allow the use of cement blended with slag or fly ash.

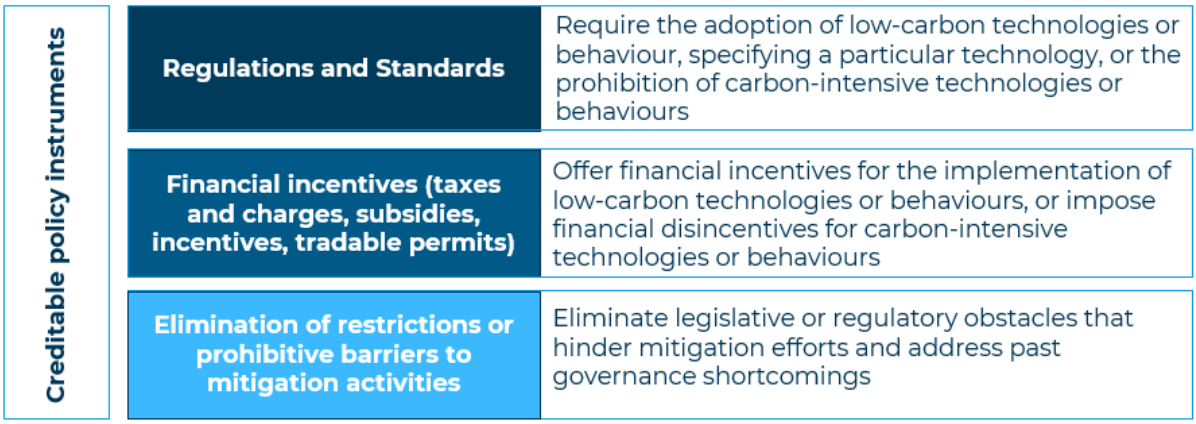

Figure 2: Three main categories of creditable policy instruments (Source: Authors)

Another eligibility criterion under Article 6 is the avoidance of emissions lock-in. This concept seeks to ensure that policy instruments do not hamper future, more ambitious climate actions or entrench carbon-intensive practices. Consequently, policies that could result in emissions lock-in, i.e. those that extend the lifespan of fossil fuel technologies, are not suitable for crediting under Article 6 of the Paris Agreement.

3. Policy crediting approaches under implementation

Concrete applications of policy crediting are slowly starting to emerge and are discussed in the following.

The Transformative Carbon Asset Facility (TCAF), a trust fund administered by the World Bank (WB), has been working on policy crediting approaches since 2017. Following previous initiatives such as the Carbon Partnership Facility (CPF), using upscaled crediting, TCAF supports policy-based, sector-based, and jurisdictional approaches (CPF 2023). The policy-based approach involves implementing energy sector reforms, fiscal policy changes and pricing and regulatory measures for promoting sustainable mobility (TCAF 2023). In October 2023, the facility announced the implementation of the first policy crediting approach in Uzbekistan (see Text Box 3 below).

Box 3: Policy crediting approach in Uzbekistan

In October 2023, the WB initiated its climate policy crediting programme by signing an agreement with Uzbekistan. This agreement includes a USD 46.25 million financing commitment for the Innovative Carbon Resource Application for Energy Transition Project (iCRAFT). Uzbekistan has traditionally provided high subsidies for electricity and gas, which discourages energy efficiency and conservation efforts. In 2020 these subsidies reached 6.6% of GDP and prices for electricity and gas covered only 70% and 50%, respectively, of the actual costs. iCRAFT payments will be used to help mitigate the impact of the increase in energy prices foreseen until 2026 for the lowest income users in a variety of ways, including financing education and awareness campaigns to raise people's awareness of the necessity and advantages of cost-covering tariffs (Climate Cent Foundation 2023). The WB estimates emissions reduction from subsidy removal at 60 million tCO_2 over the project's lifetime (World Bank 2023b). The World Bank pays USD 30 per ITMO (World Bank 2024).

The Global Green Growth Institute (GGGI), an intergovernmental organisation, is supporting countries to pilot policy approaches under Article 6 of the Paris Agreement (GGGI 2024). The Designing Article 6 Policy Approaches (DAPA) programme is financed by the Norwegian Ministry of Climate and Environment with the aim to enable Indonesia, Morocco, Senegal, and Vietnam to identify and design a viable policy approach (GGGI 2021). In June 2023, GGGI and Gold Standard jointly announced that that they are collaborating on a programme for the certification and crediting of mitigation outcomes from policy approaches (GGGI 2023). The aim was to publish specific requirements for policy crediting, so that these can be applied in 2024.

