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A GUIDE TO DEVELOPING DOMESTIC CARBON CREDITING MECHANISMS

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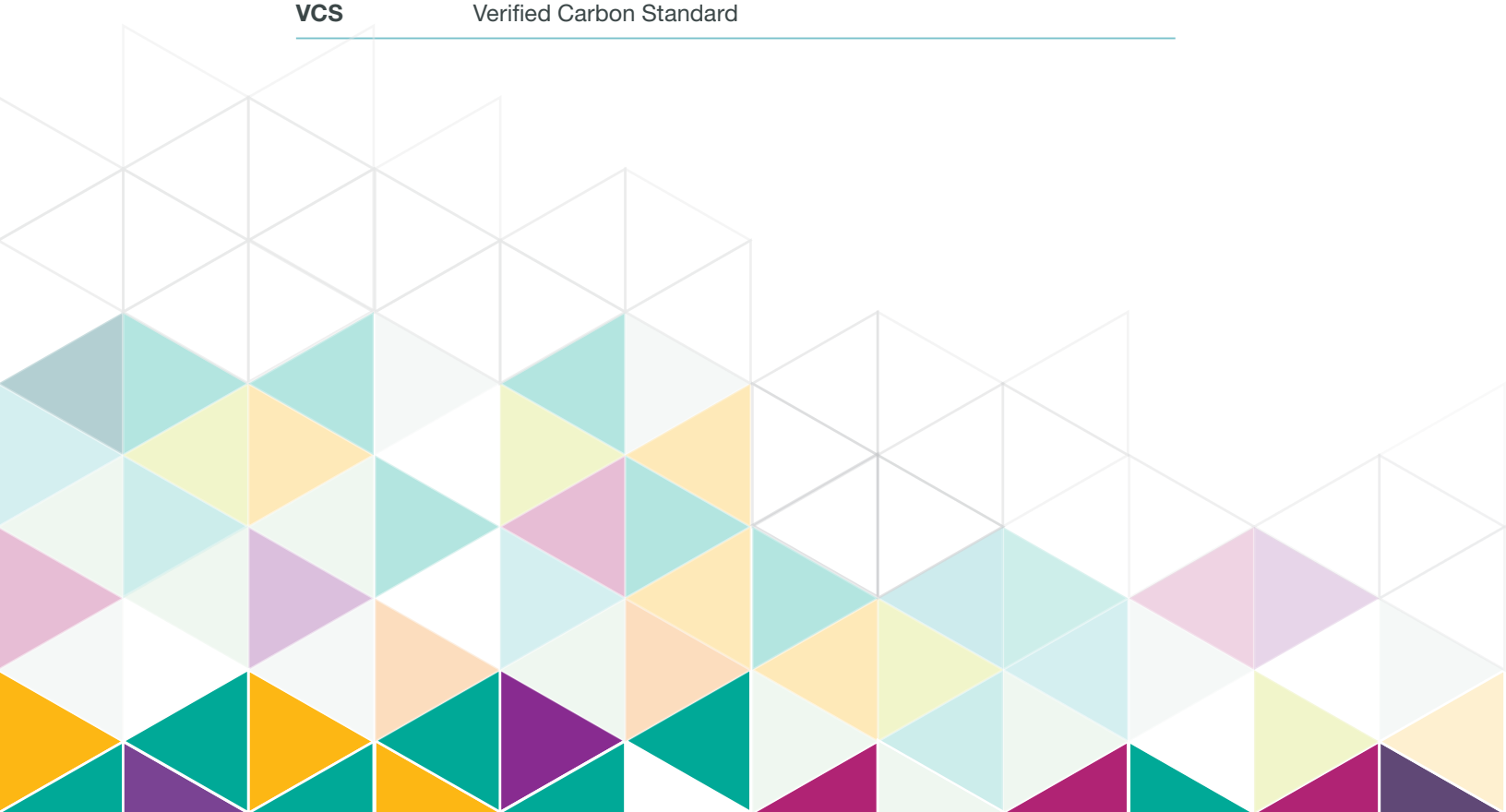
ACRONYMS

AFOLU	Agriculture, Forestry and Other Land Use
CARB	California Air Resources Board
CCER	Chinese Certified Emissions Reduction
CDM	Clean Development Mechanism
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
ETS	Emissions trading system
GHG	Greenhouse gas
ICAO	International Civil Aviation Organization
ISO	International Standards Organization
MRV	Monitoring, reporting, and verification
tCO_2e	Metric tons of carbon dioxide equivalent
NDC	Nationally Determined Contribution
SSR	Sinks, sources, and reservoirs
VCS	Verified Carbon Standard



SYNTHESIS

This guide to developing domestic carbon crediting mechanisms is intended to assist national and subnational policymakers considering whether and how to establish a carbon crediting mechanism in their jurisdiction. The guide provides insights into the decision points for designing a crediting mechanism and how to tailor the mechanism to achieve domestic policy objectives.

This guide is divided into 10 chapters representing the key elements that must be considered when setting up a domestic crediting mechanism. These chapters should be seen as the building blocks for developing a crediting mechanism, rather than linear steps in a decision-making process. Policymakers can decide on issues simultaneously or in a different order than envisioned here to suit the specific circumstances of their jurisdiction.

1. BEFORE YOU BEGIN

Carbon crediting refers to the process of issuing emissions reduction units to project activities in recognition of quantified and verified emissions reductions. These reductions are calculated as the difference between emissions from the project and emissions from a baseline scenario, which represents the scenario assumed to occur in the absence of the crediting mechanism.

Carbon credits can be used for different purposes; most often they are used to offset or partly compensate for emissions covered by mandatory domestic carbon pricing instruments such as carbon taxes or emissions trading systems (ETSs) and to help companies achieve voluntary emissions reduction goals. While various types of crediting exist, this guide focuses only on crediting single-project activities and programs of activities. Further, it is primarily intended to be used by policymakers in jurisdictions considering carbon crediting to achieve domestic climate policy objectives, and therefore, international crediting is not considered.

Carbon crediting provides a framework to support activities reducing greenhouse gas (GHG) emissions, as well those increasing removals of carbon dioxide.[1] To be effective, crediting mechanisms should only credit projects that are additional—that would not have occurred in the absence of the crediting mechanism. They should also avoid over-crediting—that is, being issued with credits that represent more emissions reductions than what occurred. Robust additionality tests and conservative quantification methodologies can guard against these risks.

Policy options for creating a crediting mechanism are assessed against three key criteria: environmental integrity, transaction costs for project proponents, and administrative burden on the government. The trade-offs between these criteria are likely to shape much of the structure of any crediting mechanism. For example, policy options that strive for a high level of environmental integrity could result in higher transaction costs for project proponents.

[1] For simplicity of language, throughout this guide “emissions reductions” is used to cover both emission-reducing and sink-enhancing activities.

2. UNDERSTANDING THE DOMESTIC CONTEXT

Carbon crediting does not stand alone in the policy mix; it requires other policy instruments to create demand for credits. It also can complement other climate policy measures and tools, including regulation and other carbon pricing instruments. Policymakers need to carefully assess the broader policy mix not only to determine the role of the crediting mechanism but also to determine how to manage interactions with other policies that may complement, overlap, or undermine the effectiveness of the crediting mechanism.

The policy objectives carbon crediting can achieve include

- reducing emissions at a low cost, leading to an overall increase in cost-effectiveness of achieving a specific emission goal;
- lowering cost of compliance for businesses seeking to fulfil other emissions reduction mandates;
- driving positive social, environmental, and economic impacts beyond GHG emissions reductions; and
- helping to mobilize carbon finance in sectors and activities not directly exposed to carbon pricing instruments.

In designing the crediting mechanism, policymakers should consider involving relevant stakeholders at an early stage to increase understanding, trust, and support for the crediting mechanism. The need for and level of stakeholders' involvement will likely vary from jurisdiction to jurisdiction. Generally, in domestic crediting mechanisms, stakeholder engagement takes place at the program design and methodology approval stages.

3. USING EXISTING CREDITING MECHANISMS

Building a domestic crediting mechanism from the ground up can be a significant undertaking, requiring financial resources, technical capacity, and regulatory expertise. To reduce the time and effort (and depending on the broader policy objectives) policymakers can allow credits issued by existing crediting mechanisms to be used for domestic policy purposes. This can be advantageous where there is an immediate need for credits, may help attract international investments and, can be attractive if domestic policymakers lack the necessary sources and expertise to start a domestic mechanism. If policymakers consider this approach, only Chapters 4 and 5 will be relevant.

Policymakers can also draw on specific elements of existing crediting mechanisms or outsource specific functions, like accreditation of auditors, methodologies for quantifying emissions reductions, or registry systems. In all such cases, policymakers will need to carefully assess the relevant tools and elements from existing mechanisms to ensure they have the appropriate scope, have robust environmental integrity safeguards, and are aligned with policymakers' crediting objectives.

4. DECIDING ON THE SCOPE

A key initial step of any crediting mechanism is determining what sectors, gases, mitigation activities, or project types are allowed, as well the scale (i.e., level of aggregation) of mitigation activities. Policymakers also need to define—often at the methodological level—which sources and sinks each mitigation activity includes, where eligible activities can take place, and the mix of project-based and programmatic activities the program will incentivize. The appropriate scope will depend on the policy objectives, priorities, and constraints of the implementing jurisdiction. The scope should be outlined in transparent and objective eligibility criteria.

Policymakers also need to decide on the scale of eligible mitigation activities and the geographic scope. Most crediting mechanisms start with project-based activities but can be scaled up to programmatic activities once they have built the appropriate knowledge and capacity. This guide is limited to domestic crediting mechanisms that focus on activities within a jurisdiction's boundaries. However, policymakers may also want to focus on certain regions within their jurisdiction.

5. DECIDING ON THE CORE ELEMENTS

The core elements of crediting mechanisms include avoiding double counting, setting the crediting period, avoiding environmental or social harm, promoting development benefits, and addressing non-permanence risks. Effective crediting mechanisms have systems in place to avoid double counting. Public and transparent registry systems with extensive monitoring, disclosure, and accounting requirements can guard against double issuance, double use, and double claiming of carbon credits. Policymakers also need to decide on the length of the crediting period (i.e., the time during which a project is registered and for which credits can be claimed). During this period, the quantification parameters for emissions reductions related to regulatory conditions are fixed at the outset, although conditions themselves may change throughout the period. Policymakers must strike a balance between periods that are short enough to respond to changing conditions (e.g., technological or policy changes) but also long enough to provide project proponents a sufficient level of investment certainty. Policymakers must also determine the rules for crediting period renewals.

Necessary safeguards should also be in place to ensure crediting mechanisms avoid social and environmental harm, particularly if existing domestic safeguard requirements are not able to sufficiently address these concerns. Related to this, policymakers may want to design their crediting mechanisms to promote development benefits, like reduced air pollution or increased job creation. If this is an objective of the mechanism, identifying and monitoring development benefits can help amplify them, but will come at a cost to the project proponents. Finally, policymakers need to address non-permanence risk for carbon removal projects by defining a permanence period and putting mechanisms like buffer reserves in place to manage the risk of reversals.

6. DEVELOPING METHODOLOGIES

Methodologies are the foundation of any crediting mechanism as they establish the rules for project eligibility, demonstrating additionality, quantifying emissions, and project monitoring. Robust methodologies are needed to safeguard the environmental integrity of carbon credits. Methodologies can employ either a project-specific approach that relies on analysis of an individual project's characteristics and circumstances, or a standardized approach where key components, such as determination of the baseline scenario and additionality, are uniformly applied for specific classes of project activities. Often crediting mechanisms use a combination of both.

To ensure environmental integrity, methodologies can restrict projects' eligibility based on criteria like baseline technologies or project scale, and these decisions should be in line with the mechanism's scope. Generally, crediting mechanisms employ a variety of tests to demonstrate additionality. These can be determined on a case-by-case basis or for a whole category of projects. Whatever approach is adopted, policymakers need to bear in mind that demonstrating additionality is key to ensuring the environmental integrity of the crediting projects and the mechanism itself.

GHG quantification and reporting should be in line with GHG accounting principles, such as ISO 14064-2 and the GHG Protocol for Project Accounting, to promote environmental integrity and provide additional guidance to project proponents and auditors. Finally, monitoring project performance over time is essential as many factors that affect emissions can change over the project life cycle.

7. ADOPTING, REVIEWING AND REVISING METHODOLOGIES

Policymakers need consistent and clear rules for developing and approving new methodologies, as well as for revising existing ones to correct for earlier errors or update them to reflect changes in policy. Policymakers can use methodologies from existing crediting mechanisms, which can also be modified to suit the domestic context or specific policy goals. Alternatively, policymakers can develop and approve methodologies through a bottom-up process, where they are developed by third

parties (often project proponents) or a top-down (i.e., internally developed) process—or a combination of both. The best approach will be determined by how quickly methodologies are needed, available resources to support this process, and the level of control policymakers want over the methodology development process.

