Methodology for assessing the quality of carbon credits

Version 0.1 used for piloting purposes

3 August 2021

Authors and background

The World Wildlife Fund (WWF-US), Environmental Defense Fund (EDF) and Oeko-Institut are developing a “Carbon Credit Quality Initiative” (previously referred to as “Carbon Credit Guidance for Buyers”) to guide buyers of carbon credits amidst a complex market. The project is implemented in several phases: Phase 1 of the project identified criteria for assessing the quality of carbon credits. This paper presents the results from Phase 2 of the project in which a methodology for assessing carbon credits against the criteria is developed and tested. Phase 3 is to pilot the application of the methodology to different carbon credits. Subsequent phases will include improving the methodology based on lessons learned from its pilot application, expanding the application of the methodology, and combining the results from the previous phases with additional recommendations for carbon credit buyers.

The methodology was prepared by a research team (Lambert Schneider, Felix Fallasch, Felipe De León, Mandy Rambharos, Sophie Progscha), WWF-US (Brad Schallert, John Holler), and EDF (Kelley Kizzier, Annie Petsonk, Alex Hanafi, Pedro Barata, Walter Stuart) and takes into account the feedback from a 5-week stakeholder consultation from 5 August to 7 September 2020 and from technical reviewers. Boston Consulting Group (BCG) helped facilitate the stakeholder consultation and provided analytical support as part of this process.

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Definitions

Term	Definition
Additionality	In the context of crediting mechanisms, emission reductions or removals from a mitigation activity are additional if the mitigation activity would not have taken place in the absence of the added incentive created by the carbon credits.
Carbon credit	An emission unit that is issued by a carbon crediting program and represents an emission reduction or removal of greenhouse gases. Carbon credits are uniquely serialized, issued, tracked and cancelled by means of an electronic registry.
Carbon crediting program	An organization that registers mitigation activities and issues carbon credits for the emission reductions or removals achieved by the activities.
Corresponding adjustment	An accounting entry applied in the context of Article 6 of the Paris Agreement in order to account for the international transfer of mitigation outcomes and avoid double counting of emission reductions or removals. A country transferring emission reductions or removals makes an addition to the total emissions covered by its NDC, and the country acquiring and using the emission reductions or removals makes a subtraction. Corresponding adjustments thereby aim to ensure that the transferring country can no longer use the emission reductions or removals to achieve its NDC, whereas the acquiring country may use them.
Crediting baseline	The emissions level against which emission reductions or removals of a mitigation activity are determined.
Double claiming	A situation in which the same emission reduction or removal is claimed by two different entities towards achieving mitigation targets or goals: once by the country or jurisdiction where the emission reduction or removal occurs, by reporting lower emissions or higher removals when tracking progress and demonstrating achievement of its mitigation target or goal, and once by the entity using the carbon credit.
Double counting	A situation in which a single greenhouse gas emission reduction or removal is counted more than once towards achieving mitigation targets or goals. Double counting can occur through double issuance, double use and double claiming.
Double issuance	A situation in which more than one carbon credit is issued for the same emission reduction or removal. Double issuance leads to double counting if more than one of these carbon credits is counted towards achieving mitigation targets or goals. Some programs and stakeholders also refer to *double registration*— the registration of the same project under two different carbon crediting programs or twice under the same program. Double registration can lead to double issuance if carbon crediting programs do not implement proper controls to ensure that, if a project is registered with more than one program, carbon credits are cancelled by one program before carbon credits are issued by another program for the same emission reductions or removals.
Double use	A situation in which the same carbon credit is counted twice towards achieving mitigation targets or goals (e.g., if two entities claim emission reductions or removals from the cancellation of one carbon credit).
Leakage	The net change of greenhouse gas emissions or removals that are attributable to the mitigation activity but occur outside the boundary of that activity. These include, for example, indirect emission changes upstream or downstream of the mitigation activity or rebound effects.

Term	Definition
Mitigation activity	An activity that reduces anthropogenic emissions of a greenhouse gas, or maintains or enhances removals by sinks. Mitigation activities can be implemented at different scales and could be projects, programmatic approaches or policies.
Non-permanence	Non-permanence refers to a situation where the emission reductions or removals generated by the mitigation activity are later reversed, for example, due to a natural disaster or project mismanagement. The mitigation activity thus may only result in a temporary greenhouse gas benefit for the atmosphere.
Quantification methodologies	Documents established by a carbon crediting program to quantify a project's net emission reductions or removals. These documents are often named by carbon crediting standards as baseline and monitoring methodologies, tools, protocols, or methodological guidelines.
Program provisions	The documents adopted under a carbon crediting program that specify requirements, procedures, and administrative and operational aspects of the program. This typically includes standards, procedures, manuals, guidance documents, and forms.
Results-based climate finance	A financing approach under which a donor disburses funds for the achievement and independent verification of a pre-agreed set of results. Some donors use the delivery and subsequent cancellation of carbon credits as a vehicle to disburse results-based climate finance. In this case, the donor does not use the emission reductions or removals to achieve its own mitigation targets or goals.
Validation and verification entity	An independent third-party entity that assesses whether a project requesting registration conforms with all program requirements (often referred to as *validation*) and whether a request for issuing offset credits conforms with all program requirements (often referred to as *verification*).

1 Introduction

Achieving the temperature goals of the Paris Agreement requires deep and fast decarbonization of our economies and the protection of carbon stocks. Although many entities, including countries, sub-national jurisdictions, corporates, other organizations, and individuals, are stepping up their climate efforts and pledges, current action is still insufficient to achieve agreed international goals. Carbon markets with high-quality credits could play an important role in raising the ambition of climate action and help close the gap between current climate commitments and the necessary decarbonisation of the global economy. Carbon credits have gained revived interest as a carbon market instrument in recent years as climate ambition has grown.

Given growing demand for carbon credits, practical and trusted guidance is critical to help buyers navigate the complicated carbon credit landscape and enable them to identify high-quality credits. The World Wildlife Fund (WWF-US), Environmental Defense Fund (EDF) and Oeko-Institut are therefore developing the "Carbon Credit Quality Initiative" (previously referred to as "Carbon Credit Guidance for Buyers"). The project is implemented in several phases. Phase 1 identified and described criteria for assessing the quality of carbon credits and is summarized in the report "What makes a high-quality carbon credit?: Phase 1: Definition of criteria for assessing the quality of carbon credits" (Schneider et al. 2020), released June 2020. This paper presents the outcomes of Phase 2 of the project, which is to develop a methodology for assessing carbon credits against the criteria developed in Phase 1. This work has further refined the criteria for assessing the quality of carbon credits from Phase 1. In Phase 3 of the project, the methodology will be piloted and tested by a consortium of researchers led by Oeko-Institut. Subsequent phases will include improving the methodology based on lessons learned from its pilot application, expanding the application of the methodology, and combining the results from the previous phases with additional recommendations for carbon credit buyers. This initiative targets a non-technical audience and may be used by prospective carbon credit buyers to inform their purchases.

The methodology is written for use by carbon market experts—not for a broader, non-technical audience. Applying the methodology requires a thorough understanding of carbon crediting. Some criteria for assessing carbon credits are straightforward to apply, but others require deep technical expertise, such as assessing the robustness of methodological approaches for quantifying emission reductions and removals. The methodology should be applied by independent experts that do not have financial interests in specific evaluation results.

Assessing the quality of carbon credits is methodologically challenging and often requires difficult judgments. The approaches presented in this document are the authors' judgment of what quality features matter and how these could be practically assessed and weighed. The methodology was developed based on a literature review, the authors' own research, and feedback from various experts and stakeholders.

This document presents a first version of the methodology that will be improved over time. The authors are aware that some parts of the methodology will need further refinement, improvement, and revision. The road-testing in Phase 3 of this project aims to inform future improvements to the methodology, particularly with regard to the scoring and weighing approaches used. The authors are also grateful for any feedback on the methodology.

2 How the methodology works

Quality objectives and criteria

What makes a “high-quality” carbon credit is not a simple question. Many different questions can be evaluated to assess different quality features of carbon credits. The methodology presented in this paper evaluates carbon credits against seven overarching *quality objectives* (see Table 1). Each objective represents a different overarching feature of a carbon credit. This grouping aims to provide buyers of carbon credits a nuanced picture of how a carbon credit performs with regard to different quality features that are difficult to compare. The relative importance of these quality objectives may depend on the preferences of carbon credit buyers.

Table 1 Overview of the quality objectives and criteria used to assess the quality of carbon credits

Quality objective		Criteria	
1	Robust determination of the GHG emissions impact of the mitigation activity	1.1	Additionality
		1.2	Vulnerability (applicable to collapsed markets only)
		1.3	Robust quantification of emission reductions and removals
2	Avoiding double counting of emission reductions or removals	2.1	Avoiding double issuance
		2.2	Avoiding double use
		2.3	Avoiding double claiming
3	Addressing non-permanence	3.1	Significance of non-permanence risks
		3.2	Robustness of approaches for addressing non-permanence risks
4	Facilitating transition towards net zero emissions	4.1	Enhancing adoption of low, zero or negative emissions technologies and practices
5	Strong institutional arrangements and processes of the carbon crediting program	5.1	Overall program governance
		5.2	Transparency
		5.3	Public consultation
		5.4	Robust third-party auditing
6	Environmental and social impacts	6.1	Robustness of the carbon crediting program's environmental and social safeguards
		6.2	Sustainable development impacts of the project type or project
		6.3	Contribution to improving adaptation and resilience (optional)
7	Host country ambition	7.1	Host country commitment to the global temperature goal
		7.2	Stringency and coverage of the host country’s current NDC
		7.3	Ability of the carbon crediting approach to enable the host country to use part of the emission reductions to achieve its own NDC

Each quality objective is assessed by evaluating several *criteria* (Table 1). In many instances, the evaluation of a criterion builds on the evaluation of several *sub-criteria* and *indicators*. The latter often assess specific design features of a carbon crediting program, such as how exactly stakeholder consultations are conducted. Overall, this results in more than 100 evaluation aspects, with some being more decisive for the quality of carbon credits than others. The rationale for using and assessing these quality objectives, criteria and sub-criteria is explained in detail in chapter 2 of this document.

The quality objectives and criteria in this document have been updated from the report "What makes a high-quality carbon credit?: Phase 1: Definition of criteria for assessing the quality of carbon credits," released June 2020. Updates to these quality objectives and criteria are based on findings from the development of the methodology, including feedback considered from a 5-week stakeholder consultation of the methodology from 5 August to 7 September 2020.

What is evaluated under the methodology?

To date, more than 10,000 mitigation projects have been registered under carbon crediting programs. Assessing each individual project would provide the best picture of the quality of the carbon credits issued to the project but would require considerable resources. The methodology presented in this paper allows assessing the quality of carbon credits at a more aggregated level.

The methodology identifies five factors that are considered to be key determinants for assessing the quality of carbon credits:

1. The **carbon crediting program** under which the project is registered. The provisions of a carbon crediting program are a key factor for the quality of carbon credits. They determine, for example, which projects are eligible, how double counting is avoided, how risks of non-permanence are addressed, or how environmental and social safeguards are assessed. Some of these provisions differ substantially between carbon crediting programs. A key element of the methodology is therefore assessing the provisions of carbon crediting programs under which a carbon credit is issued.

2. The **quantification methodologies** applied to determine the emission reductions and removals. Quantification methodologies specify how exactly the emission reductions and removals should be determined and are thus a key element of the quality of carbon credits. Although they are issued by carbon crediting programs, they are here not subsumed under the first point above, but treated separately, for three reasons: first, some carbon crediting programs allow quantification methodologies developed under another carbon crediting program; second, some carbon crediting programs issue different quantification methodologies for the same project type; and third, in some instances, quantification methodologies have been substantially changed over time such that using a different iteration will lead to inconsistencies in carbon credit quality. The methodology therefore separately considers the robustness of the quantification methodologies applied to issue carbon credits. As evaluating quantification methodologies is complex and also resource-intensive, the methodology recommends—but does not require—the evaluation of the relevant quantification methodologies.

3. The **type of project** that is being implemented. Some quality features of carbon credits depend more strongly on the type of mitigation activity, rather than the specific provisions of the carbon crediting program. For example, some project types are subject to non-permanence risks while others are not. The available literature also indicates that the likelihood that projects are additional strongly differs between project types (Schneider 2009; Cames et al. 2017; Broekhoff et al. 2019). The methodology therefore also considers the typical features of the relevant project type when assessing the quality of a carbon credit.

4. Whether the carbon credits' associated emission reductions or removals are **authorized for international use under Article 6 of the Paris Agreement**. If carbon credits are used in the context of Article 6, the international transfer and use of the associated emission reductions and removals is accounted for through the application of corresponding adjustments. In such instances additional quality considerations play a role, such as whether the carbon crediting

program has the necessary procedures in place to track carbon credits backed by corresponding adjustments, whereas such provisions are not relevant if carbon credits are used outside the context of Article 6 (see quality objective 3 for further details).

5. The **host country** in which the project is implemented. Though less important than the other factors above, the host country in which the project is implemented can also play a role in the quality of a carbon credit. For example, if carbon credits are used under Article 6 of the Paris Agreement, implementing the provisions for avoiding double counting of emission reductions with nationally determined contributions (NDCs) is important for ensuring quality. This requires that the host country has demonstrated its readiness to comply with Article 6 requirements.

The methodology identifies for each criterion or sub-criterion which of these five factors is most decisive for assessing it, and then evaluates the criterion or sub-criterion at this level. In some instances, a relevant combination of these five factors is evaluated. For example:

- Criterion 1.1 (Additionality) is evaluated both at the level of the carbon crediting program and at the level of the project type. Under sub-criterion 1.1.1, the provisions of the carbon crediting program are evaluated in order to assess whether projects that are triggered by legal requirements can be registered under the program. Under sub-criterion 1.1.3 the typical financial attractiveness of the project type is evaluated in order to assess the likelihood that the type of project may also be implemented without carbon credits.

- Criterion 2.1 (Avoiding double issuance) is mainly evaluated at the level of the carbon crediting program. The provisions that a program has in place to reduce such risks are a key determinant for avoiding double issuance. However, double issuance risks also depend on the project type, which is therefore also considered when evaluating the risk of overlaps with other projects.

All carbon credits for which the five factors outlined above are identical receive the same score. For example, the same scoring results would apply to all wind power projects that are implemented in India, are registered under the CDM using the methodology ACM0002, and when using the respective carbon credits of these projects outside the context of Article 6.

The main advantage of this approach is that it simplifies the quality assessment of carbon credits. It aims to minimize the resources required for evaluating the key determinants of carbon credit quality by assessing each criterion or sub-criterion at the most decisive level. The main disadvantage is that the approach does not necessarily account for the unique conditions of each individual project which may otherwise inform the quality of its issued carbon credits. For example, the financial attractiveness of wind power projects varies depending on local conditions; likewise, the sustainable development benefits of an afforestation activity will strongly depend on its design. The methodology therefore recommends users to apply some criteria or sub-criteria at the level of an individual project, as long as reliable information and sufficient resources are available.

What type of scores are used?

The methodology uses a standardized scoring system with a scale from 1 to 5. The number score represents the level of confidence or likelihood that the assessment subject meets the quality objective, criterion, or sub-criterion. A score of 5 represents the highest level of confidence and a score of 1 the lowest level of confidence. This scale aims to provide users a simple and intuitive picture of the quality of carbon credits.

For a few assessment subjects, the methodology establishes “minimum requirements,” meaning that this assessment subject must be fulfilled regardless of its performance against other subjects. If a

minimum requirement is fulfilled, a score of “PASS” is assigned. If the requirement is not “fulfilled”, a score of “FAIL” is assigned. In this latter case, the related carbon credits should not be used for offsetting, regardless of how the carbon credit otherwise scores. Meeting these “minimum requirements” does not necessarily indicate that a carbon credit is of good or sufficient quality; rather, the methodology aims to provide a nuanced picture of how a carbon credit performs in relation to different quality objectives. Which quality objectives are considered particularly important, however, depends on the preferences and priorities of the user of the carbon credit. Table 2 provides an interpretation of the scores used in the methodology.

Table 2 Interpreting scores

Score	Description
5	Very high confidence or likelihood that the assessment subject meets the criterion or quality objective.
4	High confidence or likelihood that the assessment subject meets the criterion or quality objective.
3	Moderate confidence or likelihood that the assessment subject meets the criterion or quality objective.
2	Low confidence or likelihood that the assessment subject meets the criterion or quality objective.
1	Very low confidence or likelihood that the assessment subject meets the criterion or quality objective.
FAIL	Does not meet at all the criterion or quality objective. The credit should not be used for offsetting.

The methodology is written to be applicable to a wide array of conditions and approaches toward ensuring high-quality carbon credits. To account for circumstances where specific elements in the methodology may not adequately address all relevant scenarios (e.g., novel approaches applied by a carbon crediting program), the methodology identifies where user discretion may be used.

How are scores for individual criteria and sub-criteria combined?

The methodology generates a score of 1–5 for each subject matter that is evaluated. The results for each individual evaluation are then combined into a score for each of the seven quality objectives (see Figure 1). The final result for each of the seven quality objectives will not be further aggregated but displayed separately. This provides a nuanced picture of the different quality features of carbon credits and allows buyers to determine which quality objectives are most important to them. Note that, in the final scoring for a quality objective, the results may be rounded to full numbers.

The methodology deploys two methods to weigh (i.e., consolidate) scores: a point system and inverse weighing (see “scoring methods”).

Point system

In several instances, the methodology uses a point system to determine the score for a criterion or sub-criterion. This means that a series of questions is assessed, for example, about how exactly a carbon crediting program conducts stakeholder consultations. For each of these questions—or subject matters—a point score is assigned. In many instances, one point is assigned if the subject matter is fulfilled. In some instances, higher point scores are assigned, depending on how the subject matter is addressed or to give more weight to some subject matters than to others.

Figure 1 Score flow

Criterion score

Criterion 1.1: Additionality	Score
Sub-criterion 1.1.1: Eligibility of mitigation activities that are triggered by legal requirements	5
Sub-criterion 1.1.2: Consideration of carbon credits before project implementation and restrictions on the eligibility of existing projects	3
Sub-criterion 1.1.3: Financial attractiveness	5
Sub-criterion 1.1.4: Barriers	NA
Weighted score	**4.37**

Quality objective score

Quality Objective 1: Robust determination of the GHG emissions impact of the mitigation activity	Score
Criterion 1.1: Additionality	4.37
Criterion 1.2: Vulnerability	NA
Criterion 1.3: Robust quantification of emission reductions and removals	3
Weighted Score	**3.31**

Full results

Quality Objectives	Score
Quality Objective 1: Robust determination of the GHG emissions impact of the mitigation activity	3
Quality Objective 2: Avoiding double counting of emission reductions or removals	4
Quality Objective 3: Addressing non-permanence	5
Quality Objective 4: Facilitating transition towards net zero emissions	1
Quality Objective 5: Strong institutional arrangements and processes of the carbon crediting program	2
Quality Objective 6: Environmental and social impacts	3
Quality Objective 7: Host country ambition	4

Source: Own representation

The result of the evaluation determines the total number of achieved points, which is then translated into a score between 1 and 5 using a linear approach: the more points achieved, the higher the score. In addition, the methodology further defines two thresholds:

- **Max score threshold:** This represents the number of points needed to receive a score of 5. In most instances, a score of 5 is only assigned if the maximum number of achievable points is obtained. In some instances, however, the methodology assigns a score of 5 even if fewer points are achieved to acknowledge that obtaining fewer than the maximum achievable points likely still reflects a very high quality.
- **Min score threshold:** Any sum of points that is equal to or lower than this threshold will result in a score of 1. In many instances, the threshold is set at about 50% of the maximum number of achievable points.

Between these two thresholds, the methodology uses a linear correlation to assign the respective score through the following general formula:

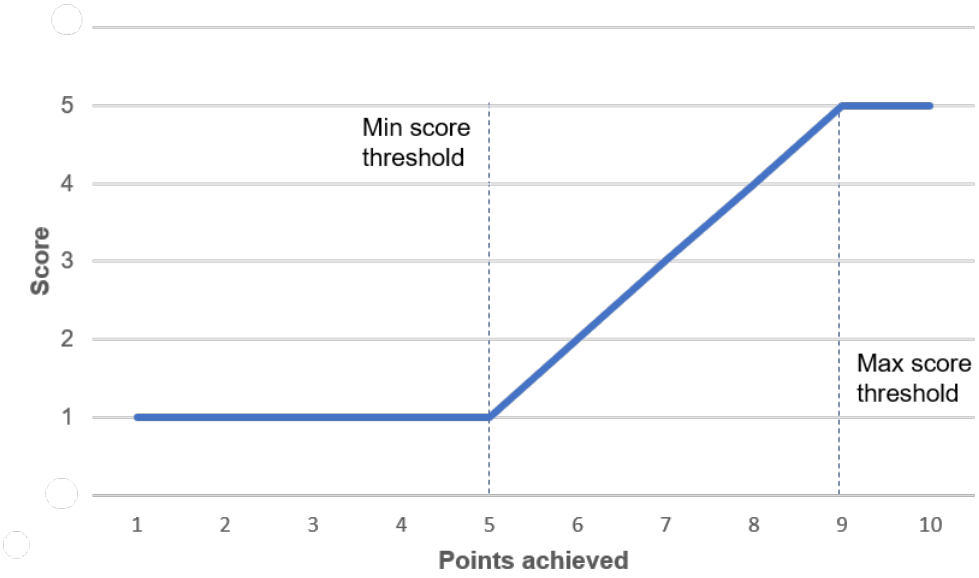
$$\text{Score} = 1 + \frac{(\text{Points achieved} - \text{Min score threshold})}{(\text{Max score threshold} - \text{Min score threshold})} \cdot 4$$

Table 3 and Figure 2 illustrate an example of this approach in which a point system with a maximum number of achievable points of 10 is assumed to evaluate a carbon crediting program. If the carbon crediting program receives 9 or more points, the criterion is assigned a score of 5. For points between 6 and 8, a proportional score between 2 and 4 is assigned. If the carbon crediting program receives 5 or fewer points, the score is 1.

Table 3 Example application of the point system

Points achieved	Thresholds	Score
10		5
9	Max score threshold	5
8		4
7		3
6		2
5	Min score threshold	1
4		1
3		1
2		1
1		1

Figure 2 Illustration of the point system



Source: Own representation

Inverse weighing

A key challenge in weighing different quality features of carbon credits is that an overall high quality is only ensured if a carbon credit scores high in *all* criteria. In many instances, a low score in one single criterion may already undermine quality. For example, if a carbon credit receives a low score on additionality it should not be considered high quality, even if it scores highly on how emission reductions or removals are quantified.

To address this challenge, the methodology draws on the approach of “inverse weighing” proposed by Trexler (2019). Inverse weighing means that as the score of a criterion increases, the overall weighing of the criterion decreases. This ensures that a low score in one criterion cannot be easily overcome by high scores in other criteria. At the same time, a high score in one criterion cannot by itself guarantee high quality.

The methodology implements inverse weighing by evaluating for each criterion the distance from the maximum score of 5. The further a score deviates from 5, the more this influences the combined scoring result. The distance of the achieved score from the maximum possible score of 5 is weighed over-proportionally by using a power function with an exponent p, with the effect that the greater the deviation of the sub-criterion score from the maximum score of 5, the worse the overall score for the criterion. The exponent p is uniformly set at 1.3 for the entire evaluation in order to apply an exponential weighing that creates an influential effect on the score but at the same time does not overly weigh a poor score in one of several sub-criteria. The general formula used for inverse weighing is as follows:

$$C_x = \mathrm{MAX}\left\{6 - \left[w_1 \cdot (6 - SC_1)^p + w_2 \cdot (6 - SC_2)^p + \ldots + w_n \cdot (6 - SC_n)^p\right]^{\frac{1}{p}}\right\}$$

Where:

C_x	=	Score for criterion x
$SC_1, SC_2, \ldots, SC_n$	=	Scores for sub-criteria 1,2,…,n
$w_1, w_2, \ldots, w_n$	=	Weighing of the sub-criteria, with $w_1 + w_2 + \ldots + w_n = 100\%$
p	=	Exponent

The MAX function sets the lowest possible score that can be achieved at 1.

The approach is illustrated in Table 4 for two sub-criteria, 1 and 2, where sub-criterion 1 is weighed with 60% and sub-criterion 2 with 40%. If a carbon credit scores 5 in both sub-criteria, it will receive an overall score of 5 for the criterion. The lower the score is in one of the sub-criteria, the more this influences the overall scoring. For example, if sub-criterion 1 is assigned a score of 3, the combined score varies between 1 and 3.10, depending on the score for sub-criterion 2. This ensures that sub-criterion 1, must be adequately addressed in order to obtain a high overall score.

Table 4 Example application of inverse weighing

		Score for sub-criterion 1				
		1	**2**	**3**	**4**	**5**
Score for sub-criterion 2	**1**	1	1	1	1.28	2.16
	2	1	1	1.07	2.10	2.97
	3	1	1	1.83	2.85	3.73
	4	1	1.38	2.51	3.54	4.42
	5	1	1.96	3.10	4.12	5.00

How the methodology should be used

The methodology presented in this document should be used by carbon market experts. The application of the methodology should be based on the study of available evidence, which may include publicly available project or carbon crediting program documents, respected independent sources, or interviews with relevant stakeholders. Adherence to the requirements in the methodology may be subject to interpretation.

This methodology is mainly intended to be used at the project type level but several criteria can also be applied to individual projects. Where the methodology is applied at the project type level, the quantitative results generated using the methodology should be considered only as partial guidance

for individual projects. In this case, buyers are encouraged to conduct additional due diligence or have third-party experts do so on their behalf to assess the specific circumstances of the project.

The methodology focuses on the use of carbon credits for offsetting—the compensation of an entity's emissions with other climate mitigation outcomes. Carbon credits may, however, also be purchased and claimed towards other uses. For example, a company may decide to purchase carbon credits from a project to primarily support poverty reduction efforts and not use them for offsetting. Some of the assessment criteria in this methodology are indeed pertinent for credit buyers pursuing other environmental or social attributes, but such uses are not the primary target of this methodology.

Example applications

A number of criteria in the methodology include example applications in which the methodology is applied to existing examples in the carbon market. The examples in the methodology are for demonstration only and only represent the state of the assessment subject at the time of evaluation.

3 The methodology

Quality objective 1: Robust determination of the GHG emission impact of the mitigation activity

The methodology assesses the degree to which the GHG emissions impact of a project is robustly determined, i.e., whether a project reduces emissions or maintains or enhances removals by at least one tonne of CO_2 equivalent for each carbon credit issued. To assess this, the methodology uses the following criteria:

1.1 Additionality
1.2 Vulnerability (applies to specific market circumstance only)
1.3 Robust quantification of emission reductions and removals

The subsequent sections describe the methodology for each of the three above criteria.

Criterion 1.1: Additionality

Additionality is essential for the quality of carbon credits. Many researchers have highlighted the central role of additionality for the concept of carbon credits and as an essential criterion for determining their quality (see e.g., Gillenwater (2012) for a seminal discussion on the concept of additionality and Trexler (2019) and Broekhoff et al. (2019) for additionality in the context of credit quality).

Emission reductions or removals from a mitigation activity are additional if the mitigation activity would not have taken place in the absence of the added incentive created by carbon credits. In other words, the ability to sell carbon credits must play a decisive role in the decision to implement the mitigation activity.

If a mitigation activity is not additional, purchasing carbon credits from such an activity does not trigger any further emission reductions or removals, and would thus not offset one's own emissions. For the purpose of offsetting one's own emissions, it is important that, for any amount of GHG emissions added to the atmosphere, someone else mitigates the same amount through an activity that they implemented due to the added incentive created by carbon credits.

In practice, assessing whether a mitigation activity is additional can be difficult (Broekhoff et al. 2019; Cames et al. 2017; Schneider 2009; Gillenwater 2012; Michaelowa et al. 2019a) because mitigation activities are implemented for different reasons, either because they are required by laws or regulations or there is a business case. Assessing additionality requires distinguishing which mitigation activities are implemented due to the incentives created by the carbon credits and which ones are due to other incentives. It requires comparing the mitigation activity to a scenario without the incentives created by the carbon credits. This scenario is not known and must be determined using informed predictions of several parameters (e.g., such as the development of electricity prices). For this reason, assessment of additionality faces information asymmetries between project owner and carbon crediting programs because only the project owner knows whether the incentives of carbon credits were indeed decisive for going ahead with activity (Broekhoff et al. 2019; Gillenwater 2012; Schneider 2009). Because of these uncertainties the methodology only can provide an assessment of the *likelihood* of the additionality of a mitigation activity.

To assess the likelihood of additionality, the methodology uses the following sub-criteria:

1.1.1 Eligibility of activities that are triggered by legal requirements
1.1.2 Consideration of carbon credits before project implementation and restrictions on the eligibility of existing projects
1.1.3 Financial attractiveness
1.1.4 Barriers

Sub-criterion 1.1.1: Eligibility of mitigation activities that are triggered by legal requirements

Rationale for using this sub-criterion

Mitigation activities are very unlikely to be additional if their implementation is required by a law, regulation or other legally binding mandate. This sub-criterion therefore assesses whether a mitigation activity is legally required.

For this sub-criterion, a mitigation activity is considered legally required when there are laws, statutes, regulations, court orders, decrees, executive orders, permitting conditions or any other legally binding mandates in place that require its implementation. A Nationally Determined Contribution (NDC) under the Paris Agreement is not considered a legally binding mandate under this definition. The methodology addresses the role of NDCs for assessing the quality of carbon credits in detail in quality objective 7.

The regulatory environment in which the mitigation activity takes place may be subject to changes over time. This can lead to a situation in which a mitigation activity that may have originally been implemented due to the incentives from carbon credits would be implemented later on to fulfill newly adopted legal requirements that are applicable to existing plants. For example, a new regulation for collecting gases from landfills could enter into force after the owner initially installed such systems with the support of the proceeds from carbon credits. In that case, the landfill owner might, without proceeds from carbon credits, install the treatment system when the regulation enters into force. Any emission reductions or removals that the system generates after the new legal requirement enters into force would then no longer qualify as additional.

These considerations hold if applicable legal requirements are enforced. The enforcement may vary considerably, however, across countries and even within a country. If they are not enforced, a legally required mitigation activity might still be additional. The level of law enforcement in a country is however hard to measure and an objective assessment remains vulnerable to errors due to information asymmetry between project owners and those that have to verify this information.

Researchers have raised concerns that excluding legally required mitigation activities could create perverse incentives for countries not to adopt such requirements, as enacting stricter environmental regulation would come at the cost of losing revenue streams from the proceeds of carbon credits. On the other hand, if carbon crediting programs would credit activities that are legally required, there is a risk that many non-additional activities would qualify. This dilemma is indeed considered an inherent shortcoming of crediting approaches (Bosi und Ellis 2005; Schneider et al. 2014; Spalding-Fecher 2013; Winkler 2004). In practice, there is no clear evidence that the perverse incentives for countries would be significant, whereas, on the other hand, the risk of non-additional projects would be high if projects that are required by legally binding mandates could generally be credited.

Level at which the sub-criterion is assessed

This sub-criterion is assessed at the level of the carbon crediting program or, where the program uses different provisions for different quantification methodologies, at the level of the quantification methodology.

Scoring approach

While most carbon crediting programs include provisions regarding legal requirements, the approaches and stringency of these provisions differ. Some programs grant eligibility to mitigation activities that are implemented to comply with a legally binding mandate in cases where host country authorities systematically do not enforce this requirement. Other programs deem such activities ineligible or do not explicitly address this situation. Some programs apply all of these approaches, differentiating between different quantification methodologies.

Differences also exist in the extent to which programs have provisions in place for situations in which new regulations that mandate a mitigation activity enter into force at a point in time when the project is already operational. While some programs specify that they will cease issuing carbon credits, others do not explicitly address this situation.