In several emerging economies, Just Energy Transition Partnerships (JETPs) have been set up since 2021. Countries with JETPs include South Africa, Indonesia, Vietnam, and Senegal. JETPs aim at the phase-out of coal-fired power plants through investment in renewable electricity generation. However, such a coal power plant phaseout is increasingly facing political obstacles in the JETP countries, with key institutions fearing an insupportable debt burden as well as instability in the power grid due to the expansion of renewable electricity generation. Harnessing revenues from international carbon markets can help to overcome these obstacles.

4. Determining the additionality of policy instruments

Additionality, a fundamental concept in carbon markets, requires that any carbon market activity, including policy instruments, must demonstrate that the resulting mitigation outcomes would not have occurred in the absence of the carbon finance. This principle ensures that mitigation outcomes are real as activities genuinely contribute to the GHG mitigation.

Additionality is also a key principle of Article 6 of the Paris Agreement. The Article 6.4 rules, modalities and procedures specify that a robust assessment is required that proves the activity would not have taken place without the incentives provided by the mechanism and that it should consider all relevant national policies including legislation, representing mitigation that goes beyond any required law or regulations (UNFCCC 2021b, para. 38).

Demonstrating the additionality of individual mitigation activities is already considered challenging. Some experts (e.g., Fuessler et al. 2014) therefore argue that developing objective criteria to demonstrate the additionality of policy instruments is impossible, while others (Michaelowa et al. 2019) consider it achievable.

General considerations for determining the additionality of policy instruments

Even the best additionality testing cannot address the inherent risk that carbon crediting opportunities might discourage governments from implementing more ambitious policies as part of increasingly ambitious (unconditional) NDCs. This is a systemic issue within the bottom-up Paris Agreement regime that international carbon market regulations cannot resolve. This challenge is present in all carbon markets, including those at the domestic level.

In theory, a policy instrument cannot be considered additional if its positive externalities outweigh its costs (Michaelowa 2013; Wooders et al. 2016; Kreibich and Obergassel 2018). The challenge is that co-benefits accrue to different actors than the costs, and co-benefits are usually much less tangible and more distributed than the costs. When fully accounting for the health benefits from reduced local air pollution, this could be the case for many mitigation policy instruments. However, in practice, many barriers prevent the implementation of policies whose benefits exceed their costs. These barriers often stem from the political economy of introducing policies, specifically the influence of emitter interest groups, and the challenges in quantifying non-monetary policy benefits. Such benefits are often underappreciated by policymakers or are subject to debate. Policy instruments have the potential to remove these non-monetary barriers, which may otherwise hinder the implementation of commercially attractive mitigation actions.

Additionality can be assessed at the level of the policy instrument, the triggered activity or both. As previously discussed, some commercially viable mitigation actions may not be implemented due to non-monetary barriers. If a policy is implemented to address those non-monetary barriers, the policy could be considered additional at the instrument level, even though not all triggered activities would qualify as additional under an individual additionality test. For instance, let's consider a policy that mandates an incumbent electricity monopolist to provide grid access to independent renewable electricity providers. The activities at sites with the best renewable energy resources would be attractive even without the revenue from emission credit sales. However, at sites with moderate resources, the credit revenue would be crucial. Therefore, not all activities that occur once non-monetary barriers are removed would automatically be considered additional.

In the context of Article 6 of the Paris Agreement, mitigation activities or policies must align with the host country's NDC, meaning they must achieve mitigation beyond the (unconditional) NDC targets. Therefore, information on policies intended to meet the NDC should be available and publicly accessible, as such policies would not be considered additional. NDCs might not be sufficiently detailed to allow for such an assessment but other relevant documentation including action plans, national legislation and sectoral strategies can alternatively be checked. In these cases, and in instances where NDCs are not sufficiently ambitious (i.e., NDC not better than BAU), it would be crucial to compare the proposed policy against similar country contexts ("policy benchmarking").