Methodologies should be reviewed and updated regularly to reflect changes to technologies, practices, and policy goals over time and protect the environmental integrity of the crediting mechanism. Policymakers need to outline the types of changes that may occur, when they will occur, and how often they will be reviewed and updated. The Partnership for Market Readiness' (PMR) Developing Emissions Quantification Protocols for Carbon Pricing: A Guide to Options and Choices for Policy Makers covers these processes in more detail.

8. DECIDING ON THE PROJECT CYCLE

The term "project cycle" refers to the phases and procedures a crediting project has to go through, which include the registration phase (i.e., project application, review, validation, and approval); the implementation phase (i.e., monitoring, reporting, verification, and credit issuance); and the renewal phase. Policymakers can opt for a full or streamlined project cycle. The full project cycle is more time-consuming and resource intensive but provides greater certainty about the environmental integrity of projects. Project proponents will also have more certainty about the eligibility of their projects. This can be useful for complex mitigation activities, projects that use project-specific methodologies, and the early phases of a crediting mechanism.

A streamlined project cycle determines the project's final eligibility at the time of the first verification of its emissions reductions. As this takes place after the project's implementation, a streamlined approach creates uncertainty for project proponents because they do not know eligibility from the outset. On the other hand, a streamlined approach can significantly reduce costs for project proponents and administrators. It works well with clear and simple eligibility criteria, such as with standardized approaches to methodologies, or where the project type is relatively simple with low additionality and safeguards risks. The streamlined system may be introduced in certain cases after program administrators and stakeholders acquire more experience.

9. OVERSEEING AUDITORS

Project validation and verification uphold the credibility and environmental integrity of crediting mechanisms. Typically, these functions are performed by independent auditors rather than program administrators or project proponents. Policymakers need to make certain that auditors are well qualified and can competently validate and verify crediting projects. Putting in place formal standards and procedures to accredit and approve auditors, as well as validation and verification standards, can ensure the consistency and rigor of these activities. Policymakers also need rules in place to minimize the risk of any conflicts of interest between auditors and project proponents. Finally, policymakers should also regularly review auditors' performance. The PMR's Designing Accreditation and Verification Systems provides more information on these issues.

10. ESTABLISHING GOVERNANCE AND SUPPORTING FRAMEWORKS

Policymakers need a governance framework in place to ensure the smooth administration of the crediting mechanism. What this looks like will be jurisdiction specific but often includes a range of bodies that can handle the following functions: (1) policy authority and oversight, to provide general policy direction; (2) rulemaking to develop secondary rules and regulations, such as methodologies; (3) implementation to ensure such rules are adhered to, as well as any general day-to-day administrative functions; and (4) technical advisory functions for expert input into specific components of the crediting mechanism's design and overall operation.

Institutional and governance choices will affect transaction costs and the administrative burden on government. Policymakers will need to find an institutional arrangement that is efficient, transparent, and predictable. This will give confidence in the crediting mechanism and can streamline both management of and participation in the mechanism. Policymakers must also consider the roles and involvement of other stakeholders.

Because of the financial and legal implications associated with the creation and transfer of carbon credits, it is important to assign liability for the quality and quantity of the credits. This is especially important in cases where credits have been found to be invalid. The mechanism also needs a process for project proponents to appeal decisions by the administrator.

Finally, crediting mechanisms will need a registry. This provides the technical infrastructure for issuing, transferring, and retiring credits, as well as making information on credits and projects publicly accessible. Key governance questions include how a registry will be built and operated and what types of functions it must be able to support. The PMR's Emissions Trading Registries: Guidance on Regulation, Development, and Administration covers this topic in more detail.

GETTING STARTED

1 BEFORE YOU BEGIN

At a glance

Carbon crediting refers to the process of issuing emissions reduction units to project activities in recognition of quantified emissions reductions. These reductions are calculated as the difference between emissions from the project and emissions from a baseline scenario, which represents the scenario assumed to occur in the absence of the crediting mechanism.

Carbon credits can be used for different purposes; most often they are used to offset or partly compensate emissions covered by mandatory domestic carbon pricing instruments (e.g., carbon taxes or emissions trading systems [ETSs]) and to help companies and other entities achieve voluntary emissions reduction goals. While there are various types of crediting, this guide only focuses on crediting single-project activities and programs of activities and is intended to be used by policymakers in jurisdictions considering carbon crediting to achieve domestic climate policy goals.

Carbon crediting provides a framework to recognize activities that either reduce greenhouse gas (GHG) emissions or increase carbon dioxide removals. Emissions reductions are distinguished from carbon dioxide removals from the atmosphere: emissions reductions prevent emissions from entering the atmosphere, while carbon dioxide removals involve sequestering atmospheric carbon dioxide in either the biosphere (e.g., trees) or the lithosphere (e.g., soil and geological structures). However, to be effective, crediting mechanisms must only award emissions reduction units to projects that are additional: these activities must lead to emissions reductions that would not have occurred in the absence of the crediting mechanism. They must also avoid over-crediting, or overstating mitigation through inaccurate quantification methodologies or inappropriate assumptions.

Policy options are assessed against three key criteria: environmental integrity, transaction costs, and administrative burden. The trade-offs between these criteria are such that they are likely to shape much of the structure of any crediting mechanism. For example, options that deliver a high level of environmental integrity may potentially lead to higher transaction costs and therefore fewer crediting projects.

Section 1.1 outlines the purpose of the guide and Section 1.2 introduces a number of fundamental concepts that are used throughout the guide. Section 1.3 outlines the scope of the report, identifying the key areas of focus and specific exclusions. Section 1.4 presents the outline of the guide, while Section 1.5 describes evaluation criteria policymakers can use to assess design options presented throughout the guide.

1.1 PURPOSE OF THIS GUIDE

This Guide to Developing Domestic Carbon Crediting Mechanisms (hereafter "guide") provides an in-depth introduction to designing domestic carbon crediting mechanisms. It provides guidance for national and subnational policymakers considering whether and how to establish a carbon crediting mechanism in their jurisdiction. The guide provides insights into the decision points for designing a crediting mechanism and indicates how to tailor the mechanism to achieve domestic policy objectives. It identifies policy design options and, where possible, provides recommendations, drawing on examples of practices in existing crediting mechanisms, with a particular emphasis on domestic systems, when available (see Box 1-1). Where policymakers have several viable options for a key design feature, the guide highlights the trade-offs policymakers need to consider.

Box 1-1. Carbon crediting mechanism categories

As outlined in the State and Trends of Carbon Pricing 2020,[2] carbon crediting mechanisms can be classified into three categories, based on how credits are generated and the way the crediting mechanism is administered:

1. **International crediting mechanisms.** International crediting mechanisms are those governed by international climate treaties and are usually administered by international institutions. Examples are the Clean Development Mechanism (CDM) and Joint Implementation.

2. **Independent crediting mechanisms.** Independent crediting mechanisms are mechanisms not governed by any national regulation or international treaties. They are administered by private and independent third-party organizations, which are often nongovernmental organizations. Examples are the Gold Standard and the Verified Carbon Standard (VCS). These largely supply the voluntary market.

3. **Regional, national, and subnational crediting mechanisms.** Regional, national, and subnational crediting mechanisms are governed by their respective jurisdictional legislatures and are usually administered by regional, national, or subnational governments. In 2020, there are 23 regional, national, and subnational carbon crediting mechanisms in operation or scheduled for implementation (see Figure 1-1).

Two developments have shaped the evolution of crediting mechanisms over the past decades: the CDM and corporate interest in voluntary credits. Firstly, practical experience with crediting mechanisms is largely dominated by the CDM, an international crediting mechanism established by the Kyoto Protocol in 1997. It has generated more than two decades' worth of experience in crediting. With projects in over 100 countries, it is also responsible for over half of all issued credits.[2] It has also developed over 250 methodologies for crediting emissions reduction activities and many countries have drawn on their experiences with the CDM, its methodologies and templates to establish their own mechanisms. Its sheer size and geographic reach means the CDM has exerted substantial influence on the design of crediting mechanisms. Secondly, a significant share of activity in the crediting market has been driven by companies interested in using carbon credits to meet corporate voluntary climate commitments. Independent crediting mechanisms, which have historically focused on servicing the voluntary market, were responsible for almost two-thirds of credits issued in 2019.[2] Many of these mechanisms, like the Climate Action Reserve, Gold Standard, and VCS, have been operating for close to 20 years.

The design, methodologies, and experiences of many of these mechanisms can also offer valuable insights to policymakers interested in designing a domestic mechanism. While regional, national, and subnational crediting mechanisms exist, many of these are found in North America and it is only in recent years that developing countries have started to roll out, or consider, their own crediting mechanisms (see Figure 1-1). This guide has tried to highlight domestic crediting examples where relevant; however, much of the experience and lessons learned to date stem from the CDM and independent crediting mechanisms and therefore have been used to demonstrate examples of implementation throughout this guide.

[2] World Bank 2020.

Figure 1-1. Existing regional, national, and subnational carbon crediting mechanisms

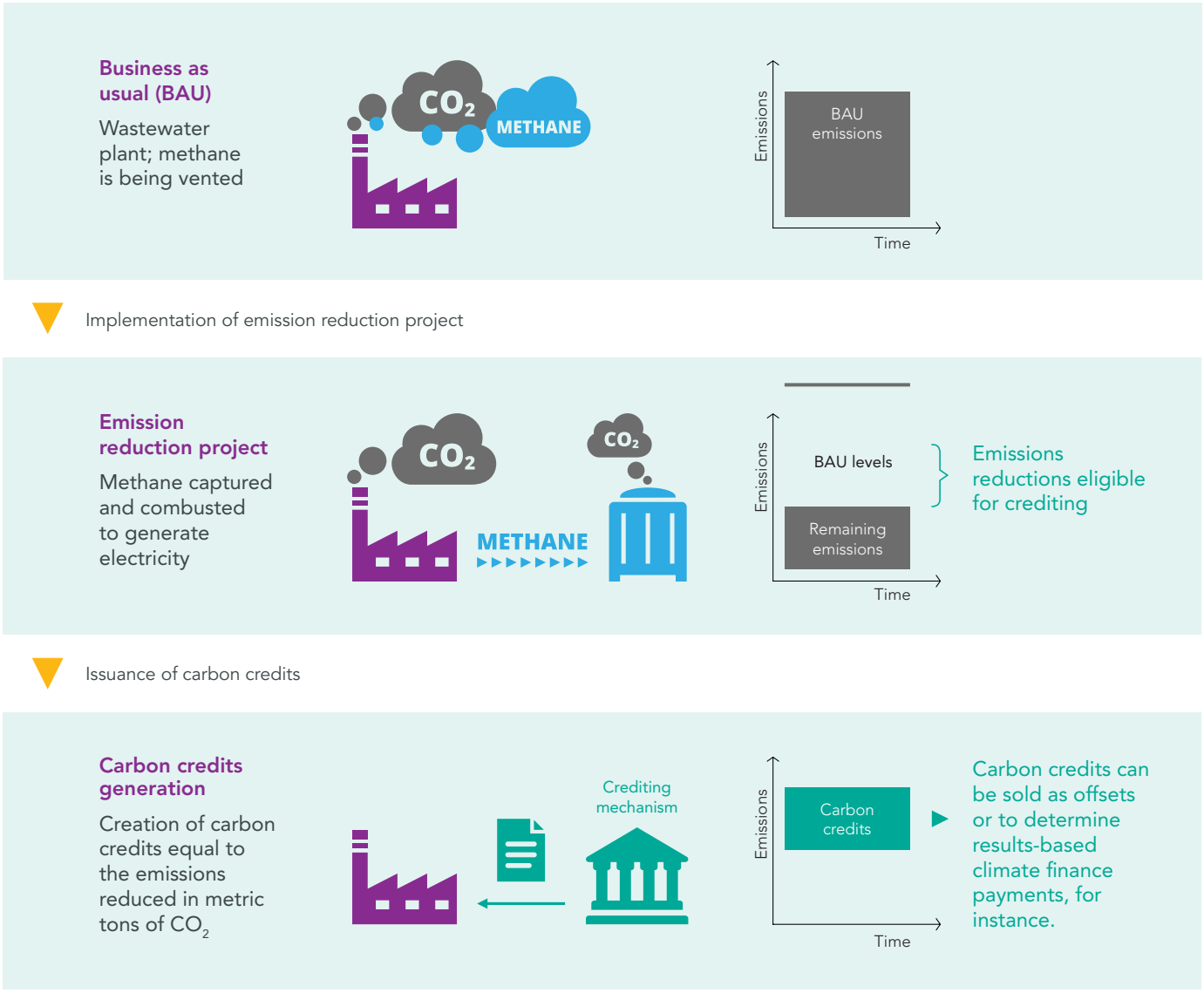
Source: *Adapted from State and Trends of Carbon Pricing 2020*, World Bank 2020.