The methodology evaluates separately how a program's provisions treat the eligibility of projects that are required by *existing* or *future* legally binding mandates.

Indicator 1.1.1.1: Consideration of existing legal requirements

The registration of non-additional mitigation activities can be best avoided if the program's provisions exclude eligibility of legally required mitigation activities, regardless of whether the requirement is enforced. Programs or quantification methodologies with such provisions are scored at 5.

Allowing for exemptions in situations in which legally binding mandates are systematically not enforced and non-compliance is widespread in the country is more vulnerable to errors, as some activities might still be implemented in order to comply with the legally binding mandate. Moreover, such exemptions might create perverse incentives for countries not to enforce legally binding mandates in order not to lose carbon credit revenues. The methodology assigns a score of 3 to programs or quantification methodologies with such exemptions.

If a program's provisions do not address the question of how to treat mitigation activities that are legally required or if a program allows mitigation activities to be registered that are required by an existing and enforced legally binding mandate, there is a significant risk for registering non-additional projects. These programs are considered not to meet minimum requirements and are assigned a score of FAIL.

Table 5 Scoring approach for existing legal requirements

Carbon crediting program requirement	Score
The program or methodology provisions exclude from eligibility mitigation activities that are required by an existing legally binding mandate, regardless of whether the mandate is enforced or not.	5
The program or methodology provisions exclude mitigation activities from eligibility that are required by an existing legally binding mandate but allows for exemptions from this provision where mandates are systematically not enforced and non-compliance is widespread in the country.	3
The program or methodology provisions do not specifically address this matter, or the program allows mitigation activities to be registered that are required by an existing and enforced legally binding mandate.	FAIL

Example application 1: Verified Carbon Standard (Verra)

Verra addresses the question of existing legal requirements in the *VCS Methodology Requirements, Version 4.0,* which define the high-level specifications and procedural steps that all methodologies need to include for assessing the additionality of a mitigation activity. The requirements prescribe a mandatory step of assessing the "regulatory surplus" of an activity which is defined as follows:

> *The project shall not be mandated by any law, statute or other regulatory framework, or for UNFCCC non-Annex I countries, any systematically enforced law, statute or other regulatory framework. (See VCS Methodology Requirements v4.0, page 32)*

The VCS provisions differentiate between Annex I and non-Annex I countries. For Annex I countries, Verra requires that the project is not mandated by any law statute or other regulatory framework, without exceptions. This corresponds to a score of 5 in our methodology.

For UNFCCC non-Annex I countries, these provisions only hold if the laws, statutes or regulatory framework are systematically enforced. This corresponds to a score of 3 in our methodology.

Example application 2: Clean Development Mechanism (CDM)

In the CDM, the determination of additionality is either specified by individual methodologies or by tools, in particular the "Tool for the demonstration and assessment of additionality" (TOOL01, also referred to as "additionality tool") and the "Combined tool to identify the baseline scenario and demonstrate additionality" (TOOL02, also referred as "combined tool"). For some methodologies (e.g., industrial gas projects), a project is explicitly not considered additional—and thus, not eligible—if the activity is required by relevant laws and regulations, regardless of whether these are enforced. For these methodologies, the CDM's provisions are thus scored as 5. Some methodological standards (e.g., combined tool and additionality tool) include provisions that projects may be considered additional if, based on an examination of current practice in the country or region in which the mandatory law or regulation applies, the applicable mandatory legal or regulatory requirements are "systematically not enforced and that non-compliance with those requirements is widespread" in the country. For these methodologies, the CDM's provisions are thus assigned a score of 3.

Example application 3: Climate Action Reserve

The *Reserve Offset Program Manual* (in its version released on October 23, 2020) requires the incorporation of a legal requirement test in all of its protocols. Each project must pass this standardized additionality test. The *Reserve Offset Program Manual* defines that:

> *A project passes the legal requirement test when there are no laws, statutes, regulations, court orders, environmental mitigation agreements, permitting conditions or any other legally binding mandates requiring its implementation or similar measures that would achieve equivalent levels of GHG emission reductions.*

In CARs protocols, the specific provisions of the legal requirement test may differ depending on the project type, but CAR further stipulates that no project type will be eligible under the *Reserve*'s program if the project is required by law. The *Reserve*'s provisions qualify for a score of 5 as they do not include exemptions in cases in which legal mandates are not systematically enforced.

Indicator 1.1.1.2: Consideration of changes in legal requirements

If a program ceases issuing carbon credits once new legally binding mandates require a mitigation activity to be implemented, this provides an additional safety valve for excluding mitigation activities that are not additional. The methodology assigns these programs a score of 5. Some programs do not require checking for new legal requirements at each issuance of carbon credits, but only at each renewal of a crediting period, allowing projects to continue to issue carbon credits during the currently applicable crediting period. This is scored as 3. If program provisions do not address this matter or continues issuing carbon credits, the methodology assigns a score of 1.

Table 6 Scoring approach for future legal requirements

Program requirements if legal requirements enter into force which require the mitigation activity to be implemented	Score
The program ceases issuance of credits when the new legal requirements enter into force regardless of whether they are systematically enforced or not.	5
The program ceases issuance of credits when the new legal requirements are systematically enforced.	3
The program allows continued issuance of carbon credits until the end of the current crediting period.	3
The program does not specifically address this matter or allows projects to continue to issue carbon credits for the remainder of the project lifetime.	1

Example Application 1: Verified Carbon Standard (Verra)

Verra addresses the question of future legally binding mandates in the *VCS Standard v4.0*, which requires that projects re-assess the activity's legal status during crediting period renewal:

> *The following shall apply with respect to the renewal of the project crediting period under the VCS Program: 1) A full reassessment of additionality is not required when renewing the project crediting period. However, regulatory surplus shall be demonstrated in accordance with the requirements set out in the VCS Program rules and the project description shall be updated accordingly. (See VCS Standard v4.0, page 28)*

This corresponds to a score of 3 for projects implemented in both Annex I and non-Annex I countries.

Example Application 2: Climate Action Reserve (CAR)

The *Reserve Offset Program Manual* specifies that, as a general rule:

> *All project monitoring plans must include procedures that the project owner will follow to periodically ascertain and demonstrate that the project passes the legal requirement test.*
>
> *Notwithstanding any pre-defined crediting period, projects that become required by law will not be eligible to receive CRTs for the reductions they generate, unless otherwise specified in the protocol. Thus, in most cases, if a project becomes subject to a regulation, ordinance or permitting condition that effectively requires its implementation, the project can no longer be considered additional and its crediting period will be terminated. The crediting period will likewise be terminated if the emission sources affected by a project are included under an emissions cap (e.g., under a state or federal cap-and-trade program) or GHG emissions from the project/project site are directly regulated by a local, state or federal agency. As specified in each protocol, emission reductions may be reported to the Reserve until the date that a regulation or emissions cap takes place.*

In a concrete example, the Mexico Landfill Project Protocol Version 1.1 puts this general rule in practice using the following provision:

> *If an eligible project has begun operation at a landfill that later becomes subject to a regulation, ordinance or permitting condition that would call for the installation of a landfill gas control system, emission reductions can be reported to the Reserve up until the date that the landfill gas control system is legally required to be operational. The Legal Requirement Test must be applied at each verification. (Section 3.4.2.1)*
>
> *The Reserve will issue CRTs for GHG reductions quantified and verified using this protocol for a period of ten years following the project start date. However, the Reserve will cease to issue CRTs for GHG reductions if at any point in the future landfill gas destruction becomes legally required at the landfill. (section 3.3 Project Crediting Period)*

The provisions meet the requirements outlined above for a score of 5.

Determination of the score for sub-criterion 1.1.1

To determine the overall score for sub-criterion 1.1.1, the two indicators are weighed differently. The formula for calculating the score is the following:

$$SC_{1.1.1} = 0.7 \cdot I_{1.1.1.1} + 0.3 \cdot I_{1.1.1.2}$$

Where:

$SC_{1.1.1}$	=	Score for sub-criterion 1.1.1
$I_{1.1.1.1}$	=	Score for indicator 1.1.1.1
$I_{1.1.1.2}$	=	Score for indicator 1.1.1.2

The rationale for this weighing is that existing legal requirements are considered to have a greater importance for the likelihood of additionality than changes in legal requirements in the future.

Sub-criterion 1.1.2: Consideration of carbon credits before project implementation and restrictions on the eligibility of existing projects

Rationale for using this sub-criterion

The likelihood that a mitigation activity is additional is higher if the project owners considered the possibility of receiving carbon credits when they made the decision to proceed with implementing the project. If project owners publicly document their intent to register a project before their decision to proceed with its implementation, it is evident that they have considered the possibility of receiving carbon credits. If a project has already been implemented or is under implementation at the time of submission for registration, this is less clear.

Furthermore, if revenues from carbon credits are decisive for the investment decision of a project, project owners will have an interest to engage as soon as possible with the carbon crediting program to start the process of validation and registration so as to avoid any financial risks to the activity that might result from delays or rejection of the project.

If a mitigation activity operates for a longer time period without revenues from carbon credits and the project owners only, after several years, decide to pursue validation or registration with a carbon crediting program, the likelihood is higher that this activity would also have occurred without the incentives from carbon credits.

Level at which the sub-criterion is assessed

This sub-criterion will be assessed on the level of the carbon crediting program.

Scoring approach

The methodology uses two indicators to assess the quality of carbon credits under this sub-criterion. These are presented in the following section. The first indicator will determine the base score for this sub-criterion. Carbon crediting programs that meet the requirements of the second indicator will receive an upgrade by one score point to the score that they received under indicator 1 (with 5 remaining the highest score that can be achieved under this sub-criterion). This reflects that indicator 1 is deemed to be more relevant for the likelihood of additionality compared to indicator 2.

Indicator 1.1.2.1: Requirements for public documentation of the intent of using carbon credits before project implementation

Without any provisions that specify when project owners must publicly document their intent to register a project, the additionality of a mitigation activity becomes less likely. In the absence of deadlines, it may become difficult to ascertain whether project owners have already implemented a project and now seek registration with a carbon crediting program.

This indicator assesses at which point in time a carbon crediting program requires project owners to publicly document their intent to register a project in order to be eligible for registration. This includes whether the intent must be documented before or after the investment decision and for how many months after the investment decision the intent needs to be documented. *Investment decision* here means the date on which the project owner committed to expenditures related to the implementation of the project. This can, for example, be the date when contracts for the purchase or installation of the equipment required for the project have been signed. The likelihood of additionality is highest if the intent to register a project must be publicly documented before the investment decision is made. Programs that have such provisions in place receive higher scores for this sub-criterion. Lower scores are given the more that time can lapse after the investment decision.

The public documentation of the intent to register a project can take different forms, such as a written notification to the carbon crediting program that states the project owner's intent, a public documentation that a stakeholder consultation meeting for the project was arranged with documented evidence of the intent to register the project, or a publicly documented initiation of validation. Non-public documents, such as internal meeting minutes, do not qualify as suitable evidence under the methodology.

The way that carbon crediting programs require project owners to publicly document their intent of registering a project is not part of the scoring approach, recognizing that different types of public documentation may achieve this purpose. What is assessed under this sub-criterion is the time that can lapse after the investment decision before any form of public documentation of the intent of using carbon credits must be made.

Table 7 Scoring approach for requirements for public documentation of the intent of registering a project

The program requires public documentation of intent of registering a project	Score
Before the investment decision is made	5
Within six months after the investment decision is made	2
Within a time period of more than six months after the investment decision is made	1
No such requirement	1

Example application 1: CDM

The CDM applies a time limit between the investment decision and the notification of intent defined as follows:

> *[…] The project participants shall notify the designated national authority (DNA) of the host Party of the project activity, if the DNA exists, and the secretariat in writing of the commencement of the project activity and their intention to seek the CDM status for the project activity, or, through a DOE, publish the PDD for global stakeholder consultation […], within 180 days of the start date of the project activity as defined in the "CDM project standard for project activities", by using the "CDM project activity prior consideration form" (CDM-PC-FORM) or the relevant PDD form, respectively.*

The CDM grants a grace period of 180 days (i.e., six months) for project owners to submit a letter of notification to the UNFCCC Secretariat and host country designated national authority. This corresponds to a score of 2.

Example application 2: Gold Standard

The Gold Standard requires that project owners conduct a stakeholder consultation prior to the start date of the project. The project start date is defined as the date on which the project owner committed to expenditures related to the implementation of the project (i.e., the investment decision). The project owner must inform all relevant (local, affected and interested) stakeholders, including relevant local and national authorities, the Gold Standard Secretariat and all Gold Standard NGO Supporters active in the host country of the project. Although the Gold Standard does not require evidence of a prior consideration for regular projects, the mandatory stakeholder consultations before the investment decision, which include the requirement to inform the Gold Standard Secretariat, can be seen as a public documentation of the intent to register the project. This rule therefore corresponds to a score of 5.

Example application 3: Climate Action Reserve

The Climate Action Reserve Offset Program Manual does not include any provisions that require a public documentation of the intent to register a project in relation to the investment decision. This corresponds to a score of 1.

Indicator 1.1.2.2: Restrictions on the eligibility of existing projects

The methodology assesses whether carbon crediting programs place a limit on the time that can lapse after a mitigation activity starts reducing or removing emissions for a project to be eligible under the program.

Placing a limit on the amount of time that can lapse ensures that no projects are accepted that have operated successfully without carbon credits for several years and are thus less likely to be additional.

The time restrictions that carbon crediting programs apply vary widely with regard to the reference points used for measuring the time allowed to lapse for projects to be eligible for registration. Moreover, some programs provide exceptions for specific activities. This is why this indicator only uses a binary assessment of whether or not the program has any restriction in place. The example applications below illustrate the variety of provisions that programs apply.

Table 8 Scoring approach for eligibility of existing projects

The program has time restrictions until when validation or registration needs to be completed for projects that already started the mitigation activity	Upgrade to score received under indicator 1
Yes	+1 score point
No	No change

Example application 1: Verified Carbon Standard (Verra)

For **projects that do not apply standardized methods for determining additionality**, the VCS applies a time limit between the project start date (defined by Verra as the date when the activity starts to reduce or remove emissions) and the date of project validation as follows:

> *Non-AFOLU projects shall complete validation within two years of the project start date. Additional time is granted for non-AFOLU projects to complete validation where they are applying a new VCS methodology. Specifically, projects using a new VCS methodology and completing validation within two years of the approval of the methodology by Verra may complete validation within four years of the project start date.*
>
> *AFOLU projects shall complete validation within five years of the project start date.*

For **projects that do apply a standardized method for determining additionality** the above provisions do not apply. These projects instead must initiate the “project pipeline listing process” within the project validation timelines set out above. Validation may be completed any time thereafter. To initiate the pipeline listing process, project owners must submit the project documents to Verra Secretariat which will review the documents and creates a project record on the project registry and lists the project status as either under development or under validation.

Verra's provisions for projects that do not apply standardized methods for determining additionality receive an upgrade of one score point to the score of 1 received under indicator 1.1.2.1, resulting in a combined score of 2 for this sub-criterion.

Verra's provisions for projects that do apply standardized methods for determining additionality do not receive an upgrade under indicator 1.1.2.2, which leads to a combined score of 1, as there is no time restriction for completing the validation. Although projects must initiate the pipeline listing process within two years of the project start date, this does not put a firm time restriction on eligibility of existing projects as validation may be completed any time thereafter. With this provision, a project can operate for two years before it must initiate the pipeline listing process. Once project owners have listed the project, there is no restriction for completing validation.

Example application 2: Climate Action Reserve

The Climate Action Reserve Program Manual specifies that "the timing of project registration may be independent of its start date" (defined by CAR as the as the start of the activity that generates GHG reductions or the "start of operations") and projects "may be submitted after they begin operation […] or before they begin operation" For projects that are submitted after they begin operation, CAR uses a time limit between the project start date and a step called *project listing* (in accordance with the CAR provisions a project receives the status "listed" after the following has been met:

- The project owner has paid the project submission fee;
- The project submittal forms are complete;
- The project is eligible according to the eligibility criteria set forth within the appropriate protocol).

The CAR defines the time limit for listing as follows:

> *For qualifying projects that have not previously been listed or registered on a greenhouse gas registry or program:*
>
> *a) For a period of 12 months following the adoption by the Reserve Board of any new protocol, the Reserve will accept projects for listing with start dates (as defined in the protocol) that are no more than 24 months earlier than the date of the Reserve protocol's adoption. These are considered pre-existing projects.*
>
> *b) After the 12-month period following the date of the Reserve protocol's adoption, the Reserve will accept projects for listing with start dates (as defined in the protocol) that are no more than six months prior to the date on which they are submitted. A project submitted within six months of its start date is considered a "new" project.*

Unlike some other carbon crediting programs, CAR does not require validation because, it argues, the eligibility criteria are mostly standardized and require minimal interpretative judgement by verification bodies. The first time a project is verified, verification bodies are required to affirm the project's eligibility according to the provisions defined in the relevant protocol.

Projects under the CAR must complete verification within 12 months of the end of their initial reporting period. The verification deadline is satisfied when project owners submit a completed verification report and signed verification statement. The length of the initial reporting period is defined separately for each methodology. For most methodologies the initial reporting period can cover between 1–2 years.

A project is considered “registered” when the project has been successfully verified by an approved third-party verification body, submitted by the project owner to the Reserve for final approval, and accepted by the Reserve.

A project that fails to meet its initial verification deadline can be re-submitted within 60 calendar days under the latest version of the applicable protocol. Projects that do so are not subject to the start date requirements described above, provided that the project met all applicable requirements at the time of initial submittal.

With these provisions, most projects must complete registration with CAR within 2–3 years after the start of operation. For example, for projects under the grassland methodology, a reporting period may not exceed 12 months in length except for the initial reporting period, which may cover up to 24 months. Furthermore, the initial verification period for a grassland project is limited to one reporting period. Depending on the length of the initial reporting period, a project would have to be verified after 2 years (12-month initial reporting period plus requirement to complete verification within 12 months of the end of the initial reporting period) or 3 years (24-month initial reporting period plus requirement to complete verification within 12 months of the end of the initial reporting period) after the start of operation. Some project types are granted more time as methodologies contain other provisions that extend the time limit for project registration.

The Climate Action Reserve's provisions therefore receive an upgrade of 1 score point to the score of 1 received under indicator 1.1.2.1, resulting in a combined score of 2 for this sub-criterion.

Score for sub-criterion 1.1.2

To determine the score for sub-criterion 1.1.2, indicator 1.1.2.1 (Requirements for public documentation of the intent of using carbon credits before project implementation) is first assessed using the aforementioned scoring approach. Secondly, indicator 1.1.2.2 is evaluated, (i.e., whether the program has time restrictions until when validation or registration needs to be completed for projects that are already in operation). If the answer to this question is “no,” then the score for indicator 1.1.2.1 is used as the overall score for sub-criterion 1.1.2. If the answer is "yes," the score for indicator 1.1.2.1 is raised by 1 to determine the overall score for sub-criterion 1.1.2. The approach is summarized in Table 9.

Table 9 Scoring approach for sub-criterion 1.1.2

		Score for indicator 1.1.2.1			
		1	2	3	5
Result for indicator 1.1.2.2	Yes	2	3	4	5
	No	1	2	3	5

Sub-criterion 1.1.3: Financial attractiveness

Rationale for using this sub-criterion

The purpose of carbon credits is to unlock mitigation activities that economic actors would normally not pursue in a given market and policy environment because they are not financially attractive without carbon market revenues or face other barriers that carbon credits could alleviate. The key characteristic of these projects is that their internal rate of return (IRR) is not sufficient to clear the benchmark/hurdle rate that applies for the project type in the country. The financial attractiveness of

projects, and whether revenues from carbon credits change the attractiveness, are therefore important indicators for the likelihood of additionality.

Level at which the sub-criterion is assessed

This sub-criterion may be assessed at the level of each individual project or at the level of the project type.

Previous analyses of the financial attractiveness of projects registered under carbon crediting programs suggest that financial feasibility without carbon revenues varies strongly between different types of mitigation activities (Cames et al. 2017; Schneider 2009; Sutter und Parreño 2007; Trexler 2019; Trexler et al. 2006). Assessments at the level of the project types can help inform buyers of carbon credits which project types generally have a higher or lower likelihood of being financially viable. This can help them to identify project types that require more due diligence than others. Assessments at the level of the project type have, however, the disadvantage that they do not consider the specific circumstances of individual projects.

Assessments at the level of the specific project can reflect these differences but are costlier and more cumbersome to implement and—if based on data provided by project owners—might be subject to bias, although third party validation might reduce this risk. While some studies (Greiner und Michaelowa 2003) have pointed to the relative robustness of the investment analysis compared to the barrier analysis, others highlighted its vulnerability to errors (Cames et al. 2017; Schneider 2009). The main challenges include the subjectivity of input assumptions, the information asymmetry between project owners and validators, and a lack of transparency to the assumptions used for undertaking different aspects of the analysis. For a more detailed discussion on these challenges see Cames et al. 2017; Gillenwater 2012; Schneider 2009).

Scoring approach

The likelihood that a mitigation activity is additional depends on three factors that are considered in the assessment of projects or project types:

1. **Financial attractiveness without carbon credit revenues:** Several studies suggest that the likelihood of additionality crucially depends on the financial attractiveness of the project without carbon credit revenues (Greiner und Michaelowa 2003; Cames et al. 2017; Schneider 2009; Sutter und Parreño 2007; Trexler 2019; Trexler et al. 2006). A project that is financially highly attractive may also be implemented without carbon credits (except where barriers prevent its implementation), while projects with a very poor financial performance without carbon credits may be unlikely to be implemented without further support. The most commonly applied indicator for assessing the financial attractiveness of a mitigation activity is its internal rate of return (IRR) in relation to a required benchmark. The higher an activity's IRR, the more desirable it is for an investor to undertake. If investors face a choice between investing in several different activities, they are likely to undertake the one with the highest IRR first. Therefore, mitigation activities with high IRRs have a lower likelihood of delivering additional emission reductions, whereas mitigation activities with negative or low IRRs have a higher likelihood of delivering additional emission reductions. For these reasons, the mitigation activity's IRR without carbon credit revenues in relation to the required benchmark IRR is used as the first indicator to assess financial attractiveness.

2. **Change in financial attractiveness due to carbon credit revenues:** If the proceeds from carbon credits have a strong influence in changing the financial attractiveness of an activity, it is more likely that the carbon market revenues are decisive in making the activity financially

viable. By contrast, for some activities carbon credit revenues have little influence on their financial viability. In these instances, it may be less likely that the revenues are decisive in making the activity financially viable.

For this reason, the change in the IRR due to the carbon credit revenues is considered a second indicator to assess financial attractiveness. The higher the change in an activity's IRR due to the revenues of carbon credits, the higher is the likelihood that this activity's emission reductions are additional.

3. **Financial attractiveness with carbon credit revenues:** To determine the likelihood of the additionality of a mitigation activity, not only the absolute change in financial attractiveness due to the carbon credits is decisive, but also whether the activity becomes financially viable with carbon credits. This depends on the extent to which the IRR with carbon credit revenues exceeds the required benchmark that applies in the host country or region for the project type.

   Therefore, a third indicator applies that assesses the ratio of the activity's IRR with carbon credit revenues to the required benchmark. This can be derived by calculating the sum of the IRR without carbon credits and the change in the IRR due to the carbon credit revenues, then dividing it by the required benchmark.

   The likelihood that the activity is additional is high for values that are clearly above one. Values that are clearly below one signal a low likelihood of additionality, while for values that are just below or above one, a degree of uncertainty remains, signalling a medium likelihood of additionality.

The IRR can be determined for the overall cash flow of a project (often referred to as "project IRR") or to the cash flow in equity (often referred to as "equity IRR"). In principle, either of the two can be applied, as long as the IRR and the required benchmark IRR are determined consistently. Here, the equity IRR is used.

Which level of benchmark IRR is necessary for investors to proceed with a project depends on the individual risk of the project and the project owner's access to capital. Usually, the project risk varies strongly between sectors and countries and their investment environments. The methodology therefore uses an expected return on equity (ROE) that applies to the sector and host country of the project. Data on the expected return on equity for different countries and project types is available in the CDM methodological tool for investment analysis.[1] The tool differentiates between different project categories to reflect the risk of projects in different sectors, providing country-level data for three different groups of project categories (see Table 10).

To appropriately reflect differences between countries and sectors, the methodology evaluates all three indicators introduced above in relation to the expected ROE that applies in the sector and host country. This addresses differences in the capital markets of host countries. In a country with well-developed capital markets, a relatively small change in the IRR due to the revenues from carbon credits might be enough to clear the benchmark for the required ROE, whereas in countries with less developed capital markets this might not be the case.

[1] CDM TOOL27 Methodological tool: Investment analysis—Version 08.0 https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-27-v8.pdf

Table 10 Project categories in the CDM methodological tool for investment analysis (CDM TOOL 27)

Group	Categories
1	Energy industries; Energy distribution; Energy demand; Waste handling and disposal
2	Manufacturing industries; Chemical industries; Construction; Transport; Mining/mineral production; Metal production; Fugitive emissions from fuels; Fugitive emissions from production and consumption of halocarbon and sulphur hexafluoride; Solvent use; Carbon capture and storage of CO_2 in geological formations
3	Afforestation and reforestation; Agriculture

The following steps should be applied to yield the score:

Step 1: Decide whether to apply the methodology to an individual project or at the level of a project type. If the methodology is applied at the level of a project type, clearly define the project type and the geographical scope for the assessment (e.g., global, region, country). Project types may be further differentiated into sub-categories considering the project size (e.g., classes of wind turbine sizes), the type of project technology (e.g., on-shore or off-shore wind power), or other project features.

Step 2: Collect the relevant data. Where the methodology is applied to an individual project, data provided by the project may be used, as long as this data can be reasonably verified. Where the methodology is applied at the level of the project type, different data sources could be used, including literature information or a sample of individual projects for which the necessary data is available. To the extent possible, the sample should represent different investment conditions and locations within the geographical scope.

Step 3: Define the carbon credit price used to calculate the change in financial attractiveness due to carbon credit revenues. The methodology recommends using the current prices of the relevant markets for which the project is developed. Assumptions made by the project owners on expected carbon prices may be used if they are plausible. In the absence of further information, the methodology recommends using a consistent proxy for all projects.

Step 4: Identify for each project the respective value for:

a. The equity IRR without carbon credit revenues (IRR);

b. The change in equity IRR due to carbon credit revenues (ΔIRR); and

c. The equity IRR with carbon credit revenues, calculated as the sum of equity IRR without carbon credit revenues and the change in equity IRR due to carbon credit revenues (IRR+ΔIRR).

Step 5: Identify for each project to which group in Table 10 above the project belongs.

Step 6: Retrieve for each project the country-level expected return on equity (ROE) in the CDM methodological tool for investment analysis for the respective group identified in step 5 (The respective table can be found on page 12 of version 08.00 of CDM TOOL 27).

Step 7: Determine for each project the three indicators by putting the IRR, the ΔIRR, and the sum of IRR and ΔIRR in relation to the expected return on equity (ROE).

$$V_{1.1.3.1} = \frac{\text{IRR}}{\text{ROE}}$$

$$V_{1.1.3.2} = \frac{\Delta IRR}{ROE}$$

$$V_{1.1.3.3} = \frac{(IRR + \Delta IRR)}{ROE}$$

Where:

$V_{1.1.3.1}$ = Value of indicator 1.1.3.1
$V_{1.1.3.2}$ = Value of indicator 1.1.3.2
$V_{1.1.3.3}$ = Value of indicator 1.1.3.3

Step 8: If the methodology is applied to a project type, calculate the average values for Indicator 1.1.3.1, Indicator 1.1.3.2 and Indicator 1.1.3.3 for the sample of projects.

Step 9: Determine the score for indicator 1.1.3.1 by using the following formula:

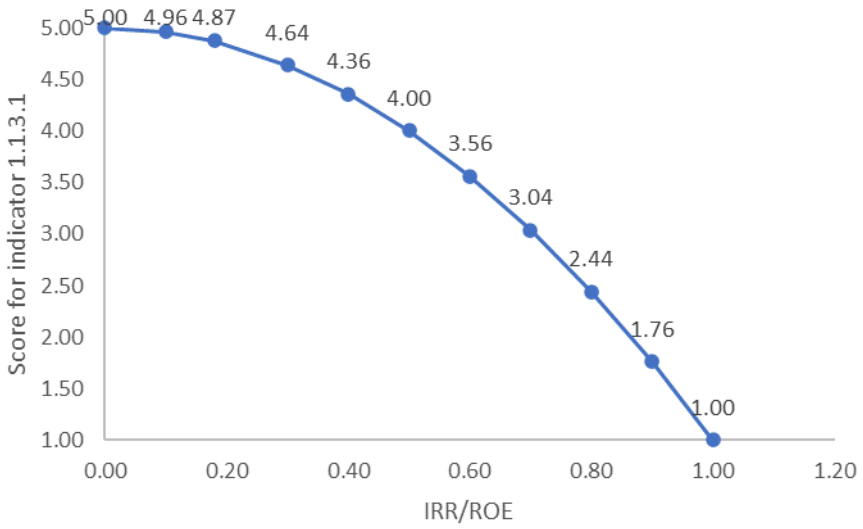
$$I_{1.1.3.1} = MAX\left\{6 - \left(1 + 4 \cdot V_{1.1.3.1}^{\frac{1}{2.5}}\right)\right\}$$

Where:

$I_{1.1.3.1}$ = Score for indicator 1.1.3.1
$V_{1.1.3.1}$ = Value of indicator 1.1.3.1

The methodology uses an exponential function to assign indicator 1.1.3.1 a score between 1 and 5. The closer the IRR of a mitigation activity is to the required ROE (i.e., the closer the value of IRR/ROE is to 1), the more sharply the score decreases (Figure 3). This scoring approach aims to reflect that the likelihood of additionality is more similar among mitigation activities with relatively low IRR values (e.g., activities with a value of 0.1 or 0.2 score relatively similar), whereas the distance to the ROE matters more for mitigation activities with higher IRRs (e.g., the likelihood of additionality may differ more strongly between a mitigation activity with a value of 0.9 and one with a value of 0.8).

Figure 3 Illustration of scoring approach for indicator 1.1.3.1



Step 10: Determine the score for indicator 1.1.3.2 by using the following formula:

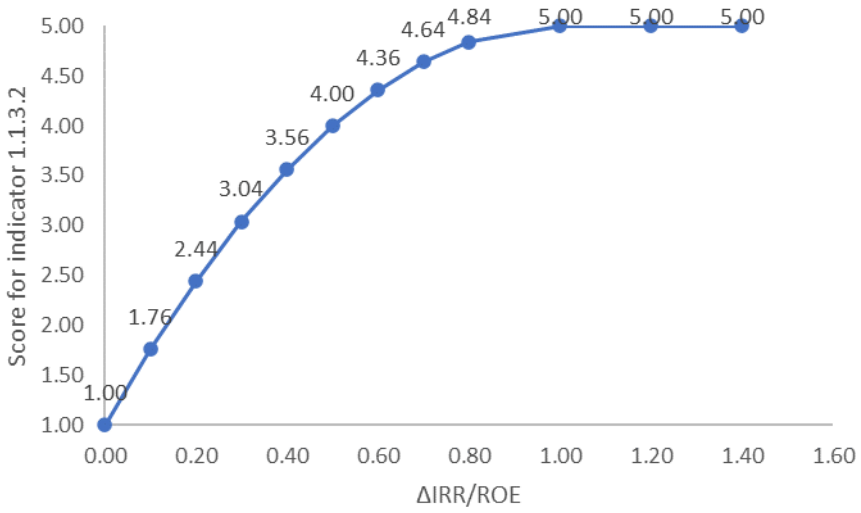
$$I_{1.1.3.2} = \text{MAX}\left\{6 - \left(1 + 4 \cdot \left(1 - V_{1.1.3.2}\right)^{2.5}\right)^{\frac{1}{}}\right\}$$

Where:

$I_{1.1.3.2}$ = Score for indicator 1.1.3.2
$V_{1.1.3.2}$ = Value of indicator 1.1.3.2

Similar to indicator 1.1.3.1, an exponential function is also used for the scoring of indicator 1.1.3.2. As Figure 4 shows, in this case the score decreases exponentially with lower values for indicator 1.1.3.2, as low values indicate a low impact on the financial attractiveness of a mitigation activity.