Approaches to determine the additionality of policy instruments

Different ways to determine additionality of policy instruments have been proposed. Some experts advocate for determining additionality indirectly through the process of baseline setting, while others argue for a separate additionality test. The TCAF, for example, aligns more closely with the former group and defines additionality as the difference between the TCAF baseline (discussed in the next chapter) and actual emissions (market mechanism layer) (World Bank 2022). The facility argues that the baseline is set so much below BAU, by choosing a baseline far below the country's own BAU definition and well below the NDC target that it will capture all commercially viable activities (World Bank 2022, p. 4). However, the World Bank does not articulate this clearly. It states that "crediting parameters reflect TCAF's strategic objectives as well as host country circumstances and interests including conditional targets" (World Bank 2022, p. 3). Furthermore, the bank introduces a limitation to its approach by indicating that the baseline defaults to BAU if the NDC is entirely conditional, which may not effectively account for commercially viable activities. The second (finance layer) of additionality determination proposed by the World Bank (2022) does not constitute an additionality test per se. Rather, it describes the attribution of credits based on the proportion of TCAF financing within the overall grant equivalent received by the country. The third component of TCAF's additionality assessment is the requirement of a "theory of change[1]". This is operationalised by four requirements: large emission reductions volume (at least 5 million tonnes CO_2 over 5-7 years), long-lasting sustainability[2], leverage[3] in terms of boosting the host country's climate ambition and supporting the development of domestic carbon pricing policies through scaled-up approaches (World Bank 2022). None of these requirements is linked to the question whether the policy triggers mitigation activities. Consequently, the difference between the TCAF baseline and the actual emission trajectory is deemed to result from additional activities but there is no check regarding the policy triggering them.

[1] Transformational change is understood as the complete decarbonisation of the electricity sector and widespread electrification in the industrial, building and transportation sector in line with achieving the global below 2°C target.
[2] This criterion spans three dimensions: technology, policy and financing.
[3] E.g., re-investment of received carbon revenues in further mitigation actions or strengthened capacity.

On the other hand, Michaelowa et al. (2019) argue for a separate additionality test, given that the crediting baseline does not automatically capture the additionality of a policy instrument. Therefore, they suggest that additionality should be determined through specific tests to demonstrate that the policy truly mobilises mitigation by triggering concrete activities. These additionality tests are often derived from those applied for individual projects but not all of them perform well. With its standard documents for policies, Gold Standard is following such an approach in its methodology tool "Determining Additionality of a Policy" (Gold Standard 2024). The tool and the policy requirements and procedures went through a public consultation in February 2024 and the pilot version was published in June 2024. In the additionality tool, the standard requires six steps to determine additionality of a policy: regulatory additionality check, NDC alignment check, Paris temperature goal alignment check, financial additionality assessment[4], barrier analysis and common practice test. These steps are described in more detail in the following (Gold Standard 2024):

- Step 1: It must be shown that a policy instrument goes beyond existing and scheduled policies (i.e. implemented in the forthcoming crediting period). Thereby, it needs to be ensured that the existing policy instruments are not rebranded or repackaged. This should also encompass the "substitution" of policies, for instance, when replacing a carbon tax with an emission trading scheme (ETS).
- Step 2: The project developer has to demonstrate that the policy instrument and attributed outcomes go beyond the (unconditional) NDC targets of the host country.
- Step 3: It needs to be demonstrated that the policy instrument and "associated" activities[5] do not feature on any negative list adopted by the host country or relevant international organisation to avoid lock-in.
- Step 4: The project developer has to demonstrate financial additionality by:
    - Step. 4.1: Assessing the financial non-additionality risk of the policy and its associated activities based on the following factors: evidence of potential profitability, short payback periods, availability of subsidies and competitive financing sources. This includes simple cost analyses for each associated activity.
    - Step 4.2: Carrying out an investment analysis for associated activities[6] with the policy instrument building on a payback period, investment comparison or benchmark analysis.

[4] The financial additionality assessment comprises two steps: First, the financial non-additionality risk of the activity type is assessed and as a result of this assessment an investment analysis is required in some cases.
[5] We prefer the term 'triggered activities' as it more clearly conveys the key role of the policy in initiating these activities.
[6] Inclusion criteria can be developed (valid for max. three years), so that not for each associated activity an investment analysis needs to be carried out.

- Step 5: If mandate and incentives are considered financially attractive based on step 4.2, a barrier analysis must be conducted at the policy instrument level (always the case for replacement policies). The focus thereby lies on the assessment of non-monetary barriers (political economy barriers, uncertainty about policy co-benefits and their value, non-monetary barriers to investments, technological barriers, barrier due to prevailing practice).
- Step 6: It needs to be demonstrated that the associated activities are not widely diffused in the host country.

Gold Standard's additionality tool for policies adopts an approach that employs distinct tests to assess a policy instrument's additionality, while differentiating the level at which each test applies.