1.2 FUNDAMENTAL CONCEPTS IN CARBON CREDITING

For the purposes of the guide, carbon crediting is defined as the process of issuing emissions reduction units to project activities in recognition of quantified emissions reductions. These reductions are calculated as the difference between emissions from the project and emissions from a baseline scenario, which represents the scenario assumed to occur in the absence of the crediting mechanism (see Figure 1-2).

The subsections below introduce some concepts that are fundamental to the crediting process. Key terms used throughout the guide are summarized in Box 1-2.

Figure 1-2. Example of how carbon crediting works



Source: World Bank 2020.

Box 1-2. Key terms used in the guide

Different crediting mechanisms often use different terminology to describe their system and the various actors in the system. For consistency and clarity, this Guide uses a common set of terms regardless of the specific mechanism considered, summarized below.

Crediting mechanism: Initiative that issues tradable credits to actors that voluntarily implement emissions reduction activities that are additional to business-as-usual operations. Other sources may use "crediting program" or "offset program" to describe the same initiative.

Policymaker: The entity responsible for designing the crediting mechanism (and/or other policies) in the jurisdiction. Other sources may use "program designer" to describe an entity with the same function.

Program administrator: The entity responsible for administering the day-to-day functions of the crediting mechanism.

Projects: The activity, group of activities, or programs undertaken to deliver emissions reductions.

Project proponents: The entities responsible for implementing the project. Other sources may use the terms "project developers," "project owners," or "project designers" to describe the same entities.

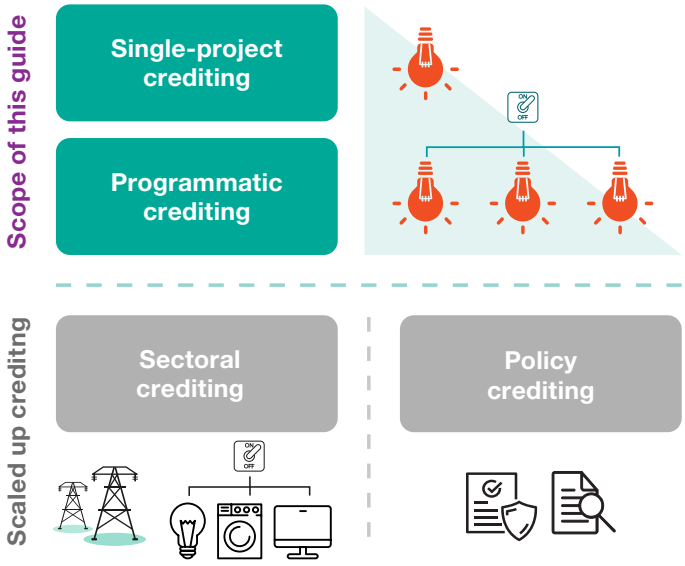
Auditors: The entities responsible for undertaking validation and verification activities. Other sources may use "verifiers, validation, and verification bodies" or, in the case of the CDM, "designated operational entities" to describe the same entities.

1.2.1 Crediting at the levels of projects and programs

Policymakers can take four different approaches to carbon crediting. The first two involve focus on specific activities, and the second two are forms of "scaled-up" crediting (see Annex I):

- **Single-project crediting** is are pursued by a project proponent, normally in a single installation (i.e., facility or entity) or a set of installations, applying a specific technology or process.
- **Programmatic crediting** lets project proponents generate credits from similar activities within an overall program as described in the project methodology or protocol. Programs allow for some flexibility in that they need not identify clearly, before commencing activities, the specific installations or devices generating the required emissions reductions. These tend to be small and micro scale activities (e.g., at the household level).
- **Sectoral crediting** aggregates emissions reductions across an entire industrial sector or subsector. It does not prescribe the types of activities undertaken within the sector. Credits are only generated if a predetermined aggregate target (e.g., sector-wide target or jurisdictional target in the case of jurisdictional crediting) is reached.
- **Policy crediting** involves estimating the effects of specific policy measures, like an energy efficiency standard or feed-in tariff, on overall emissions levels and crediting the outcomes of such policies.

Figure 1-3. Crediting at different levels and scope of this guide



Additional detail on each of the four approaches to crediting, including examples of each, is provided in Annex II.

1.2.2 Emissions reductions versus carbon removal

In most industrial and energy-related projects, reducing GHG emissions from the baseline scenario involves reducing (or avoiding) an emission that would have otherwise occurred. By contrast many forestry-related projects, as well as carbon capture and storage projects, capture carbon dioxide from the atmosphere and store it in carbon sinks—the biosphere (e.g., in forests) or the lithosphere (e.g., in soils or in geological structures).

For simplicity of language, throughout this guide, "emissions reductions" is used to cover both emission-reducing and sink-enhancing activities.

1.2.3 Crediting versus offsetting

The terms offsetting and crediting are often used interchangeably. However, in this guide crediting refers to the process of providing recognition for emissions reductions, while offsetting refers to the particular use of a credit to compensate for (or "offset") an emission by an agent under either a mandatory or a voluntary commitment. Similarly, a credit is the unit representing an emissions reduction, whereas an offset represents the use of that unit in a particular policy context. For instance, a credit is not an offset where it is used to support results-based climate finance through a mechanism, like the Pilot Auction Facility of the World Bank. In this example, the Pilot Auction Facility could purchase credits as a proxy for mitigation, but such credits would not be used to compensate for any emissions. This guide uses the term "credit" wherever the unit is involved, and only uses "offset" in contexts involving compensation for other emissions.

1.2.4 Additionality

Carbon credits should only be awarded to activities that are driven by the incentive provided from the crediting mechanism—that is, if they demonstrate additionality. If an actor would undertake an activity even in the absence of the crediting mechanism, the activity is not additional and the emissions reductions should not be recognized by the crediting mechanism. There are a range of options to test whether a project activity is additional. These tests are described in Chapter 6. Additionality is a fundamental part of crediting mechanisms and a mechanism's environmental integrity is compromised if carbon credits are issued to non-additional projects.

1.2.5 Over-crediting

Even if a crediting mechanism has deemed an activity additional, if the methodology applied to calculate the emissions reductions overestimates baseline scenario emissions or underestimates project scenario emissions, the resulting calculation will be inflated. This situation is referred to as over-crediting.

Credits can only have environmental integrity if the issued credits are additional and the emissions reductions quantification methods are conservative, and therefore avoid over-crediting (see environmental integrity criteria below).

1.2.6 Voluntary participation

Carbon taxes and ETSs adopt the "polluter pays principle," whereby polluters face a carbon price that they internalize into their decision-making. Instead of placing a cost on emissions, carbon crediting rewards emissions reductions. As a result, project proponents and other actors participating in a crediting mechanism do so voluntarily—even where mandatory obligations (e.g., for emitters under a carbon tax or ETS) drives demand for those credits.

1.2.7 The need for an external source of demand

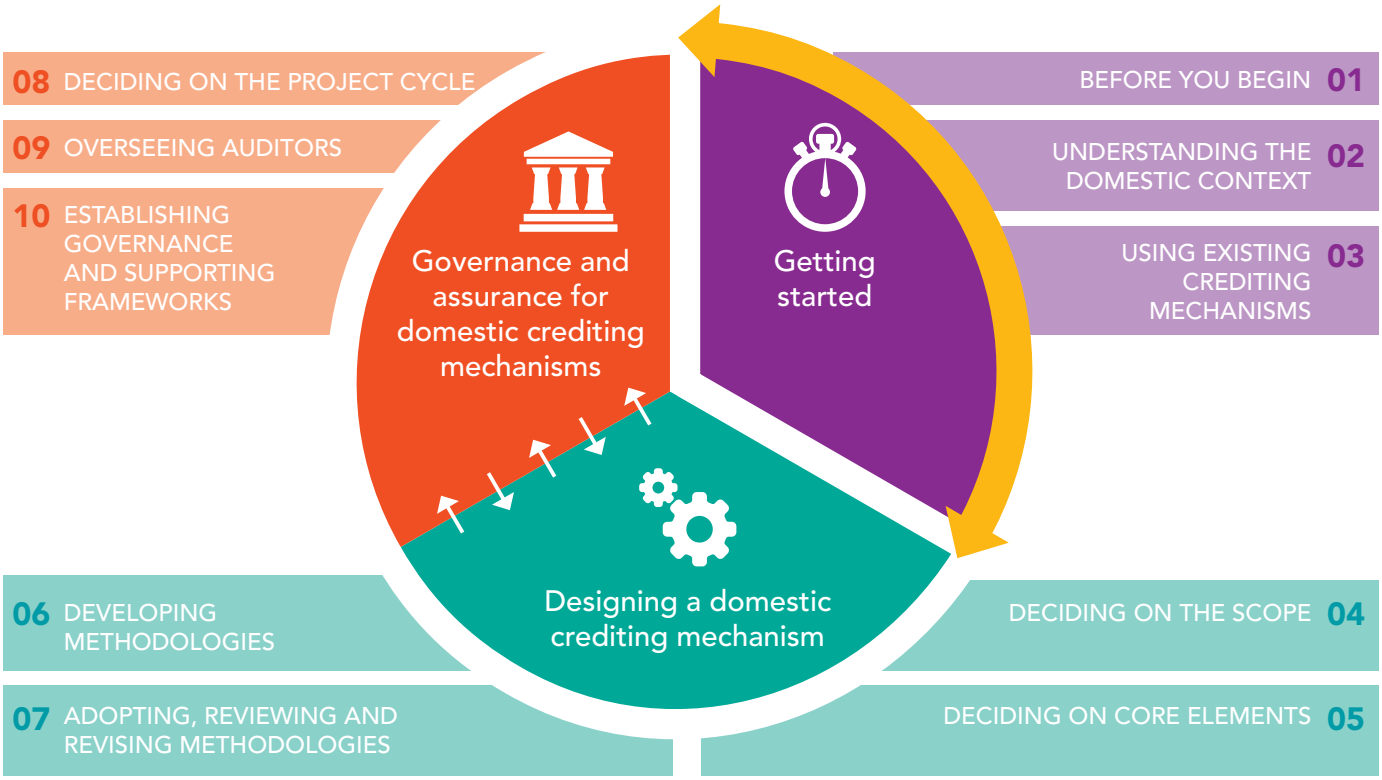
Carbon crediting mechanisms are a type of carbon pricing instrument that, unlike carbon taxes and ETSs, do not in themselves create a carbon price directly or indirectly. Instead, they complement initiatives that create demand for emissions reducing activities, either at the domestic or the international level. For carbon credits to have value, crediting mechanisms require an external source of demand for the credits. For example, an ETS could allow regulated emitters to use credits as part of their compliance with the cap, corporations could use them to help meet their voluntary emissions reduction goals, or governments could purchase the credits in recognition of the delivered emissions reductions (otherwise known as results-based climate finance).

1.3 SCOPE OF THE GUIDE

The guide's primary target is policymakers aiming to develop domestic crediting mechanisms in support of domestic mitigation goals. It does not include details on developing an international crediting mechanism—such as the ongoing discussions on rules for Article 6.4 and Article 6.2 of the Paris Agreement—and refers to these only where there is a link to policy choices made at a domestic level. International cooperation is approached only insofar as it may be relevant to discussions on the design of domestic carbon crediting systems.

This guide focuses on project-based and programmatic crediting. In domestic contexts, scaled-up crediting may play less of a role and be less relevant because such mechanisms may be larger than the potential crediting demand in most domestic markets, and most national governments lack the capacity to administer them. In addition, with the exception of reduced emissions from

Figure 1-4. Outline of designing a domestic crediting mechanism



deforestation and land degradation, which has been a viable and well-defined category of crediting mechanism, sectoral and policy-based concepts have remained at a pilot stage to date. Annex II provides additional information on sector and policy crediting, as does the PMR's technical note on Establishing Scaled-up Crediting Program Baselines under the Paris Agreement.