Figure 4 Illustration of scoring approach for indicator 1.1.3.2



Step 11: Determine the score for indicator 1.1.3.3 by using the following formula:

$$I_{1.1.3.3} = \left[\frac{4}{\left(1 + e^{-1.9 \cdot 4 \cdot V_{1.1.3.3} + 6} \cdot \left(\frac{4}{1} - 1\right)\right)} + 1\right]$$

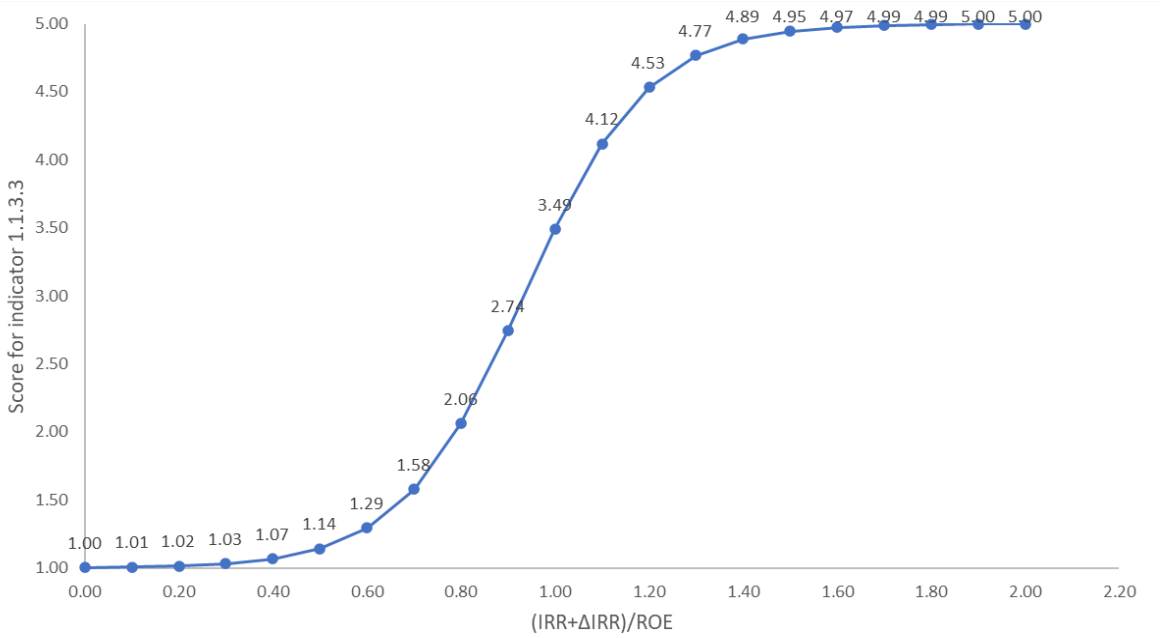
Where:

$I_{1.1.3.3}$ = Score for indicator 1.1.3.3
$V_{1.1.3.3}$ = Value of indicator 1.1.3.3

To determine the score for indicator 1.1.3.3, the methodology uses the formula for logistic growth, the so-called *S function* (Figure 5). The figure shows that the score for indicator 1.1.3.3 initially increases exponentially with increasing values for indicator 1.1.3.3. Around the value of one, which represents the point where IRRs with carbon credit revenues clear the benchmark, and which is the inflection point of the curve, the growth is highest. As for all values above one, IRRs with carbon credits exceed the benchmark, the score continues to increase and approaches the maximum value of 5. Once the benchmark has been

cleared by a sufficient margin, the degree of the curve's slope decreases and the amount by which the rate was cleared becomes less relevant to determining the likelihood of a mitigation activity's additionality.

Figure 5 Illustration of scoring approach for indicator 1.1.3.3



Step 12: Determine the overall score for sub-criterion 1.1.3 (financial attractiveness) by using the following formula:

$$SC_{1.1.3} = MAX\left\{\begin{matrix} 1 \\ 6 - (0.4 \cdot (6 - I_{1.1.3.1})^{1.3} + 0.4 \cdot (6 - I_{1.1.3.2})^{1.3} \\ + 0.2 \cdot (6 - I_{1.1.3.3})^{1.3}) \end{matrix}\right\}$$

Where:

$SC_{1.1.3}$	=	Score for sub-criterion 1.1.3
$I_{1.1.3.1}$	=	Score for indicator 1.1.1.1
$I_{1.1.1.2}$	=	Score for indicator 1.1.1.2
$I_{1.1.1.3}$	=	Score for indicator 1.1.1.3

The methodology uses the general formula for inverse weighing to determine the overall score for sub-criterion 1.1.3; therefore, a good overall score for the sub-criterion can only be achieved by good scores for all indicators. At the same time, a bad score for one indicator cannot be compensated by a good score in another, due to the principle that the lower the score achieved for one indicator, the more it weighs in the overall score. Each indicator is weighed differently because both the IRR without carbon credit revenues and the change in IRR with carbon credit revenues are more relevant in determining financial attractiveness than is the extent to which the IRR with carbon credit revenues exceeds the required benchmark.

If a project or project type does not have revenues or cost savings other than carbon market revenues, an IRR cannot be calculated. As these projects fully rely on carbon market revenues, they

are clearly not financially viable without carbon market revenues and are therefore assigned a score of 5.

Example application 1: CDM Project 4702

Project 4702 is a tapioca starch wastewater biogas extraction and utilization project that entails the installation and operation of an anaerobic digester system with biogas recovery, using the Up-flow Anaerobic Sludge Blanket (UASB) technology. The project owners estimated that without carbon credits this project would have an equity IRR of 2.52% and that carbon credit revenues would increase the IRR to 25.48%. The change in the equity IRR is thus 22.96 percentage points. The project is a waste handling and disposal project and falls in the group 1 project categories from Table 10. It takes place in Viet Nam, where the CDM methodological tool for investment analysis provides an expected return on equity of 14% for group 1 project categories. Using the formulas above, the following values are determined for the three indicators:

$$V_{1.1.3.1} = \frac{\text{IRR}}{\text{ROE}} = \frac{2.52}{14} = 0.18$$

$$V_{1.1.3.2} = \frac{\Delta\text{IRR}}{\text{ROE}} = \frac{22.96}{14} = 1.64$$

$$V_{1.1.3.3} = \frac{(\text{IRR} + \Delta\text{IRR})}{\text{ROE}} = \frac{(2.52 + 22.96)}{14} = 1.82$$

Where:

$V_{1.1.3.1}$ = Value of indicator 1.1.3.1
$V_{1.1.3.2}$ = Value of indicator 1.1.3.2
$V_{1.1.3.3}$ = Value of indicator 1.1.3.3

Inserting these values into the scoring formula results in a score of 4.93 for the project. Project owners assumed a carbon price of USD 10/ton CO_2e for their calculation of the IRR with carbon credits, which was considered a plausible assumption at the time of the project's submission in 2006.

Example application 2: CDM Project 1550

Project 1550 is a renewable energy project involving the installation of eight 1250 kW wind turbine generators. The project owners estimated that without carbon credits this project would have an equity IRR of 9.19% and that revenues from carbon credits would increase it to 10.75%. The change in the equity IRR is therefore 1.56 percentage points.

The project is an energy industry project and thus falls in the group 1 project categories. It takes place in India, where the CDM methodological tool for investment analysis provides an expected return on equity of 10.73 for group 1 project categories. Using the formulas above, the following values can be calculated for the IRR, the ΔIRR and the sum of IRR and ΔIRR in relation to the country benchmark:

$$V_{1.1.3.1} = \frac{\text{IRR}}{\text{ROE}} = \frac{9.19}{10.73} = 0.86$$

$$V_{1.1.3.2} = \frac{\text{IRR}}{\text{ROE}} = \frac{1.56}{10.73} = 0.15$$

$$V_{1.1.3.3} = \frac{(\text{IRR} + \Delta\text{IRR})}{\text{ROE}} = \frac{(9.19 + 1.56)}{10.73} = 1$$

Where:

$V_{1.1.3.1}$ = Value of indicator 1.1.3.1
$V_{1.1.3.2}$ = Value of indicator 1.1.3.2
$V_{1.1.3.3}$ = Value of indicator 1.1.3.3

Inserting these values into the formula for the combined score for sub-criterion 1.1.3 results in a score of 1 for the project.

While the carbon credits help the project clear the stated benchmark rate for this project, their contribution to the overall financial attractiveness is very small. Project owners assumed a carbon price of USD 10/ton CO_2e for their calculation of the IRR with carbon credits, which was considered a plausible assumption at the time of the project's submission in 2006.

Example application 3: CDM Project 9163

The purpose of project 9163 is to implement the infrastructure to allow the utilization of the associated gas that is flared from two oil fields. The project owners estimated that without carbon credits this project would have an equity IRR of 9% and that revenues from carbon credits would increase it to 17.2%. The change in the IRR is thus 8.2 percentage points.

The project is a fugitive emission from fuels project and thus falls in the group 2 project category. It takes place in Nigeria, where the CDM methodological tool for investment analysis provides an expected return on equity of 15% for group 2 project categories. Using the formulas above, the following values can be calculated for the IRR, the ΔIRR, and the sum of IRR and ΔIRR in relation to the country benchmark:

$$V_{1.1.3.1} = \frac{\text{IRR}}{\text{ROE}} = \frac{9}{15} = 0.6$$

$$V_{1.1.3.2} = \frac{\text{IRR}}{\text{ROE}} = \frac{8.2}{15} = 0.55$$

$$V_{1.1.3.3} = \frac{(\text{IRR} + \Delta\text{IRR})}{\text{ROE}} = \frac{(9 + 8.2)}{15} = 1.15$$

Where:

$V_{1.1.3.1}$ = Value of indicator 1.1.3.1
$V_{1.1.3.2}$ = Value of indicator 1.1.3.2
$V_{1.1.3.3}$ = Value of indicator 1.1.3.3

Inserting these values into the formula for the combined score for sub-criterion 1.1.3 results in a score of 3.48 for the project. Project owners assumed a carbon price of USD 5/ton CO_2e for their calculation of the IRR with carbon credits, which was considered a plausible assumption at the time of the project's submission in 2012.

Sub-criterion 1.1.4: Barriers

Rationale for using this sub-criterion

Some mitigation activities are financially viable but still face other obstacles to implementation, such as information deficits or capacity constraints. In some instances, the institutional set-up of carbon crediting projects and the issuance of carbon credits can help to overcome these barriers. For example, carbon credit revenues can be used to distribute for free a technology (e.g., clean cookstoves) that households would otherwise not acquire due to the upfront costs, even though its

use would provide economic benefits to them. These barriers therefore can be important factors that prevent the implementation of a project even though it would be financially profitable.

An objective demonstration of barriers is difficult to operationalize because barriers are specific to local contexts. The CDM in its *Guidelines for objective demonstration and assessment of barriers* in 2009 introduced a requirement to monetize barriers as part of the investment analysis. The objective of this requirement is to ensure that project owners provide objective and verifiable evidence that barriers indeed prevent the implementation of the project.

In additionality tests of carbon crediting programs, the assessment of barriers often is used as a complement to the investment analysis. Project owners may apply the barrier analysis when their project is financially viable but is stalled by barriers.

The application of this sub-criterion is optional. This sub-criterion should be used in combination with the sub-criterion on *financial attractiveness*. It may function as an additional criterion for activities where the assessment has shown a high financial attractiveness even without carbon credits.

Level at which the sub-criterion is assessed

This sub-criterion may be assessed at the level of the project type, or a combination of project type and host country.

Scoring approach

The methodology employs an expert judgment on the likelihood that barriers prevent the implementation of a project type and that these barriers indeed can be overcome through the incentives of carbon credits. When arriving at this judgment the aspects in Table 11 should be evaluated.

Table 11 Questions for conducting an expert analysis on barriers

Question
Does the project type face considerable non-financial barriers that can be identified in an objective and verifiable manner?
Is it possible to produce objective and verifiable evidence that the identified barriers are unique to the project type and do not apply to alternatives?
Is the market uptake of the technology underpinning the project type low although it is financially viable/competitive?
Can the barriers for this project type not be mitigated by additional financial means (and hence be assessed through the investment analysis)?
Is it possible to produce objective and verifiable evidence that carbon credits are indeed decisive for overcoming the barrier, and does the incentive for carbon credits match the strength of the barrier? (Note that this criterion can be assessed by analyzing the ΔIRR in the analysis of financial viability. The higher the ΔIRR is, the more likely it may be that the revenues from the carbon credits help overcome the barriers.)

Table 12 Scoring approach for barriers

	Score
It is very likely that barriers prevent the implementation of this project type and that carbon credits incentivize overcoming them.	5
It is very likely that barriers prevent the implementation of this project type and it is likely that the incentives through carbon credits will overcome these barriers. OR It is likely that barriers prevent the implementation of this project type and it is very likely that the incentives through carbon credits will overcome these barriers.	4
It is likely that barriers prevent the implementation of this project type and that the incentives through carbon credits overcome these barriers.	3
It is likely that barriers prevent the implementation of this project type, but it is uncertain that the incentives through carbon credits will overcome these barriers.	2
It is likely that barriers do not prevent the implementation of this project type and that the incentives through carbon credits do not help the project to overcome these.	1

Criterion 1.2: Vulnerability (applicable to collapsed markets only)

Rationale for using this criterion

In market situations in which the supply of carbon credits from already registered and implemented projects considerably exceeds the current and expected future demand for carbon credits, the purchase of carbon credits does not necessarily trigger further emission reductions. In such a market situation, carbon credits are stranded assets. Creating new demand for these carbon credits does not lead to further emission reductions if the projects would continue GHG abatement anyways, regardless of whether they can sell carbon credits.

This criterion therefore only applies to carbon credits from markets where the supply from already implemented projects exceeds the current demand and if there is no prospect for the market to return to an equilibrium in the future. The methodology refers to this situation as a “collapsed market” and below defines the conditions of a collapsed market. Currently, this situation only applies to the CDM.

In a collapsed market, a key consideration for the global GHG emissions effect of creating new demand for carbon credits is whether the projects would continue to reduce GHG emissions even without carbon credit revenues, or whether they are at risk of discontinuing GHG abatement without these revenues. This concept is also referred to as “vulnerability” to discontinuing GHG abatement (Warnecke et al. 2017; Warnecke et al. 2019; Schneider und Cames 2014). Two types of projects are distinguished:

- **Vulnerable projects** are at risk of discontinuing GHG abatement without ongoing carbon credit revenues. This typically applies to projects which do not generate revenues or cost savings other than from carbon credits or to projects for which the carbon credit revenues at the current market price are lower than the ongoing operational expenditure (OPEX) for continuing GHG abatement. This applies, for example, to landfill gas flaring or to N_2O abatement from nitric acid production. Purchasing carbon credits from vulnerable projects could enable these projects to continue their GHG abatement and may trigger further emission reductions that would not also occur without the demand for carbon credits.
- **Non-vulnerable projects** are likely to continue GHG abatement even without carbon credit revenues. The main feature of “non-vulnerable projects” is that they have a source of income besides revenues from selling carbon credits and that this income exceeds the OPEX for

continuing GHG abatement. Although these revenues might not be enough to fully service debt obligations and other capital related cost of the project, these projects are likely to continue the mitigation activity because this is still financially more attractive than stopping the mitigation activity. Hence, project owners might be able to restructure their debt, or lenders would continue the mitigation activity in case a default of the current project owner cannot be averted. This situation usually applies, for example, to solar or hydro power generation. In a collapsed market, purchasing carbon credits from non-vulnerable projects is unlikely to trigger further emission reductions that would not also occur without the demand for carbon credits.

A collapsed market is usually unable to support the continuation of vulnerable projects, as the market prices are lower than the marginal costs to continue GHG abatement (Fearnehough et al. 2018; Warnecke et al. 2019). Buying carbon credits from these projects can be an intervention that ensures that these mitigation activities are not lost for the atmosphere.

While vulnerability hinges on market conditions and not the nature of the carbon credit itself, it is an important criterion in the event of a collapsed market to ensure that purchasing carbon credits has a global GHG emission effect. The methodology specifically recognizes that vulnerability is not a relevant consideration in a functioning market and cautions that applying the criterion in all market situations may disincentivize the initiation of mitigation projects that have high upfront investment costs compared to their operational expenditures. Its application is therefore limited to collapsed markets only.

Level at which the criterion is assessed

The first step assesses whether the relevant market of the carbon credit can be characterized as collapsed.

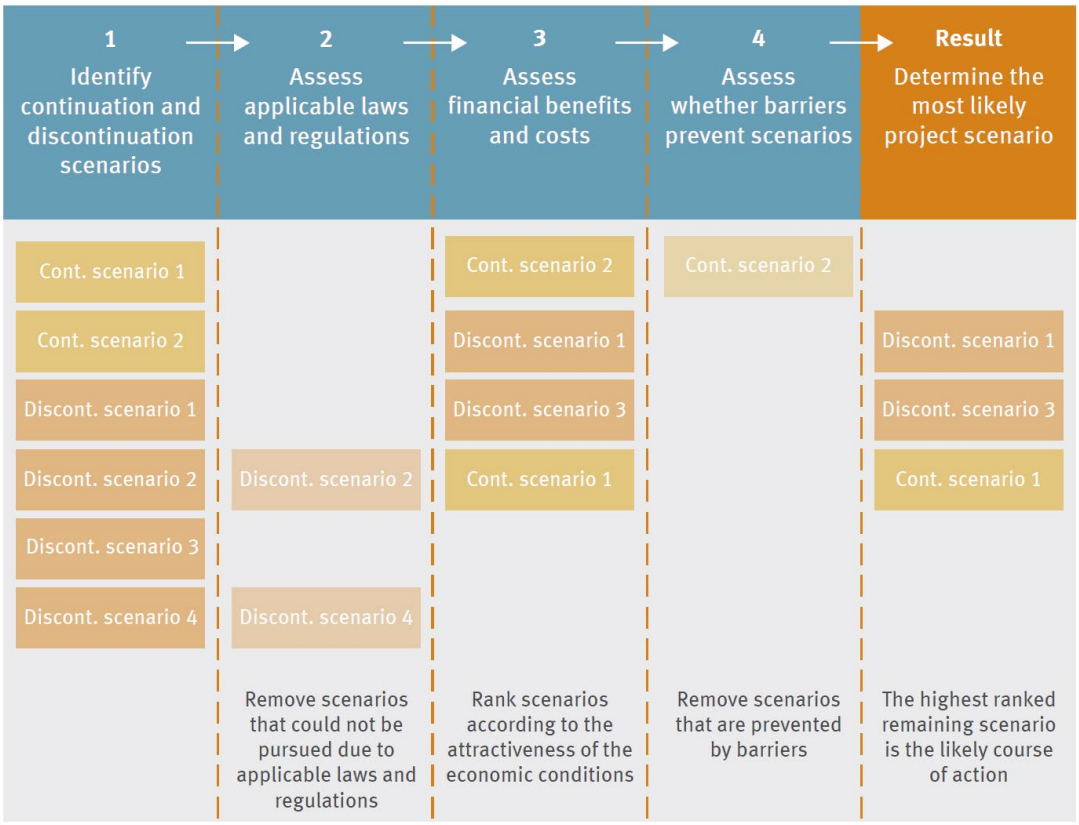
The criterion can be assessed on the project type level or on the individual project level in the second step. For some project types, an assessment at the level of the project type may be sufficient to inform buyers. For example, hydro and wind power projects are typically deemed not to be vulnerable to the risk of discontinuing GHG abatement. Clean cookstoves, HFC-23, and nitric and adipic acid projects, on the other, hand are typically deemed to be vulnerable. Analysis has, however, shown that for some activity types, such as the use of biomass, the local conditions are an important factor for determining whether continuation of an activity results in further emission reductions (Warnecke et al. 2017). For these types of activities, an assessment at the project level may be useful. Conceptually, the stepwise approach for assessing vulnerability presented in the following section can be applied both to the project type and project level.

Scoring approach

In the first step, the methodology provides guidance on how to define the market for a carbon credit and how to determine whether this market can be characterized as collapsed.

In the following steps, the methodology determines whether an individual project or a project type (in the context of a specific host country) is considered vulnerable. The approach draws strongly on a methodology developed by Warnecke et al. (2017), who applied it to assess the vulnerability of different types of mitigation activities. The methodology starts by identifying all plausible scenarios for the future course of a mitigation activity when losing the revenue from carbon credits. In the following steps the scenarios are ranked by their financial attractiveness and tested against potential factors that might prevent the occurrence of a scenario in a given environment and institutional setting. Figure 6 outlines the different steps of the methodology, which are presented in more detail in the following section.

Figure 6 Steps for assessing the vulnerability of activities to discontinuing GHG abatement



Source: Warnecke et al. 2017

Step 1: Assessment of the market condition

This step provides guidance on how to define the market for a carbon credit and how to determine whether this market can be characterized as collapsed. The following sub-steps should be applied:

1. Identify the relevant market for the carbon credit:

   In identifying the relevant market, it is important to consider the boundaries of a specific 'market'. A market is not necessarily defined by the type of credit (e.g., a CER issued under the CDM) but by the sources of demand under which the credits are eligible for use. It therefore makes sense to define a market in terms of the fungibility of credits. For example, all CERs that are eligible for use in the EU ETS could be considered one market. However, some of these CERs may also be eligible in markets that face scarcity and where prices might be higher, such as CERs that are eligible in the South Korean ETS or CERs from landfill gas projects that are eligible under the Pilot Auctioning Facility of the World Bank. Generally, a market is defined by the terms and conditions of specific compliance markets or purchase programs.

2. Assess whether the market is collapsed:

   The most relevant indicator to determine whether a carbon market has collapsed is the carbon credit price. Low credit prices point towards an oversupply of carbon credits. The relevant price threshold may depend on the certainty the buyers would like to have that the market is not over-

supplied. As a proxy, a market may be considered functioning if the credit price exceeds the marginal transaction costs of issuing carbon credits by at least by a factor of two or three.

Furthermore, a market may be considered collapsed if the credit supply from registered projects in the market significantly exceeds the known expected demand for carbon credits.

Currently, only the market for CERs is collapsed, with the exception of CERs that are eligible in markets that have scarcity, such as CERs eligible under the South Korea ETS or CERs eligible under the World Bank's Pilot Auctioning Facility.

Step 2: Identifying continuation and discontinuation scenarios

There are many ways project owners can react when market conditions make the monetization of carbon credits from a mitigation activity impossible. One potential course of action could be to stop the activity and dismantle the mitigation equipment. Another could be to adjust the activity to make it financially viable without carbon credits. Yet another action the project owner could take is to abandon the mitigation equipment, but other actors might find a way to continue the mitigation activity without the revenues from carbon credits.

Mapping out the different courses into distinct scenarios is the first step of the methodology. Project design documents and other project documentation can serve as sources of information for constructing the scenarios. If applied on the project type level a representative sample of projects can be assessed.

The scenarios can be clustered into two categories:

- **Continuation scenarios:** All scenarios in which the mitigation activity continues to operate.
- **Discontinuation scenarios:** All scenarios in which the mitigation activity is not continued.

These scenarios form the basis for the assessment. In the following steps, the methodology identifies which of the scenarios is the most likely course of action that a project will take once it does no longer receives revenues from carbon credits.

Step 3: Assessing applicable legal requirements

This step considers how applicable legal requirements affect the feasibility of the scenarios identified in step 2. This step should be applied to both continuation and discontinuation scenarios. Scenarios that would breach relevant applicable legal requirements should be removed from further analysis.

This analysis may be applied at one of the following two levels:

- **Project or project type in the context of a specific host country:** This approach analyzies the specific situation in the relevant host country. For example, project owners might not be able to go ahead with dismantling the mitigation equipment because laws and regulations at that point in time require project owners to continue mitigation. Likewise, despite being financially feasible without carbon credits, a mitigation activity might not continue because it is not compliant with legal requirements.
- **Carbon crediting program:** This approach assesses whether a carbon crediting program has provisions in place for ceasing the issuance of carbon credits once new legal requirements enter into force. In this case the program prevents carbon credit issuance to projects that would continue GHG abatement due to new legal requirements. In this case, the project continuation

scenario can be considered in compliance with relevant legal requirements. Other scenarios cannot be assessed in this simplified step and should be deemed to be also compliant with relevant legal requirements. To assess applicable legal requirements at the level of the carbon crediting program, the relevant indicator in the methodology to assess additionality can be used (indicator 1.1.1.2 in section 1.1.1).

Step 4: Assessing financial benefits and costs

After assessing applicable legal requirements, this step ranks the remaining scenarios in order of their financial attractiveness through a cost-benefit analysis of each scenario.

Rational choice theory assumes that economic actors will base their decision on whether to continue an activity on expected costs and benefits from that activity in the future. Past costs and expenditures (such as CAPEX) are not included in the decision-making process. This means that the financial attractiveness of a project depends on whether its income exceeds the operational expenditure in the absence of carbon credits. Only OPEX and benefits (i.e., revenues or cost savings, with the exception of carbon market revenues) are therefore considered in the analysis.

The analysis should exclude costs and benefits that uniformly occur under all scenarios. Warnecke et al. illustrate this with the example of capturing biogas through manure management on a livestock farm. A part of the operational cost, such as the cost for collecting the manure, might be the same under all plausible scenarios. Other costs, such as the operation of a biodigester, only apply to some scenarios. As the costs for manure collection occur in all scenarios, they are excluded in the cost-benefit analysis.

Data for costs and benefits could be obtained from different sources, such as project design documents. As these documents sometimes contain assumptions that no longer apply to the current market situation (e.g., on the price level for electricity), further due diligence through literature review and interviews with local experts may be conducted to validate the analysis.

The analysis may start with looking at the benefits of the mitigation activity. Because the purpose of the analysis is to determine whether the benefits exceed the costs, there is no further need to assess the costs if there are no benefits under a scenario. In cases in which a scenario has benefits, an assessment of the costs is necessary to see how the two compare.

Step 5: Assessing whether barriers prevent scenarios

After the scenarios have been ranked in step 4, this step assesses whether any of the scenarios faces non-financial barriers that exclude it from being the course of action. For conducting the barrier assessment, the same approach described in section 1.1.4 (barriers) is applied using an expert judgement. All scenarios that face non-financial barriers and are scored at 5 or 4 should be removed from further consideration.

This analysis usually is quite specific to the local context and may be more reliable if applied in the specific context of a host country.

Step 6: Determination of vulnerability

Following the previous steps, the most financially attractive scenario is deemed the most likely course of action if revenues from carbon credits are no longer available. If this is a continuation scenario, the project is deemed to have a low vulnerability to discontinue GHG abatement (FAIL

score). If the scenario is a discontinuation scenario, and it is either the only remaining scenario or any other scenarios are financially significantly less attractive, then the vulnerability is deemed to be high (score of 5). In other instances (e.g., where a continuation and discontinuation scenario may be equally plausible) no clear conclusion can be drawn on vulnerability (score of 3).

Table 13 Scoring approach for vulnerability

Degree of Vulnerability	Score
High Vulnerability	5
Vulnerability not conclusive	3
Low Vulnerability	FAIL

Criterion 1.3: Robust quantification of emission reductions and removals

A robust quantification of emission reductions and removals is key to ensuring integrity. The methodology uses three sub-criteria to assess this criterion:

1.3.1 Whether the carbon crediting program uses ex-ante or ex-post crediting
1.3.2 The robustness of the general program principles and provisions for determining emission reductions and removals
1.3.3 The robustness of the quantification methodologies applied to determine emission reductions and removals

The evaluation of the last sub-criterion requires considerable resources, as several hundred quantification methodologies have been developed over time under various carbon crediting programs. For this reason, the application of the third sub-criterion is optional but recommended, as the robustness of the quantification hinges strongly on the specific quantification methodologies applied. Without this third sub-criterion, the assessment is therefore less reliable. This particularly holds for project types for which the quantification of emission reductions or removals is subject to significant uncertainty.

Sub-criterion 1.3.1: Ex-ante versus ex-post crediting

Rationale for using this sub-criterion

Most carbon crediting programs issue carbon credits only *after* the emission reductions or removals have occurred and been verified (*ex-post crediting*). Ex-post crediting ensures that a validation and verification entity can verify that the emission reductions or removals have actually taken place before carbon credits are issued and used for offsetting purposes. By contrast, some programs issue carbon credits for emission reductions or removals that are expected to occur in the future and allow these carbon credits to be used for offsetting purposes (*ex-ante crediting*).

Ex-ante crediting introduces a unique risk to the integrity of carbon credits because it is possible that the number of the credits issued will exceed the actual emission reductions or removals of the project. This could occur if the mitigation activity is discontinued or has a lower-than-expected performance. Because of the risk introduced by ex-ante crediting, ex-post and ex-ante approaches differ in their robustness of quantifying emission reductions and are therefore assigned different scores in the methodology.

Some carbon crediting programs also issue units for future emission reductions or removals but do not allow these units to be used for offsetting purposes. Such *forward units* may only be used for

offsetting purposes—in some instances, after conversion into another unit, after the emission reductions or removals have occurred and been verified. An example are the “planned emission reductions” (PERs) issued by the Gold Standard Foundation. Forward units represent a vehicle that aims to facilitate the provision of upfront finance. They can also provide buyers with greater certainty that they will receive the carbon credits in the future, as some programs limit the conversion of forward units into carbon credits to the account holder of the forward units. This prevents the project owner from issuing the carbon credits to another buyer's account. As forward units cannot be used for offsetting purposes, they are not assessed in the methodology.

Level at which the sub-criterion is assessed

This sub-criterion is assessed at the level of the carbon crediting program. In the case in which the program's approach differs between project types or quantification methodologies, the assessment is undertaken at these levels.

Scoring approach

In the case of ex-ante crediting, the actual achievement of the emission reductions or removals cannot be guaranteed because the mitigation activity might be discontinued or because the actual emission reductions may be lower than initially expected. Even if programs establish approaches to compensate for over-issuance (e.g., through buffers), there remains uncertainty whether such compensation mechanisms will be effective and enforced further into the future, which may pose considerable integrity risks. Therefore, the methodology considers ex-post crediting best practice and assesses carbon credits issued based on ex-ante crediting with FAIL.

Sub-criterion 1.3.2: Robustness of the general program principles and provisions for determining emission reductions and removals

Rationale for using this sub-criterion

Carbon crediting programs should establish general principles and provisions that support the robust quantification of emission reductions and removals under the program. It is important to note that while programs must have such principles and provisions in place, adherence to these provisions does not guarantee that emission reductions and removals will be accurately and conservatively estimated. Even with these provisions in place, individual quantification methodologies may vary significantly in their methods and quantification risks. Consequentially, this sub-criterion has a lower weight in the overall assessment of the robustness of the quantification of emission reductions and removals.

Level at which the sub-criterion is assessed

This sub-criterion is assessed at the level of the carbon crediting program.

Scoring approach

The methodology assesses different questions in relation to general program principles and provisions and uses a point system to arrive at an overall score (see Table 14).