Tests can be applied at the level of the policy instrument, the triggered activities or both. This also should be the case for the financial additionality assessment. Activity level testing is critical when the triggered activities have widely differing characteristics regarding generation of non-carbon credit-related revenues and thus one is unable to differentiate which activities are actually triggered by the policy and which ones would have happened anyway. A financial test at the policy level would look at costs related to implementation of the policy, e.g. paying salaries of officials that implement the policy, training of officials or collection of data. If the policy triggers activities that incur costs without providing any benefits to the implementing entities, the policy is clearly additional. In this case, the additionality test would involve proving that no revenues can be generated from these activities (Kreibich and Obergassel 2018). For activities that do generate revenue, the situation is more complex, requiring an examination of the characteristics of mitigation costs (Michaelowa 2013). For instance, some activities undertaken after the introduction of the policy might be profitable, exhibiting negative marginal abatement costs (MAC). However, as the volume of the mitigation increases, MACs turn positive and continue to rise. As illustrated in Figure 3, at a very low carbon price (carbon $price_1$), the volume of profitable activities exceeds that of costly ones, indicating that the policy is not additional. In contrast, a stronger carbon pricing policy, leading to carbon $price_2$, results in a higher proportion of costly activities compared to profitable ones, demonstrating the policy's additionality.

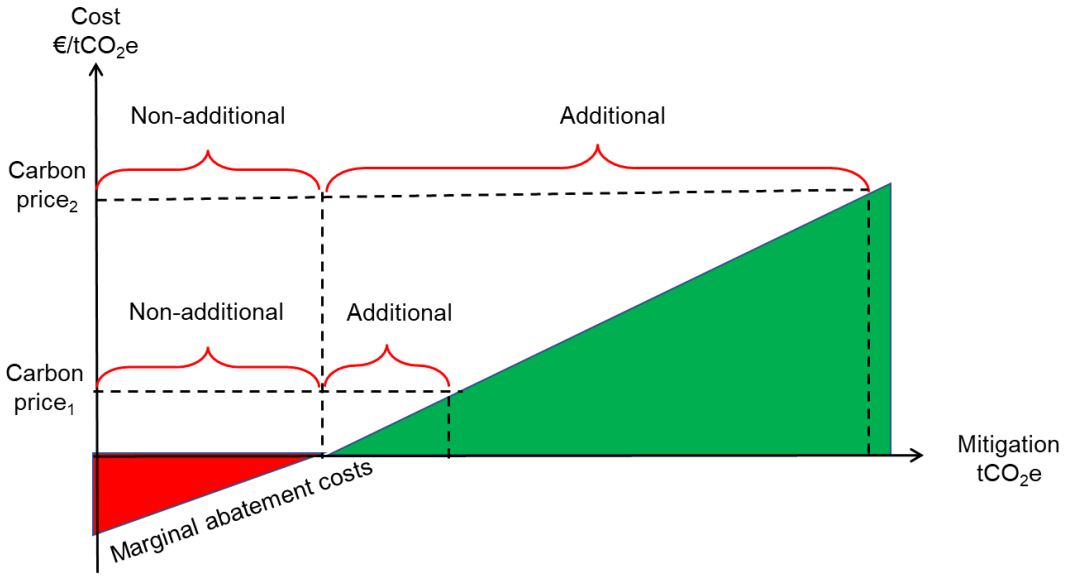

Figure 3: Carbon pricing policies and their additionality (Source: Authors)

Theoretically, it is possible to calculate the carbon price level at which a policy becomes additional. This is illustrated in Figure 4. At carbon price$_A$, the volume of mitigation from additional and non-additional activities is equal. For any price above this level, the volume of additional activities surpasses that of non-additional ones.

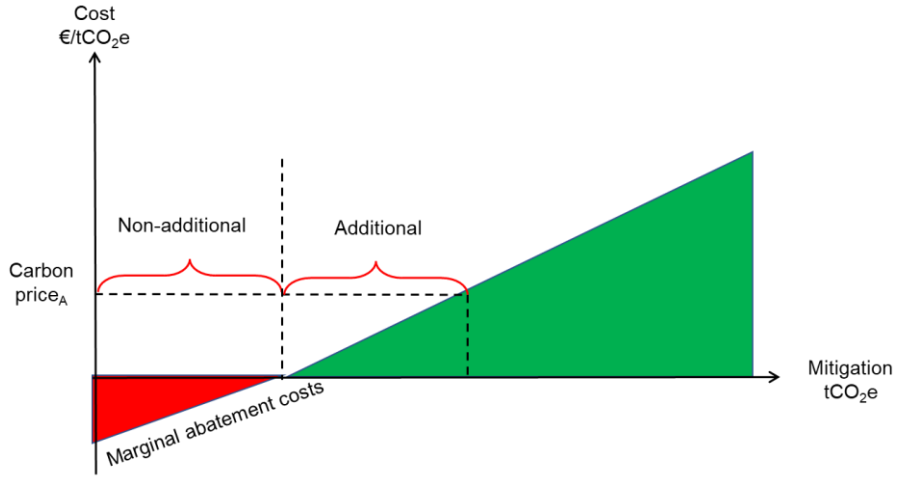

Figure 4: Additionality threshold for a carbon pricing policy (Source: Authors)

For regulations like technology and performance standards, payback period thresholds can be used to determine financial additionality. If the payback period for investing in the technology exceeds the industry standard, the policy instrument is considered additional. In countries with high perceived investment risk, payback period thresholds will be shorter. Michaelowa et al. (2019) suggest payback period thresholds at 4 to 5 years.