1.4 OUTLINE OF THE GUIDE

The guide summarizes the main decisions confronting policymakers in setting up a crediting mechanism (see Figure 1-4). The first step in this process, before the actual design of any program, is to clarify its policy objectives. The following chapters cover the major decisions for designing a crediting mechanism once the objectives have been clarified. Rather than linear steps in a decision-making process, these may be seen as building blocks. There is a typical order of issues—deciding on scope before deciding on methodological development rules, for example. Nevertheless, policymakers can also decide on issues simultaneously or in a different order than envisioned here.

1.5 EVALUATION CRITERIA FOR ASSESSMENT OF DESIGN OPTIONS

The guide provides three evaluation criteria policymakers can use to assess design options or considerations presented at each step of the design process:

- **High environmental integrity**. Promoting environmental integrity in a crediting system means ensuring that aggregate emissions do not increase as a result of the crediting transactions.[3] This requires consideration of multiple elements, including ensuring that the activity is additional, the emissions abatement is independently verified, there is no double counting of emissions reductions, and the emissions reductions are permanent.[4] Policymakers often use principles to promote environmental integrity in program development, project implementation, and sourcing of carbon credits.[5] Ensuring genuine abatement also requires GHG emissions reductions to be quantified and reported in accordance with the GHG accounting principles to avoid over-crediting emissions reduction activities. Promoting

[3] Schneider and La Hoz Theuer 2019.
[4] Schneider and La Hoz Theuer 2019; Broekhoff et al. 2019.
[5] See, for example, Broekhoff et al. 2019.

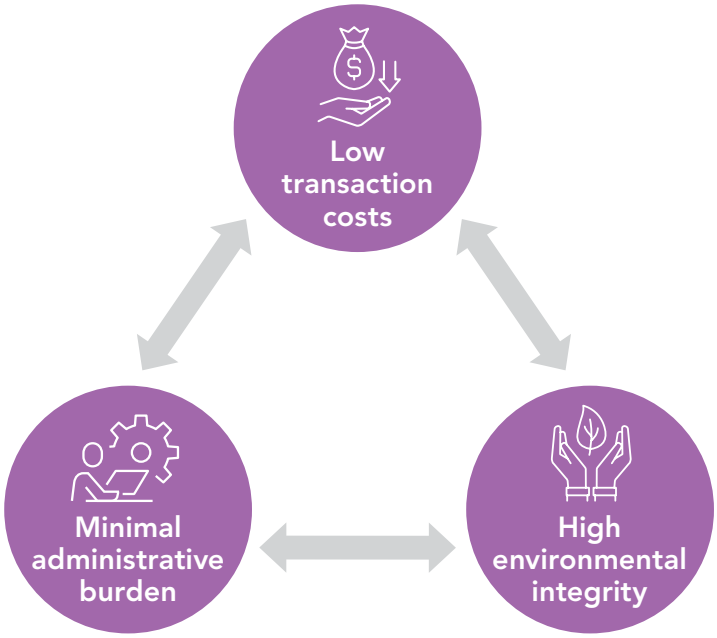
environmental integrity is important for stakeholders to view carbon credits, and the crediting mechanism more generally, as a credible approach to reducing emissions. A market that includes carbon credits that have (or are perceived to have) low environmental integrity can undermine investment certainty and reduce overall confidence. Further, the presence of low environmental integrity carbon credits will make it more expensive for jurisdictions to meet emissions reduction targets, because additional emissions reductions must be sourced to compensate for any abatement that is not real. Chapters 5, 6, and 9 in particular address these components in more detail.

- **Low transaction costs**. Transaction costs for project proponents include costs of collecting and reporting program-specific data, fees charged by the crediting mechanism (e.g., for registering projects or issuing credits), and the costs of developing and auditing project documentation and performance. They can also include the costs of the uncertainty and time required in the regulatory process or resulting from frequent or unexpected changes in the rules, procedures, and guidelines (see discussion of the project cycle in Chapter 8). Higher transaction costs may reduce participation in the market, both because they affect the financial viability of projects and because they create uncertainty for investors.
- **Minimal administrative burden**. An important criterion, given administrative capacity in many developing countries, is that the rules of the crediting mechanism must not impose an unreasonable administrative burden on the government. Policymakers may consider whether specific choices might require significant additional analysis, review, or other action by government agencies, and whether this is worthwhile. There are several options to minimize the burden; for example, by utilizing the administrative infrastructure of international crediting mechanisms or outsourcing some functions to third parties (see Chapters 3 and 10).

At times, policymakers may have to decide how to balance competing criteria (see Figure 1-5).

A classic trade-off will likely involve the balance between environmental integrity and the administrative and transaction costs. While a certain level of environmental integrity is necessary, additional rigor, tests, and procedures may also increase the costs for program administrators and project proponents. Jurisdictions have developed a range of ideas on how to manage transaction costs, including greater emphasis on regulatory certainty; simplification through standardization of baselines, project cycles, and other methodological components; development of standardized parameters and approaches (such as positive lists for additionality); and the introduction of concepts such as "materiality"[6] into the validation and verification procedures.

Figure 1-5. Trade-offs between design criteria



[6] Materiality is a concept that auditors apply in verifications in order to detect errors, omissions, or misstatements in emissions reductions being claimed. Something is material when the statement, omission, misstatement, or erroneous reporting of it could change the registration or issuance of carbon credits. This may be defined, for example, in terms of a certain percentage of the emissions reductions impact.

2 UNDERSTANDING THE DOMESTIC CONTEXT

At a glance

Carbon crediting does not stand alone in the policy mix; it requires mechanisms to create demand for credits. It also can complement other climate policy instruments, including regulation and other carbon pricing instruments.

The policy objectives carbon crediting can achieve include:

- reduce emissions at a low cost, leading to an overall increase in cost-effectiveness;
- reduce businesses' cost of compliance with other emissions reduction mandates;
- deliver positive social, environmental, and economic impacts beyond greenhouse gas (GHG) emissions reductions; and
- help to mobilize carbon finance in sectors and activities not directly exposed to a carbon price.

In designing the crediting mechanism, policymakers should consider involving relevant stakeholders at an early stage to increase understanding, trust, and support. Stakeholders' inputs will be needed at the design stage and particularly in the process of methodology and project approval.

This chapter outlines the preparatory steps policymakers should consider before designing a domestic crediting mechanism. Section 2.1 looks at the rationale and objectives for crediting, highlighting the need for policymakers to prioritize their objectives from the outset. Section 2.2 discusses the role of crediting: a crediting mechanism cannot operate in isolation but can support and complement a broader suite of climate policies. Finally, Section 2.3 highlights the importance of identifying and engaging with stakeholders to build understanding and expertise for both stakeholders and the government.

2.1 POLICY RATIONALE AND OBJECTIVES

Policymakers must establish the objective(s) of the crediting mechanism because these priorities will affect important design and policy decisions later on. Table 2-1 identifies the policy objectives that introducing a crediting mechanism into the climate policy mix can achieve. These objectives are not mutually exclusive, and, in some cases, the objectives may even be mutually supportive. For example, allowing credits from uncovered sectors can reduce a business's cost of complying with an emissions trading system (ETS), while mobilizing additional investment to these uncovered sectors.

2.1.1 Reducing emissions and helping the jurisdiction achieve its targets

If demand exists, crediting can contribute to emissions reductions and help governments achieve their emissions reduction targets (including, if appropriate, National Determined Contributions [NDCs]). Under the Kyoto Protocol, for example, Germany, France, Portugal, and Spain instituted domestic carbon credit procurement schemes. These incentive programs were based on the use of carbon crediting methodologies to advance carbon mitigation in sectors and activities climate policy instruments did not otherwise cover. This can be particularly useful for sectors that are not traditionally covered by an ETS or a carbon tax, like the forestry sector. Forestry credits are generated in domestic crediting mechanisms in several jurisdictions (for example, Alberta, Beijing, California, and Switzerland). Clearly defining the role of the crediting mechanism in a jurisdiction's

Table 2-1. Potential policy objectives for crediting mechanisms

Policy objectives	Description	Illustrative examples
Reduce emissions/ help achieve NDC	Broadens access to emissions reductions options across the economy, increasing the cost-effectiveness of achieving mitigation targets, and can result in an increased level of ambition.	Almost all national and subnational crediting mechanisms have this goal.
Reduce domestic compliance costs	Adds additional flexibility to compliance options by allowing offsets in addition to allowances or tax payments.	Used for offsetting compliance obligations under carbon markets in the United States and Canada.[7] Used for offsetting compliance obligations under South Africa's carbon tax regime.
Provide offset options to corporations	Facilitates stronger voluntary commitments to mitigation from corporations and other entities not subject to mandatory policies or emission constraints.	Costa Rica's Carbon Neutrality Program for companies.
Mobilize investment (including international results-based climate finance)	Directs private (or public) investment to mitigation activities in possibly under-funded sectors/activities.	Results-based climate finance programs such as the World Bank's Pilot Auction Facility.
Promote development benefits	Delivers investment into sectors and activities that may increase development benefits (employment/biodiversity, environmental health).	Programs such as the Carbon Initiative for Development and VCS methodology for blue carbon credits.

policy mix and its contribution to achieving both current and future emissions reduction targets will be critical components of the crediting mechanism design process.

2.1.2 Providing flexibility and reducing domestic compliance costs

The most common reason for introducing a domestic crediting mechanism is to reduce the cost of compliance with a mandatory ETS or carbon tax that is already in place. However, almost all[8] jurisdictions that allow the use of offsets cap the amount that can be used to meet an entity's compliance obligation. Out of the 21 ETSs in operation in 2020, only three systems (Nova Scotia, New Zealand, and Massachusetts) do not allow for offsets. (However, a link to high-integrity international carbon markets is likely to form part of New Zealand's 2030 strategy and Nova Scotia's ETS legislation includes the possibility for a future offset system.[9]) Carbon crediting mechanisms, if designed and implemented correctly, can lower the overall ETS compliance costs, and may theoretically result in industry and government having a broader willingness to take on more aggressive mitigation. The Partnership for Market Readiness' (PMR) Emissions Trading in Practice: A Handbook on Design and Implementation provides additional guidance on other options to improve compliance flexibility and reduce compliance costs.

Similarly, some jurisdictions allow companies to use credits to satisfy carbon tax obligations or as a way of avoiding the requirement to pay carbon taxes, as is the case in South Africa and Colombia, respectively. Chile and Mexico are also in the process of developing domestic crediting mechanisms that will be linked with their carbon taxes. Allowing a company to meet part of its carbon tax obligation through credits can provide greater flexibility for businesses in how they fulfill their tax obligations. The PMR's Carbon Tax Guide: A Handbook for Policymakers provides additional guidance.

[7] For instance, the British Columbia Offset Program, California Compliance Offset Program, Québec Offset System, and the Regional Greenhouse Gas Initiatives' CO_2 Offset Mechanism.

[8] Kazakhstan, for instance, does not limit the use of domestic offsets in its ETS.

[9] For more see the International Carbon Action Partnership's ETS Map: https://icapcarbonaction.com/en/ets-map.

2.1.3 Providing offset options to businesses and other organizations

Carbon crediting mechanisms provide a source of credible emissions reductions that businesses and other organizations can use to voluntarily offset their emissions. Crediting mechanisms facilitate this by providing a source of high-quality units.

2.1.4 Measuring benefits and mobilizing finance

Crediting mechanisms can be used as tools to measure the climate benefit of specific policies or investments and/or mobilize climate finance. These benefits can be realized even if carbon credits are not formally issued, as the methodologies used in crediting mechanisms can be used by governments and private investors to estimate the GHG emissions reduction value of a particular measure or understand the GHG emissions reduction impact of a financial investment.

Where credits are issued, they provide a tangible investment opportunity that can attract investments from a broad range of financial players. In this way, carbon credits can be used as a metric of carbon performance. This approach is used in results-based climate finance, which relies on the ability to measure, in a cost-effective way, actual GHG performance of a specific investment (i.e., decrease in GHG emissions or increase in carbon sequestration).

Domestic jurisdictions can attract additional international financial flows where foreign investors can make investments in specific projects to obtain carbon credits. As an example, the Clean Development Mechanism (CDM) under the Kyoto Protocol facilitated foreign financial flows by attracting private sector investment. The discussions on Article 6 of the Paris Agreement to date suggest a similar international transfer of domestic credits may be allowed and recognized under the Paris Agreement framework (see Box 2-1).

Box 2-1. Transferring domestically generated carbon credits under the Paris Agreement

The direction of international climate policy may be particularly important if a country wants to allow the "export" of domestic mitigation units (e.g., carbon credits) in order to attract foreign financial flows through the purchase of these units. However, the transfer of mitigation units to other jurisdictions, if not well designed, carries the risk of exporting lower-cost abatement (i.e., the domestic carbon credits) that the host country could otherwise use to reach its own domestic mitigation goals. If countries sell their domestic mitigation units abroad, they cannot use those reductions to reach current and future climate goals. The Paris Agreement will regulate how participating countries (Parties) engage in the international transfers of mitigation outcomes—including domestic credits.