Table 14 Questions for program principles and provisions for determining emission reductions and removals

General carbon crediting programs principles and provisions for quantification of emission reductions and removals		Points
Methodology development process		
1.3.2.1	The methodology approval process includes expert review (e.g., through technical panels or working groups).	1
1.3.2.2	The methodology approval process includes public stakeholder comments.	1
1.3.2.3	The program requires that quantification methodologies be reviewed and updated at least every five years to verify that they continue ensuring environmental integrity.	1
Consideration of uncertainty and conservativeness		
1.3.2.4	The program requires that emission reductions or removals be determined in a conservative manner (rather than using the most accurate estimate) to ensure that emission reductions or removals are not overestimated.	3
1.3.2.5	The program systematically requires, for each project or once at approval for each methodology, estimating the uncertainty of emission reductions and removals.	1
1.3.2.6	If uncertainty is estimated, the program requires that the degree of conservativeness be based on the magnitude of uncertainty in the emission reductions and removals (i.e., applying a larger degree of conservativeness in case of higher uncertainties).	1
1.3.2.7	The program has provisions that individual projects or project types are considered ineligible if the uncertainty is deemed to be large in relation to the emission reductions or removals (sometimes also referred to as "signal-to-noise issue").	1
Baseline determination		
1.3.2.8	The program explicitly requires reflecting *existing* government policies and legal requirements which lower GHG emissions in establishing baseline emissions.	2
1.3.2.9	The program explicitly requires reflecting *new* government policies and legal requirements which lower GHG emissions in establishing baseline emissions, once they enter into force.	1
1.3.2.10	The program requires that crediting baselines consider changing circumstances over time, where appropriate (e.g., by using dynamic baselines to reflect autonomous energy efficiency improvements).	1
Selection of accounted emission sources		
1.3.2.11	The program offers sound guidance for which project, baseline, and leakage emission sources should be considered in quantification methodologies for calculating emission reductions and removals.	1
1.3.2.12	The program prohibits projects from accounting for “positive leakage” where GHG emissions decrease or removals increase outside of the project boundary due to the project.	1
Quantification methodologies		
1.3.2.13	The program offers sound guidance on how and when quantification methodologies may use different methods (e.g., measurement, calculation, and/or estimation) to determine project and leakage emissions, along with general principles on controlling for errors and uncertainty.	1
Crediting period length and renewal		
1.3.2.14	The maximum length of the sum of crediting periods is up to 10 years (or 20 years in case of the LULUCF sector). up to 15 years (or 30 years in case of the LULUCF sector).	 3 2

	up to 20 years (or 40 years in case of the LULUCF sector).	1
	more than 20 years (or 40 years in case of the LULUCF sector).	0
1.3.2.15	The program offers sound guidance on the renewal of the crediting period, including a re-assessment of the baseline scenario.	1
1.3.2.16	In the case of project types where the baseline scenario is the continuation of the current situation (i.e., not undertaking any investment), the program requires re-assessing additionality at the renewal of the crediting period.[2]	2
Maximum achievable points		**22**

This sub-criterion is assigned a score of 5 if a carbon crediting program receives the maximum possible number of points (22 points). The sub-criterion is assigned a score of 1 if a carbon crediting program receives 9 or fewer points. For any points between 9 and 22, a proportional score between 1 and 5 is assigned using the general formula for point systems (see chapter 2). Accordingly, the score for sub-criterion 1.3.2 is determined as follows:

$$SC_{1.3.2} = 1 + \frac{(\text{Points} - 9)}{(22 - 9)} \cdot 4$$

Where:

$SC_{1.3.2}$ = Score for sub-criterion 1.3.2

Sub-criterion 1.3.3: Robustness of the quantification methodologies applied to determine emission reductions or removals

Rationale for using this sub-criterion

Whether emission reductions or removals are overestimated or underestimated depends largely on the robustness of the specific quantification methodologies used in the quantification of emission reductions or removals. In assessing the robustness of these quantification methodologies, the methodology recommends drawing upon existing independent assessments available in the literature.

Level at which the sub-criterion is assessed

This sub-criterion is assessed at the level of the quantification methodologies used by carbon crediting programs to determine emission reductions and removals. In some instances, different versions of quantification methodologies may differ substantially. In these cases, different versions of these quantification methodologies may need to be assessed separately.

[2] Explanation: For some project types (e.g., the construction of a highly efficient cement plant), an alternative investment with a similar lifetime would be undertaken in the absence of the incentives from the carbon credits (e.g., the construction of a less efficient cement). In these cases, a re-assessment of additionality at the renewal of the crediting period is not necessary because it is not possible that the project would be implemented at a later stage without the incentives from the carbon credits. By contrast, for some project types (e.g., installation of a landfill gas capture system), no alternative investment would be undertaken in the absence of the incentives from the carbon credits (e.g., no collection of landfill gas). In these cases, it is possible that in the absence of the incentives from the carbon credits, the project would become viable at a later stage and be implemented (e.g., due to higher electricity prices for electricity from landfill gas). In these cases, it is therefore necessary to reassess the additionality of at the renewal of the crediting period.

Scoring approach

In crediting emission reductions or removals, it is good practice to estimate them in a conservative manner. This means that the approaches to quantify the emission reductions and removals should err on the side of underestimating emission reductions or removals resulting from the project. Furthermore, the degree to which emission reductions or removals are underestimated should depend on the uncertainty of the emission reductions or removals: the larger the uncertainty, the more conservative an approach is recommended. In practice, some quantification methodologies are likely to lead to underestimation of the emission reductions or removals, whereas others are likely to lead to an overestimation. The degree of underestimation or overestimation can also vary significantly.

Judging the conservativeness of quantification methodologies is challenging for three reasons. First, given that the emission reductions or removals are determined against a counter-factual baseline scenario, there can be considerable uncertainty as to how much emissions are reduced, or removals enhanced. Second, many mitigation activities can involve significant indirect emissions changes upstream and downstream of the mitigation activity. And third, whether the overall approach is conservative depends on several factors which need to be assessed in conjunction to arrive at an overall assessment. The various—and sometimes significant—revisions that many quantification methodologies have undergone over time document the difficulties that technical experts and policy-makers face when considering what methodological approaches are best suited to quantify emission reductions. The available experience and literature suggest that which approaches are most suitable depends on the project type, context, and data availability.

The methodology therefore employs an expert judgment of the conservativeness of the quantification methodologies. In arriving at this judgment, the following aspects should be evaluated with regard to the overall robustness and conservativeness of the determination of emission reductions and removals:

1. **Selection of emission sources for calculating emission reductions or removals:** This relates to whether all major project and leakage emission sources are included and whether the choice of sources included and excluded is conservative.

2. **Determination of baseline emissions:** This includes:

    - the degree of stringency or conservativeness of the baseline in the light of the uncertainties, taking into account the choice of approaches, assumptions, parameters, data sources and other factors (e.g., whether sound science is applied);
    - whether implemented government policies and legal requirements are considered in determining the baseline;
    - whether new government policies and legal requirements, once adopted, are considered in determining the baseline;
    - whether any potential perverse incentives are appropriately taken into account in determining the baseline, where applicable;
    - whether mitigation targets and actions in NDCs or LEDSs are considered in determining the emissions baseline, where applicable (e.g., where NDCs include specific goals for the renewable electricity penetrations, these goals should be reflected in establishing an emission factor for the electricity system).

3. **Determination of project emissions:** This includes the degree of stringency or conservativeness of the approaches in light of uncertainties, taking into account the choice of approaches, assumptions, parameters, data sources and other factors (e.g., whether "sound science" is applied).

4. **Determination of leakage emissions:** This includes:

    - the degree of stringency or conservativeness of the approaches in light of uncertainties, taking into account the choice of approaches, assumptions, parameters, data sources and other factors (e.g., whether "sound science" is applied);
    - the degree to which indirect effects, such as perverse incentives, rebound effects or "market leakage" are material and, if so, whether and how they are taken into account.

The evaluation should be based on an analysis of the respective quantification methodologies, relevant literature and other methodological documents (e.g., stakeholder inputs to the methodology development process).

The expert assessment of the quantification methodologies should consider the degree of conservativeness in light of the uncertainty of the emission reductions or removals, as set out in Table 15 below. The assessment is based on the likelihood that the emission reductions or removals are underestimated, estimated accurately, or overestimated, applying probability assignments used in IPCC assessment reports (IPCC 2010):

- A score of 5 is provided if it is *very likely* that the emission reductions or removals are underestimated. This applies if the uncertainty in the quantification of emission reductions or removals is very low (e.g., 5%) and slightly conservative approaches are used in the quantification (e.g., underestimating the likely accurate estimate by about 5%). It may also apply if the uncertainty is large, but the quantification methodologies apply very conservative approaches. In other words, the critical parameter is the probability that emission reductions or removals are underestimated. A score of 4 is provided if it is *likely* that the emission reductions are underestimated.

- If the emission reductions or removals are likely to be estimated accurately (i.e., there is about the same probability that they are overestimated or underestimated), the assessment depends on the degree of uncertainty in the estimates. If the uncertainty is low, a score of 4 is provided. With larger uncertainties, a score of 2 or 3 is assigned.

- If the emission reductions or removals are likely to be overestimated, both the likelihood and degree of overestimation are considered important parameters. The more likely and the larger an overestimation is, the lower is the assigned score.

If the quantification methodologies provide project owners with different options to determine the emission reductions or removals, these different options should be considered in the evaluation. The *least* conservative option (or combination of options) should be used to arrive at the scoring of the quantification methodology.

Table 15 Scoring approach for the robustness of the quantification methodologies applied to determine emission reductions or removals

Assessment outcome	Score
It is very likely that the emission reductions or removals are underestimated, taking into account the uncertainty in quantifying the emission reductions or removals	5
It is likely that the emission reductions or removals are underestimated, taking into account the uncertainty in quantifying the emission reductions or removals OR The emission reductions or removals are likely to be estimated accurately (i.e., there is about the same probability that they are underestimated or overestimated) and uncertainty is low (<10%) in the estimates of the emission reductions or removals	4
The emission reductions or removals are likely to be estimated accurately (i.e., there is about the same probability that they are underestimated or overestimated) but there is medium uncertainty (10-30%) in the estimates of the emission reductions or removals	3
It is likely that the emission reductions or removals are overestimated, taking into account the uncertainty in quantifying the emission reductions or removals, but the degree of overestimation is likely to be moderate (<20%) OR The emission reductions or removals are likely to be estimated accurately (i.e., there is about the same probability that they are underestimated or overestimated) but there is significant uncertainty (>30%) in the estimates of the emission reductions or removals	2
It is likely that the emission reductions or removals are overestimated, taking into account the uncertainty in quantifying the emission reductions or removals, and the degree of overestimation is likely to be significant (>20%) OR It is very likely that the emission reductions or removals are overestimated, taking into account the uncertainty in quantifying the emission reductions or removals, but the degree of overestimation is likely to be moderate (<20%)	1
It is very likely that the emission reductions or removals are overestimated, taking into account the uncertainty in quantifying the emission reductions or removals and the degree of overestimation is likely to be significant (>20%)	FAIL

Example application 1: CDM methodology AM0001 for HFC-23 destruction from HCFC-22 plants

The methodology has been thoroughly analyzed in the literature (Schneider 2011; UNFCCC 2005; Wartmann et al. 2006), next to a similar methodology applied to Joint Implementation (JI) projects in Russia (Schneider und Kollmuss 2015). All significant emission sources are included in the emission reduction calculation. Project emissions are also appropriately monitored with a low level of uncertainty, and any leakage emissions are immaterial. Up until the fifth version of the methodology, there is, however, a risk that emission reductions may be overestimated, due to perverse incentives for plant operators to continue to generate the waste gas HFC-23 or to produce HCFC-22 at historical rates. In some instances, this could lead to an overestimation of emission reductions. In our expert judgement, emission reductions are likely to be overestimated but probably not by more than 20%. Versions 1 to 5 of the methodology are therefore assigned a score of 2. Version 6 of the methodology uses a rather conservative baseline emission factor of 1.0% HFC-23 waste gas per HCFC-22 production. This emission factor is far below the waste gas rate typically observed at these plants. Version 6 of the methodology is thus very likely to significantly underestimate the actual emission reductions, and receives a score of 5.

Determination of the combined score for quality objective 1

The overall score for quality objective 1 is determined through the following steps:

Step 1: Assessment of the market condition

1. Follow the steps outlined in section 1.2 to assess the market condition, i.e., whether the relevant market for the carbon credit can be considered functioning or collapsed.

2. If the market can be characterized as functioning, proceed with the additionality assessment in step 2. If the market can be characterized as collapsed, proceed with the vulnerability analysis in step 3.

Step 2: Additionality

1. Determine the score for all sub-criteria using the scoring approach described in the respective section.

2. Apply the general formula for inverse weighing to determine the overall score for the additionality criterion:

$$C_{1.1} = \text{MAX}\left\{\begin{matrix} 1 \\ 6 - (0.4 \cdot (6 - SC_{1.1.1})^{1.3} + 0.2 \cdot (6 - SC_{1.1.2})^{1.3} \\ + 0.4 \cdot (6 - (SC_{1.1.3}; SC_{1.1.4})^{1.3}) \end{matrix}\right\}$$

Where:

$C_{1.1}$	=	Score for criterion 1.1
$SC_{1.1.1}$	=	Score for sub-criterion 1.1.1
$SC_{1.1.2}$	=	Score for sub-criterion 1.1.2
$SC_{1.1.3}$	=	Score for sub-criterion 1.1.3
$SC_{1.1.4}$	=	Score for sub-criterion 1.1.4

Inverse weighing is here applied because a good performance in one of the three sub-criteria cannot compensate for a poor performance in another sub-criterion. To have high quality, projects should score highly on all three sub-criteria. The use of inverse weighing ensures that a credit that receives a poor score in one sub-criterion cannot receive a good overall score.

Note that sub-criterion 1.1.3 (financial attractiveness) and sub-criterion 1.1.4 (barriers) are used as alternative sub-criteria. While it is recommended to assess both sub-criteria, only the sub-criterion with the higher score is included in the calculation of the overall score for additionality. In exceptional circumstances, for project types where the available information clearly demonstrates that they typically face barriers, only barrier analysis may be applied. Likewise, where the available information suggests that barriers are very unlikely to exist or to be prohibitive, only the financial analysis may be applied. Further note that more weight is allocated to sub-criterion 1.1.1 (legal requirements) and sub-criterion 1.1.3 or 1.1.4 (financially attractiveness or barriers) than to sub-criterion 1.1.2 (prior consideration), as a high scoring against these two sub-criteria is deemed to provide a higher assurance of the likelihood of additionality.

3. Proceed to step 4.

Step 3: Vulnerability

1. Follow the steps described in section 1.2 to determine the score for this criterion.
2. Proceed to step 4.

Step 4: Robust quantification of emission reductions and removals

1. Determine the score for all sub-criteria using the scoring approach described in the respective sections. Note that if the carbon credits are issued based on ex-ante crediting, as assessed in sub-criterion 1.3.1, then the score for quality objective 1 is FAIL.
2. If carbon credits are issued based on ex-post crediting, as assessed in sub-criterion 1.3.1, use the following formula to arrive at the overall scoring for this criterion:

$$C_{1.3} = 0.15 \cdot SC_{1.3.2} + 0.85 \cdot SC_{1.3.3}$$

Where:

$C_{1.3}$	=	Score for criterion 1.3
$SC_{1.3.2}$	=	Score for sub-criterion 1.3.2
$SC_{1.3.3}$	=	Score for sub-criterion 1.3.3

Note that more weight is assigned to sub-criterion 1.3.3 as the robustness of the quantification methodologies is deemed to have a stronger influence on the overall robustness of quantification than the program provisions.

Step 5: Determine the overall score quality objective 1

1. Use the following formula to determine the overall score for cluster 1:

$$Q_1 = \text{MAX}\left\{6 - \left(0.65 \cdot \left(6 - (C_{1.1}; C_{1.2})\right)^{1.3} + 0.35 \cdot (6 - C_{1.3})^{1.3}\right)^{\frac{1}{1.3}}\right\}$$

Where:

Q_1	=	Score for quality objective 1
$C_{1.1}$	=	Score for criterion 1.1
$C_{1.2}$	=	Score for criterion 1.2
$C_{1.3}$	=	Score for criterion 1.3

Note that more weight is given to criteria 1.1 and 1.2 because the additionality or vulnerability of the mitigation activity is considered more crucial to the robust determination of the GHG emissions impacts of the mitigation action than the robust quantification of emission reductions and removals. Table 16 illustrates how different scores for the criteria translate into an overall score for quality objective 1.

Table 16 Overall scoring approach for quality objective 1

		Score for criterion 1.1 (Additionality) or criterion 1.2 (Vulnerability)				
		1	**2**	**3**	**4**	**5**
Score for criterion 1.3 (Robust quantification)	**1**	1	1	1	1.56	2.51
	2	1	1	1.17	2.28	3.23
	3	1	1	1.83	2.94	3.89
	4	1	1.20	2.43	3.54	4.49
	5	1	1.71	2.94	4.05	5.00

Quality objective 2: Avoiding double counting of emission reductions or removals

Double counting of emission reductions or removals refers to a situation in which a single greenhouse gas emission reduction or removal is counted more than once towards achieving mitigation targets or goals. Double counting can occur in different ways. The methodology distinguishes between three forms of double counting:

1. **Double issuance** means that more than one carbon credit is issued for the same emission reduction or removal. Double issuance leads to double counting if more than one of these carbon credits is counted towards achieving mitigation targets or goals. Some programs and stakeholders also refer to double registration—the registration of the same project under two different carbon crediting programs or twice under the same program. Double registration can lead to double issuance if carbon crediting programs do not implement proper controls to ensure that, if a project is registered with more than one program, carbon credits are cancelled by one program before carbon credits are issued by another program for the same emission reductions or removals.

2. **Double use** means that the same carbon credit is counted twice to achieve a climate target or goal. This could, for example, occur if the same credit is cancelled twice or if two entities claim emission reductions or removals from the cancellation of one carbon credit.

3. **Double claiming** occurs if the same emission reduction or removal is claimed by a country, jurisdiction or entity that reports lower emission levels to demonstrate achievement of mitigation targets, goals or obligations, as well as by the country or entity using the carbon credit. For instance, a reduction or removal may be claimed by the host country when reporting lower emission levels to demonstrate implementation and achievement of its NDC, as well as by the country or entity using the carbon credit. Double claiming can also occur if carbon credits are issued for emission reductions or removals in sectors covered by an ETS or other mandatory domestic mitigation scheme.

The methodology addresses each of these forms of double counting, including under which contexts they need to be avoided and how. The assessment of whether double counting is avoided is mostly conducted at the level of the carbon crediting program and to some extent at the level of the host country. The methodology strongly draws and builds on the Guidelines for Avoiding Double Counting with CORSIA (ClimateWorks Foundation et al. 2019). Although decisions on guidance for the implementation of cooperative approaches under Article 6 of the Paris Agreement have not yet been adopted, relevant decisions from COP24 in Katowice and progress made at COP25 in Madrid provide useful materials. The methodology will be considered for further review upon adoption of Article 6 decisions by the CMA.

The term “host country” is used here to denote the country where the mitigation activity is implemented (e.g., the hydro power plant is located). In most instances, the emission reductions or removals occur in the same country; however, in some instances, mitigation activities in one country may result in emission reductions or removals in another country. In this case, avoiding double counting requires distinguishing these countries.

The forms of double counting that are relevant depend on the purpose for which a carbon credit is used. For example, double issuance and double use should be avoided in all instances, whereas double claiming with the host country NDC may not need to be avoided in some specific contexts (see Table 17 below). Which parts of the methodology are applicable therefore depends on the purpose for which the carbon credit is used.

Table 17 Applicability of double counting criteria

Purpose of carbon credit use	Form of double counting to be avoided: Double issuance	Double use	Double claiming with the host country NDC (i.e., authorization and corresponding adjustments are required)	Double claiming with mandatory domestic mitigation schemes
International transfer and use towards NDCs (or other relevant international mitigation targets)	Yes	Yes	Yes	Yes
Use by airlines under CORSIA	Yes	Yes	Yes	Yes
Use of domestic credits for domestic compliance schemes (e.g., in ETS)	Yes	Yes	No	Yes
Voluntary purchase of carbon credits used towards claims that imply compensation for the claimant's emission footprint (sometimes referred to as offsetting)	Yes	Yes	Yes*	Yes
Voluntary purchase of carbon credits as a contribution to climate action in the host country without any claim to the underlying emission reductions or removals	Yes	Yes	No	No

* Double claiming with host country NDCs can occur when there are no corresponding adjustments applied to the emissions balances of the host country. Stakeholders currently hold varying views as to whether a corresponding adjustment by the host country is required, in this case, to promote high carbon credit quality and to ensure the mitigation outcome is only used once when tracking progress in the implementation and achievement of NDCs. WWF, EDF and Oeko-Institut acknowledge that double claiming with host country NDCs can constitute an environmental integrity risk, noting that this risk may not materialize in all circumstances. WWF, EDF and Oeko-Institut recommend that, as a precautionary approach, double claiming with host country NDCs should be avoided, through the application of corresponding adjustments by the host country, when carbon credits are used towards claims that imply compensation for the claimant's emission footprint. Further considerations on the appropriate course of action if a country does not participate in the Paris Agreement or does not maintain an NDC may be necessary. As a result, the methodology recognizes two distinct types of carbon credits: those backed by corresponding adjustments, and those that are not.

The methodology includes three criteria which are structured around the approaches needed to avoid each of the three forms of double counting distinguished above:

2.1 Avoiding double issuance
2.2 Avoiding double use
2.3 Avoiding double claiming

Criterion 2.1: Avoiding double issuance

Double issuance can occur in different ways. Two sub-criteria are used to assess the extent to which double issuance is avoided:

2.1.1 Avoiding double issuance due to double registration
2.1.2 Avoiding indirect overlaps between projects

Double issuance can also occur if a project overlaps in scope with a sectoral crediting approach—for example, if individual REDD+ projects are not properly incorporated into sectoral REDD+ carbon crediting programs. The methodology assumes that the responsibility for avoiding such overlaps lies with the jurisdiction implementing the sectoral crediting approach. Such potential overlap is therefore not considered in in the assessment of double issuance risk from individual projects.

Sub-criterion 2.1.1: Avoiding double issuance due to double registration

Rationale for using this sub-criterion

Double issuance could occur if the same project is registered twice (either under the same program or under two different programs) and if carbon credits are issued simultaneously under both programs for the same emission reductions or removals.

Level at which the sub-criterion is assessed

This sub-criterion is assessed at the level of the carbon crediting program.

Scoring approach

Carbon crediting programs can employ different approaches to manage this risk. Some programs have explicit provisions that address the transition of projects between carbon crediting programs. If a project is registered with more than one program, carbon crediting programs should ensure that carbon credits are cancelled by one program before carbon credits are issued by another program for the same emission reductions and removals. To ensure that these cancellations cannot be claimed for any other purposes, carbon crediting programs should also require that the cancellations be clearly designated for the purpose of allowing the reissuance under another program.

Some programs require legal attestations from project owners that confirm that they have not, and will not, request issuance of carbon credits for the same emission reductions or removals under more than one program. Requiring a legal attestation from project owners makes requirements against double issuance enforceable. It signals to project owners that they must not request registration under another program or must not request double issuance of carbon credits. It also provides a basis for taking legal or regulatory action against project owners that knowingly do so, within the same program or within multiple programs.

Some programs also conduct checks to verify that carbon credits issued for registered projects are not also issued by another program for the same emission reductions or removals (unless the credits have been cancelled under other programs prior to reissuance under the current program). Programs can coordinate with each other to implement such checks, which can consist of a review of the project databases of other programs and/or coordinated communication with other programs' staff at the time a project is submitted for registration or when project owners request an issuance. Checks may be undertaken by program staff or by verification bodies as part of required verification duties.

The scoring approach for this sub-criterion follows a point system based on the evaluation of these aspects (see Table 18). If a program has basic provisions in place to manage the transition of

projects to another program, 2 points are awarded. An additional point is awarded if a program requires legal attestations from project owners or if the program conducts checks, or requires validation and verification entities to verify, that double issuance does not occur. The overall score depends on the total number of points: a score of 5 is given for 4 points, a score of 4 for 3 points, a score of 3 for 2 points, a score of 2 for 1 point, and a score of 1 for 0 points.

Table 18 Scoring approach for avoiding double issuance due to double registration

Indicator		Points
2.1.1.1	The program has basic provisions in place which manage the transition of projects from one to another program and either avoids registration of the same project under two programs or, if double registration is permitted, has basic provisions in place to ensure that carbon credits for the same emission reductions or removals cannot be issued under the same program or must be cancelled under one program before they can be issued under another.	2
2.1.1.2	The program also requires legal attestations from project owners that confirm that they have not and will not request issuance of carbon credits for emission reductions or removals from more than one program.	1
2.1.1.3	The program also conducts checks, or requires validation and verification entities to verify, that already registered projects have not, and will not, be issued carbon credits in any other programs for emission reductions or removals for which the program is also issuing carbon credits (unless the credits have been cancelled under other programs prior to reissuance under the current program).	1
Maximum achievable points		**4**

Example application 1: Climate Action Reserve (CAR)

The Reserve Offset Program Manual, dated November 2019, section 2.9, includes provisions that specifically address the transition of projects between programs. Though the provisions are not entirely clear on the specific steps that must be taken and what type of proof is necessary to ensure that credits that are issued under one program have been cancelled by another program, they set out the basic principles and checks to avoid double issuance (two points for indicator 2.1.1.1). Project owners must sign a legal Attestation of Title prior to each registration. Through this form they attest, and thus accept liability, that the relevant emission reductions are not registered in any other program, or in the Reserve under another project (one point for indicator 2.1.1.2). CAR's program staff is stated to conduct checks following the verification to assess that no such overlap occurs (one point for indicator 2.1.1.3). The CAR is thus awarded four points and receives a score of 5.

Example application: Clean Development Mechanism (CDM)

The CDM does not have provisions in place to avoid double issuance due to double registration with other carbon crediting programs. Designed to serve the Kyoto Protocol, the mechanism is considered the only mechanism applicable to developing countries for which carbon credits can be used under the Kyoto Protocol. The CDM includes a procedure to de-register projects, which may facilitate the avoidance of double registration if projects intend to register under another program. However, none of the criteria above is addressed. The CDM is thus assigned a score of 1. It should be noted that, in practice, the risk of double issuance due to double registration is low because most other carbon crediting programs have relevant procedures in place.

Sub-criterion 2.1.2: Avoiding indirect overlaps between projects

Rationale for using this sub-criterion

Double issuance can also occur indirectly, through overlapping claims by different entities involved in mitigation projects. Overlapping claims can, for example, occur when different entities involved in the production and/or consumption of the same good or service claim carbon credits for the same emission reductions or removals. For example, this could happen if the owner of a forest management project is issued credits for carbon stored in wood products, while at the same time (e.g., under the same or a different program) the user of wood products is issued credits for the same stored carbon.

Level at which the sub-criterion is assessed

This sub-criterion is assessed at the level of the carbon crediting program and the project type, as this risk is only applicable to some types of projects.

Scoring approach

Indirect overlaps between projects can only occur in cases where projects, in calculating their emission reductions or removals, include emissions sources that occur at other sites than where the project is implemented (also referred to as "indirect" emissions or "upstream" or "downstream" emissions). Table 19 summarizes for which project types this risk is relevant. For project types for which this risk is not relevant, the score is 5. For other project types, the scoring depends on the carbon crediting programs' procedures to address this risk.

Table 19 Examples of project types with and without potential indirect overlaps between projects

Project types with potential indirect overlaps between projects	Project types without potential indirect overlaps between projects
• Landfill gas utilization • Renewable electricity generation • Biomass use • Composting	• Landfill gas flaring • Avoidance of N_2O from nitric or adipic acid production • Energy efficiency improvements in thermal on-site applications

Some carbon crediting programs have explicit procedures to address overlaps between registered projects, whereas others do not have respective procedures in place. Programs also differ in whether they only address overlaps between projects registered within the same program or also address overlaps with projects registered under other programs.

A simple and robust way of avoiding indirect overlaps is limiting the program scope to project types that do not involve this risk. This, however, considerably narrows the scope of the program. This approach is assigned a score of 5.

Within a program, overlaps between projects can be avoided if the program defines the boundaries for different project types such that overlap does not occur (e.g., in the methodology used for forest management projects, excluding any accounting for carbon stored in wood products). In some cases, this may mean allowing eligibility for certain kinds of project activities and disallowing others (e.g., allowing only forest landowners to register a project, not the wood product users). Adopting appropriate eligibility criteria and quantification methodologies is usually straightforward within a

single program. However, this approach does not address a possible overlap with projects registered under other programs. This approach is therefore assigned a score of 3.

An alternative approach is implementing the following two principles that aim to ensure that overlaps are avoided between projects registered under different programs:

- If a project's quantification methodology includes emission *reductions* at a source that is not located at the project site but upstream or downstream of the project, and a second project reduces emissions directly at this same source, then the emission reduction calculation for the first project should use an emission factor for the source that *takes into account* the implementation of the second project. This ensures that the first project cannot claim the emission reductions caused and claimed by the second project. Likewise, the second project should not count any incremental reductions associated with the effects of the first project.
- If a project's quantification methodology includes emission *increases* at a source that is not located at the project site but upstream or downstream of the project, and a second project reduces emissions directly at this same source, then the emission reduction calculation for the first project should use an emission factor for this source that *ignores* the effects of the second project (i.e., that reflects the emissions level that would occur in the absence of the second project). This ensures that the first project cannot (in effect) claim the emission reductions caused and claimed by the second project.

Examples for implementing these principles are included in the Guidelines for Avoiding Double Counting with CORSIA (ClimateWorks Foundation et al. 2019). Programs that implement these principles in their quantification methodologies receive a score of 5.

Table 20 Scoring approach for avoiding indirect overlaps between projects

Program requirements	Score
The program only credits those types of projects for which overlaps between projects are very unlikely to occur.	5
The program has robust procedures that effectively identify and avoid overlaps between projects registered within the program *and* projects registered under other programs (see principles above).	5
The program has robust procedures that effectively avoid overlaps between projects registered *within* the same program.	3
The program does not have robust procedures to avoid indirect overlaps between projects.	1

Example application 1: Climate Action Reserve (CAR)

The *Reserve Offset Program Manual*, dated November 2019, aims to avoid indirect overlaps between projects through two approaches. First, double counting risks due to claims from indirect emission sources are considered in a screening process when deciding to develop a protocol (see sections 2.9 and 4.1). Indeed, many CAR protocols are applicable to project types that mainly or only address direct emission sources at the project site; however, a few protocols allow projects to claim emission reductions from indirect emission sources or other entities to claim the emission reductions at the project site. Second, potential overlaps are addressed in specific protocols. These procedures also address overlaps with projects registered under other programs. For example, the Organic Waste Composting Project Protocol, version 1.1 from July 2013, addresses situations wherein landfills, at which the waste would be disposed in the baseline scenario, partially capture

methane generated from the waste. The Protocol does not allow claiming avoided methane emissions from such capture. This reflects the principles set out above. The CAR is therefore assigned a score of 5.

Example application 2: Clean Development Mechanism (CDM)

CDM methodologies usually include explicit provisions to avoid overlaps between projects within the CDM but do not have procedures to avoid overlaps with projects registered under other programs. The CDM uses two different approaches to avoid overlaps within the CDM. First, for many project types (e.g., renewable electricity generation under methodology ACM0002), only one type of entity is allowed to use the methodology applicable to the project (e.g., the producer of renewable electricity) and other possible entities that could claim the same emission reductions (e.g., the consumer of renewable electricity) are not eligible. Some methodologies explicitly require legal agreements with other potential entities that may claim the same emission reductions (e.g., methodology ACM0017 for the production of biofuels). The CDM is thus assigned a score of 3.

Criterion 2.2: Avoiding double use

Rationale for using this criterion

Avoiding double use requires that programs have registry systems in place that effectively prevent a carbon credit from being duplicated, cancelled or retired more than once, so that only a single cancellation claim is made for a carbon credit.

To prevent double use (and also other forms of double counting), programs need to administer registry and project database systems that support carbon credit issuance, transfer and cancellation functions, and make available—in an accessible, user-friendly format—information needed to avoid double issuance, double use and double claiming.