When MACs cannot be determined robustly, barrier analysis has been proposed as an alternative. This approach involves identifying and understanding the obstacles that might impede the implementation of policy instruments, even if activities under the policy instrument are feasible. These barriers can be of technological, financial, institutional, or social nature. However, political (economy) barriers are difficult to assess and often relate to issues like institutional capacities (Kreibich and Obergassel 2018) or the weight of lobbies in a political system (Okubo et al. 2011). Given this context, a barrier test should not be applied when the policy provides significant net societal benefits. Generally, barrier analysis should complement other additionality tests such as investment analysis, rather than serve as a standalone test.

The common practice test assesses whether a policy instrument and the triggered activities have already been extensively adopted in countries within the same economic income group in a specific region. These 'reference areas' help determine if the policy and activities are genuinely additional in the host country's context. Diffusion thresholds should be adjusted based on a country's level of development, with less stringent thresholds for low- to middle-income countries and more stringent ones for high-income countries. A key challenge is the need to continuously update these threshold values to account for the rapid diffusion of technologies. While the common practice analysis can complement the investment and barrier analyses, it should not be used as a standalone additionality test.

Additionality should be reassessed at the end of the crediting period to ensure that a policy instrument that has become non-additional does not continue to receive credit. The length of the policy crediting period should be aligned with the NDC implementation timeframe.

5. Baseline setting and quantification of mitigation outcomes

Setting a baseline which represents the reference level of the emissions that would have occurred in the absence of the policy instrument, is a crucial step in quantifying mitigation outcomes. The baseline scenario must be set in a robust and credible manner to prevent the overestimation of baseline emissions.

During discussions on the crediting of nationally appropriate mitigation activities (NAMAs) between 2010 and 2020, some experts argued that setting baselines for NAMA crediting would be excessively challenging (Kreibich and Obergassel 2018). However, given that national targets are typically assessed using similar assumptions, this challenge should not preclude policy crediting altogether (Michaelowa 2013). Therefore, the data and assumptions used in developing NDCs could also serve as foundation for setting baselines in policy crediting. Ensuring the robustness of this process is pivotal for the approach's integrity.

According to the requirements under Article 6.2 and 6.4, baselines must be set in a conservative manner, below business-as-usual (BAU). Article 6.4 specifies further baseline-related requirements including that methodologies shall encourage ambition over time, align with the NDC, the LT-LEDS of the host Party and the long-term temperature goal of the Paris Agreement, reduce emission levels in the host Party and avoid leakage.

General considerations for quantifying the volume of carbon credits

Irrespective of the requirements discussed above, the quantification of mitigation outcomes from policy instruments and specifically the setting of crediting baselines faces numerous challenges:

- For the determination of the baseline scenario's boundaries and emissions drivers, the effects of the implementation of other mitigation policies and non-policy drivers must be considered. Regarding the latter, important indicators include technological development, changes in fuel prices and behavioural changes (Kreibich and Obergassel 2018). Factoring in all these external effects will be very difficult. A pragmatic approach could be to apply time-tested project-specific baseline methodology approaches to parameters affected by the policy, e.g. electricity production or consumption.
- As for the setting of baselines for national mitigation commitments, modelling approaches are often proposed for policy crediting. This is due to difficulties with identifying and quantifying the many influencing factors on GHG projections. Modelling comes with numerous challenges including whether to choose a bottom-up (engineering) or a top-down (computable general equilibrium) approach (Wooders et al. 2016). Economy-wide approaches (top-down/aggregated) forecast future emission trends by considering macroeconomic factors that encompass the entire economy. These factors consider changes in elements such as gross domestic project (GDP), population growth, energy efficiency, pricing, and overall supply and demand at a broader level. Sectoral scenarios (bottom-up/disaggregated) incorporate sector-specific developments related to technologies and social influences. Hybrid models accommodating functions of both types have been recognised as a solution to address the limitations of purely macroeconomic models.
- If models are used, these need to account for new emissions trends and therefore be regularly updated throughout the implementation of the policy instrument. Regardless of the chosen approach, specific factors like GDP growth, population growth, international fuel and energy prices are essential building blocks of any model, meaning that their monitoring and updating needs to be ensured. The models' integrity thus also depends on the underlying governance.
- Whether a model is used or not, baseline parameters must be regularly updated to consider technology development. One proposal is the use of