Article 6 of the Paris Agreement establishes two potential opportunities for for Parties to voluntarily cooperate to support meeting their NDC goals. Under Article 6.2, Parties may transfer "mitigation outcomes" to achieve their NDC targets; that is, they could transfer domestic credits as mitigation outcomes to other Parties. The detailed rules for Article 6.2 are still being negotiated, and thus it would be premature to provide specific recommendations for the design of domestic crediting mechanisms to align with them. Similarly, Article 6.4, for which rules are also being negotiated, is intended to allow emissions reductions to be transferred under a more centralized international mechanism that is directly under the guidance of the Parties to the Paris Agreement.

Notwithstanding the absence of final rules on implementation of Article 6, the Paris Agreement has established the intent that only one Party can count the same internationally transferred mitigation outcome toward meeting its NDC target. Thus, a Party that transfers the results of an Article 6 cooperation program cannot then count those emissions reductions toward achieving its own NDC goal. Article 6.2 requires that Parties avoid "double counting," which is discussed further in Chapter 5. Countries are beginning to develop their own policies and procedures in anticipation of an agreement on principles and rules for Article 6 in the coming years. For example, Costa Rica has already developed credit export criteria and an approval procedure for such transactions.

2.1.5 Promoting development benefits

Carbon crediting mechanisms have the potential to promote additional benefits beyond emissions reductions. They can provide incentives for specific technologies or processes that have other sustainable development benefits. In many cases, climate change mitigation may go hand in hand with objectives such as improving air quality, protecting water resources, improving soil health and biodiversity, and improving productivity. Other social and economic benefits could include improved energy access (e.g., off-grid lighting and electrification), providing jobs implementing new technologies (e.g., retrofitting of buildings), improving livelihoods, and assisting in the early commercialization of new emissions reductions technologies or products. Policymakers may choose to narrow the scope of eligible projects or impose additional requirements to promote specific benefits. See Chapter 5 and the PMR's forthcoming report *The Development Benefits of Carbon Pricing* for more detail.

2.2 CREDITING IN THE POLICY MIX

While a domestic crediting mechanism cannot be the only tool to decarbonize an economy, it can serve as a useful mechanism to incentivize emissions reductions and help deliver broader policy objectives. Determining the role of crediting in a policy mix will require policymakers to map existing and planned policies to see where a crediting mechanism will be best suited. The answer to the question of how carbon crediting should be used by a jurisdiction vis à vis other policy options is one that will vary depending on jurisdictional context and is beyond the scope of this paper. The PMR's forthcoming guide on *Carbon Pricing Assessment and Decision Making: A Guide to Adopting a Carbon Price* provides a framework for determining the role of a carbon pricing instrument.

Looking at the interaction with other policy frameworks, crediting can help to develop appropriate monitoring frameworks that support policy development for other regulatory approaches or vice versa. In some early cases, low-cost abatement opportunities identified (for example, in the framework of the CDM), have led the way to inclusion of these opportunities in regulatory instruments, post-crediting. Conversely, emissions or technology regulations may provide benchmarks against which to assess crediting activities. In most crediting mechanisms, activities can be credited only if they are not mandated by law and thus crediting projects must achieve a higher level of climate action than the law requires.

Broad-based mandatory carbon pricing instruments, such as a carbon tax or an ETS, provide better tools to incentivize reductions across the economy than crediting. However, carbon crediting has its advantages in some situations. For example, jurisdictions with an ETS or carbon tax can use crediting in uncovered sectors to provide additional compliance flexibility to regulated companies in covered sectors. In addition, a crediting mechanism could be a useful option if there are barriers, for instance legal hurdles or political resistance, to implementing an ETS or a carbon tax. In these cases, a crediting mechanism may be a good starting point to send a carbon pricing signal and build familiarity with market mechanisms. Additionally, crediting may also be useful in sectors that have diffuse emissions—such as emissions from agriculture and livestock—and for which appropriate emissions monitoring protocols have not yet been developed.

Importantly, unlike a carbon tax or an ETS, carbon crediting cannot stand alone because it requires an external demand for credits. Demand for carbon credits could be generated through a number of options, such as from entities with compliance requirements under an ETS or carbon tax; a government mandate for emissions reductions; and/or voluntary climate commitments. Governments will need to consider whether there will be sufficient demand before embarking on the crediting mechanism design process. Assessing demand for credits will usually rely on economic analysis of mitigation options and economic modeling of supply-demand interaction. At the same time, a variety of other policy instruments may have a bearing on the effectiveness of carbon crediting, so their interaction also needs to be factored in. Overlapping or countervailing policies could undermine the additionality of the crediting mechanism and its overall effectiveness.

2.3 STAKEHOLDERS AND THE PROCESS FOR DESIGNING A CREDITING MECHANISM

Involving stakeholders in program design and implementation has several key benefits, including the following:[10]

- **Building understanding and expertise**. Stakeholder engagement gives policymakers access to additional sources of expertise and ensures stakeholder concerns are considered as part of the crediting design process. Stakeholders who were involved in the design of the program will be better positioned to participate in it. Likewise, involving multiple well-

[10] Based on Step 2 on engaging stakeholders in the forthcoming revised ETS Handbook.

informed stakeholders, such as potential project proponents, industry players, environmental regulators, auditors, climate experts, and experienced authorities from other jurisdictions, in the design of the mechanism will allow for smoother implementation. In addition, the program may need to allow extra time for stakeholders to consider particularly complex elements of carbon crediting mechanisms, particularly if the country has little experience with market mechanisms. Additional time may also be needed to engage with the regulatory authorities of a carbon tax or ETS that may provide the domestic demand for the credits.

- **Building credibility and trust**. Giving stakeholders the chance to review and understand the rationale and planned rules for a system tends to increase their confidence in it. External, peer-reviewed research will ensure that information and data are public and that conclusions are as transparent as possible. Active engagement before and during implementation will make it easier for stakeholders to anticipate the approval processes for crediting projects. Transparent and clear stakeholder engagement can also build trust, for instance, with civil society and environmental nongovernmental organizations in the environmental integrity of the crediting mechanism.

- **Building acceptance and support**. A successful crediting mechanism needs enduring social acceptance and interest. Broad political support will help ensure the viability of the system through political cycles and increase the system's legitimacy.

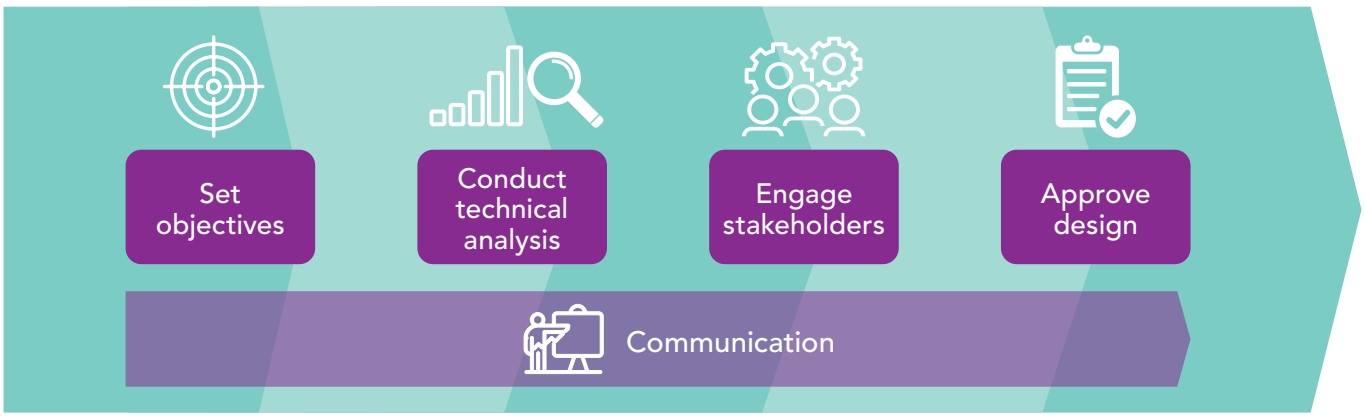
Policymakers should identify and map stakeholders before engaging with them. This includes not only project proponents and businesses from sectors likely to participate in the crediting mechanism, but other government stakeholders (including relevant ministries and political parties), academia and think tanks, the media, and the broader public. Other jurisdictions with similar domestic crediting mechanisms may also be consulted.

The nature of the stakeholder engagement will likely be shaped by the statutory requirements, standard practices, and norms for public engagement in that jurisdiction. Broadly speaking, stakeholder engagement should take place at two levels, which are addressed in different places in this guide:

- **Program design**. While a government entity (national or subnational) leads the design process, both technical review (e.g., by experts in the private sector, academia, and think tanks) and input from civil society on the socioeconomic and local environmental impacts of the crediting mechanism will benefit the design process. As an example, Mexico is currently developing a mechanism to allow mitigation credits to be recognized as offsets under its ETS. The development process started with internal consultations with the main public institutions in charge of design and regulation and the support of international experts. This was followed by a series of virtual technical workshops with stakeholders across several sectors to seek advice on alignment with other national policies and programs, as well as on the scope and approach of the crediting mechanism across several sectors. Once the first draft of the program is ready, it is expected that the government will consult with a wider stakeholder group. The development of the crediting mechanism in Mexico follows a much longer process of stakeholder engagement on the ETS design itself. Policymakers in Mexico have therefore built on established public consultation procedures generally used for new environmental regulations in the country.

- **Methodology approval**. Stakeholders may be invited to review and comment on proposed crediting methodologies as part of the review and approval process (see Box 2-2). Stakeholders may have particular insight into technical aspects such as the additionality of the project activities, availability of information, and the assessment of the

Figure 2-1. Example of process for making policy decisions for a crediting mechanism



Box 2-2. Example of stakeholder input on methodology approval: California

The California Air Resources Board (CARB) governs the Compliance Offset Program for the state's ETS. CARB has a formal and extensive process for stakeholder input for all new proposed offset protocols:[a]

- **Offset Protocol Announcements and Timing**: announce decisions to develop new offset protocols in a public setting, open to all stakeholders.
- **Informal Development Activities**: hold public workshops or technical meetings to discuss the development of a potential offset protocol. Depending on the complexity of the project type, CARB may hold a series of workshops or technical workgroup meetings.
- **Issuing the Public Notice**: initiate formal rulemaking action by issuing a public notice of proposed rulemaking, with a Board hearing date posted at least 45 days prior to the Board hearing. This notice initiates a 45-day public comment period.
- **Availability of the Proposed Text and the Initial Statement of Reasons**: Along with the public notice, provide the proposed Compliance Offset Protocol text and a staff report that includes an explanation of why certain decisions were made in the development of the proposed Compliance Offset Protocol.
- **45-Day Comment Period**: provide at least 45 days for the public to review the proposed Compliance Offset Protocol text and staff report and provide written comments to CARB.
- **Public Hearing**: present the proposed Compliance Offset Protocol to the Board for its consideration. The dates and agendas for each hearing are posted on the rulemaking website. Stakeholders can provide written and oral testimony to the Board.
- **Summary and Response to Comments**: summarize and respond to all formal comments submitted during the 45-day comment period, at the Board hearing, and during any subsequent 15-day comment periods.
- **Submission of a Rulemaking Action to the Office of Administrative Law for Review**: following final CARB approval, submit rulemaking record to the Office of Administrative Law for review. Upon the office's approval, the Board-adopted Compliance Offset Protocol is filed with the Secretary of State.

Source: CARB 2013.

[a] https://ww2.arb.ca.gov/sites/default/files/classic//cc/capandtrade/compliance-offset-protocol-process.pdf

baseline and monitoring, reporting, and verification requirements. Their input can also ensure that the program will address any local stakeholder concerns about potential adverse impacts. This could be particularly important for land-use change and forestry methodologies, as well as projects improving cookstove efficiency (for more detail see Chapter 7).

In addition, in some cases, there may be a need to consult as part of project approvals. While this was a large part of many international and independent crediting mechanisms, it is uncommon for domestic programs. To promote transparent and effective stakeholder management, policymakers should compile, and provide public responses to, feedback and comments received, including criticisms or concerns.

In terms of the process for designing a new crediting mechanism, governments may choose to seek input from a wide range of stakeholders on the proposed design options for the crediting mechanism (see Figure 2-1). This might follow a technical analysis of policy options and be part of a process led by the principal ministry for the crediting mechanism or an interministerial committee or board overseeing climate change policy. More detailed guidance on stakeholder consultation can be found in the PMR's Carbon Tax Guide and the PMR and International Carbon Action Partnership's Emissions Trading in Practice: A Handbook on Design and Implementation. The Guide to Communicating Carbon Pricing also offers relevant insights.