Double use could also occur if the same carbon credit cancellation or retirement is used for more than one claim to achieve climate targets or goals. Currently, most carbon programs leave it up to the carbon credit buyers to ensure a single retirement or cancellation is not used for more than one purpose. Carbon crediting programs can ensure in two ways that such double use is avoided. First, their registry and project database systems can provide for functionalities that allow the carbon credit holders to specify the purpose for which a carbon credit is cancelled or retired. Alternatively, carbon crediting programs could require all users to specify the purpose.

Level at which the criterion is assessed

This criterion is assessed at the level of the carbon crediting program.

Scoring approach

Drawing on the Guidelines for Avoiding Double Counting with CORSIA (ClimateWorks Foundation et al. 2019), the methodology identifies key functionalities of a program's registry and project data system for avoiding double use (and other forms of double counting) and assesses the extent to which the program has these functionalities in place, using a point system set out in Table 21. Some registry and project database system features are considered minimum requirements: if these requirements are not met, the carbon credits are scored FAIL. Other features are considered optional.

Indicator 2.2.6 in Table 21 is only applicable to carbon credits that are backed by corresponding adjustments. If the program does not issue credits that can be used for purposes for which double

claiming with the host country NDC needs to be avoided, then indicator 2.2.6 in Table 21 is not applicable. Therefore, the overall scoring of the registry and project database system depends not only on total number of points but also on whether the carbon crediting program issues credits backed by corresponding adjustments. The scoring approach is set out in Table 21.

Table 21 Scoring approach for carbon crediting program's registry and project database system

Indicator		Points
2.2.1	The registry is capable of securely effectuating the issuance, transfer, cancellation, or retirement, of carbon credits, clearly avoiding that the same credit can be duplicated or cancelled or retired more than once.	PASS / FAIL
2.2.2	The registry tags each carbon credit with a unique identifier (e.g., serial number) so that each carbon credit is clearly associated with a specific issuance and vintage related to quantified and verified emission reductions or removals, and so the information that is relevant for avoiding double counting can be assigned to each carbon credit.	2
2.2.3	The registry or project database system makes relevant information on carbon credits readily available to users and the public in a user-friendly format, including:	
	a. The project to which the carbon credit was issued, including unique identifying information about the project	PASS / FAIL
	b. The host country of the relevant project (i.e., the country where the project is implemented)	PASS / FAIL
	c. The calendar year in which the carbon credit's associated emission reductions or removals occurred	2
	d. Information on the status of the credit (e.g., cancelled, retired or active).	PASS / FAIL
2.2.4	To address the risk of double use due to the cancellation of one carbon credit for more than one purpose, the registry system has functionalities to document the purposes for which carbon credits are used. These functionalities:	
	a. Require users of carbon credits (and/or their representatives) to transparently and unambiguously specify, either within the registry system or in another publicly accessible information system, the purpose for which a carbon credit is cancelled or retired, including which entity's voluntary goals or mandatory requirements are met and the calendar year(s) for which these voluntary goals or requirements are achieved. For example, for cancellations to meet offsetting requirements under the CORSIA, the cancellation information should specify the aeroplane operator for which the carbon credits were cancelled and the calendar year for which an offsetting requirement is fulfilled through the cancellation (e.g., "XYZ Airlines, 2024 offsetting requirement covering the 2021-2023 compliance period under CORSIA").	2
	OR	
	b. Allow users of carbon credits to transparently document, either within the registry system or in another publicly accessible information system, the purpose for which a carbon credit is cancelled or retired.	1
2.2.5	The program administers a publicly accessible, transparent and easily searchable project database that provides relevant information needed to avoid double counting. The project database may operate as a separately functioning system or be incorporated as part of the program's registry system. The	

	database provides a unique identifier for each project that can be cross-referenced with carbon credits issued in the program's registry, so that project information can be identified for every carbon credit issued within the registry. The database includes, moreover, the following information:	
	a. A description of the project, including information on the mitigation technologies	PASS / FAIL
	b. The emission sources, sinks, and greenhouse gases included in the calculation of the project's emission reductions or removals, along with the location(s) of all relevant sources and sinks	1
	c. The country and geographical location where the project is implemented, and any other information needed for the project to be unambiguously identified and distinguished from other projects that may occur in the same location	PASS / FAIL
	d. The project owners.	PASS / FAIL
2.2.6	In the case that the program's carbon credits may be backed by corresponding adjustments and thus be used for purposes for which double claiming with the host country NDC needs to be avoided, the program's registry and project database system also provides the following information:	
	a. The country where the carbon credit's associated emission reductions or removals occurred (which in some instances may be different from the host country)	2
	b. Whether Article 6 authorization has been obtained from the host country (or, where applicable, the country where the project will cause emission reductions or removals) and documentation of this authorization, consistent with relevant international decisions under the Paris Agreement.	4
	c. Whether the country has applied the necessary corresponding adjustment related to the use of the carbon credit	2
	d. An attribute indicating whether the carbon credit has been ear-marked by the program as eligible for use for purposes for which double claiming with the host country NDC needs to be avoided.	2
Maximum achievable points		**17**

Determination of the score for criterion 2.2:

The score for criterion 2.2 is determined using the point system scoring method outlined in chapter 2 above. In the case wherein the carbon crediting program issues credits backed by corresponding adjustments, a score of 5 is assigned if the maximum number of achievable points is reached (17 points). A score of 1 is assigned if 8 or fewer points are achieved. For any achieved points between these thresholds, the score is determined based on a linear interpolation using the following formula below:

$$C_{2.2} = 1 + \frac{(\text{Points} - 8)}{(17 - 8)} \cdot 4$$

Where:

$C_{2.2}$ = Score for criterion 2.2

In the case wherein the carbon crediting program only issues credits not backed by corresponding adjustments, a score of 5 is assigned if the maximum number of achievable points is reached (7 points). A score of 1 is assigned if 2 or fewer points are achieved. For any achieved points between these thresholds, the score is determined based on a linear interpolation using the following formula below:

$$C_{2.2} = 1 + \frac{(\text{Points} - 2)}{(7 - 2)} \cdot 4$$

Where:
$C_{2.2}$ = Score for criterion 2.2

Example application: Clean Development Mechanism (CDM)

The CDM operates a secure and robust registry system. Under the CDM, certified emission reductions (CERs) are issued into the CDM registry and can either be forwarded to national registry systems of Parties with a commitment inscribed in Annex B to the Kyoto Protocol or be cancelled within the CDM registry. The operation of national registries is subject to internationally agreed provisions and review under the Kyoto Protocol. An international transaction log checks that all transactions are in line with agreed provisions under the Kyoto Protocol. The system effectively avoids that one CER can be retired or cancelled twice. The minimum requirement of indicator 2.2.1 is thus fulfilled.

The CDM registry and the national registries established by Annex B countries under the Kyoto Protocol use a serialized unit system. Each CER is tagged to one issuance for a specific monitoring period and documentation about the relevant emission reductions or removals is available in the project database system (2 points for indicator 2.2.2). The CDM information system makes all relevant information on carbon credits available, except for the exact calendar year in which the emission reductions occurred, as monitoring reports may straddle calendar years and the emission reductions are not associated to any calendar year but to commitment periods under the Kyoto Protocol (all minimum requirements for indicator 2.2.3 fulfilled, and 0 points for indicator 2.2.3.c.). Information about the purpose of cancellation is made available (1 point for as sub-item b of indicator 2.2.4 applies). The CDM information system makes all relevant project information available (all minimum requirements for indicator 2.2.5 are fulfilled, and 1 point as item b of indicator 2.2.5. applies). The CDM does not have procedures for avoiding double claiming with the host country NDC (indicator 2.2.6 is thus not applicable). Overall, the CDM fulfils all minimum requirements and is awarded 4 points, which corresponds to a score of 2.6.

Criterion 2.3: Avoiding double claiming

Avoiding double claiming is essential for the integrity of the environment. Double claiming can occur at two different levels:

1. **With host country NDCs:** This can occur if an emission reduction or removal is claimed by the host country when it reports lower emission levels to demonstrate implementation and achievement of its NDC and by the country or entity using the carbon credit. This form of double claiming is only applicable to carbon credits that are backed by corresponding adjustments.
2. **With mandatory domestic mitigation schemes:** This can occur if carbon credits are issued for emission reductions or removals in sectors covered by an ETS or other mandatory domestic mitigation scheme.

If double claiming is not prevented, actual greenhouse gas emissions could end up being higher than what the participating countries, jurisdictions or private entities report, thereby undermining the credibility of the carbon markets.

Avoiding double claiming with host country NDCs requires several procedures to be in place to enable robust accounting, consistent with Article 6 and relevant decisions under the Paris

Agreement. Both host countries and carbon crediting programs need to have procedures to facilitate and implement the necessary steps to avoid double claiming. Avoiding double claiming with ETSs and other mandatory domestic mitigation schemes requires that carbon crediting programs establish standards and procedures to avoid such overlap. Therefore, the methodology uses three sub-criteria to assess double counting risks associated with carbon credits:

2.3.1 Host country provisions for avoiding double claiming with its NDC
2.3.2 Carbon crediting program provisions for avoiding double claiming with NDCs
2.3.3 Avoiding double claiming with mandatory domestic mitigation schemes

The first two sub-criteria are only applicable to carbon credits backed by corresponding adjustments (i.e., for which double claiming with the host country NDC needs to be avoided (see Table 17)). The third criterion is applicable to all carbon credits.

This section first provides background on the requirements arising from the Paris Agreement and the ongoing negotiations on Article 6. This forms the basis for describing the methodology for the three sub-criteria.

Overview of requirements arising from the Paris Agreement and Article 6 negotiations

As the negotiations on Article 6 are not yet concluded, there is not yet clarity as to how exactly double claiming will be avoided. The criteria provided can only be partially applied at present. Both host countries and carbon crediting programs still need to implement the provisions governing Article 6 of the Paris Agreement, once they are adopted. Nevertheless, the methodology already provides sub-criteria for assessing whether host countries and carbon crediting programs have the necessary procedures in place.

For the purpose of the methodology, the state of negotiations from COP25 in Madrid as well as relevant decisions adopted at COP24 in Katowice are considered, including the following documents:

- The "MPGs", i.e., the modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement, as contained in the Annex to decision 18/CMA.1.
- The "ICTU guidance", i.e., the information to facilitate clarity, transparency and understanding of nationally determined contributions, referred to in decision 1/CP.21, paragraph 28, as contained in Annex I to decision 4/CMA.1.
- The "NDC accounting guidance", i.e., the accounting for Parties' nationally determined contributions, referred to in decision 1/CP.21, paragraph 31, as contained in Annex II to decision 4/CMA.1.
- The "Draft Article 6.2 guidance", i.e., the third iteration of the draft text at COP25 on matters related to Article 6 of the Paris Agreement: Guidance on cooperative approaches referred to in Article 6, paragraph 2, of the Paris Agreement, version 03, of 15 December 00:50 hrs (available at https://unfccc.int/sites/default/files/resource/DT.CMA2_.i11a.v3_0.pdf).

Moreover, the methodology makes a few assumptions with regard to the outcome of negotiations on Article 6:

- It is assumed that carbon credits used to meet airlines' obligations under CORSIA are considered ITMOs, regardless of whether the credits are transferred internationally (see Table 17 above).

- It is assumed that emission reductions resulting from the Article 6.4 mechanism are considered ITMOs if the mitigation activity has been authorized by the host Party and if the emission reductions are subsequently internationally transferred and that the accounting provisions of Article 6.2 will apply to such emission reductions.
- For simplicity, it is assumed that the application of corresponding adjustments will be required for all ITMOs, regardless of whether the mitigation outcomes are covered by the NDC and regardless of the mechanism under which the mitigation outcomes are generated.
- For simplicity, it is assumed that ITMOs are expressed in tCO_2e with a 100-year time horizon and not in non-GHG metrics. Note that 100-year time horizons were adopted by Parties under the UNFCCC and the Paris Agreement. If shorter time horizons were chosen, the values would differ (e.g.; be higher for methane).

Sub-criterion 2.3.1: Host country provisions for avoiding double claiming with its NDC

This sub-criterion is only applicable to carbon credits backed by corresponding adjustments, i.e., for which double claiming with the host country NDC needs to be avoided (see Table 17).

Rationale for using this sub-criterion

Host countries that are a Party to the Paris Agreement need to implement several provisions that have been adopted or are under negotiation under the Paris Agreement to effectively avoid double claiming with their NDC. Only if host countries have the necessary institutional arrangements and processes in place is there a satisfactory level of assurance that double claiming will be avoided.

Level at which the sub-criterion is assessed

This sub-criterion is assessed at the level of the host country.

Scoring approach

The methodology identifies key requirements and assesses whether countries meet these requirements, using a point system as summarized in Table 22 below. The key requirements are clustered into themes that appear in different parts of the negotiation texts, as follows:

1. **Participation in the Paris Agreement and maintenance of an NDC:** The host country must be a Party to the Paris Agreement and must prepare, communicate and maintain an NDC.
2. **Clarification of the coverage of the NDC:** For ITMOs in tCO_2e metrics, double claiming is avoided by applying corresponding adjustments to the emissions and removals from the sectors and GHG covered by the NDC (paragraph 9 of the draft Article 6.2 guidance, paragraph 77d(i) of the MPGs). This requires that countries clarify the sectors, sources, GHGs and time periods covered by the NDC (paragraph 18d of the draft Article 6.2 guidance; similar requirements in paragraph 64 to the MPGs and paragraphs 1 to 3 of the ICTU guidance).
3. **Quantification of the NDC in tCO_2e metrics:** Likewise, applying corresponding adjustments, preparing the resulting emissions balance, and providing an adjusted emissions level for comparison with the quantified NDC target (paragraphs 70 and 77d of the MPGs) requires that Parties, in their initial report, quantify the mitigation information in their NDC in tCO_2e, or, where this is not possible, provide a methodology for the quantification of the NDC in tCO_2e (paragraph 18d of the draft Article 6.2 guidance).
4. **Selection of a relevant indicator for tracking progress towards the NDC:** Reporting a complete time series of annual emissions covered by the NDC from 2021 onwards is a prerequisite for applying corresponding adjustments (paragraph 9 of the draft Article 6.2

guidance, paragraph 77d(i) of the MPGs). For this purpose, countries need to select a relevant indicator (paragraphs 65-70 of the MPGs). For NDCs quantified in GHG emissions terms, the most suitable indicator is that part of the national GHG inventory that corresponds to the coverage of the NDC.

5. **Selection and specification of accounting approach in relation to single-year and multi-year targets:** Host countries need to choose and communicate the method for corresponding adjustments for multi-year or single-year NDCs (paragraph 18c of the draft Article 6.2 guidance). The approach chosen has to be applied consistently throughout the period of NDC implementation (paragraphs 8 and 18c of the draft Article 6.2 guidance). For multi-year targets or budgets, countries need to clearly define their multi-year target or budget. For single-year targets, countries can choose between averaging and establishing a multi-year emissions trajectory or budget. Averaging causes several challenges and may imply that aggregated GHG emissions due to the use of Article 6 can increase or decrease. Examples of challenging factors include: how the countries engage in ITMOs; whether the emissions in the target year are representative for the NDC implementation period; and the risk that countries may "cherry-pick" between averaging and multi-year trajectories. A multi-year emissions trajectory is therefore deemed more robust, as long as the trajectory is reasonably defined (e.g., as a linear interpolation between current emissions and the target level in the target year).
6. **Selection and specification of ITMO metric:** Host countries need to choose and communicate the ITMO metric used for measuring ITMOs (paragraph 18c of the draft Article 6.2 guidance). The methodology only considers carbon credits expressed in GHG emission terms. ITMOs in other metrics may lead to an increase or decrease in aggregate emissions from the cooperative approach and are thus not considered as ensuring environmental integrity.
7. **Arrangements for authorizing ITMOs and managing NDC compliance:** Host countries need to establish institutional arrangements and processes for authorizing the use of ITMOs (paragraph 4c of the draft Article 6.2 guidance). It is a good practice to include measures to manage compliance with the NDC (i.e., to ensure that the country does not over-sell ITMOs).
8. **Arrangements for tracking ITMOs:** Host countries need to have arrangements in place for tracking ITMOs (paragraph 4d of the draft Article 6.2 guidance). These may include a national registry or access to a (third-party) international registry (paragraphs 29-31 of the draft Article 6.2 guidance).
9. **Fulfillment of reporting obligations:** Host countries engaging in Article 6 need to provide relevant information in an initial report, annual reports and biennial reports (paragraphs 18 to 24 of the draft Article 6.2 guidance). This requires relevant institutional arrangement and processes for regular reporting to be in place. Non-submission of relevant reports, in particular on the application of corresponding adjustments, can pose a serious threat to avoiding double claiming.

Table 22 Scoring approach for host country provisions for avoiding double claiming with its NDC

Indicator		Points
Participation in the Paris Agreement		
2.3.1.1	The country is a Party to the Paris Agreement, it has communicated and is maintaining an NDC, and has not announced an intention to withdraw from the Paris Agreement.	PASS / FAIL
2.3.1.2	The coverage of the NDC has unambiguously been clarified in GHG emissions metrics, including the NDC implementation period; the gases, sectors, and categories of anthropogenic emissions and removals covered; and the activities and pools covered in the case of the LULUCF sector.	4
Quantification of the NDC in tCO_2e		
2.3.1.3	The NDC has been unambiguously quantified in tCO_2e, or the country has provided a methodology to unambiguously quantify it after the target year (e.g., in case of targets per gross domestic product), including a clear specification of the target level (e.g., in relation to a reference year).	2
2.3.1.4	The NDC target is an emission reduction compared to an historical reference year or a deviation from a business-as-usual emissions projection. In the latter case, the country has either specified that it will not update its business-as-usual project or it has unambiguously specified the conditions and methodology for updating the business-as-usual emissions projection.	1
2.3.1.5	All mitigation information in the NDC has been appropriately considered in quantifying the NDC in tCO_2e, resulting in a target level that is consistent with the aggregated outcome of the mitigation information specified in the NDC.	3
	Accounting for single- or multi-year targets	
2.3.1.6	The country has chosen and communicated its method to account for single- or multi-year targets.	2
2.3.1.7	The country has communicated a multi-year emissions target. OR The country has a single-year target and established a robust and credible multi-year trajectory or budget to account for its single-year target (e.g., as a linear interpolation from current emissions to the target level in the target year). OR The country has a single-year target and chosen averaging to account for its single-year target.	6 4 0
Accounting for ITMOs		
2.3.1.8	The country has chosen and publicly communicated the metric used to measure ITMOs.	2
2.3.1.9	If the country has chosen and publicly communicated the metric, the metric is tCO_2e.	PASS / FAIL
2.3.1.10	The GWP values and metrics used in accounting for the NDC are consistent with those used to issue carbon credits.	1
2.3.1.11	The country has established appropriate domestic institutional arrangements and processes for authorizing the carbon credits' associated emission reductions or removals for use as ITMOs.	2

2.3.1.12	These institutional processes and arrangements include effective measures to manage compliance with the NDC, i.e., to ensure that the country does not over-sell ITMOs.	4
2.3.1.13	The country has institutional arrangements and processes in place for tracking ITMOs.	2
Reporting obligations under the Paris Agreement		
2.3.1.14	The country has selected the relevant part of emissions from its national GHG inventory, consistent with the scope of its NDC, as the indicator to track progress towards the NDC.	2
2.3.1.15	The country has established institutional arrangements and processes for regular reporting of relevant information.	2
2.3.1.16	The relevant reports are complete and provide the necessary level of detail of information.	1
2.3.1.17	Issues of non-implementation are observed (e.g., as part of relevant review processes), in particular in relation to the reporting of corresponding adjustments.	-4
Maximum achievable points		**34**

The overall score for sub-criterion 2.3.1 is determined using the point system scoring method outlined in chapter 2 above, barring failure of a minimum requirement. A score of 5 is assigned if the maximum number of achievable points is reached (34 points). A score of 1 is assigned if 17 or fewer points are achieved. For any achieved points between these thresholds, the score is determined based on a linear interpolation using the following formula below:

$$C_{2.3.1} = 1 + \frac{(\text{Points} - 17)}{(34 - 17)} \cdot 4$$

Where:

$C_{2.3.1}$ = Score for sub-criterion 2.3.1

Sub-criterion 2.3.2: Carbon crediting program provisions for avoiding double claiming with NDCs

This sub-criterion is only applicable to carbon credits backed by corresponding adjustments, i.e., for which double claiming with the host country NDC needs to be avoided (see Table 17).

Rationale for using this sub-criterion

Avoiding double claiming with host country NDCs requires not only that the host country have respective processes and institutional arrangements in place, but also that carbon crediting programs have procedures in place to facilitate the application of corresponding adjustments by host countries. This sub-criterion therefore assesses the carbon crediting programs' readiness and ability to facilitate the avoidance of double claiming, drawing on the Guidelines for Avoiding Double Counting with CORSIA (ClimateWorks Foundation et al. 2019).

Level at which the sub-criterion is assessed

This sub-criterion is assessed at the level of the carbon crediting program.

Scoring approach

The methodology identifies key program design elements for avoiding double claiming with host country NDCs and assesses whether carbon crediting programs have these design elements in place, using a point system as summarized in Table 23 below.

Table 23 Scoring approach for carbon crediting program implementation of international provisions for avoiding double claiming with host country NDCs

Indicator		Score
2.3.2.1	The program has established standards and procedures to identify the host country (i.e., the country in which the project is implemented). Carbon credits issued by the program are attributable to the host country, either through an attribute to each issued credit (e.g., in the serial number) or through the project database. If the carbon crediting program allows multi-country projects, the program's standards and procedures accommodate situations in which a project is implemented in more than one country.	PASS / FAIL
2.3.2.2	The program has established standards and procedures to identify in which country each carbon credit's associated emission reductions or removals occurred. For each carbon credit, the country where the carbon credit's associated emission reductions or removals occurred is identifiable, either through an attribute to each issued credit (e.g., in the serial number) or through the project. The standards and procedures accommodate situations where a project is implemented, or affects emissions, in more than one country.	2
2.3.2.3	The program has established standards and procedures to identify for each carbon credit, or each block of carbon credits, the period in which the emission reductions or removals occurred.	PASS / FAIL
2.3.2.4	The program has established standards and procedures to identify for each carbon credit the calendar year in which the associated emission reductions or removals occurred, and to assign to each issued carbon credit an attribute indicating the calendar year. Carbon credits are allocated proportionally to calendar years based on when the project caused emission reductions or removals to occur, ensuring that only one calendar year is assigned to each carbon credit.	2
2.3.2.5	The program has established standards and procedures for project owners or the program to obtain and publicly report Article 6 authorizations from host countries (or, where applicable, the country where the project will cause emission reductions or removals), consistent with relevant international decisions under the Paris Agreement.	4
2.3.2.6	The program has adopted policies with provisions for enforcement that require its own employees, sub-contractors, as well as project owners to commit to anti-corruption policies and practices with regards to obtaining Article 6 authorization.	2
2.3.2.7	The program has adopted standards and procedures to obtain evidence of the appropriate application of adjustments from the host country (or, where applicable, the country in which the carbon credit's associated emission reduction or removal occurred).	2
2.3.2.8	The program has established standards and procedures to qualify and earmark carbon credits as eligible for uses for which double claiming with the host country NDC needs to be avoided, once all relevant requirements have been satisfied.	2

	The program has standards and procedures to cease qualifying and earmarking credits as eligible in the event that evidence for the appropriate application of corresponding adjustments cannot be obtained.	
2.3.2.9	The program has robust provisions for replacing carbon credits for which the evidence of the appropriate application of corresponding adjustments cannot be provided within two years. The replacement provisions ensure that the relevant credits are only replaced by credits issued for emission reductions or removals that have been qualified by the program as eligible for uses for which double claiming with the host country NDC needs to be avoided.	2
Maximum achievable points		**16**

The overall score for sub-criterion 2.3.2 is determined using the point system scoring method outlined in chapter 2 above, barring failure of a minimum requirement. A score of 5 is assigned if the maximum number of achievable points is reached (16 points). A score of 1 is assigned if 8 or fewer points are achieved. For any achieved points between these thresholds, the score is determined based on a linear interpolation using the following formula below:

$$C_{2.3.2} = 1 + \frac{(\text{Points} - 8)}{(16 - 8)} \cdot 4$$

Where:

$C_{2.3.2}$ = Score for sub-criterion 2.3.2

Sub-criterion 2.3.3: Avoiding double claiming with mandatory domestic mitigation schemes

This sub-criterion is applicable to all carbon credits (see Table 17).

Rationale for using this sub-criterion

Double counting can also occur with mandatory domestic mitigation schemes. These refer to schemes that are legally binding through respective laws and regulations and that establish a target for a defined group of installations, entities, or sinks and sources, such as an ETS or a renewable electricity generation quota. For example, a renewable power plant could reduce emissions in an ETS which covers fossil fuel-based power plants. A project's overlap with such schemes would raise concerns about the additionality of such a mitigation activity and pose risks for double counting. If it is not prevented, the same emission reductions may be claimed by entities under the mitigation schemes (e.g., entities covered by the ETS) and the buyers of the carbon credit.

In the context of carbon tax obligations that allow for the use of carbon credits to comply with a tax liability, double counting may be a risk if carbon credits may be generated from emission reductions at installations subject to the tax, or if the use of such credits results in a claim by the liable entity of an emission reduction. If instead the use of carbon credits is only counted towards the carbon tax obligation but not claimed on the entity's account, then the emission reduction or removal is not being accounted for twice.

Level at which the sub-criterion is assessed

This sub-criterion is assessed at the level of the carbon crediting program.

Scoring approach

Carbon crediting programs can avoid this form of double counting in two ways, by:

1. Not qualifying projects or issuing carbon credits that overlap with mandatory domestic mitigation schemes;

2. Cancelling the equivalent number of allowances: Requiring that, if carbon credits are associated with activities or emission reductions/removals that are covered by these schemes, the activities or emission reductions/removals are not counted towards the achievement of these targets (e.g., by cancelling ETS allowances before issuing carbon credits, to the extent that the project reduces emissions from sources and gases covered by the ETS).

The methodology considers this sub-criterion a minimum requirement. Therefore, carbon crediting programs that have any of these two approaches in place are assigned a score of PASS. If a carbon crediting program does not have such procedures in place but nevertheless registers projects for which the emission reductions or removals may overlap with mandatory domestic mitigation schemes, a score of FAIL is assigned where there is such a risk (e.g., renewable electricity generation). For other project types, a score of PASS is assigned.

Example application: Clean Development Mechanism (CDM)

The CDM prevents CERs from being issued for emission reductions that occur in countries included in Annex I to the Convention. However, it does not have any procedures in place to avoid overlap with emissions trading systems or other mandatory domestic mitigation schemes. The CDM thus receives a score of FAIL for project types where there is such a risk, and PASS for other project types.

Example application: Verified Carbon Standard (VCS)

The VCS Project Standard, version 4.0, section 3.20, stipulates that projects can claim only VCUs or other forms of environmental credit. The provisions address, inter alia, the overlap with emissions trading systems and require that a respective amount of allowances be cancelled. The VCS is thus assigned a score of PASS.

Determination of the combined score for quality objective 2

Step 1: Avoiding double issuance

1. Determine the score for all sub-criteria using the scoring approach described in the respective section.

2. Apply the general formula for inverse weighing to determine the overall score for criterion 2.1:

$$C_{2.1} = \mathrm{MAX}\left\{6 - \left(0.5 \cdot (6 - SC_{2.1.1})^{1.3}\right)^{\frac{1}{1.3}} + 0.5 \cdot (6 - SC_{2.1.2})^{1.3}\right\}$$

Where:

$C_{2.1}$	=	Score for criterion 2.1
$SC_{2.1.1}$	=	Score for sub-criterion 2.1.1
$SC_{2.1.2}$	=	Score for sub-criterion 2.1.2

Step 2: Avoiding double use

Determine the score for criterion 2.2 using the scoring approach described in the respective section above. Note that if any of the indicators used to determine the score for criterion 2.2 is assigned the score FAIL, then the total score of criterion 2.2 is FAIL.

Step 3: Avoiding double claiming

Determine the score for criterion 2.3. The score for criterion 2.3 depends on (a) whether sub-criterion 2.3.3, which is a minimum requirement, is passed and on (b) whether the carbon credits concerned are backed by corresponding adjustments, given that two out of the three sub-criteria only apply in such instances.

If the carbon credits concerned are not backed by corresponding adjustments, then the score of sub-criterion 2.3.3 (either PASS or FAIL) is used as the score for criterion 2.3.

If the carbon credits concerned are backed by corresponding adjustments, then the score for sub-criterion 2.3 is determined as follows:

$$C_{2.3} = \mathrm{MAX}\left\{6 - \left(0.5 \cdot (6 - SC_{2.3.1})^{1.3}\right)^{\frac{1}{1.3}} + 0.5 \cdot (6 - SC_{2.3.2})^{1.3})\right\}$$

Where:

$C_{2.3}$	=	Score for criterion 2.3
$SC_{2.3.1}$	=	Score for sub-criterion 2.3.1
$SC_{2.3.2}$	=	Score for sub-criterion 2.3.2

Note that if any of the indicators used to determine scores of sub-criteria 2.3.1, 2.3.2, or 2.3.3 is assigned a score of FAIL, then the total score of criterion 2.3 is FAIL.

Step 4: Determine the overall score quality objective 2

Determine the combined score of quality objective 2. The combined score of quality objective 2 depends on whether the carbon credits concerned are backed by corresponding adjustments.

If the carbon credits concerned are not backed by corresponding adjustments, then the score of quality objective 2 is determined as follows:

$$Q_2 = \mathrm{MAX}\left\{6 - \left(0.6 \cdot (6 - C_{2.1})^{1.3}\right)^{\frac{1}{1.3}} + 0.4 \cdot (6 - C_{2.2})^{1.3})\right\}$$

Where:

Q_2	=	Score for quality objective 2
$C_{2.1}$	=	Score for criterion 2.1
$C_{2.2}$	=	Score for criterion 2.2

If the carbon credits concerned are backed by corresponding adjustments, then the score of quality objective 2 is determined as follows:

$$Q_2 = \mathrm{MAX}\left\{6 - \left(0.3 \cdot (6 - C_{2.1})^{1.3} + 0.2 \cdot (6 - C_{2.2})^{1.3}\right)^{\frac{1}{1.3}} + 0.5 \cdot (6 - C_{2.3})^{1.3})\right\}$$

Where:

Q_2	=	Score for quality objective 2
$C_{2.1}$	=	Score for criterion 2.1
$C_{2.2}$	=	Score for criterion 2.2
$C_{2.3}$	=	Score for criterion 2.3

Note that if any of the three criteria (2.1, 2.2. or 2.3) is assigned a score of FAIL, then the total score of quality objective 2 is FAIL.

Furthermore note that inverse weighing is used here in order to ensure that, in situations for which the scoring of one criterion is poor, this cannot be fully made up by high scores in other criteria.

Quality objective 3: Addressing non-permanence

Non-permanence refers to a situation wherein the emission reductions or removals generated by a mitigation activity are later reversed, for example, due to a natural disaster, project mismanagement or changes in local conditions that make storage no longer viable. To assess the risk this creates for carbon credits, the methodology assesses two criteria:

3.1 **Significance of non-permanence risks:** The risk of non-permanence differs among projects. Reversal risks depend on several factors, including how project owners manage these risks and address the underlying drivers for reversals. For some project types, such as landfill methane destruction, the emission reductions cannot be reversed at all. This criterion determines for which project types reversal risks are considered material.

3.2 **Robustness of the carbon crediting program's approaches for addressing non-permanence risks:** Carbon crediting programs pursue varying approaches to reduce non-permanence risks and to compensate for any non-permanence. Thoroughness in the approach is crucial to appropriately addressing reversal risks. Key factors include establishment of liability for reversals, the duration for which the occurrence of reversals is monitored and accounted for, whether and how any reversals are compensated, and whether the compensation mechanisms are robust enough to also address disastrous events.