dynamic baselines, meaning that the baseline calculation is defined ex-ante, but parameters are quantified ex-post (Michaelowa et al. 2021a). A key question remains regarding the feasibility of such regular updates and implications for investment certainty. Regular updates do not necessarily protect against major exogenous shocks (e.g., pandemic). The so-called "hot air" risk thus remains.

Approaches to quantify carbon credits from policies

In the case of TCAF the baseline is determined through a comparison of the target emissions trajectory (informed by the unconditional NDC targets) with the BAU emissions trajectory determined by economic modelling and selecting the lower one of both (World Bank 2022). The resulting crediting threshold ("TCAF-baseline") is stated to be well below BAU but how this is ensured remains unclear. Also, not all mitigation outcomes will be credited against this baseline as discussed above.

While an approach for modelling the baseline for energy subsidy removal in Morocco was published (World Bank 2018), TCAF did not implement this in practice.

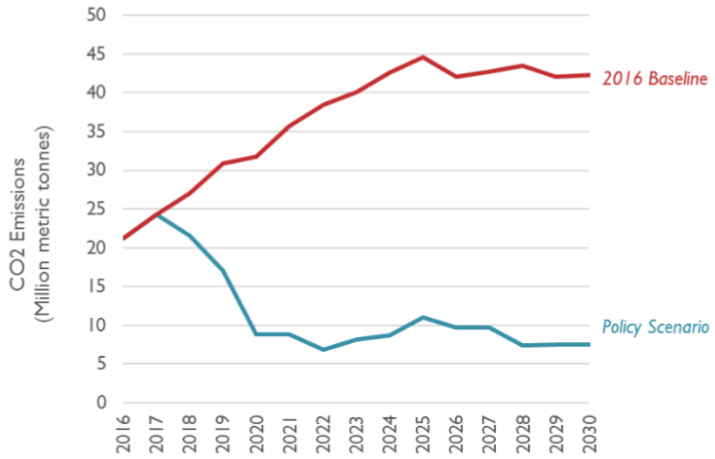

Figure 5: Policy crediting baseline for the electricity sector in Morocco (Source: World Bank 2018)

Thereby, TCAF considered four specific baseline approaches (World Bank 2018, p. 48) and advocated for selecting the most conservative one. These options were: Option A, setting the baseline at the level of policy effort observed before the introduction of the new policy; Option B, setting the baseline based on the historical policy effort during a period preceding policy introduction; Option C, establishing the baseline as an incremental year-over-year policy improvement. Option D, which was conceptually different from the other three, proposed a discount on emission credit volumes proportional to the shortfall relative to a policy benchmark, in this case set as a full cost-recovery electricity tariff. Figure 6 illustrates these options.

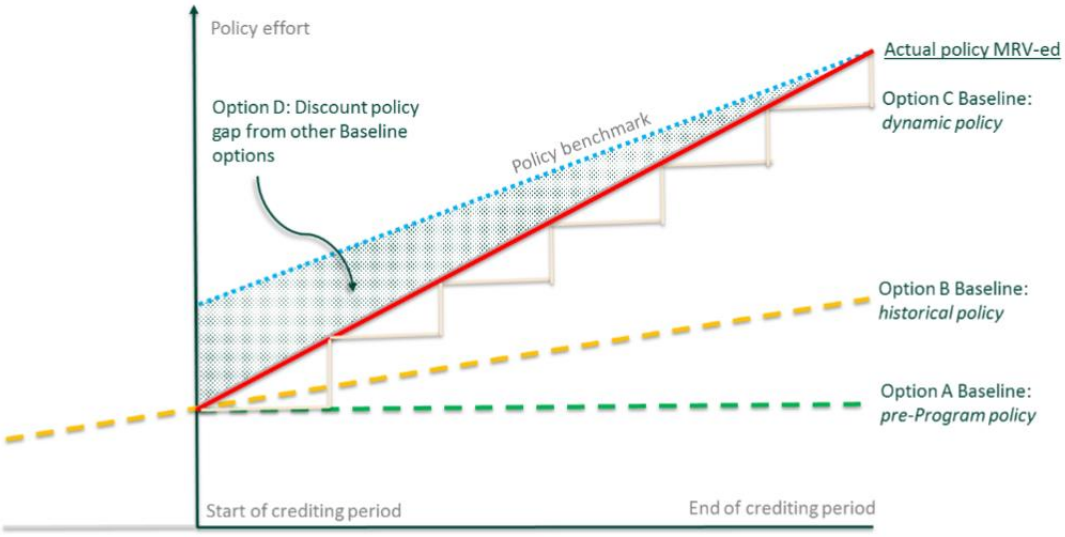

Figure 6: TCAF baseline options for policy crediting (Source: World Bank 2018)