3 USING EXISTING CREDITING MECHANISMS

At a glance

Building a domestic crediting mechanism can be a significant undertaking, requiring financial resources, technical capacity, and regulatory expertise. However, policymakers can save time by relying or building on existing crediting mechanisms. One option is to allow credits issued by existing crediting mechanisms to be used for domestic policy purposes. This can reduce time and effort, generating an immediate supply of credits consistent with other carbon market standards. Over time, policymakers could build up the necessary sectoral knowledge and monitoring, reporting, and verification (MRV) skills to develop their own domestic mechanism, if desirable.

Another option is to model elements of a domestic crediting mechanism on existing mechanisms, or to choose to outsource specific functions to them. For instance, a domestic mechanism could base its own project cycle requirements on those of an existing mechanism (see Chapter 8) and rely on auditors accredited under an existing mechanism to perform domestic validation and verification functions (see Chapter 9). Relying on existing crediting mechanisms in this way can reduce the resource requirements to develop and implement a domestic mechanism but limits a jurisdiction's control over specific design elements. These trade-offs need to be balanced by policymakers when considering if and how to use elements from existing crediting mechanisms.

This chapter discusses both the options and the considerations for allowing the use of credits issued by existing mechanisms in a domestic context, as well as the options for, and possible advantages of, establishing an independent domestic crediting mechanism that outsources certain components or is modeled on existing mechanisms.

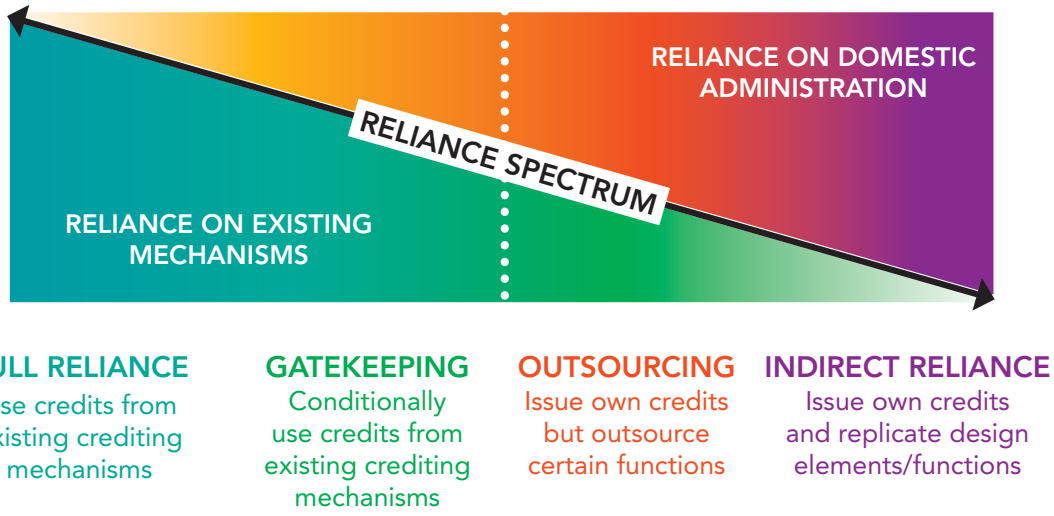
3.1 SPECTRUM OF RELIANCE

As outlined in Chapter 1 (see Box 1-1), existing crediting mechanisms include international; independent; and regional, national, and subnational mechanisms. Reliance on one or more of these mechanisms, either in full or in part, can greatly reduce the time and resources required to establish a domestic crediting market. The Partnership for Market Readiness' (PMR) technical note Options to Use Existing International Offset Programs in a Domestic Context [11] identifies a spectrum for using existing mechanisms. This spectrum outlines four options that can be allocated into two categories of international reliance, which are discussed further in the following subsections:

- **Using credits issued by existing crediting mechanisms**. Options on the left side of Figure 3-1 simply require domestic policymakers to generally oversee and approve the use of international credits, potentially based on additional terms and conditions (i.e., gatekeeping).
- **Replicating design elements from existing crediting mechanisms**. Options on the right side of Figure 3-1 require policymakers to play a larger role. In these options, discrete elements, like auditing, are outsourced or components of other mechanisms, like emissions factors or methodologies, are used as a basis for their own domestic design.

[11] World Bank 2015a.

Figure 3-1. Options for using existing crediting mechanisms in a domestic context



Source: World Bank 2015a.

The level of reliance can differ across design elements. The Korea Offset Program, for example, allows the use of some Clean Development Mechanism (CDM) carbon credits for domestic compliance (a type of gatekeeping) while also designing its own domestic program modeled on the CDM and allowing the use of CDM methodologies (a combination of indirect reliance and outsourcing).

The level of reliance on existing crediting mechanisms may change over time. For example, policymakers could start out allowing the use of credits issued by existing crediting mechanisms, but transition to locally administering a domestic mechanism as administrative and MRV capacities are developed.

Deciding whether and how to use existing international crediting mechanisms in a domestic context requires consideration of domestic constraints, opportunities, and policy objectives. It will also likely be influenced by the outcomes of negotiations relating to Article 6 of the Paris Agreement and, in particular, the ongoing recognition of these programs in a post-Kyoto Protocol framework.

3.2 USING CARBON CREDITS ISSUED BY EXISTING MECHANISMS

Domestic policymakers can permit the use of externally issued carbon credits for domestic policy or regulatory requirements. Full reliance would entail accepting all credits issued by an existing mechanism for domestic use. Adopting this approach could be problematic, however, where existing crediting mechanisms do not align with the preferred scope of a domestic mechanism—for example, if they are not issuing credits for projects within the jurisdiction or they do not target priority project types.

In most cases, domestic policymakers prefer to be selective about which credits are used. To facilitate this, policymakers can adopt "gatekeeping" criteria, which are typically based on project type, vintage and location (generally domestic projects). This is similar to the approach being used under the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) established by International Civil Aviation Organization (ICAO), which uses criteria to determine which credits airlines can use for offsetting purposes (see Box 3-1).

Other criteria are possible as well, though they may require additional vetting by domestic policymakers or program administrators. South Africa, for example, allows credits issued by certain international and independent crediting mechanisms to be used to meet domestic carbon tax obligations so long as the credits are issued for projects that are located in South Africa and are not covered by the carbon tax. South Africa's program administrators must also check whether government subsidies are present since the existing crediting mechanisms do not check this directly.

Note that in practice, allowing the use of credits issued by existing crediting mechanisms almost always means relying on crediting mechanisms that operate internationally—and typically only if those programs operate within the country that allows their credits to be used (see Table 3-1).

Box 3-1. "Gatekeeping" criteria used in CORSIA

CORSIA requires aircraft operators (that is, airlines) to purchase and surrender carbon credits to offset greenhouse gas (GHG) emissions from international flights above a 2019–2020 baseline.

In 2019, the ICAO Council adopted program-level and credit-level criteria—the CORSIA Emissions Unit Eligibility Criteria—to assess existing crediting mechanisms and their credits.[a,b] Existing crediting mechanisms must meet both sets of criteria in order for credits to be eligible for use under CORSIA.

The **program-level criteria** include clear crediting methodologies and development process, robust issuance and tracking processes, protection against double counting, and sound transparency and governance measures, including validation and verification procedures.

The **credit-level criteria** specify that emissions reductions must (1) be additional; (2) be based on a realistic and credible baseline; (3) be quantified, monitored, reported, and verified; (4) have a clear and transparent chain of custody; (5) represent permanent emissions reductions; (6) assess and mitigate against potential increase in emissions elsewhere; (7) be counted only once toward a mitigation obligation; and (8) do no net harm.

Following the publication of the criteria, offsets programs were invited to apply to become eligible for the pilot phase of CORSIA. An independent body was appointed to review applications and make recommendations of eligibility to the ICAO Council.[c]

As part of a first call for proposals, six existing crediting mechanisms[d] were approved in early 2020 for use to comply with offsetting requirements during the first phase of CORSIA. However, not all activities from the six approved crediting mechanisms were assessed as being eligible. For instance, activities from afforestation or reforestation under the CDM were not approved for use under CORSIA.

[a] https://www.icao.int/environmental-protection/CORSIA/Pages/CORSIA-Emissions-Units.aspx.
[b] https://www.icao.int/environmental-protection/CORSIA/Documents/ICAO_Document_09.pdf
[c] A group of 19 international independent carbon markets experts, the Technical Advisory Board, was appointed to review applications and make recommendations on their eligibility to the ICAO Council.
[d] These programs are the American Carbon Registry, the China GHG Voluntary Emission Reduction Program, the CDM, the Climate Action Reserve, the Gold Standard, and VCS.

Policymakers may want to allow the use of credits issued by existing mechanisms in a domestic context for the following reasons:

Urgency

Depending on policymakers' policy objectives, it may be important to generate a readily available supply of credits in the near term—for example, to promote early action, increase market liquidity, attract investment, or help reassure participants covered by a newly implemented emissions trading system (ETS) or carbon tax that the program has flexibility, which can help contain compliance costs. If expedited implementation is a priority, then allowing the use of credits issued by existing programs may be advantageous, given that it often takes years to establish a fully independent crediting mechanism. The Republic of Korea recognized this when it developed the Korea Offset Program, allowing for a gatekeeping option even as it developed its own administrative capacity, as described in Table 3-1.

Limited resources

One advantage of allowing the use of credits from existing mechanisms is that it offers a way to source carbon credits without having to establish a domestic initiative that can be administratively burdensome. If governments do not have the internal capacity, whether it be sufficient staff or expertise, to build and run a domestic crediting mechanism, full reliance or gatekeeping can be a particularly attractive option. While domestic policymakers will still need to assess the suitability of these other crediting mechanisms and maintain some level of oversight, the effort and expertise required is more manageable. Several of the countries listed in Table 3-1 also developed and supplied CDM projects and this shift to a direct reliance model allows the country to leverage its preexisting projects and private sector experience without much additional work. Allowing the use of external credits enables domestic policymakers to focus on policy priorities and avoids the need to develop and oversee all the crediting mechanism elements described in Parts II and III of this guide.

Table 3-1. Examples of countries allowing use of credits issued by existing mechanisms[12]

Jurisdiction	Description
Chile	In February 2020, improvements to the green tax on stationary sources were adopted as part of the national tax code reform. Revisions to the green tax include allowing the use of carbon credits to meet green tax obligations from 2023 onwards. Policymakers have three years to set the offset rules, including setting the eligibility criteria for project activities and developing the MRV requirements for offset projects. It also includes the development of a carbon offset registry and transaction system.
Colombia	Allows the use of credits in specific circumstances. Taxable entities can use credits acquired from projects located in Colombia to fully or partially reduce carbon tax liabilities. Credits must be from a crediting mechanism that, among other things, has a public registry and methodology development procedures that include public consultation (such as CDM, Verified Carbon Standard [VCS] and Gold Standard). Other requirements currently include ensuring the credits were generated after January 1, 2010, and were generated by activities not mandated by law. Project activities must also be registered on Colombia's National Registry for the Reduction of GHG Emissions and credits must be canceled in the originating crediting mechanism's public registry to avoid double counting.
Republic of Korea	The Korea Offset Program has a gatekeeping element, where ETS-regulated companies are allowed to use CDM credits, provided those credits come from domestic projects that started after April 14, 2020. International CDM projects developed by Korean companies that generate credits after June 1, 2016, are also allowed from 2018. However, Korean companies need to meet certain conditions relating to ownership, project cost, and funding. All CDM credits need to be converted into Korean Credit Units before they can be used for compliance.
New Zealand	Until 2015, New Zealand allowed the use of CDM credits (Certified Emissions Reductions) with no restrictions for compliance in its domestic ETS (a rare example of full reliance). International units were not eligible for compliance as of June 1, 2015.
Mexico	Allows credits issued under CDM to be used to fulfil carbon tax obligations as long as they are sourced from projects located in Mexico. The initial draft of the offset mechanism for the ETS uses international standards as a main reference, adapting criteria and procedures to the national context.
South Africa	Allows credits issued under programs such as CDM and voluntary market standards including VCS and Gold Standard, to be used to fulfil carbon tax obligations as long as they are from projects that are located in South Africa, are not covered by the carbon tax, and do not receive certain government subsidies. Units are canceled in the standard's registry and then transferred to a domestic registry for retirement against the tax liability of the covered entities account.