The overall score for quality objective 3 depends on these two criteria. The first criterion assesses whether the relevant project type faces material non-permanence risks. If a project type is deemed to have no material non-permanence risks, then approaches to address non-permanence risks are also not needed. In this case, quality objective 3 is assigned a score of 5. If a project type faces material non-permanence risks, the robustness of the approach to addressing non-permanence risks is important. In this case, the maximum score under this quality objective is 4. While there can be adequate measures in place to address non-permanence risks—as in the approaches presented below—future reversals cannot be ruled out, and compensation for any reversals cannot be guaranteed. As such, the methodology does not, in these instances, assign a score of 5.

Criterion 3.1: Significance of non-permanence risks

Rationale for using this criterion

Non-permanence relates to reversals of carbon from a reservoir. It occurs when a mitigation activity enhances or preserves carbon stocks in carbon reservoirs; however, at a later point in time, some or all of the additional increments in stock caused by the mitigation activity are released to the atmosphere. Such reversals can occur due to natural processes, such as wildfires, or anthropogenic drivers, such as land conversion. A reversal is similar to leakage, except that it happens at a different time, rather than in a different place. In the case of leakage, reductions or removals from a mitigation activity are negated by increased emissions elsewhere in the system. With reversals, the reductions or removals from a mitigation activity could still have some temporary value as long as carbon stocks continue to stand.

Non-permanence risk varies significantly between different types of mitigation activities and may also depend on the specific design of a mitigation activity. Understanding the non-permanence risks is important in weighing the quality objective of addressing non-permanence.

Level at which the criterion is assessed

This criterion is assessed at the level of project types.

Scoring approach

Non-permanence risks apply to several types of potential carbon crediting projects. A permanent reduction can only be guaranteed in the context of a full assurance of non-reversal by natural means. In principle, any mitigation measure associated with carbon reservoirs has a reversal risk, including fossil fuel or land-based carbon reservoirs. By contrast, greenhouse gas reductions that are not associated with the preservation or enhancement of carbon reservoirs are always permanent. This holds for mitigation activities that destroy non-CO_2 gases, such as the capture and flaring of methane from landfill sites, as well as for activities that prevent the formation of non-CO_2 gases, such as reducing methane emissions from rice cultivation. In these cases, there is no physical process by which such destruction or avoided formation can be undone. A reversal is therefore not possible.

Not all carbon-related mitigation activities associated with carbon reservoirs have the same non-permanence risk. To compare non-permanence risks, it is critical to understand the likelihood of reversals *within a time horizon that is relevant for avoiding dangerous climate change*. This depends on various factors: whether and how the underlying mitigation activities address the anthropogenic drivers for the depletion of the carbon reservoir, including whether these measures will continue to ensure that carbon remains stored even if they are terminated; the susceptibility of the reservoir to natural disturbances; and, in some instances, the size of the reservoir.

Given that demand for fossil fuel is indirect demand for the energy services they provide, and that these are increasingly competing with renewable energy, it is much less likely that the drivers for the exhaustion of the fossil fuel carbon stock will persist after an emission reduction. On the other hand, land-based carbon stocks face a multitude of potential drivers, including agriculture and logging industries. In conclusion, mitigation measures targeting terrestrial carbon reservoirs are exposed to higher levels of anthropogenic reversal risks as well as natural disturbance risks.

Table 24 provides an overview for which types of mitigation activities non-permanence risks are considered material and for which they are not. This list is not exhaustive. The table also provides examples and justifications.

Table 24 Non-permanence risks of different types of mitigation activities

Mitigation activity	Non-permanence risk	Example activities
Destruction of non-CO_2 gases	No risk: No reservoir involved. The destruction cannot be physically reversed.	HFC-23 destruction from HCFC-22 production
Avoidance of formation of non-CO_2 gases, without effecting the amount of carbon stored in reservoirs	No risk: No reservoir involved. The destruction cannot be physically reversed.	Reducing CH_4 emissions from rice cultivation, ruminant livestock or organic waste diversion
Reducing demand for fossil fuels	No material risk within time horizon relevant for avoiding dangerous climate change (except for possible lock-in effects in the case of activities that lead to a long-term increase in energy or feedstock demand).	Adoption of renewable energy; energy efficiency measures
Reducing demand for non-renewable biomass (thereby reducing forest degradation)	Relevant natural disturbance risks and anthropogenic factors.	Efficient cook stove projects
Enhancing, preserving, or slowing depletion of terrestrial carbon reservoirs	Relevant risks. The size of the risk depends on spatial scale, how underlying drivers are addressed, and stability of the reservoir(s) affected by the mitigation activity	Afforestation/reforestation; improved forest management; avoided deforestation/conversion; soil carbon enhancements; peatland preservation or "rewetting"; etc.
Storing carbon in geologic reservoirs	Relevant risks. The size of the risks mainly depends on reservoir stability.	Carbon capture and storage (CCS BECCS, DACCS, or other)
Preventing or extinguishing accidental uncontrolled burning of fossil fuels	Relevant risks. The size of the risks mainly depends on reservoir stability.	Extinguishing or preventing ignition of fires at waste coal piles
Preventing or slowing exploitation of fossil fuel reserves	Relevant risks. If the protection measure is discontinued, the reservoir may be depleted.	"Supply side" climate policies or interventions.

Criterion 3.2: Robustness of the carbon crediting program's approaches for addressing non-permanence risks

Carbon crediting programs use a variety of approaches toward non-permanence risks. The approaches can be categorized in two main approaches:

1. **Accounting or compensating for reversals (Approach 1):** this entails different measures to account or compensate for (potential) reversals.
2. **Avoiding or reducing non-permanence risks (Approach 2):** this mainly entails conducting non-permanence risk assessments and, based on the results, either excluding higher-risk mitigation activities from eligibility or providing incentives for mitigation activity owners to avoid reversals from occurring.

Most carbon crediting programs combine approach 1 with approach 2, while some use only approach 1 and very few use only approach 2. In some instances, the approach applied also varies between different project types.

The methodology uses these two main approaches as sub-criteria. If a carbon crediting program uses only one of the two approaches, it will receive a lower score than a carbon crediting program that employs both approaches. A few carbon crediting programs may issue credits to project types that are subject to material reversal risks but nonetheless do not have any measures in place to address non-permanence. For these project types, the respective carbon crediting programs are assigned a score of FAIL under this section of the methodology.

Sub-criterion 3.2.1: Approaches for accounting and compensating for reversals (Approach 1)

Rationale for using this sub-criterion

Many carbon crediting programs apply approaches to account and compensate for any reversals. The robustness of these approaches is critical for addressing non-permanence. This sub-criterion assesses the robustness of the relevant approaches.

Level at which the sub-criterion is assessed

This sub-criterion is assessed at the level of the carbon crediting program. If the carbon crediting program uses different approaches for different project types or geographical areas, then this sub-criterion should be applied separately to the relevant project types or geographical areas.

Scoring approach

Carbon crediting programs employ the following three approaches for accounting and compensating for reversals:

- **Temporary carbon credits (Approach 1a):** credits that expire after a certain period and need to be replaced by other carbon market units, irrespective of whether a reversal occurred;
- **Monitoring and compensation for reversals (Approach 1b):** monitoring of any (potential) reversals and the compensation for the reversal through the cancellation of other carbon market units;
- **Discounting (Approach 1c):** discounting of emission reductions or using lower baselines that result in fewer emission reductions or removals that are credited in order to account for possible future reversals.

Usually, a carbon crediting program only pursues *one* of these three approaches for a given project type and geographical area. The assessment in this section should thus be applied to the relevant approach only and the scoring result for the relevant approach constitutes the score for sub-criterion 3.2.1. In situations where a program uses another approach than the above three approaches to account and compensate for reversals, the users of the methodology may use expert judgment to assess the robustness of the relevant approach.

Approach 1a: Temporary credits

Carbon crediting programs can address non-permanence risks by issuing carbon credits that are only valid for a pre-defined period and, following their expiry, must be replaced, regardless of whether a reversal has occurred. This approach thus treats carbon storage as ‘rented’ mitigation that is

inherently temporal (Maréchal und Hecq 2006; Marland et al. 2001; Marland und Marland 2009; Sedjo und Marland 2003).

In principle, treating emission reductions or removals as inherently temporal is a very conservative approach that can lead to a net reduction in global emissions, because all carbon credits must be ultimately replaced by permanent carbon market units while it can be expected that some carbon remains stored. Emissions could only increase for the time period between a reversal and the expiry of the temporary carbon credits. In principle, this ensures environmental integrity, as long as the replacement of expired units is secured.

This approach thus effectively addresses non-permanence as long as the necessary procedures and governance arrangements are in place to ensure the replacement of temporary carbon credits following their expiry. Assurance of replacement of credits must be demonstrated, for example, in the form of a verified legal documentation that attests to the replacement of these credits. If this is ensured, including in scenarios in which programs are no longer in operation, this approach receives a score of 4; otherwise, it receives a score of FAIL.

Example application: Clean Development Mechanism (CDM) for afforestation and reforestation activities

Temporary carbon credits are used under the CDM to address non-permanence risks of afforestation and reforestation projects. Two types of units are distinguished:

1. **Temporary certified emission reductions (tCERs)** expire at the end of the subsequent commitment period under the Kyoto Protocol for which they were issued. Project owners can request the issuance of new tCERs for each subsequent commitment period, subject to a verification that the carbon is still stored.
2. **Long-term certified emission reductions (lCERs)** are valid until the end of the last crediting period of the project (i.e., up to 60 years) but must be replaced by permanent units in the case of reversals or in the case that a monitoring report is not submitted.

In theory, this approach could ensure integrity for the reasons highlighted above. In practice, however, it was developed in the specific context of the Kyoto Protocol that is about to run out. As a third commitment period beyond 2020 is not envisaged in UNFCCC negotiations, permanent Kyoto units will no longer be available after the end of the true-up period of the second commitment period after 2023. It may thus become technically impossible to compensate for any reversals after 2023. In practice, the approach therefore no longer ensures environmental integrity, except if provisions were put in place under the Paris Agreement to ensure that Parties will continue to meet their obligations arising from tCERs and lCERs used under the Kyoto Protocol. In current negotiations no such provisions are being considered. Because the necessary procedures and governance arrangements are not currently in place to ensure the replacement of temporary CDM credits, the non-permanence provisions of the CDM receive a score of FAIL.

Approach 1b: Monitoring and compensating for reversals

The predominant approach for carbon crediting programs to address non-permanence is to monitor, report, and compensate for reversed mitigation outcomes by cancelling issued carbon credits. The robustness of this approach depends on several aspects of its design. The methodology therefore considers several indicators to assess the application of this approach. All of these indicators are assessed at program level and, where the program's requirements differ between project types, also take into account project-type specific provisions of the program.

Indicator 3.2.1.1: Time-horizon for monitoring reversals

Ideally, emission reductions or removals should last indefinitely to keep global emissions within a carbon budget compatible with limiting global warming to 1.5°C. In practice, however, no risk can be insured against in perpetuity, including reversal risks. An important question regarding the compensation of reversals is for how long the occurrence of any reversals must be monitored and, if occurring, compensated for. Carbon crediting programs specify different minimum time periods when any reversals must be monitored, reported and compensated for.

The minimum period for which reversals must be monitored and reported varies considerably among carbon crediting programs—between 5 and 100 years from the start of the crediting period. A longer period of time provides a higher assurance that future reversals are addressed. Table 25 specifies which score is assigned for which minimum duration.

Table 25 Scoring approach for the period for which monitoring and reporting of reversals are required

Period for which monitoring and reporting of reversals are required (from the start of the first crediting period)	Score
100 years or longer	4
≥ 60 years	3
≥ 30 years	2
Shorter	1

Example application 1: Climate Action Reserve (CAR)

The Climate Action Reserve (CAR) requires monitoring and compensation of reversals for 100 years, unless otherwise regulated by protocols for specific project types, as well as using the discounting of emission reductions to address non-permanence (*Reserve Offset Program Manual*, November 12, 2019, section 2.8). The CAR receives a score of 4, except for credits from project types for which this requirement does not apply.

Example application 2: American Carbon Registry (ACR)

The American Carbon Registry Standard (version 6.0, chapter 5) specifies a “minimum project term” of 40 years, during which projects must monitor and compensate for any reversals. It is thus assigned a score of 2.

Indicator 3.2.1.2: Addressing potential reversals in case of discontinuation of monitoring

In cases where monitoring of reversals discontinues prior to the required time horizon, there is a risk that reversals occurring thereafter will not be accounted for. In some instances, activity owners might even cease monitoring because of a reversal.

Carbon crediting programs pursue different approaches to address this risk. As it is possible that a significant reversal causes monitoring to be terminated, the most conservative approach would be to require compensation for carbon credits that were issued to the project. If such compensation is required within 1 year after a monitoring report is overdue, the program is assigned a score of 4. If such compensation is required at a later stage (e.g., after a grace period longer than 1 year to still submit a monitoring report), the program is assigned a score of 3. Some carbon crediting programs compensate only for a fraction of the issued credits (e.g., by retiring the project's credits in a pooled

buffer reserve). These are scored significantly lower, with a 2, as there is considerable uncertainty whether reversals have occurred. Some programs may not address reversals at all, and are assigned a score of FAIL (see Table 26).

Table 26 Scoring approach for potential reversals in case of discontinuation of monitoring

Program requirements	Score
All carbon credits previously issued to the project must be compensated for within 1 year after the monitoring report was due	4
All carbon credits previously issued to the project must be compensated for, with a grace period longer than 1 year after the monitoring report was due	3
Only a fraction of carbon credits (e.g., those set aside in a buffer) must be used to compensate for a possible reversal	2
No action required, or no time limit is indicated for compensation	FAIL

Example application: Clean Development Mechanism (CDM)

CDM provisions for lCERs and for CERs issued to CCS projects require that all issued units must be replaced if a certification report is not submitted within five years of the last report. Following a grace period of 120 days (for lCERs) or six months (for CERs from CCS projects), all units must be replaced by the relevant buyers (decision 5/CMP.1, paragraphs 33 and 50, and decision 10/CMP.7, paragraphs 17 and 25). The approach therefore receives a score of 4.

Indicator 3.2.1.3: Addressing potential reversals after the end of regular monitoring

Carbon crediting programs require monitoring of any reversals only for a limited period of time (see indicator 3.2.1.1). As reversals can also occur after the end of this period, an important question to consider is whether and how carbon crediting programs address any reversals that might occur after the end of the required time horizon for monitoring reversals.

To address this risk, some carbon crediting programs require that the project's credits that are held in a buffer reserve are cancelled after the end of the required time horizon for monitoring and compensating reversals. This approach implicitly discounts part of the emission reduction or removals to account for possible future reversals. It also fully addresses future reversals, as long as the extent to which reversals occur after the monitoring period ends is equal to or smaller, on average, than the total credits cancelled in buffers that use this approach. This approach is considered best practice and thus assigned a score of 4.

Some carbon crediting programs require that the project's credits that are held in a buffer reserve stay in the reserve without retiring them. These credits could then be used to compensate for reversals from other projects, in which case non-permanence would not be addressed beyond the monitoring period. Keeping credits in the buffer may also promote environmental integrity though to a lesser extent: it enhances the capitalization of buffers for future compensation of reversals, which might help to address large-scale reversals. However, if the credits are ultimately used to compensate for the reversals from other mitigation activities during their monitoring period, they no longer compensate for potential future reversals from the project. This approach receives a score of 3. Some carbon crediting programs may not address reversals beyond the regular end of the monitoring period. This approach is scored as a 1 (see Table 27).

Table 27 Scoring approach for potential reversals after the end of regular monitoring

Program requirements	Score
The project's credits held in a buffer reserve are cancelled	4
The project's credits held in a buffer reserve stay in the reserve without retiring them	3
No action required (all credits are issued to the project owners)	1

Example application: American Carbon Registry (ACR)

The American Carbon Registry Standard, version 6.0, Appendix B, section B.6, states that, following the end of the Project Term (the time period for which monitoring takes place), the ACR shall decide to "continue to hold or retire any remaining offsets contributed to the Buffer Pool Account with respect to the Project." The program thus applies the first two approaches set out in Table 27 above. No further information could be identified for the conditions under which carbon credits will be held or cancelled. As it is unclear under which conditions ACR uses which of the two approaches, the program's approach is here scored as a 3.

Indicator 3.2.1.4: Types of reversals to be compensated for

Non-permanence is only truly ensured if all types of reversals are compensated for. Therefore, another important indicator is whether carbon crediting programs require compensation of all or only some types of reversals.

Some carbon crediting programs distinguish two types of reversals:

1. **Unintentional reversals** happen if stored carbon is lost due to natural disturbances, such as storms, wildfire or disease, that are not the result of human willful intent.
2. **Intentional reversals** denote reversals that are caused by a landowner's or project owner's willful intent, including harvesting, land conversion or negligence, (i.e., through poor management).

In practice, it may be difficult to draw a clear line between the two, as the extent of damage taken from natural disturbances can depend on how a forest is managed. For example, some intentional reversals, such as partial harvesting, may be undertaken to reduce risks from natural disturbances.

Many carbon crediting programs require that all types of reversals be compensated for. These receive a score of 4. Some programs only require that unintentional reversals be compensated for. This approach only partially addresses reversal risks and therefore receives a score of 1.

Table 28 Scoring approach for the type of reversals that must be compensated for

Program requirements	Score
All type of reversals must be compensated for	4
Only unintentional reversals (e.g., due to natural disturbances) must be compensated for	1

Example application: American Carbon Registry (ACR)

The American Carbon Registry Standard, version 6.0, section B, specifies that both intentional and unintentional reversals must be compensated for, and is thus assigned a score of 4.

Indicator 3.2.1.5: Robustness of the approach for compensating for reversals

Once reversals have been identified (or their occurrence cannot be excluded because no monitoring report is available), the reversed mitigation needs to be compensated for by cancelling an equivalent number of other carbon market units. The robustness of the approach used by carbon crediting programs to compensate for reversals is critical to ensuring that emission reductions or removals are permanent.

Assessing the overall robustness of the approach to compensating reversals is complex, as the overall effectiveness may depend on how different measures are implemented or combined. This may depend on several factors, including which entities are responsible for compensating, in what sequence they assume responsibility, and what assurances are provided that the responsible entities have incentives and will be able to fully compensate for the reversals. The methodology uses a point system which identifies key questions for the overall robustness (see Table 29 below).

A key question is: which entities are responsible for compensation, and what level of assurance and safeguards have they provided that the relevant entity is incentivized and able to compensate for reversals? The methodology is therefore structured around the different options for entities responsible for compensating and gives points if measures are in place that provide additional levels of assurance that compensation will take place. The methodology considers the following entities, or combinations thereof:

- **Project owners:** Many carbon crediting programs make project owners responsible for compensating for reversals. Making project owners the first responsible entity is particularly important for intentional reversals, as this approach avoids the moral hazard of other entities having to cover for the reversals intentionally caused by the project owners. To provide higher assurance that carbon crediting programs can enforce compensation by project owners, carbon crediting programs can require program owners to sign enforceable legal agreements. One risk to this approach is that, in case the project owners go bankrupt, they may not be able to compensate for reversals. Provisions to use other approaches, such as pooled buffer reserves in the event of bankruptcy, can mitigate such risks.

- **Pooled buffer reserves:** Many carbon crediting programs manage a “pooled buffer reserve” to compensate for reversals. Under this approach, a fraction of the carbon credits from projects with non-permanence risks is set aside into a common buffer reserve which can be drawn upon to cover reversals from any participating project. As with any kind of insurance, buffer reserves can only be effective at guaranteeing permanence if they are sufficiently “capitalized” to cover reversal risks over time, including from catastrophic losses. It is therefore important which fraction of carbon credits is put into the reserve and how the reserve is replenished in case a reversal needs to be compensated for. What level of capitalization is appropriate, however, also depends on the level and diversification of non-permanence risks of the project portfolio (which may change over time as new projects are registered) and what type of reversals (only unintentional, also intentional, or bankruptcy) need to be covered by the reserve. What matters is the fraction of carbon credits that is held in the reserve, in relation to the level and diversification of non-permanence (and bankruptcy) risk of the project portfolio. Lastly, it is important that the reserve continues to be available if the carbon crediting program ceases to exist or is no longer able to operate the reserve. This may, inter alia, depend on whether the reserve is sufficiently protected in case of insolvency.

- **Non-pooled buffer reserves:** Some carbon crediting programs use non-pooled buffer reserves which, like pooled reserves, set aside a fraction of the issued carbon credits, but establish a separate reserve for each individual project. Non-pooled buffer reserves provide a lower

assurance that reversals are compensated than pooled buffer reserves because a more limited number of carbon credits is available to compensate for catastrophic reversals.

- **Insurances:** Some carbon crediting programs allow project owners to provide insurances to manage the risk for compensation. In the event of reversals, the insurance could either conduct the compensation or make a payment to the carbon crediting program which allows the program to purchase carbon credits to compensate for the reversal.
- **State responsibility:** Some carbon crediting programs allow states to assume responsibility for replacing carbon credits in the event of reversals. For example, under the CDM, the country hosting the mitigation activity (CDM CCS) or the country using the credits (CDM AR, CDM CCS) assumes responsibility for compensating reversals.

The scoring approach, detailed in Table 29, follows a point system based on the evaluation of specific questions. Table 29 specifies the questions.

Table 29 Scoring approach for the robustness of the approach for compensating for reversals

Sub-indicator		Points
Compensation by project owners		
3.2.1.5.1	The program requires project owners to compensate for reversals.	2
3.2.1.5.2	The project owners are the sole responsible entity for compensating for *intentional* reversals (e.g., they are required to top up units temporarily drawn from a pooled buffer reverse), except in the case of bankruptcy.	4
3.2.1.5.3	Project owners are required to sign enforceable legal agreements to monitor, report and compensate for reversals.	2
3.2.1.5.4	In the case of a default of the project owners, the program makes provisions for another entity to assume responsibility for the reversals, such as a pooled buffer reserve.	2
Use of pooled buffer reserves		
3.2.1.5.5	The program uses a pooled buffer reserve to compensate for reversals.	6
3.2.1.5.6	An expert judgement finds that the fraction of issued carbon credits from projects at risk of reversal that is placed into the reserve is: at least as large as the most likely percentage of emission reductions or removals that will be reversed over 100 years. OR at least 50% larger than the most likely percentage of emission reductions or removals that will revert over 100 years.	 2 4
3.2.1.5.7	Activities contributing to the buffer pool contribute from a minimum of at least 20 countries.	1
3.2.1.5.8	Activities contributing to the buffer pool represent a minimum of 100 mitigation activities.	1
3.2.1.5.9	No activity contributing to the buffer pool represents more than 2% of the buffer pool reserve.	1
3.2.1.5.10	Activities contributing to the buffer pool include at least 4 different project types.	1
3.2.1.5.11	There are provisions in place to ensure the continued operation of the reserve if the carbon crediting program ceases to exist, including in the case of bankruptcy.	4

3.2.1.5.12	The program funds any of its pooled buffer reserve with emission reductions from projects that do not have a non-permanence risk.	2
3.2.1.5.13	The program funds more than 50% of its pooled buffer reserve with emission reductions from projects that do not have a non-permanence risk.	2
Use of non-pooled buffer reserve		
3.2.1.5.14	The program uses a non-pooled buffer reserve to compensate for reversals.	1
3.2.1.5.15	An expert judgement finds that the fraction of issued carbon credits from the project that is placed into the non-pooled buffer reserve is at least as large as the most likely percentage of emission reductions or removals that will be reversed over 100 years. OR at least 50% larger than the most likely percentage of emission reductions or removals that will revert over 100 years.	1 2
3.2.1.5.16	There are provisions in place to ensure the continued operation of the non-pooled buffer reserve if the carbon crediting program ceases to exist, including in the case of bankruptcy.	1
Use of insurances		
3.2.1.5.17	The program allows insurances to be used to compensate for reversals.	1
3.2.1.5.18	The program establishes clear conditions in which insurance conditions are considered sufficient, including provisions that only high-quality credits may be used for compensation.	2
State responsibility		
3.2.1.5.19	The program allows states to accept the responsibility for compensating reversals.	2
Maximum achievable points		**41**

The score for indicator 3.2.1.5 is determined using the point system scoring method outlined in chapter 2, with the difference that the maximum score is 4 instead of 5. A score of 4 is assigned if the maximum number of achievable points is reached (41 points). A score of 1 is assigned if 20 or fewer points are achieved. For any achieved points between these thresholds, the score is determined based on a linear interpolation using the following formula below:

$$I_{3.2.1.5} = 1 + \frac{(\text{Points} - 20)}{(41 - 20)} \cdot 3$$

Where:

$I_{3.2.1.5}$ = Score for indicator 3.2.1.5

Indicator 3.2.1.6: Possibility to update the baseline in the case of reversals

Some carbon crediting programs allow or require that a new baseline be established in the event of a reversal. However, if the baseline is adjusted upwards by adding the reversals to the baseline, then the reversal would no longer be accounted for (i.e., the cumulative emission reductions that may be claimed could be equal to the situation when the reversal had never occurred). Such provisions could thus undermine the effectiveness of fully accounting for reversals. Carbon crediting programs are assessed depending on the extent to which they allow or require adjusting baseline emission upwards in the case of reversals (see Table 30).

Table 30 Scoring approach regarding updates of baselines in the case of reversals

Program provisions in the case of reversals	Score
The program provisions do not allow or require adjusting the baseline upwards (i.e., towards higher emissions).	4
The program provisions allow or require adjusting the baseline upwards (i.e., towards higher emissions), but only to a much smaller extent than the actual reversals.	3
The program provisions potentially allow or require adjusting the baseline upwards (i.e., towards higher emissions) to the same extent as the reversals that occurred.	1

Example application: Verified Carbon Standard (VCS)

The VCS Standard, version 4.0 from September 2019, paragraph 3.2.17 allows project owners to re-establish the baseline in the case of catastrophic events. There are no limitations as to how the baseline is adjusted. The program is thus assigned a score of 1.

Determination of the combined score for approach 1b

After determining the score for each of the six indicators above, the following weighing formula should be applied to determine the combined score for approach 1b:

$$A_{1b} = MAX\left\{\begin{array}{c} 1 \\ 5 - [0.25 \cdot (5 - I_{3.2.1.1})^{1.3} + 0.15 \cdot (5 - I_{3.2.1.2})^{1.3} + 0.15 \cdot (5 - I_{3.2.1.3})^{1.3} + \\ +0.10 \cdot (5 - I_{3.2.1.4})^{1.3} + 0.25 \cdot (5 - I_{3.2.1.5})^{1.3} + 0.10 \cdot (5 - I_{3.2.1.6})^{1.3}] \end{array}\right\}$$

Where:

A_{1b} = Score for approach 1b
$I_{3.2.1.1}$ = Score for indicator 3.2.1.1
$I_{3.2.1.2}$ = Score for indicator 3.2.1.2
$I_{3.2.1.3}$ = Score for indicator 3.2.1.3
$I_{3.2.1.4}$ = Score for indicator 3.2.1.4
$I_{3.2.1.5}$ = Score for indicator 3.2.1.5
$I_{3.2.1.6}$ = Score for indicator 3.2.1.6

Approach 1c: Discounting

Some carbon crediting programs aim to address non-permanence by discounting emission reductions or removals from projects that imply reversal risks. The discount rate may be set in different ways. In principle, non-permanence would be fully addressed if the non-credited emission reductions or removals are equal to, or larger than, the future reversals.

In terms of environmental integrity, this approach can be problematic for several reasons. First, it provides weak incentives for project owners to avoid reversals. Project owners only have incentives for avoiding reversals as long as they intend to continue requesting carbon credits. Once the project is abandoned (e.g., due to harvesting) or the crediting period ends, any reversal would not have any consequences for the project owners. This could create moral hazards (i.e., the project owners may pursue activities even if they have higher reversal risks as they do not face higher costs in case of reversals).

Second, if credited reductions are completely reversed after a certain period of time, these reversals would not be compensated for, which could ultimately result in higher future CO_2 emission concentrations compared to crediting activities without non-permanence risks. For these reasons, this approach receives a score of 1 (except if it is used as a complementary approach to compensating for potential reversals after the end of a required period for monitoring and compensating for reversals—see indicator 3.2.1.3).

Sub-criterion 3.2.2: Approaches for avoiding or reducing non-permanence risks (Approach 2)

Rationale for using this sub-criterion

If the risk of non-permanence is effectively reduced, this increases the likelihood that the emission reductions or removals will be permanent. Fewer reversals may occur and the chances that any that do occur can be compensated for are higher. Carbon crediting programs that have measures in place to avoid or reduce reversal risks are thus given a higher score than carbon crediting programs that do not have these approaches in place. Moreover, the carbon crediting programs may differ in how well their approaches reduce or avoid reversal risks.

Level at which the sub-criterion is assessed

This sub-criterion is assessed at the level of the carbon crediting program. As some carbon crediting programs have different requirements for different project types, the assessment may, in some instances, also differ by the project type. For example, the CDM requires a risk assessment for CCS projects, but not for afforestation and reforestation projects. In this case, the requirements for CCS projects and afforestation or reforestation projects should be assessed separately.

Scoring approach

Some programs require project owners to conduct a risk assessment of the respective activity, following a pre-defined methodology. The outcome of this risk assessment can be used in several ways. Activities with a high risk may be deemed ineligible for crediting; the amount of carbon credits to be put into a buffer reserve may depend on the determined reversal risk; or the level of a discount rate applied to the emission reductions may be informed by the determined reversal risk. This provides incentives to project owners for managing and reducing risks. Some programs also require updating risk assessments, which can include regular updates or new assessments. Some carbon crediting programs also have specific regulatory safeguards in place, such as requirements for project owners to have land titles or legally binding agreements with landowners. The scoring approach for this sub-criterion follows a point system based on the evaluation of specific questions. Table 31 specifies the questions and the points allocated.

Table 31 Scoring approach for avoiding or reducing the risk of reversals

Indicator		Points
3.2.2.1	The program requires a risk assessment of the specific project.	5
3.2.2.2	The risk assessment follows a pre-defined and thorough methodology, taking into account the likelihood and significance of non-permanence risks, the measures taken by project owners to manage these risks and their capacity to do so.	4
3.2.2.3	The application of the risk assessment is validated by validation and verification entities.	3
3.2.2.4	The risk assessment is used to exclude from eligibility projects with a significant unaddressed reversal risk.	5
3.2.2.5	The outcome of the risk assessment affects the number of carbon credits that the project receives (e.g., by determining the fraction of carbon credits set aside in pooled buffer reserve or informing a discount rate applied to the emission reductions or removals).	5
3.2.2.6	The program requires project owners to update the risk assessment in case of reversals.	4
3.2.2.7	The program requires project owners to have land titles or legally binding agreements with landowners, or other similar measures (e.g., conservation easements, trusteeships).	3
Maximum achievable points		**29**

The score for sub-criterion 3.2.2 is determined using the point system scoring method outlined in chapter 2 above with the difference that the maximum score is 4 instead of 5. A score of 4 is assigned if the maximum number of achievable points is reached (29 points). A score of 1 is assigned if 14 or fewer points are achieved. For any achieved points between these thresholds, the score is determined based on a linear interpolation using the following formula below:

$$SC_{3.2.2} = 1 + \frac{(\text{Points} - 14)}{(29 - 14)} \cdot 3$$

Where:

$SC_{3.2.2}$ = Score for sub-criterion 3.2.2.

For example, if a program has a basic risk assessment (5 points) and its application is audited by a validation and verification entity (3 points) and the outcome affects the number of carbon credits the project receives (5 points), this would result in a total of 13 points.