A discounting approach is also proposed by Kreibich and Obergassel (2018) and would be in line with the potential downward adjustment requirement under the Article 6.4 mechanism (see UNFCCC 2024) which intends the alignment of the baseline with the long-term temperature goal of the Paris Agreement.

In the context of its Designing Article 6 Policy Approaches (DAPA) project, the Global Green Growth Institute (GGGI) has built on economic modeling to generate policy crediting baselines (GGGI 2021). The institute stresses the need for regular updates of baseline parameters throughout the implementation of the policy and the need for consistency with countries' NDC baselines.

In line with forestry baseline methodologies which have involved control groups, Kreibich and Obergassel (2018) propose establishing a control area with similar characteristics that has not implemented the respective policy instrument. Identifying the right control area which has the same key characteristics as the host country is cumbersome though.

6. Conceptual examples for additionality determination and carbon credit quantification

In the following, we will discuss the suitability of the above-mentioned approaches for crediting of three specific policy instruments:

- Introduction of an energy efficiency (EE) standard (e.g., in the building sector)
- Introduction of a renewable energy (RE) feed-in tariff (FIT)
- Introduction of a carbon tax.

Table 1: Policy crediting approach for three types of policy instruments

	Additionality determination		**Quantification of mitigation outcomes**	
EE standard in the building sector (e.g. building code)	Investment analysis (at policy level)	Costs of implementation of the policy (staffing, training, data collection and verification) to be taken into account. Payback period threshold (for generic activity types): We propose that an activity type be considered additional if the payback period of the mandated EE technologies exceeds three years for least developed countries, four years for developing countries and seven years for industrialised countries. This assessment would apply to the mandated technologies on a generic level, rather than to specific activities.	Baseline setting	Baseline scenario to be based on the energy consumption trend without the introduction of the energy efficiency standard. Application of a reduction factor to ensure that the baseline is below BAU in line with Article 6 requirements. Application of a linear annual downward adjustment factor to ensure alignment with the Paris Agreement's long-term temperature goal.
	Barrier analysis (level of policy instrument)	Not applicable as impact of energy efficiency can be reflected in the payback period.	Monitoring	Parameters that need to be monitored: energy consumption, leakage effects (e.g., rebound effect)
Introduction of a RE FIT	Investment analysis (policy level if differences in RE	Activity is additional if the payback period, prior to receiving subsidies, exceeds three years for least	Baseline setting	BAU baseline to be calculated based on information about the type and capacity of existing power plants, electricity generation

	Additionality determination		**Quantification of mitigation outcomes**	
	resources between activities are not significant)	developed countries, four years for developing countries and seven years for industrialised countries.		from newly installed RE capacity, indirect emission from RE operation.
	Investment analysis (associated activity level)	Required when there is significant variation in potential and highly attractive sites remain available (particularly if gird access was previously unavailable)	Monitoring	Other policies and non-policy effects need to be considered (e.g., control area)
	Barrier test (policy level)	Public budget related barriers could be relevant		
	Common practice test (policy instrument level)	Check whether feed-in tariff is already present in > 1/3 of countries on the continent belonging to the same income group		
Carbon tax	Investment analysis (policy level)	Threshold analysis: USD 5/tCO_2 for low-income countries, USD 10/tCO_2 for middle income countries, USD 50/tCO_2 for high income countries.	Baseline setting	Baseline scenario to be based on the historical emission levels in the sector covered by the tax. Application of a reduction factor to ensure that the baseline is below BAU in line with Article 6 requirements. Application of a linear annual downward adjustment factor to ensure alignment

	Additionality determination		Quantification of mitigation outcomes	
				with the Paris Agreement's temperature goal.
	Common practice test (policy instrument level)	Verify whether a carbon tax at or above the levels introduced by the policy is already implemented in more than 1/3 of the countries on the continent within the same income group	Monitoring	Verify the actual implementation of the tax

7. Recommendations

The potential of large-scale mitigation outcomes to drive transformational change is a critical factor motivating policymakers to explore policy crediting under Article 6 of the Paris Agreement. However, implementing credible policy crediting approaches presents numerous methodological challenges, as outlined in this brief paper. Below, we provide some key recommendations for addressing the methodological challenges associated with policy crediting.