Attracting international finance

If one objective for a domestic crediting mechanism is to attract international finance, then working with existing mechanisms could be advantageous as a way to offer consistency and familiarity to international credit buyers already familiar with such programs. Developing a domestic market can then focus on fostering demand (international and/or domestic), while using existing infrastructure to generate carbon credit supply.

3.3 OUTSOURCING OR REPLICATING DESIGN ELEMENTS

Domestic policymakers may prefer to directly administer a domestic crediting mechanism. In this case, policymakers will be responsible for making final decisions about registering projects and issuing credits. This entails greater effort to both design and administer the mechanism but gives policymakers greater control and, they can ensure the mechanism is more closely aligned with domestic policy objectives. In pursuing this approach, domestic policymakers do not have to reinvent the wheel. They can:

[12] Assembled by the authors from personal knowledge as well as information from South African National Treasury 2019; MexiCO2; International Emissions Trading Association & Environmental Defense Fund 2018; and International Carbon Action Partnership 2020.

- outsource certain functions to existing crediting mechanisms; and/or
- replicate design and functional elements of existing crediting mechanisms.

Outsourcing can be done by incorporating the principles, standards (including methodologies), or other requirements of existing mechanisms into the domestic crediting mechanism design. As an example, both the VCS and the Gold Standard allow new methodologies to use methodological tools developed and maintained by the CDM (e.g., the CDM's "Tool for the Demonstration and Assessment of Additionality"); if the CDM revises or updates these tools, the revisions automatically apply within the VCS and the Gold Standard. Similarly, the Korea Offset Program allows domestic projects to be developed using CDM methodologies (see Table 3-2); updates or additions to CDM methodologies also apply within the Korea Offset Program. Such outsourcing can avoid the need to maintain technical capacity and administrative resources needed for some of the more complex elements of crediting design.

Another common approach is to outsource program administrative functions. For example, policymakers may permit the use of auditors accredited and overseen by other crediting mechanisms (see Chapter 9). The Joint Crediting Mechanism, a bilateral mechanism implemented by Japan and partner countries, for example, allows CDM-accredited auditors and entities accredited under International Organization for Standardization (ISO) 14065 to perform validation and verification. Alberta's crediting mechanism outsources its registry functions to the Canadian Standards Association (see Table 3-2 and Table 3-3). The California Air Resources Board (CARB) has approved the Climate Action Reserve, American Carbon Registry, and VCS to serve as official "offset project registries" tasked with reviewing project applications, evaluating auditor reports, and issuing provisional credits. It thus effectively outsources these administrative tasks, but still performs its own oversight and retains authority to make final decisions about converting provisional credits into compliance-eligible Air Resources Board Offset Credits.

Alternatively, policymakers can use or build on what existing mechanisms have done by replicating or adapting their standards, governance structure, or procedural requirements. A wide range of options is possible here, including replicating or adapting methodologies or methodology development procedures; adapting auditor training and accreditation requirements; replicating registry design and functionality; replicating project cycle definitions and requirements; and so on. The PMR's technical note on Options to Use Existing International Offset Programs in a Domestic Context refers to this as "indirect reliance" since these elements are under the complete control of domestic program administrators, often with modifications to better fit domestic circumstances.

Table 3-2. Examples of outsourcing crediting features or functions

Jurisdiction	Description[13]
California	CARB has approved several independent crediting mechanisms (Climate Action Reserve, American Carbon Registry, and VCS) to serve as official "offset project registries" tasked with reviewing project applications, evaluating auditor reports, and issuing provisional credits. It thus effectively outsources these administrative tasks, but still performs its own oversight and retains authority to make final decisions about converting provisional credits (registry offset credits) into compliance-eligible Air Resources Board Offset Credits.
Japan and 17 partner countries	The Joint Crediting Mechanism allows validation and verification to be performed by auditors accredited either under the CDM (known under the CDM as "Designated Operational Entities") or ISO 14065.
Republic of Korea	The Korea Offset Program allows domestic projects to be developed using CDM methodologies. The program is also modeled on many aspects of the CDM, including project cycle and monitoring procedures. The Korea Offset Program also has a gatekeeping element, where ETS-regulated companies are allowed to use CDM credits, provided those credits come from domestic projects that started after April 14, 2010. International CDM projects developed by Korean companies that generate credits after June 1, 2016 are also allowed from 2018. However, Korean companies need to meet certain conditions relating to ownership, project cost, and funding. All Certified Emissions Reductions need to be converted into Korean Credit Units before they can be used for compliance.

[13] Assembled by the authors from personal knowledge as well as information from International Emissions Trading Association & Environmental Defense Fund 2018; International Carbon Action Partnership 2020.

Table 3-3. Examples of replicating design elements of existing mechanisms[14]

Jurisdiction	Description
Alberta	Alberta's crediting mechanism provides flexibility to large, industrial facilities under the province's baseline-and-credit system (Technology Innovation and Emissions Reduction Regulation). Crediting methodologies have been independently developed but have drawn on those from other existing mechanisms, including the CDM, Climate Action Reserve, the American Carbon Reserve, and resources from the Intergovernmental Panel on Climate Change, World Resources Institute, and the World Business Council for Sustainable Development.
China	The CCER program is largely based on the CDM, particularly the methodologies and project development framework. Unlike the CDM, though, MRV is largely carried out by local bodies rather than on the national level,[15] which can reduce transaction costs. Policymakers also initially allowed CDM-registered projects to transition into the CCER. These projects can generate CCER offset credits generated before the date of registration ("pre-CDM projects"). This leverages the significant supply of carbon offset projects already in the country as a result of China's involvement in the CDM. The extent to which they can be converted for compliance is likely contingent on the additional project type and geographic restrictions demanded by the respective ETS pilots and those that may be imposed by the future national carbon market.
Republic of Korea	The Korea Offset Program is modeled on many aspects of the CDM, including project cycle and monitoring procedures.

For countries with experience hosting projects registered under existing programs (e.g., CDM projects), drawing on this experience can be a natural starting point for designing a domestic mechanism. The Chinese Certified Emissions Reduction (CCER) Scheme is a national crediting mechanism that is largely based on the CDM, with some adjustments to reduce transaction costs. For instance, there is no request for review stage in the project cycle and no charge for project proponents (see Table 3-3). Policymakers will need to assess which mechanisms are most appropriate to draw from and a number of factors come to play here from scope and project type(s), sufficient granularity, the level of familiarity and experience of the domestic private sector, and the crediting mechanism(s) and activity in neighboring jurisdictions.

The main advantages of outsourcing and replicating design elements:

Better alignment with domestic policy goals

Because existing crediting mechanisms were developed to serve a variety of different markets and policy contexts, they may not always align well with domestic policy needs in terms of scope (e.g., locations and sectors targeted; see Chapter 4) or stringency, particularly related to environmental integrity (see Chapters 5 and 6). If so, then simply allowing the use of credits issued by these mechanisms may not be feasible. Establishing a domestic crediting mechanism—though it requires more time and cost—gives policymakers more control over how the mechanism will function, the relative incentives it provides for mitigation activities in different sectors, and the balancing of transaction costs with environmental integrity. If this greater level of control is desired, adapting or outsourcing where appropriate can make the jobs of domestic policymakers and administrators easier.

Building up domestic mitigation capacity

One goal for establishing a domestic crediting mechanism could be to build up technical capacity related to certain mitigation activities, as well as MRV capacities. Relying on existing mechanisms by allowing the use of their credits can begin to develop some of these capacities (especially among domestic private actors) but offers fewer advantages in terms of gaining experience with crediting governance, administration, and regulatory oversight. Domestic policymakers may wish to begin with (or transition to) the outsourcing and indirect reliance models as a way to build up their capacity to exert greater control, in line with domestic policy objectives.

[14] Assembled by the authors from personal knowledge as well as information from International Emissions Trading Association & Environmental Defense Fund 2018; International Carbon Action Partnership 2020.

[15] There are 12 CCER validation agencies approved by the National Development and Reform Commission. CCER projects must be validated by one of these 12 national agencies.

II

DESIGNING A DOMESTIC CREDITING MECHANISM

4 DECIDING ON THE SCOPE

At a glance

The scope of a crediting mechanism can be defined in terms of the sectors, gases, and mitigation activities or project types covered. Policymakers will also need to define—often at the methodological level—which sources and sinks each mitigation activity includes, where eligible activities can take place, and the mix of project-based and programmatic-based activities the mechanism will incentivize. The scope should be outlined in transparent and objective eligibility criteria and should avoid overlapping with existing carbon pricing instruments or regulations that mandate certain technologies or emissions reduction targets.

Ultimately, the choice of scope will depend on the priorities and constraints in the implementing jurisdiction; however, the criteria outlined in Chapter 1 may help governments decide which sectors to prioritize in order to promote environmental integrity while keeping costs low. Apart from sector choice, policymakers need to decide on the scale of eligible mitigation activities and the geographic scope. Generally, starting with project-based activities and scaling up to programmatic activities could give policymakers time to build capacity. This guide is limited to domestic crediting mechanisms that focus on activities within a jurisdiction's boundaries. In this context, policymakers may want to prioritize aspects for their jurisdiction, including

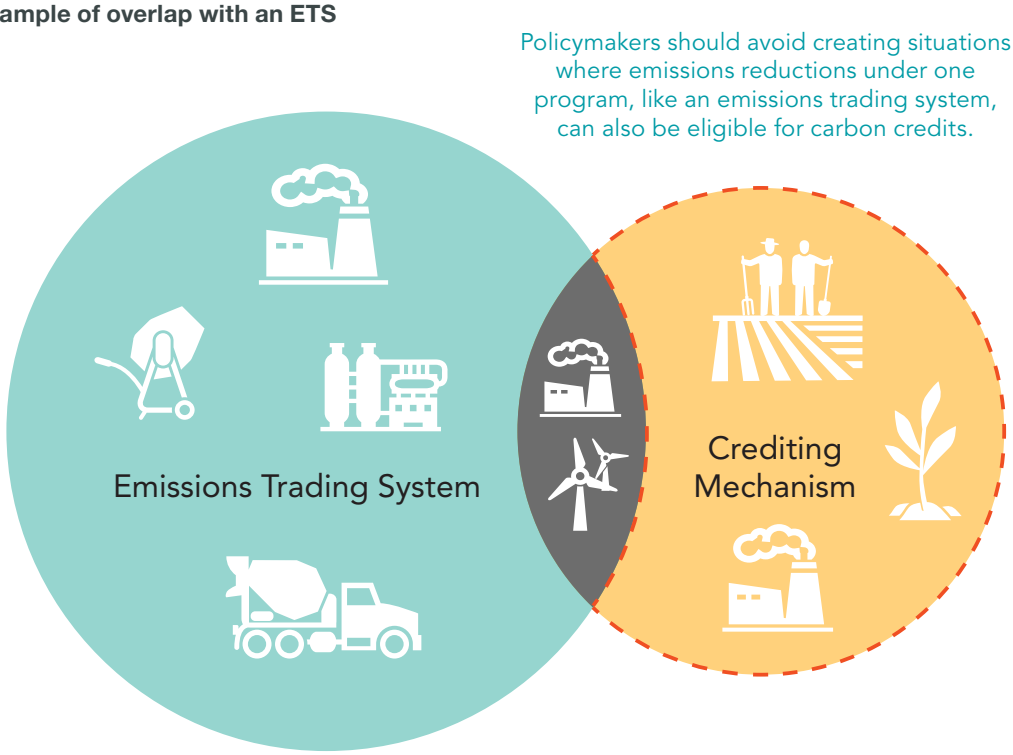
- sectors and gases;
- types of mitigation activities and the greenhouse gas (GHG) sources and sinks from those activities;
- the scale, or level of aggregation, of eligible mitigation activities crediting; and
- the locations in which projects may generate eligible credits.

Sections 4.1 and 4.2 address, respectively, avoiding overlap with other policies in choosing sectors, gases, and mitigation activities and prioritizing types of mitigation activities. Section 4.3 addresses scale and Section 4.4 addresses geographic scope.

4.1 AVOIDING OVERLAP WITH OTHER POLICIES AND REGULATIONS

Crediting is premised on the idea of incentivizing mitigation in activities that are not appropriately incentivized by existing policies. Thus, in general, the scope of the crediting mechanism should not include entities, gases, or activities covered by mandatory GHG emissions reduction regulations. For more on managing policy overlaps with a carbon pricing instrument, see Chapter 4 of the World Bank's State and Trends of Carbon Pricing report and the Partnership for Market Readiness' (PMR) forthcoming report *Carbon Pricing Assessment and Decision Making: A Guide to Adopting a Carbon Price*. These resources provide a framework for categorizing policies, as well as a range of tools and modeling approaches to map out potential issues in the policy mix. However, the challenges of managing policy overlaps is a changing and ongoing process. As such, building in regular review and evaluation windows can be a good opportunity to respond to any new issues.