Example application: American Carbon Registry (ACR)

The American Carbon Registry Standard, version 6.0, chapter 5, requires all terrestrial and geologic sequestration and avoided conversion projects with a risk of reversal to conduct “a reversal risk assessment,” using an approved tool. The approved tools address both general and project-specific risk factors. General risk factors include financial failure, technical failure, management failure, rising land opportunity costs, regulatory and social instability, and natural disturbances. Project-specific risk factors vary by project type. The application of the risk assessment must be validated by validation and verification entities. Projects with a higher risk score are not excluded from eligibility but the risk assessment is used to determine the fraction of carbon credits that must be deposited in a pooled buffer reserve. The ACR risk tool, version 1.0, uses risk scores for different risks and circumstances that result in an overall percentage of credits to be deposited in the buffer reserve. No information could be found on requirements to secure land titles for at least 50 years. The

program therefore receives points for indicators 3.2.2.1, 3.2.2.2, 3.2.2.3 and 3.2.2.5 and no points for indicators 3.2.2.4, 3.2.2.6 and 3.2.2.7. The total point score is thus 17 points which corresponds to a score of 1.6.

Determination of the combined score for quality objective 3

1. Apply the methodology for criterion 3.1 to determine whether the relevant project type raises material non-permanence risks. If not, a score of 5 is assigned to quality objective 3. If yes, proceed to the next step.

2. Apply the methodology for sub-criterion 3.2.1 and determine which of the three approaches (1a, 1b or 1c) the carbon crediting program applies (for the relevant project type and relevant geographical area, where applicable). Determine the score for the relevant approach, which is the score for sub-criterion 3.2.1. If the carbon crediting program does not apply any approach for accounting and compensating for reversals (Approach 1), then sub-criterion 3.2.1 is assigned a score of 1.

3. Apply the methodology for sub-criterion 3.2.2 and determine the resulting score. If the carbon crediting program does not apply any approaches for avoiding or reducing non-permanence risks (Approach 2), then sub-criterion 3.2.2 is assigned a score of 1.

4. Determine the overall score for quality objective 3 by applying the following formula:

$$Q_3 = 5 - (0.8 \cdot (5 - SC_{3.2.1})^{1.3} + 0.2 \cdot (5 - SC_{3.2.2})^{1.3})$$

Where:

Q_3	=	Score for quality objective 3
$SC_{3.2.1}$	=	Score for sub-criterion 3.2.1
$SC_{3.2.2}$	=	Score for sub-criterion 3.2.2

Inverse weighing is used to ensure that a poor score in one criterion cannot be compensated for by a good score in another criterion, thereby misconstruing the overall score. Approach 1 is weighed at 80%, while approach 2 is weighed at 20% of the total score. Approach 1 is weighed at a higher value as it can provide a better indication for a programs ability to mitigate and compensate for potentially at-risk projects and credits, whereas Approach 2 indicates procedures in place within a program to curb said risk, without necessarily accounting for what would occur following a reversal. Further note that the formula here is slightly different from other parts of the methodology in order to reflect that the maximum achievable score for mitigation activities with material non-permanence risk is 4. The formula and weighing also ensures that a program cannot receive a score higher than 3 if it applies only one of the two approaches.

Quality objective 4: Facilitating transition towards net zero emissions

Facilitating transition towards net zero emissions (i.e., ensuring that the implementation of the project facilitates, rather than delays or impedes, a transition towards achieving global net zero greenhouse gas emissions) is one important feature of carbon credits, and some projects more directly facilitate that transition than others.

This quality objective is concerned with avoiding lock-in of technologies and practices that lead to continuous GHG emissions, and creating positive incentives for innovative technologies and practices that will be necessary for the long-term net zero goal.

Both carbon lock-in and the promotion of innovative technologies and practices can have indirect emission impacts beyond the project. Locking-in continued emissions may result in stranded investments or require embarking on more expensive negative emission technologies to compensate for the continued emissions, which increases the costs to achieve the goals of the Paris Agreement. Similarly, using any less efficient than the best available technology can lead to an inefficient use of scarce resources such as biomass, and likewise undermine the ability to achieve net zero emissions. By contrast, promoting innovative technologies and practices can lead to increased technology learning effects and lower their costs. Such spill-over effects can lead to a faster uptake of these technologies or practices and may thereby induce further indirect emission reductions.

This quality objective is therefore complementary to quality objective 1, which is limited to the robust determination of the GHG emissions impact that directly results from the project. It provides an added safeguard to the contribution of a project towards the long-term goals of the Paris Agreement. The importance of this quality objective may vary among buyers.

To evaluate this quality objective, the methodology assesses the degree to which the project employs a technology or practice that is consistent with a zero/low carbon economy, avoids carbon lock-in, fosters innovation, and/or leads to transformational change. The methodology assesses whether the project uses a technology type or practice that will be transformational and is consistent with the net zero goal. The methodology also assesses the extent to which the project supports or enables innovation and/or the application of the best-available technologies or processes that underpin them, demonstrating progression from common practice.

Level at which the quality objective is assessed

The assessment will be applied at level of the project type.

Scoring approach

The scoring approach assesses the degree to which the technologies or practices applied under the project facilitate the transition towards net zero emissions. The main consideration is whether the project employs negative, zero or low emission technologies or practices. Moreover, it considers whether the project poses risks for locking-in technologies or practices that may result in an increase in GHG emissions in the long-term, thereby undermining the achievement of net zero emissions, or whether the project employs innovative technologies or practices which may accelerate the transition to net zero emissions.

The following categories for assessing the technologies and practices are considered: negative emission technologies and practices; zero emitting technologies and practices; avoided emissions technologies and practices, and low emitting technologies and practices. Emission reductions and

removals are both considered as they are essential for achieving the net zero goal. The examples provided for each category are for guidance, and are by no means exhaustive.

In the table below, the overall approach assesses technology types that will be required in the long term to achieve a net zero goal with a score of 5. There may be technologies that are required now to enable a transition towards net-zero but carry a risk of locking-in continued GHG emissions. Due to this risk, these technologies are scored with a 3 as a default, or alternatively 4 or 2, depending on the degree of the lock-in risk and whether best available technology is used.

Box 1 Risks associated with using biomass for energy purposes

The use of biomass for energy purposes is a key GHG mitigation strategy. In the methodology, the use of biomass for energy purposes is, however, scored with a lower score than other sources of renewable energy. This is because it can be difficult to assess the extent to which biomass production and use for energy purposes involves zero emissions, as the emissions depends on a number of site-specific factors which influence direct and indirect emissions. Emissions related to feedstock cultivation, harvesting, collection and recovery, processing and extraction, transportation, and other processes will have direct effects on a biomass feedstock's lifecycle emissions. In addition to these direct emissions, the use of biomass may also induce land-use change or reduce carbon stocks on the land (e.g., in dead wood, litter or soil carbon). The large-scale cultivation of biomass for energy purposes can compete with other land uses, particularly agriculture for food production, which can lead to conversion of natural ecosystems and their respective carbon stocks. In addition to these diverse greenhouse gas emissions implications, it should also be noted that biomass use may have other consequences for sustainability, including biodiversity and social risks (e.g., land use rights, water rights). Whether the use of biomass can actually be considered a zero emissions technology is therefore highly dependent on individual circumstances, and biomass can thus only play a limited role in the transformation towards net-zero emissions.

Further exceptions for specific technologies within the broader categories are indicated where there is a superior option within that same category. For example, both CFLs and LEDs contribute to avoided emissions, but LEDs are the superior technology. Therefore, CFLs are scored lower than LEDs. Similarly, the use of biomass for energy purposes involves certain risks and is thus scored lower than other renewable energy technologies (see Box 1). The score for a specific technology takes precedence over the score for the category. Given that the examples provided are not exhaustive, where a technology type is not listed in the table, the user must apply the definition of the category in assessing the technology.

Table 32 Scoring approach for enhancing adoption of low, zero or negative emission technologies and practices

Technology type	Score
Negative emissions technologies and practices	
Description: Technologies and practices that remove CO_2 from the atmosphere, such that more CO_2 is sequestered in the process than greenhouse gases are emitted:	
• Direct air carbon capture and storage (capture of CO_2 from the atmosphere and storage in long-term reservoirs) (DACCS)	5
• Bioenergy with carbon capture and storage (BECCS)	4
• Afforestation, reforestation and restoration (ARR)	5

Zero emissions technologies and practices	
Description: Technologies and practices that result in net zero GHG emissions during their operation. **Exception:** A score of 4 applies to technologies or practices that are less innovative than the best available technology. For example, this holds for biomass power generation using less efficient plants than the best available technology.	
• Cement production with renewable energy sources combined with carbon capture and storage (CCS) with high efficiency rate (e.g. >90%)	5
• Fuel switching to zero-emitting technology (e.g., fuel switch from natural gas to "green" hydrogen produced from renewable energy sources and with minimal hydrogen leakage throughout the value chain)	5
• Change in practice or components along the process or production cycle leading to change from high to zero emissions (e.g., steel production using "green" hydrogen produced from renewable energy sources and with minimal hydrogen leakage throughout the value chain)	5

• Zero emissions renewable energy generation, such as
  ○ Wind and solar power generation
  ○ Hydro power generation from run-of-river plants or dams with negligible CH_4 and CO_2 emissions
  ○ Geothermal energy use with negligible fugitive emissions
	5

• Use of biomass residues or other forms of sustainable/renewable biomass using best available technology	4
Avoided emissions technologies and practices	
Description: Technologies and practices that generate indirect upstream or downstream emission reductions as a result of the use of technology or practice, or practices that intervene with the release of existing of terrestrial carbon stocks. **Exceptions:** A score of 4 applies to technologies or practices that have a superior alternative or do not represent the best available technology, for example, because they are less energy efficient than already available alternatives (e.g., compact fluorescent lamps (CFLs) compared to light-emitting diodes (LEDs)).	
• Highly efficient demand side technology (e.g., LED lamps)	5
• Efficient demand side technology (e.g., CFL lamps)	4
• Battery or pump storage enabling greater renewable electricity generation	5
• Recycling of waste	5
• Composting of organic waste	5
• Reducing emissions from deforestation and degradation	5
Low emissions technologies and practices	
Description: Technologies and practices that emit comparatively lower levels of GHG emissions during their operation. The default score is 3, given that these technologies or practices lead to continuous GHG emissions and could thus compromise the goal of achieving net zero emissions in the future. A score of 4 applies to technologies or practices that use best available technology, and for which the risk of locking-in investments that lead to continuous GHG emissions is low. This holds, for example, for the use of landfill gas for energy generation from already closed landfills. In the case of closed landfills there is no risk that, as a result of the project, landfilling is continued rather than embarking on more sustainable waste handling practices, such as recycling and composting.	

A score of 2 applies to technologies or practices that do not use best available technology and for which the risk of locking in investments which lead to continuous GHG emissions is significant. This holds in particular for technologies with a long lifetime, such as fossil fuel-based power plants.

• Carbon capture and storage (CCS) from fossil fuel fired power plants Rationale: While CCS can avoid any direct emissions from fossil fuel fired power plants, the continued use of fossil fuels causes unavoidable emissions from their mining, exploration, processing and transportation, such as CH_4 emissions from coal mining and oil and gas exploration. Given that power plants may operate for decades, there is a significant risk of locking-in investments that may undermine achieving net-zero emissions in the future. In addition, superior alternatives, such as renewable power generation in combination with storage systems, are already available.	2
• Fuel switching to a less carbon intensive fossil fuel (e.g., from coal to natural gas)	3
• Carbon capture and utilization (CCU)	3
• Use of landfill gas from closed landfills for energy generation	4
• Use of landfill gas from open landfills for energy generation	3
• Waste to energy	3
• Landfill gas flaring	3
• Greenfields natural gas power plants	2
• Use of "blue" hydrogen from fossil fuel sources combined with carbon capture and storage (CCS)	3

Quality objective 5: Strong institutional arrangements and processes of the carbon crediting program

Carbon crediting programs are the standard-setters and issuers of carbon credits. They hold an enormous amount of responsibility for ensuring that the credits issued under their programs each accurately represent an emission reduction or removal of one metric ton of CO_2 equivalent. Their capacity to do so largely depends on having in place strong institutional arrangements and processes to ensure that the program is governed consistently with their mission, that the crediting standards they put forth are adhered to, and that stakeholders have a transparent and accessible view into their decision-making. Carbon credits issued from carbon crediting programs that score well against this quality objective are more likely to be of high quality.

The methodology assesses carbon crediting programs against the following four criteria:

5.1 Overall program governance
5.2 Transparency
5.3 Public consultation
5.4 Robust third-party auditing

Criterion 5.1: Overall program governance

Rationale for using this criterion

Good program governance is an important safeguard for the quality of credits. This includes whether the carbon crediting program has transparent provisions and procedures in place that regulate how the program is governed to effectively support its mission and whether there have been past cases of non-compliance with program standards and procedures, fraudulent conduct, or conviction of key personnel.

Level at which the criterion is assessed

This criterion is assessed at the level of the carbon crediting program.

Scoring approach

The overall program governance is assessed based on a series of questions, included in Table 33 below. The total points depend on how many questions can be answered positively. The overall score depends on the total points achieved.

Table 33 Scoring approach for overall program governance

Indicator		Points
Crediting program governance structure		
5.1.1	The program has a resourced Secretariat with paid staff that is responsible for the administration of the program. Contact details of the Secretariat are publicly available on the program's website.	PASS / FAIL
5.1.2	The program defines who is responsible for the administration of the program and how decisions are made. This information is publicly available.	1
5.1.3	The program is overseen by a Board of Directors or Trustees.	1
5.1.4	Board members and technical committees are subject to conflict of interest provisions to address any financial or other conflicts that may arise in the administration of the program. The conflict of interest provisions are publicly available on the program's website.	1
5.1.5	Program staff and registry administrators are subject to publicly available conflict of interest provisions to address any financial or other conflicts that may arise in the administration of the program. The conflict of interest provisions are publicly available on the program's website.	1
Crediting program governance procedures		
5.1.6	The program's provisions and requirements are developed in accordance with formally defined procedures. Provisions and requirements may include, inter alia, the program's standard, quantification methodologies and other provisions documents. Satisfaction of this indicator requires that procedures cover all relevant documents.	1
5.1.7	The program's provisions and requirements are updated in accordance with formally defined procedures. Provisions and requirements may include, inter alia, the program's standard, quantification methodologies, and other provisions documents. Satisfaction of this indicator requires that procedures cover all relevant documents.	1
5.1.8	There are procedures in place and clear, time-bound requirements for handling disputes and complaints by all stakeholders in relation to the carbon crediting program. This includes addressing potential issues with the standards or quantification methodologies under the program, as raised by stakeholders at any time.	1
Carbon crediting program history		
5.1.9	There is no evidence that the program staff have ever engaged in fraud on behalf of the program or that key personnel have been convicted of fraud. Web searches or other publicly accessible information may inform this indicator.	1
5.1.10	The program has never been sanctioned by a regulator or other relevant authority for noncompliance with relevant laws and regulations, or for not complying with its own provisions. Web searches or other publicly accessible information may inform this indicator.	1
Maximum achievable points		**9**

The score for criterion 5.1 is determined using the point system scoring method outlined in chapter 2 above, barring failure of a minimum requirement. A score of 5 is assigned if the maximum number of achievable points is reached (9 points). A score of 1 is assigned if 5 or fewer points are achieved. For any achieved points between these thresholds, the score is determined based on a linear interpolation using the following formula below:

$$C_{5.1} = 1 + \frac{(\text{Points} - 5)}{(9 - 5)} \cdot 4$$

Where:
$C_{5.1}$ = Score for criterion 5.1

Criterion 5.2: Transparency

Rationale for using this criterion

Transparency is essential for good governance. Carbon crediting programs should be transparent by facilitating access to relevant information, including that sufficiently detailed information on all projects is publicly available and program requirements are transparent. Procedures should be in place that ensure transparent and consistent decision-making based on criteria that are clearly formulated and, as much as possible, subject to easy interpretation. It is important that key information on the credited activity is made available, including project design documents, monitoring and verification reports, and issuance requests and host party approvals.

Level at which the criterion is assessed

This criterion is assessed at the level of the carbon crediting program.

Scoring approach

The overall program transparency is assessed based on a series of questions, included in Table 34 below.

Table 34 Scoring approach for transparency

Indicator		Points
Access to information		
5.2.1	Names and affiliations of Board members, advisory groups and expert committees are publicly available on the program website, as relevant, to the extent the program has Board, advisory groups, or expert committees.	1
5.2.2	Minutes of Board or Trustee meetings are publicly available on the program's website.	1
5.2.3	The program's core normative and regulatory documents (e.g., statutes, bylaws, principles, standards, quantification methodologies and audit manuals) are publicly available online. Normative references developed by the program are publicly available on the program's website.	PASS / FAIL
5.2.4	The program clearly distinguishes mandatory requirements from recommendations and guidance.	1
5.2.5	The program has quantification methodologies in place and available for use, as well as a process for developing further quantification methodologies. The existing quantification methodologies, as well as the process for developing further quantification methodologies, are publicly disclosed.	PASS / FAIL

5.2.6	The program maintains a database on all credited activities that is publicly accessible through the program's website. The database includes detailed information on each credited activity, including all documentation required for the approval of the activity (e.g., project design documents, auditing reports, and supporting documentation), and all documentation required for the issuance of carbon credits (e.g., monitoring reports including reproducible emission reductions and/or removal calculations, auditing reports, and supporting documentation).	1
5.2.7	The program defines and publicly discloses the level at which activities are allowed under the program (e.g., project-based, program of activities, etc.) and scope of eligible activities (e.g., which sectors, project types, or geographic locations are or are not included within the scope of the program).	1
5.2.8	The program has in place publicly available procedures for how carbon credits are: (a) issued; (b) retired or cancelled; and (c) subject to any discounting.	1
5.2.9	The program has in place publicly available procedures to invalidate and/or replace carbon credits under circumstances in which the emission reductions or removals are demonstrated to have been overestimated.	1
5.2.10	The program publicly discloses the length and dates of crediting periods and whether the period is renewable.	PASS / FAIL
5.2.11	The program has in place publicly available procedures that ensure that: (a) units are tracked; (b) units are individually identified through serial numbers; (c) the registry is secure (i.e., robust security provisions are in place); and (d) units have clearly identified owners or holders (e.g., identification requirements of a registry). All of the above must be publicly disclosed information.	PASS / FAIL
5.2.12	The program defines and ensures the underlying attributes and property aspects of a unit, and publicly discloses the process by which it does so. This means clearly defining what the unit represents (e.g., one metric ton of CO_2 equivalent); the underlying values used to calculate the CO_2 equivalent (e.g., the source of the GWP conversion value and the time horizon used); and how ownership of the unit is defined and transferred (e.g., entitlement to the credit is based on the owner of the relevant registry account in which the unit is held).	1
5.2.13	The program requires that all relevant non-confidential project documentation, including reports from validation and verification entities, be disclosed. The program defines what information would qualify as “confidential” and excludes from that definition information related to the determination of the baseline scenario, additionality, or the calculation of emission reductions or removals.	1
Maximum achievable points		**9**

The score for criterion 5.2 is determined using the point system scoring method outlined in chapter 2 above, barring failure of a minimum requirement. A score of 5 is assigned if the maximum number of achievable points is reached (9 points). A score of 1 is assigned if 5 or fewer points are achieved. For any achieved points between these thresholds, the score is determined based on a linear interpolation using the following formula below:

$$C_{5.2} = 1 + \frac{(\text{Points} - 5)}{(9 - 5)} \cdot 4$$

Where:
$C_{5.2}$ = Score for criterion 5.2

Criterion 5.3: Public consultation

Rationale for using this criterion

Stakeholder engagement is essential for good governance. It improves the quality of decision making and can thereby result in higher quality carbon credits. Program provisions and projects should be subject to expert review and/or public stakeholder consultation. Note that crediting program provisions for local stakeholder engagement are covered in the environmental and social impacts methodology, while the methodology here focuses on broader stakeholder consultation. It is important that comments from stakeholders are duly considered.

Level at which the criterion is assessed

This criterion is assessed at the level of the carbon crediting program.

Scoring approach

The overall program stakeholder consultation approach is assessed based on a series of questions, included in Table 35 below.

Table 35 Scoring approach for public consultation

Indicator		Points
5.3.1	Material program updates (e.g., new or updated provisions or quantification methodologies) are subject to public consultation and the process for doing so is clearly defined in the program's regulatory documents. The program informs actively on commenting and review periods (e.g., through messages on their websites, or messages to email listservs).	1
5.3.2	Material program updates (e.g., new or updated provisions or quantification methodologies) are developed with meaningful participation of experts, for example, through advisory groups, expert committees and/or targeted stakeholder consultations.	1
5.3.3	Input received in public consultations on material program updates (e.g., new or updated provisions or quantification methodologies) is documented and there is report back on how raised issues are addressed.	1
5.3.4	The program requires that projects be subject to public consultation on the global level via online facilities (e.g., submitting comments on an online platform).	1
5.3.5	A public consultation of projects is conducted before a project is allowed to register under the carbon crediting program, so that the feedback provided can still influence the implementation of the project.	1
5.3.6	Public consultations of projects make available key information on the credited activity, including project design documents, monitoring and verification reports, as relevant.	1
5.3.7	Input received in public consultations of projects is documented and there is a report back on how issues raised are addressed. Examples may include requiring that the project owner respond to any input received, and that a validation and verification entity review this requirement.	1
5.3.8	The program allows the public to submit comments about a project at any time during project operation and has provisions for due consideration of those comments from the project owner.	1
Maximum achievable points		**8**

The score for criterion 5.3 is determined using the point system scoring method outlined in chapter 2 above. A score of 5 is assigned if the maximum number of achievable points is reached (8 points). A score of 1 is assigned if 4 or fewer points are achieved. For any achieved points between these thresholds, the score is determined based on a linear interpolation using the following formula below:

$$C_{5.3} = 1 + \frac{(\text{Points} - 4)}{(8 - 4)} \cdot 4$$

Where:

$C_{5.3}$ = Score for criterion 5.3

Criterion 5.4: Robust third-party auditing

Rationale for using this criterion

Accredited third-party validation and verification entities (i.e., auditors) must confirm that a project fulfils all requirements of the carbon crediting program. Auditing is typically conducted for the initial approval of a project's design, often referred to as "validation," and the monitoring of emission reductions, often referred to as "verification." Following successful auditing, the project

documentation and the auditing reports are submitted to the carbon crediting program for final approval, where programs may apply their own oversight of validation and verification entities and project quality control measures. A weak auditing system could undermine the thoroughness of scrutiny of third-party validation and verification entities and therefore potentially undermine the quality of the carbon credit.

Level at which the criterion is assessed

This criterion is assessed at the level of the carbon crediting program.

Scoring approach

The overall third-party auditing approach is assessed based on a series of questions, included in Table 36 below.

Table 36 Scoring approach for robust third-party auditing

Indicator		Points
5.4.1	The program requires that accredited third-party validation and verification entities assess the adherence of a project against all program provisions, including conformity to the design of the activity and the determination of emission reductions or removals. This auditing must take place prior to the issuance of carbon credits. The eligibility requirements of third-party validation and verification entities should be available on the program's website.	PASS / FAIL
5.4.2	Validation and verification entities are accredited by an International Accreditation Forum (IAF) member body or the CDM Executive Board (EB). The eligibility requirements of third-party validation and verification entities should be available on the program's website.	1
5.4.3	The program has in place procedures, provisions or guidance directed at validation and verification entities (e.g., validation verification standards and procedures, audit manuals) to ensure consistent auditing practices under the program. These standards, procedures and requirements should be publicly disclosed. These are standards and procedures set forth by the program that validation and verification entities must comply with in their validation or verification duties.	1
5.4.4	Validation and verification entities are required to take account of comments provided via public stakeholder consultations and report on how those comments are addressed.	1
5.4.5	The program has in place provisions which restrict a project owner's use of the same validation and verification entity. These restrictions, sometimes referred to as "rotation" provisions, may limit the frequency of audits, total audits, or types of audits which may be performed by the same validation and verification entity for the same project.	1
5.4.6	The program requires that audit reports from validation and verification entities include details of audit dates, locations and scope of auditing, team composition, main findings and corrective action requests. This requirement should be set out by the program in the standards and procedures for validation and verification entities, or otherwise indicated in the program documentation as mandatory.	1
5.4.7	The certification standard clearly distinguishes mandatory requirements from recommendations and guidance.	1

5.4.8	The program has procedures in place to perform oversight of the validation and verification entities approved to perform validation or verification activities under the program and report non-compliances to the validation and verification entity's accreditation body(ies). Oversight should extend beyond individual project reviews and include systematic monitoring of validation and verification entity's performance and feedback to the validation and verification entity and its respective accreditation program.	1
5.4.9	The accreditation bodies recognized by the carbon crediting program have procedures in place to regularly assess the performance of validation and verification entities in relation to the relevant carbon crediting program (e.g., through regular accreditation surveillance).	1
5.4.10	The program has procedures in place for program personnel to perform their own quality control reviews of individual registration or carbon credit issuance requests. Examples of quality control reviews of project compliance may include desk reviews of submitted project documentation and/or in-person site visits.	1
5.4.11	The program and/or the accreditation bodies recognized by the program have procedures in place to apply sanctions against validation and verification entities in cases of performance issues, including suspension or practicing increased scrutiny (e.g., spot checks). Sanctions could be in response to accreditation lapses or other non-compliances identified by the program.	1
Maximum achievable points		**10**

The score for criterion 5.4 is determined using the point system scoring method outlined in chapter 2 above, barring failure of a minimum requirement. A score of 5 is assigned if the maximum number of achievable points is reached (10 points). A score of 1 is assigned if 6 or fewer points are achieved. For any achieved points between these thresholds, the score is determined based on a linear interpolation using the following formula below:

$$C_{5.4} = 1 + \frac{(\text{Points} - 6)}{(10 - 6)} \cdot 4$$

Where:

$C_{5.4}$ = Score for criterion 5.4

Determination of the combined score for quality objective 5

1. Determine the score for all criteria using the scoring approach described in the respective section.
2. Apply the general formula for inverse weighing to determine the overall score for quality objective 5:

$$Q_5 = \text{MAX}\left\{\frac{1}{6 - (0.25 \cdot (6 - C_{5.1})^{1.3} + 0.25 \cdot (6 - C_{5.2})^{1.3} + 0.25 \cdot (6 - C_{5.3})^{1.3} + 0.25 \cdot (6 - C_{5.4})^{1.3})}\right\}$$

Where:

Q_5 = Score for quality objective 5
$C_{5.1}$ = Score for criterion 5.1
$C_{5.2}$ = Score for criterion 5.2
$C_{5.3}$ = Score for criterion 5.3
$C_{5.4}$ = Score for criterion 5.4

Note that inverse weighing is used in determining the combined score for this quality objective in order to ensure that in situations where the scoring is poor with respect to one criterion, this cannot be fully made up by high scores for other criteria.

Quality objective 6: Environmental and social impacts

The climate crisis is inextricably linked to every aspect of modern production and consumption, making it also a development issue, rather than only an environmental issue. The climate crisis must therefore be addressed in a way that does not only reduce GHG emissions to net-zero, but does so in a way that is widely inclusive and firmly grounded in the respect of human rights, particularly of the most vulnerable populations, and the promotion of sustainable development. To that effect, the methodology evaluates the degree to which the project avoids adverse environmental or social impacts and generates benefits beyond reducing GHG emissions, contributes to enhancing adaptation and resilience, and supports those least responsible but most affected by the climate emergency.

The main challenges of evaluating environmental and social impacts are identifying the potential impacts a project may have, understanding the trade-offs between these potential impacts, assessing the degree of these potential impacts, and then consolidating these impacts into indicators that enables comparisons. This complexity is further compounded by the subjective and highly contextual nature of some of the judgements associated with these issues. This is one of the reasons why there is such a diversity of frameworks and approaches, including the Universal Declaration of Human Rights and the Sustainable Development Goals (which are often used as standardized frameworks with nationally determined obligations and/or targets from virtually every country in the world), the United Nations Development Program's Social and Environmental Standards (UNDP 2020), and the International Finance Corporation's Performance Standards (IFC 2012), among others.

In the light of these challenges, the methodology establishes a framework to help users systematically assess these issues. To assess this quality objective, the following criteria are evaluated:

6.1 Robustness of the carbon crediting program's environmental and social safeguards
6.2 Sustainable development impacts of the project type or project
6.3 Contribution to improving adaptation and resilience

Criterion 6.1: Robustness of the carbon crediting program's environmental and social safeguards

Rationale for using this criterion

Project impacts are rarely limited to GHG emission reductions or removals, and their overall social and environmental impact is often very important to buyers of carbon credits, whether because they want to limit potential liability or reputational risks and/or because they want to maximize the overall economic value-for-money of their investments. Many carbon crediting programs have established environmental and social safeguards with the view to ensuring a do-no-harm approach to social and development impacts, particularly by enabling local and affected stakeholders to voice concerns and demand fair treatment and, when appropriate, redress or compensation. The rigor and comprehensiveness of these requirements, however, varies among programs. This criterion therefore aims to evaluate the carbon crediting program's requirements for environmental and social safeguards.

Level at which the criterion is assessed

This criterion is assessed at the level of the carbon crediting program, or the combination of the carbon crediting program with a complementary certification standard. For example, a project

applying a combination of the Verified Carbon Standard (VCS) and the Climate, Community and Biodiversity Standard (CCB) would receive a “Yes” for the indicators in Table 37 if the specified safeguard is part of the VCS or the CCB.

Scoring approach

Strong environmental and social safeguards set by the carbon crediting program, or through the application of complementary certification standards, ensure that there is a framework in place through which project owners and validation and verification entities must examine the project’s risks in these categories. It is important to note that while these provisions are essential, they cannot be assumed to anticipate all potential environmental and social issues, nor guarantee compliance with the program’s requirements.

The methodology assesses the social and environmental safeguards that a carbon crediting program and any complementary certification standard requires a project to have in place, assuming that effective safeguards generally reduce the likelihood of harm. Table 37 lists the indicators for the program requirements that are evaluated. This list of indicators was informed by several sources, including the existing requirements of carbon crediting programs, requirements by international finance institutions, as well the literature. Moreover, the Universal Declaration of Human Rights and the Sustainable Development Goals are used as standardized frameworks with nationally determined obligations and/or targets from virtually every country in the world. The United Nations Development Program’s Social and Environmental Standards (UNDP 2020) and the International Finance Corporation’s Performance Standards (IFC 2012) were also considered during the development of the indicators in Table 37 and may provide further details.

Each indicator from Table 37 adds the specified number of points to the total for this criterion. Recognizing the importance of ensuring a robust focus on a do-no-harm approach to implementation, some indicators are considered minimum requirements. If a carbon crediting program fails on an indicator that is considered a minimum requirement, the overall score of the quality objective is “FAIL.”