Key eligibility criteria for policy instruments to qualify for crediting under Article 6 of the Paris Agreement include avoiding emissions lock-in by aligning with the Agreement's long-term temperature goal and exceeding the host country's (unconditional) NDC targets. Policies that merely support the achievement of unconditional NDCs or perpetuate the use of fossil fuel infrastructure should therefore be ineligible for crediting.

As with all baseline-and-credit systems, determining additionality is critical to safeguarding environmental integrity. We recommend conducting a separate additionality test for the respective policy instrument, as ambitious baseline setting alone replaces specific tests that demonstrate a policy's ability to mobilise mitigation by triggering concrete activities. A more stringent benchmark level moves down the baseline emissions level and leads to a lower credit volume, it does, however, not give any indication of the additionality of a specific activity. While additionality tests for individual projects can inform testing for policy instruments, not all are well-suited for different policy instruments. For example, a barrier test should not be applied when the policy provides significant net societal benefits.

It is also essential to specify the level at which the test is to be applied: Additionality can be determined at the level of the policy instrument, the triggered activity or both. Policy-level additionality determination is generally feasible for mandatory regulations and carbon pricing instruments, particularly when project characteristics show limited variation in non-carbon revenue. Activity-level testing is necessary when triggered activities exhibit diverse characteristics in generating non-carbon credit-related revenues, making it challenging to distinguish which activities are genuinely triggered by the policy and which would have occurred regardless.

For the accurate quantification of mitigation outcomes, the establishment of a robust and credible baseline is key. Baselines must be set conservatively, aligned with the host country's NDC, and designed to avoid overestimating mitigation achieved. Policymakers and practitioners should leverage data and assumptions from NDC development and consider external factors such as technological advancements, economic changes, and the impact of other policies. To maintain credibility, baseline parameters should be regularly updated to reflect new trends, using dynamic approaches where feasible, while balancing the need for investment certainty. Regular updates to parameters, alongside strategies to address uncertainties and exogenous shocks, will enhance the reliability of baselines and minimise risks like "hot air". The use of hybrid models, combining bottom-up and top-down approaches, can address the limitations of single-method approaches and better capture sectoral and macroeconomic influences.

A robust MRV framework is essential for ensuring the credibility of any policy crediting approach. It must clearly demonstrate that the policy is operational and not merely a theoretical construct on paper. This requires the collection of relevant parameters, such as measuring the energy efficiency of a representative sample of buildings for a building energy efficiency standard. Independent third-party verification of policy implementation is indispensable, and buyers of ITMOs should avoid purchasing from countries lacking such verification mechanisms.

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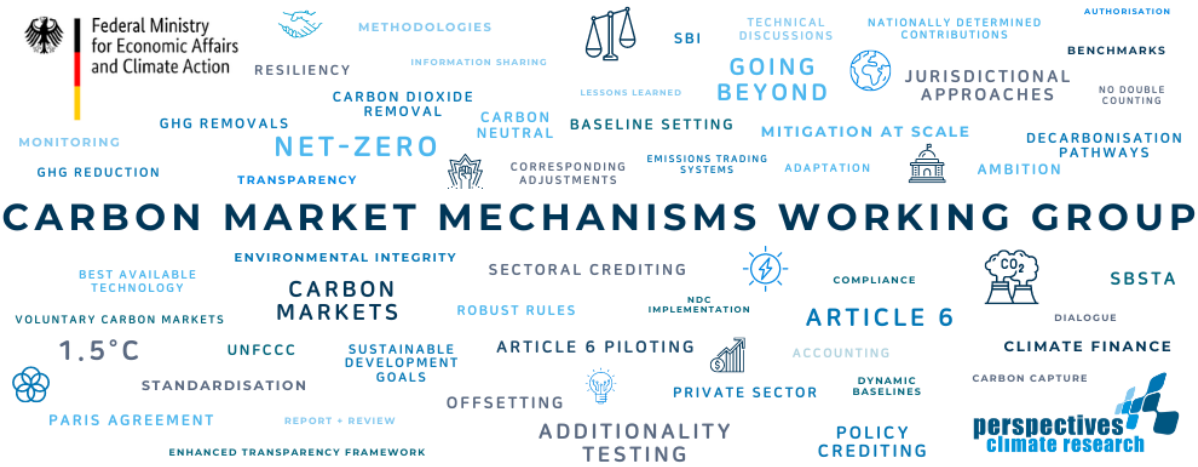

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