Table 37 Scoring approach for robustness of the crediting program´s social and environmental safeguards

Indicator		Points
Procedural requirements		
6.1.1	The program has an environmental and social safeguard policy in place that articulates how it integrates environmental and social considerations into its decision-making and operations to effectively manage environmental and social risks. This includes a clear description of the roles and responsibilities.	1
6.1.2	The program clearly defines the environmental and social impacts that must be assessed and discloses this information publicly.	1
6.1.3	The program provides guidelines for each of its safeguards that explain the requirements and provide reference materials, methodologies and good practices.	1
6.1.4	The program assesses the track record and capacities of the project owner to manage the environmental and social risks associated with the project.	1
6.1.5	The program requires the project owner to identify and adhere to any national or local laws and regulations which may be relevant to the project activity, including any environmental and social scoping requirements.	1

6.1.6	The program requires the project owner to identify and mitigate potential negative environmental and social impacts, including any likely risks to local and affected stakeholder wellbeing during the project implementation and operation.	PASS / FAIL
6.1.7	The program requires the disclosure of relevant information from the project owner's evaluation of environmental or social impacts or any Environmental Impact Assessment, if relevant or required to be carried out in the project's local legal context.	1
6.1.8	The program requires that the evaluation of social and environmental impacts by the project owner be validated by an independent third party prior to registration and to include issues raised in monitoring plans and verify these during performance review.	1
6.1.9	The program requires that social and economic impacts be monitored throughout the crediting periods of the project.	1
6.1.10	The program requires an environmental and social management plan for medium- and high-risk projects.	1
6.1.11	The program has a culturally appropriate grievance mechanism in place or requires that project owners have a culturally appropriate grievance mechanism in place for local stakeholders to provide anonymous feedback during the development and lifetime of the project. Such feedback must be duly considered by the project owner or carbon crediting program.	1
6.1.12	The program requires that grievances received by carbon crediting program or the project owner must be responded to within a specific response time.	1
Requirements for stakeholder consultations		
6.1.13	The program requires the project owner to conduct an assessment of which local stakeholders will be impacted by the project, including, where relevant (e.g., land use projects), any legal or customary tenure or access rights held by local stakeholders.	1
6.1.14	The program requires the project owner to conduct a local stakeholder consultation in a way that is inclusive and culturally appropriate for local communities before the project is implemented and validated under the carbon crediting program. The project owner is required to take due account of any input received in the implementation of the project.	PASS / FAIL
6.1.15	The program requires free, prior and informed consent if indigenous, tribal or traditional people are affected by a project.	PASS / FAIL
6.1.16	The program requires experts to support the process of obtaining free, prior and informed consent.	1
6.1.17	The program requires the project owner to establish mechanisms for ongoing communication with local stakeholders and take due account of input received.	1
6.1.18	The program requires that local stakeholder consultation and mechanisms to maintain ongoing communication with local stakeholders are performed in a manner appropriate to the context of the stakeholders (e.g., literacy, culture and language). A record of how issues have been addressed is made publicly available upon request, ensuring anonymity.	1
6.1.19	The program requires that project validation and verification entities proactively consult with affected stakeholders during audits, where relevant (e.g., land use projects).	1
Coverage and completeness of environmental and social safeguards		
6.1.20	The program provisions explicitly ban any sort of discrimination.	1

6.1.21	The program has specific provisions in place that ensure that Cultural Heritage is preserved, protected and promoted in project activities in a manner consistent with UNESCO Cultural Heritage conventions or any other national or international legal instruments that might have a bearing on the use of Cultural Heritage.	1
6.1.22	The program requires experts to support the process of ensuring Cultural Heritage is preserved.	1
6.1.23	The program provisions specifically address the need to avoid or minimize the risks and impacts to community health, safety and security that may arise from projects, with particular attention given to a gender-sensitive approach and to disadvantaged and marginalized groups.	1
6.1.24	The program provisions specifically require projects to avoid physical and economic displacement in its projects and that they require, in exceptional circumstances and where avoidance is not possible, displacement to occur only with full justification; appropriate forms of legal protection and compensation; support; and the collaborative, meaningful and informed participation of those affected, including in any planning and implementation of resettlement activities.	PASS / FAIL
6.1.25	The program requires experts to support any processes related to avoiding physical and economic displacement.	1
6.1.26	The program provisions specifically require projects to support a just transition, enhance employment promotion benefits, development outcomes and sustainability by ensuring sound worker-management relationships and cooperation in their design and implementation.	1
6.1.27	The program provisions specifically require projects to seek to promote more sustainable use of resources, including energy, land and water; to promote safe, effective, and environmentally sound pest management and to avoid or minimize generation of hazardous and non-hazardous substances and wastes; and promote a human rights-based approach to the management and disposal of hazardous substances and wastes.	1
6.1.28	The program requires the establishment of a specific benefits-sharing mechanism with local stakeholders (e.g., that part of carbon credit proceeds are made available for community activities).	1
6.1.29	The program explicitly prohibits the introduction of invasive non-native species, where relevant (e.g., land use projects).	1
Gender		
6.1.30	The carbon crediting program has a dedicated gender policy, strategy or action plan that integrates gender considerations and women empowerment into all aspects of its operations.	1
6.1.31	The carbon crediting program requires that stakeholder consultations are conducted in a gender-sensitive manner, enabling equal participation.	1
6.1.32	The carbon crediting program requires that project owners perform a gender safeguard assessment during project design.	1
Maximum achievable points		**28**

The score for criterion 6.1 is determined by using the point system scoring method outlined in chapter 2 above, barring the failure of a minimum requirement. A score of 5 is assigned if 24 or more points are achieved. A score of 1 is assigned if 14 or fewer points are achieved. For any achieved points between these thresholds, the score is determined based on a linear interpolation using the following formula below:

$$C_{6.1} = 1 + \frac{(\text{Points} - 14)}{(24 - 14)} \cdot 4$$

Where:
$C_{6.1}$ = Score for criterion 6.1

Criterion 6.2: Sustainable development impacts of the project type or project

Rationale for using this criterion

While program requirements, as assessed in the previous sub-criterion, are critical for ensuring minimum environmental and social safeguards, the overall sustainable development impacts of projects can still vary considerably. Some project types may provide for few benefits or even have some negative impacts, while others may catalyze significant positive social and economic benefits that go beyond GHG emission reductions. The available literature suggests that sustainable development impacts depend, to a degree, on the project type but can also depend on the individual project.

Level at which the criterion is assessed

This criterion may be assessed at the level of the project type or project. If the methodology is applied at project type level, it is recommended that the sustainable development impacts of the specific project be assessed as part of the project-specific due diligence. Application at the level of the project will provide more reliable results and is necessary to ensure that a do-no-harm approach was carried throughout.

Scoring approach

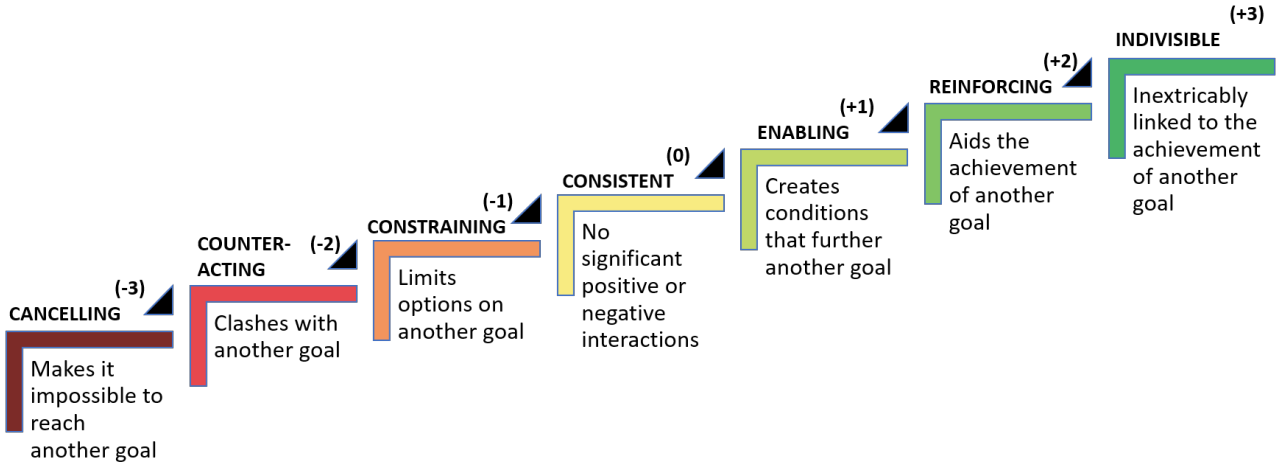
The methodology assesses the extent to which a project type or specific project contributes to or hinders the achievement of each of the 17 Sustainable Development Goals (SDGs), with the exception of goal 13 on climate action, which is the primary goal of the climate mitigation projects (https://www.un.org/sustainabledevelopment/sustainable-development-goals/).

If applied at project type level, the methodology takes into consideration generic impacts associated with the project type. If applied at project level, the specific impacts associated with the individual project and its management should be considered. The Sustainable Development Goals are used here, as they are a well-established, standardized framework with nationally determined obligations and/or targets from virtually every country in the world.

The evaluation should consider both positive and negative impacts with respect to the SDGs. Project type and individual project-level impacts should be compared to a baseline scenario to identify the net effect of the project whenever possible. For example, a hydroelectric power plant may directly employ a number of people but could have a net negative effect on employment if the flooding an area for the reservoir destroys valuable agricultural land.

To assess the impacts of a project type or individual project on each SDG, the methodology draws on a scale developed by (Weitz et al. 2014). Given the integrated nature of the SDGs and the well-documented interlinkages and potential synergies and trade-offs between different SDGs, they developed an approach which classifies interactions between SDGs on a seven-point ordinal scale that indicates the nature of the interaction and the extent to which it is positive or negative (see Figure 7 below).

Figure 7 Seven-point typology of interactions between SDGs



Based on based on Weitz et al. 2018.

The International Council for Science describes the approach as follows: "[T]he magnitude of the score, in whichever direction, provides an indication of how influential a given SDG or target is on another. For instance, a value of +1 corresponds to an 'enabling' relationship, wherein the achievement of one objective (such as providing electricity access in rural homes, SDG 7) creates conditions for furthering another (such as child and adult education, SDG 4). Meanwhile a higher score of +3 corresponds to an 'indivisible' relationship, wherein one objective is inextricably linked to the achievement of another. For example, ending all forms of discrimination against women and girls (target 5.1) is absolutely necessary for ensuring women's full and effective participation in society (target 5.5). As an example of a negative interaction, the relationship between on the one hand boosting a country's economic growth (target 8.1) and on the other reducing waste generation (target 12.5) might be assigned a score of -2 ('counteracting'), since the former potentially clashes with the latter (unless mechanisms are put in place to prevent this, such as circular economy strategies that include effective waste prevention or substantially increasing recycling rates). Finally, for SDGs and targets exhibiting no significant positive or negative interactions, a score of 0 ('consistent') is assigned" (International Council of Science 2017).

The same scale from -3 to +3 points is used here to assess the impact or influence of a project type or individual project on each individual SDG goal. To this effect, the scale is applied to assess how the project (which contributes to SDG goal 13) influences progress towards other SDG goals. The adapted scale is illustrated in Table 38 below.

Table 38 Scale to assess the impacts of the project on each SDG

Interaction label	Meaning
+3 Indivisible	The successful implementation of the project automatically delivers progress on this SDG goal.
+2 Reinforcing	The successful implementation of the project directly makes it easier to make progress on this SDG goal.
+1 Enabling	The successful implementation of the project indirectly creates conditions that enable progress on this SDG goal.
±0 Consistent	There is no significant link between the project and this SDG goal.
−1 Constraining	The successful implementation of the project constrains the options for how to deliver on this SDG goal.
−2 Counteracting	The successful implementation of the project makes it more difficult to make progress on this SDG goal.
−3 Cancelling	The successful implementation of the project automatically leads to a negative impact on this SDG goal.

Source: Adapted from (adapted from Weitz et al. 2018)

The score for criterion 6.2 is determined by using the point system scoring method outlined in chapter 2 above, except if any individual SDG achieves a score of -3, in which case criterion 6.2 is assessed as FAIL. A score of 5 is assigned if 20 or more points are achieved. A score of 1 is assigned if 1 or fewer points are achieved. For any achieved points between these thresholds, the score is determined based on a linear interpolation using the following formula below:

$$C_{6.2} = 1 + \frac{(\text{Points} - 1)}{(20 - 1)} \cdot 4$$

Where:

$C_{6.2}$ = Score for criterion $C_{6.2}$

Some buyers of carbon credits may recognize that projects in Least Developed Countries and Small Island Development States face structural challenges that go beyond what is faced by equivalent projects elsewhere, a recognition that is well established at the UNFCCC and other international fora. Recognizing this, they may choose to prioritize supporting projects in these countries.

Hence, as an additional step of the evaluation, it is assessed whether the project is implemented in Least Developed Countries or Small Island Developing States, which are recognized to face special circumstances that require additional support.

Projects implemented in these countries receive an upgrade of one score point (e.g., from 3 to 4) in the overall evaluation of criterion 6.2. This upgrade cannot be applied from a FAIL score and the overall score cannot exceed 5.

Example application at project type level

In this example, a project of a hypothetical project type “X” is evaluated. For the sake of this example, projects of type “X” are known to typically create more jobs, produce renewable energy and therefore enable responsible production, which may result in the project-type evaluation illustrated in Table 39. In this example, the project type evaluation results in a total point score of 8 and would therefore receive a score of 2.47.

Table 39 Example evaluation of the SDG impacts of a generic project of type "X"

SDG goal	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Total
Score	+1	0	0	0	0	0	+3	0	0	0	0	1	-	0	0	0	0	8

Example application at the level of an individual project of type "X"

In this example, project-specific positive and negative SDG impacts, as identified through a due diligence check, are incorporated into the project-type assessment. This should include, as a minimum, a "do-no-harm" approach to human rights impacts, particularly with regard to indigenous people and local communities.

During the due diligence of the specific project of type "X", in this example, the project turns out to have a capacity building program to certify green job skills and an outreach program to support women in Science, Technology, Engineering and Math (STEM) which would lead to adjusting the evaluation of SDG 4 and SDG 5, and the total score respectively. The evaluation of the individual project results in an adjusted total point score of 12 and would therefore receive a score of 3.32.

Table 40 Example evaluation of the SDG impacts of a project of type "X"

SDG goal	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Total
Score	+1	0	0	+2	+2	0	+3	0	0	0	0	1	-	0	0	0	0	12

Criterion 6.3: Contribution to improving adaptation and resilience

Rationale for using this criterion

The best available science currently tells us that, barring large-scale negative emissions, we have already locked-in well over 1 degree of heating above pre-industrial levels by the end of the century, with further heating to be expected unless drastic and immediate measures are taken to reduce GHG emissions. Given the scale and intensity of impacts already being experienced, it is imperative to ensure that all communities, but particularly those in developing countries, adapt and increase their resilience. Some buyers may therefore prioritize projects that directly or indirectly contribute to improving adaptation and resilience.

Level at which the criterion is assessed

This criterion is assessed at the individual project level and is therefore optional.

Scoring approach

Drawing on a guidebook for results-based monitoring of climate change adaptation projects (GIZ 2013), the methodology assesses the extent to which the project supports or hinders adaptation and resilience in the host country across three dimensions: building adaptive capacity, reducing identified risks/vulnerabilities and successful development in spite of climate change (sustained development).

Host country adaptation plans, policies and priorities as set out in National Adaptation Needs Assessments, National Adaptation Plans and Strategies, Adaptation Communications, adaptation elements of previous National Communications and the adaptation elements of the NDC should be used as a reference for the evaluation, where available. These documents provide valuable information on what adaptation and resilience mean in the specific context of the host country and on how well the project fits in with the host country's broader adaptation and resilience approach.

To evaluate the project's positive and negative adaptation and resilience (A&R) impacts against the host country's broader adaptation and resilience approach, relevant project documentation may be evaluated, as well as additional information reported on the project in relevant literature or by the media or NGOs.

Drawing on the same methodology developed by Weitz et al. (2018) in the context of SDG goals, Table 41 provides for a -3 to +3-point scale to assess the impact of the project on adaptation and resilience in the host country. This scoring should be applied separately to each of the three dimensions introduced above. The scores for the three dimensions are added up and used to determine the final score for the criterion. Any project with a score of -3 in an individual assessment or the total score will be assigned a FAIL.

Table 41 Scale to assess the impact of the project on improving different dimensions of adaptation and resilience

Indicator	Score
Has direct positive A&R impacts (high impact)	+3
Reinforces positive A&R impacts	+2
Enables positive A&R impacts	+1
Does not have A&R impacts	0
Constrains A&R advancement	-1
Counteracts A&R advancement	-2
Has indisputable negative A&R impacts (high impact)	-3

The score for criterion 6.3 is determined using the point system scoring method outlined in chapter 2 above, barring the failure of a minimum requirement (i.e., any individual assessment achieving a score of -3). A score of 5 is assigned if 7 or more points are achieved. A score of 1 is assigned if -2 or fewer points are achieved. For any achieved points between these thresholds, the score is determined based on a linear interpolation using the formula below:

$$C_{6.3} = 1 + \frac{(\text{Points} - (-2))}{(7 - (-2))} \cdot 4$$

Where:

$C_{6.3}$ = Score for criterion $C_{6.3}$

Determination of the combined score for quality objective 6

1. Determine the score for all criteria using the scoring approach described in the respective section.

2. Given that criterion 6.3 is resource-intensive and therefore optional, apply one of the following formulas to determine the overall score for quality objective 6:

   If all three criteria are applied:

$$Q_6 = \text{MAX}\left\{6 - (0.3 \cdot (6 - C_{6.1})^{1.3} + 0.5 \cdot (6 - C_{6.2})^{1.3} + 0.2 \cdot (6 - C_{6.3})^{1.3})^{\frac{1}{1.3}}\right\}$$

Where:

Q_6	=	Score for quality objective 6
$C_{6.1}$	=	Score for criterion 6.1
$C_{6.2}$	=	Score for criterion 6.2
$C_{6.3}$	=	Score for criterion 6.3

If optional criterion 6.3 is not applied:

$$Q_6 = \mathrm{MAX}\left\{6 - (0.35 \cdot (6 - Q_{6.1})^{1.3} + 0.65 \cdot (6 - Q_{6.2})^{1.3})^{\frac{1}{1.3}}\right\}$$

Where:

Q_6	=	Score for quality objective 6
$C_{6.1}$	=	Score for criterion 6.1
$C_{6.2}$	=	Score for criterion 6.2

The sustainable development impacts of the project type or project are here deemed most important for the assessment of the environmental and social impacts, which is why criterion 6.2 is weighed higher in the overall evaluation (0.5 respective 0.65) than criteria 6.1 and 6.3 (if applied).

Quality objective 7: Host country ambition

This quality objective is only applicable to carbon credits that are backed by corresponding adjustments and that are internationally transferred in the context of Article 6 of the Paris Agreement. In this case, the ambition of the NDC and any long-term mitigation targets of the host country are important, for several reasons.

First, cooperative approaches under Article 6 shall promote ambition and help achieve the overarching aim of the Paris Agreement. That is, to ensure that global temperatures do not rise more than 2 degrees Celsius above pre-industrial levels this century, and to strive to achieve a scenario where temperature rise remains at 1.5 degrees Celsius. The main tool among Paris Agreement Parties to achieve this goal are the NDCs. When we consider that many countries are not close to reaching their current NDC targets, which when added up are significantly insufficient, the scale of the challenge ahead is clear. To achieve the goals of the Paris Agreement, it is essential that countries engaging in cooperative approaches under Article 6 participate in and remain Parties to the Paris Agreement. If countries could transfer ITMOs without being Party to the Paris Agreement, this could create a perverse incentive to leave the Paris Agreement, since it may be perceived that participation in carbon markets is easier outside the Paris Agreement.

Second, the potential for participation in cooperative approaches under Article 6 should provide incentives for host countries to enhance the ambition of their NDCs over time, rather than creating perverse incentives not to do so, as host countries could perceive that they can sell a larger number of ITMOs if they adopt less stringent targets. Such perverse incentives for climate action under the Paris Agreement could be avoided if buyers focus on host countries that do have an ambitious NDC and long-term goals. Likewise, such perverse incentives could be reduced if carbon market approaches are designed in a way such that only part of the emission reductions or removals achieved through a cooperative approach are internationally transferred to a buyer, and another part can be used by the host country to achieve its own NDC.

Third, ambitious NDCs and long-term goals of the host country provide essential safeguards for assuring the quality of carbon credits. If a country with an ambitious NDC sells ITMOs that do not present actual mitigation actions, it would have to compensate for the shortfall to still achieve its NDC by further reducing its own emissions or purchasing ITMOs on the market. By contrast, a country with an NDC target that will be over-achieved without taking any climate action could sell ITMOs that are not backed by actual emission reductions and still achieve its NDC (Schneider und La Hoz Theuer 2019). A country with an ambitious NDC and long-term goal has incentives to only authorize ITMOs that represent actual emission reductions or removals. As long as the country has a multi-year target or uses a multi-year trajectory or budget to account for ITMOs, the country may also have incentives to only authorize ITMOs that have low non-permanence risks, as any future reversals would make it more difficult for the country to achieve its future NDCs. The ambition of the host country's NDC and long-term goals may thus indirectly impact the emissions outcome from engaging in carbon markets.

In summary, this quality objective is introduced to avoid that the engagement in carbon markets provides perverse incentives that could undermine mitigation action beyond the project concerned, and to assess whether the project and its implementation context provides incentives for enhancing ambition.

To assess this objective, the methodology uses the following criteria:

7.1 Host country commitment to the global temperature goal
7.2 Stringency and coverage of the host country's current NDC
7.3 Ability of the carbon crediting approach to enable the host country to use part of the emission reductions to achieve its own NDC

Criterion 7.1: Host country commitment to the global temperature goal

Rationale for using this criterion

A commitment to the global temperature goals could be demonstrated if a country communicated a net zero emissions target supported by a Low Emissions Development Strategy (LEDS). As highlighted above, ambition provides a safeguard for ensuring that emission reductions or removals are additional, real and permanent since a host with an ambitious NDC, when accounting for transferred credits, may need to compensate for carbon credits that do not "track back" to real emission reductions or removals. A host with a clear long-term decarbonisation strategy communicated in a LEDS is more likely to approve only projects that are likely to generate additional, real and permanent emission reductions and removals, and to consider crediting periods consistent with an increase in ambition over time.

Level at which the criterion is assessed

The assessment is applied at host country level.

Scoring approach

The scoring approach assesses whether the host country has an explicit commitment in the form of a target progression towards net zero emissions and the time-frame of this target. The assessment also considers whether these commitments are transparent by being communicated in a LEDS.

Scores from 1 to 5 are applied where a 5 means that the host country has adopted an explicit domestic net zero emissions target for 2050 or earlier and communicated a LEDS for meeting that target (see Table 42). A score of 1 is given if the host country does not have a zero emissions target and an LEDS is not communicated. Scores 2 to 4 fall between these extremes. Exceptions could be applied to Least Developed Countries, where the country is unable to make explicit commitments due to capacity and resource constraints. The exception should be at the discretion of the user of the methodology.

Table 42 Scoring approach for host country commitment to net zero emissions

Host country provision	Score
The country has adopted a domestic net zero emissions target for 2050 or earlier and has communicated a LEDS for meeting this target.	5
The country has adopted a net zero emissions target (with possible use of international credits) for 2050 or earlier and has communicated a LEDS for meeting this target. OR The country has a domestic net zero emissions target for 2050 or earlier but not yet communicated a LEDS for meeting this target.	4
The country has adopted a domestic net zero emissions target in the time horizon 2051 to 2070 and communicated a LEDS for meeting this target.	3
The country has no net zero emissions target but has communicated a LEDS.	2
The country has no net zero emissions target and no LEDS communicated.	1

Criterion 7.2: Stringency and coverage of the host country's current NDC

Rationale for using this criterion

The stringency of the host country's current NDC is an important safeguard for the quality of carbon credits and for avoiding perverse incentives for host countries not to enhance the ambition of their NDC when they engage in cooperative approaches. This is because, if emission reductions or removals were not additional, real or permanent, the country would report higher emissions and would thus need to pursue further mitigation action to still achieve its NDC, thereby compensating for the non-additionality, overestimation or non-permanence of the emission reductions or removals. In practice, however, there are several caveats and challenges to making this happen:

- **Lack of ambition of NDC targets:** The ambition of NDC targets differs widely. Independent assessments of current NDC targets suggest that many countries have NDC targets that correspond to higher levels of emissions than their likely emissions with the policies in place at the time of target setting—an issue that has also been referred to as 'hot air' in the context of the Kyoto Protocol (Boehringer 2000; Woerdman 2005; Kollmuss et al. 2015). In this case, countries may not need to compensate for any reversals, as they would achieve their NDC targets anyways. The more ambitious an NDC target is, the more likely it is that a country would compensate for reversals.

- **Coverage of NDCs:** When accounting for their NDCs, countries only account for those sectors, gases, categories, activities, sources and sinks, and carbon pools that are included within the scope of their NDC. Any non-additionality, overestimation or reversals would only be compensated for if they are covered by the NDC. Moreover, determining what is inside and outside of NDCs can be difficult, due to the lack of clarity and diversity of NDCs and methodological challenges in determining which fraction of the mitigation occurred within and outside NDCs (Schneider et al. 2020).

- **Visibility of reversals in indicators used to track progress:** Under the Paris Agreement, countries need to select 'indicators' to track progress towards their NDC targets. For countries with emissions targets, the GHG emissions covered by the NDC can be used as indicators. For a country with an afforestation target, the hectares of afforested land may be a suitable indicator. In practice, reversals are not always "visible" in these indicators, as they sometimes lack the necessary granularity to capture the emissions.

- **Single-year targets:** Many countries communicated in their NDCs only targets for single years such as 2030. In the case of reversals, any occurring in the target year would be accounted for when demonstrating achievement of the NDC. Reversals in other years, however, may only be reported, without implications for the achievement of the target and hence not requiring the country to compensate for such reversals in order to still achieve its NDC. By contrast, if countries have continuous multi-year targets, such as under the Kyoto Protocol, or establish emissions trajectories for NDC accounting, reversals from all years would be accounted for.

- **Treatment of natural disturbances and harvested wood products in NDC accounting:** Countries pursue different approaches in how they account for natural disturbances and harvested wood products in their NDCs. Some countries exclude natural disturbances. In this case, reversals may not necessarily be accounted and compensated for. Also, the treatment of removals after disturbances is crucial; removals occurring after natural disturbances should not be accounted towards NDCs.

Whether host countries of projects would compensate for emission reductions or removals that were not additional, real or permanent, depends on various factors.

Level at which the criterion is assessed

The assessment is applied at host country level, in combination with information on the project or project type.

Scoring approach

The assessment is applied in several steps:

Step 1: First, the methodology assesses whether the emission reductions or removals of the project or project type are covered by the NDC of the host country. If the emission reductions or removals are *not* covered, then this criterion receives a score of 1, as the country does not have incentives to only authorize projects that are additional, do not overestimate emission reductions, and have low non-permanence risks. In this case, the sub-sequent steps are not applicable.

Step 2: If the emission reductions or removals are covered by the NDC, this step of the methodology assesses to which degree the NDC target deviates from the emissions level that would most likely occur in the target year or period with policies in place at the time of communicating the NDC. This is critical for the likelihood that the country would actually need to compensate for non-additional projects or overestimated or non-permanent emission reductions. The more climate action the country needs to pursue to achieve its NDC, the more likely it is that compensation would be required, and the higher the incentives for the country to only authorize ITMOs from projects that are truly additional and do not overestimate emission reductions or removals. The same may not be true, however, for a country with a target that is less stringent than its likely business-as-usual (BAU) emissions with current policies in place—i.e., which does not require the country to take mitigation action to achieve its target. In these instances, the country might accrue more financial revenues from over-estimating emission reductions and selling the resulting units without infringing its ability to achieve its NDC (Schneider und La Hoz Theuer 2019). This is supported by evidence from Joint Implementation under the Kyoto Protocol, wherein units from countries with ambitious Kyoto Protocol targets were assessed to have a significantly higher quality than those from countries with targets less stringent than the likely BAU emissions. Some researchers (Kollmuss et al. 2015; Michaelowa et al. 2019b) even propose additionality testing at the level of the host country.

Assessing to what degree NDC targets are below realistic projections of BAU emissions is prone to uncertainty and may be subject to change over time. Nevertheless, independently established assessments of NDCs can provide an indication of the likelihood that coverage by NDCs provides a safeguard for environmental integrity. The methodology recommends using independently established assessments, such as those from the Climate Action Tracker project, to assess NDCs. The assessment is based on the extent to which the NDC target level deviates from these independently-established, most likely BAU emission projections, with policies in place at the time of communicating the NDC, as illustrated in Table 43 below.

Table 43 Scoring approach for stringency of the current NDC

Percentage band within which the NDC target level is below the likely emissions level in the target year or period with policies in place at the time of communicating the NDC	Score
> 30%	5
20-30%	4
10-20%	3
0-10%	2
< 0% (target level is less stringent than likely emissions level with current policies in place)	1

Step 3: This step assesses whether the emission reductions of the project or project activity are likely to be visible in the GHG emissions reported by the country to track progress towards its NDC. This may be undertaken by assessing the generic risk that GHG emissions are not visible in GHG inventories (e.g., because higher IPCC Tiers are needed in GHG inventories) or by also assessing the quality of the GHG inventory of the country. If the emission reductions or removals are likely to be visible, the score from step 2 is maintained. If it is questionable whether the emission reductions are visible, then the result from Table 43 is downgraded by one score point, but should in any case not be higher than 3. This step is optional, because the quality of GHG inventories is only temporarily relevant, given that countries can conduct recalculations of their GHG inventories over time in order to improve the quality.

Step 4: In this step, the methodology assesses whether any reversals are likely to be accounted and compensated for by the country. This fourth step is only applicable to projects or project types that have material non-permanence risks. Whether reversals are accounted for, depends critically on two questions:

1. Does the NDC fully account for natural disturbances?
2. Does the NDC have a multi-year target or use a multi-year trajectory or budget for NDC accounting purposes?

The score from the previous steps is maintained if both questions are answered with a yes. If one of the two questions is answered negatively, the result from the previous steps is downgraded by one score point, but should in any case not be higher than 3. If both questions are answered negatively, the result from the previous steps is downgraded by two score points, but should, in any case, not be higher than 2.

Criterion 7.3: Ability of the carbon crediting approach to enable the host country to use part of the emission reductions to achieve its own NDC

Rationale for using this criterion

Carbon market approaches can help enhance the ambition of host countries' climate action if part of the emission reductions or removals through the carbon market approaches are not internationally transferred, but can be used by host countries to achieve their own NDCs. This is can be achieved in different ways, particularly by establishing ambitious baselines that are below business-as-usual (BAU) emission levels or by choosing crediting periods that are shorter than the period over which the project will reduce emissions.

Level at which the criterion is assessed

At which level the assessment is applied depends on how the carbon crediting approach enables the host country to use part of the emission reductions to achieve its own NDC. The criterion may be assessed at the level of the host country, the quantification methodology, and/or the carbon crediting program.

Scoring approach

Some host countries may apply approaches to ensure that they can use part of their emission reductions to achieve their own NDC. This may, for example, include authorizing only a part of the achieved emission reductions under Article 6, while using the remainder of the emission reductions to achieve their own NDC.

Second, it can be important to consider the relevant carbon crediting program provisions and quantification methodologies to assess whether, and to what extent, fewer credits are issued than emission reductions or removals occur as a result of the project. This requires a thorough assessment of the relevant methodological aspects, such as the ambition of the baseline level or the length of the crediting period. Similar to the evaluation of the robustness of the emission reductions quantification, the scoring approach therefore relies on a thorough evaluation of the respective quantification methodologies and carbon crediting program provisions, and an expert judgment of to what degree the emission reductions are under-credited over the period in which the project will generate emission reductions or removals.

The scoring assesses which fraction of the emission reductions or removals can be used by the host country to achieve its own NDC. The higher this share is, the higher is the respective score (see Table 44).

Table 44 Ability of the carbon crediting approach to enable the host country to use part of the emission reductions to achieve its own NDC

Fraction of emission reductions or removals achieved through the project that can likely be used by the host country to achieve its own NDC	Score
> 50%	5
30-50%	4
10-30%	3
0-10%	2
None	1

Determination of the combined score for quality objective 7

1. Determine the score for all criteria using the scoring approach described in the respective section.
2. Apply the following formula to determine the overall score for quality objective 7:

$$Q_7 = 0.3 \cdot C_{7.1} + 0.5 \cdot C_{7.2} + 0.2 \cdot C_{7.3}$$

Where:

Q_7 = Score for quality objective 7
$C_{7.1}$ = Score for criterion 7.1
$C_{7.2}$ = Score for criterion 7.2
$C_{7.3}$ = Score for criterion 7.3

Note that the stringency and coverage of the host country's current NDC is weighed higher than the other two criteria because of its safeguard function for avoiding perverse incentives for host countries not to enhance the ambition of their NDC when they engage in cooperative approaches, as outlined above.

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