Figure 4-1. Example of overlap with an ETS



4.1.1 Overlap with other carbon pricing instruments

Crediting emissions reductions in a sector covered by an emissions trading system (ETS), for example, would undermine the environmental integrity of the crediting mechanism.[16] As the ETS already provides a price signal to incentivize emissions reductions in those sectors, the additionality of credits generated from those sectors would be highly questionable (see Figure 4-1). Even if the incentive from the carbon price was not sufficient to make the offset project viable, allowing offsets within a covered sector creates the risk of double counting (see Chapter 5). For example, if cement manufacturing is covered by an ETS and a covered cement plant could also generate carbon credits from an energy efficiency project, then the emissions reductions could be counted twice: first by lowering the GHG emissions of the cement plant (which is covered by the ETS) and second when the credits are used (e.g., as an offset by another ETS entity).

Without appropriate accounting adjustments between the crediting mechanism and the ETS, this would look like more emissions reductions are being achieved than actually is the case. What is more, the cement plant owner would receive a double benefit: once by reducing its liability under the ETS and then again from the sale of the carbon credits.

However, identifying these risks is not always simple, because of indirect overlaps between covered and uncovered sectors, or types of mitigation activities within those sectors. An example of this complexity occurs when the point of regulation for a carbon tax or ETS is "upstream" of the point where GHG emissions occur, such as the producer of a fossil fuel.[17] In these cases "downstream" businesses (such as electricity generators) face an indirect carbon price. So in this example, while an electricity generator is not directly covered by a carbon tax or ETS (e.g., is not required to pay the carbon tax or surrender allowances), it faces a carbon price that is included in the cost of the fuel. This carbon price is passed through the supply chain, providing an incentive to reduce emissions (e.g., using less fuel or switching to a lower-carbon fuel). Allowing the electricity producer to also create a credit for reducing emissions (e.g., through switching to lower-carbon fuels) would raise questions about the additionality of those credits and would double count the emissions reductions associated with the carbon tax or ETS. Box 4-1 presents some examples of how different jurisdictions address issues of overlap between crediting mechanisms and other carbon pricing instruments.

[16] Entities below the coverage threshold in an ETS (e.g., metric tons of carbon dioxid per year per facility in emissions) could be allowed to participate in the crediting mechanism market without risk of overlap.

[17] Many jurisdictions place the point of regulation "upstream" (e.g., on fossil fuel producers or distributors) to simplify administration.

Box 4-1. Examples of how different jurisdictions avoid overlap between crediting and other carbon pricing instruments

In California, sectors under the ETS are not eligible to generate carbon credits to be used as offsets to ensure additionality and avoid policy overlap. Indirect coverage is also managed through restricting offset uses. The state's Compliance Offset Program is restricted to agriculture, forestry, land use, livestock methane, and ozone-depleting substances, while the California ETS covers electricity, industrial energy, and transportation.

In South Africa, overlap with the carbon tax is avoided by restricting which activities are eligible to generate carbon credits. South Africa's Carbon Offsets Regulations exclude activities covered by the carbon tax. South Africa manages the overlap in renewable power regulations and the inclusion of the power sector under the carbon tax by imposing threshold limits. For instance, only large electricity generators are covered by the carbon tax, meaning small generators are potentially eligible to generate carbon credits. Overlap with regulations like the country's Renewable Energy Independent Power Purchase Procurement Program, which provides a feed-in tariff, is also managed through the use of thresholds: only small independent power producers, or technologies facing barriers due to higher production costs, are eligible to generate carbon credits.[a] In addition to minimizing overlap, this ensures that credits can only be generated by small renewable power producers that might need additional support because they are not viable at the available tariffs.

Mexico allows entities to offset their emissions with carbon credits (limited to Clean Development Mechanism [CDM] projects located in Mexico) under the carbon tax regime. In practice, because the value of carbon credits (and the carbon tax) is low, covered entities have not yet used carbon credits to meet their carbon tax obligation. Mexico also considered the interaction with renewable energy policy during the design of its ETS. To avoid double counting and potential policy overlap, Clean Energy Certificates (which are designed to promote renewable electricity generation, with an associated reduction in GHG emissions) cannot be used to meet compliance obligations during the pilot phase of the ETS.

Sources: MexiCO2; International Emissions Trading Association Environmental Defense Fund 2018; National Treasury 2019.

[a] The carbon offset regulations only allow independent power producers in the Renewable Energy Independent Power Purchase Program to generate carbon credits if they are smaller than 15 megawatts or if their generation cost is above ZAR 1.09/kilowatt-hour (USD 0.06).

4.1.2 Other regulations

If other regulations already mandate certain activities, then crediting the emissions reductions from these same activities would raise issues of fairness and concerns about additionality. If the regulations provide incentives or subsidies, then it might be possible to reflect the impact of these incentives in the analysis of projects in the crediting mechanism, but only if an investment additionality test was used and the incentives were fully reflected in the baseline and additionality assessment (see Chapter 6). For example, California policymakers deliberately excluded in-state landfill methane projects from the state's crediting mechanism because the law already required methane capture and destruction at in-state landfills.

To assess the potential overlap with existing and planned regulations, policymakers should undertake a policy-mapping exercise as part of the development of the crediting mechanism. This exercise would identify the coverage of existing and planned carbon pricing instruments at the level of sectors, types of mitigation activities within those sectors, and gases. The exercise would also identify other policies, like energy regulations, that mandate the implementation of mitigation activities, as well as any incentives or support that might need to be considered later in additionality and baseline assessments (see Box 4-2).

4.2 PRIORITIZING SECTORS AND TYPES OF MITIGATION ACTIVITIES

The decision on whether and how to prioritize sectors and types of mitigation activities in the crediting mechanism will depend on the priorities and constraints in the implementing jurisdiction. The criteria outlined in Chapter 1—environmental integrity, transaction costs, and administrative burden—can guide jurisdictions,

Box 4-2. Interaction between carbon credits and certificates from clean energy programs

One potential area of overlap with a carbon crediting mechanism is with programs that issue tradable renewable energy certificates, such as renewable portfolio standards (also called renewable energy targets), or energy efficiency programs that issue tradable "white certificates." While these program types have slightly different objectives—one to accelerate renewable energy deployment and the other to provide an incentive for increased energy efficiency—each also could provide carbon benefits and potentially support a type of carbon crediting activity.

For example, a new renewable energy project could theoretically be issued with renewable energy certificates for its contribution to a renewable energy target and also with carbon credits for generating electricity with lower emissions to what otherwise would have been generated. This overlap highlights the need for policymakers to carefully consider the interactions with related policies and address issues relating to additionality and/or double counting of the carbon benefits (see Chapter 6) in case such programs are also considered as a part of crediting programs.

along with their overall objectives for the crediting mechanism, in deciding the scope. In particular, with limited administrative resources available, there is a need to prioritize resources, effort, and timing for those activities and sectors that best meet the jurisdiction's objectives. Policymakers can prioritize sectors and activities by restricting a crediting mechanism's project types or by giving particular types preferential treatment, for instance, by providing simplified procedures and rules. There are several ways policymakers might prioritize what to include in the crediting mechanism, which are largely dependent on the broader policy objectives of the mechanism (as outlined in Chapter 1). Some are mutually exclusive, while others can be complementary, as they address different characteristics of mitigation activities that policymakers may choose to promote.

[18] Cames et al. 2016; Warnecke et al. 2017; World Bank 2016; Kollmuss, Schneider, and Zhezherin 2015.

Considerations of how to prioritize specific sectors, mitigation activities, and gases should address the following questions:

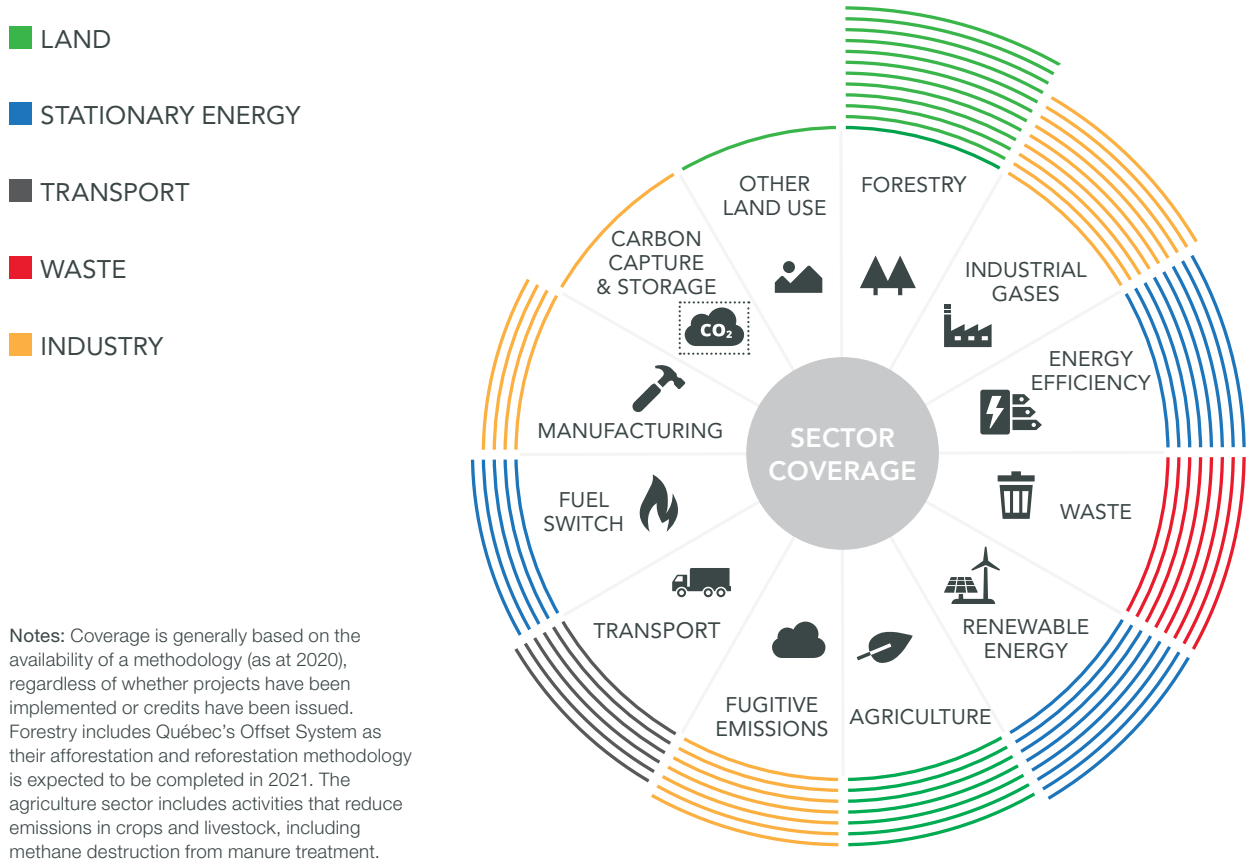
- **How large is the mitigation potential and how low are the mitigation costs?** The starting point for many mechanisms would be to include activities with a high potential to provide low-cost emissions reductions, as long as they are not covered by another climate policy instrument. Policymakers may prioritize the most cost-effective mitigation options—including those with low transaction costs—but will need to carefully consider how to incorporate other objectives, such as achieving sustainable development outcomes. Further, policymakers need to ensure that encouraging high volumes of abatement does not compromise the environmental integrity of the crediting mechanism.

- **How significant are the additionality risks?** Demonstrating additionality is easier for certain activities or in certain sectors than others. As an example, studies of the CDM and Joint Implementation indicate that activities with significant non-carbon revenues—such as large-scale wind power and hydropower, waste heat recovery and fossil fuel switching, energy-saving cookstoves and energy-efficient lighting—had greater difficulty with demonstrating additionality.[18] Focusing on project types that do not have high risks can help secure the environmental integrity of the crediting mechanism. In addition, because evaluating additionality and setting baselines for activities with low additionality risks are easier, prioritizing such activities can lower transaction costs and administrative burden on an ongoing basis.

- **What monitoring, reporting, and verification (MRV) skills does the country want to develop?** Some activities (e.g., agriculture) produce GHG emissions that are inherently more difficult to measure at the project level. As a result, it is particularly challenging to cover these activities under a mandatory carbon pricing instrument (e.g., carbon tax or ETS). In these cases, it may be advantageous to prioritize these activities for inclusion within a crediting mechanism. This could build the necessary MRV capacity in the country in preparation for future coverage under a mandatory carbon pricing instrument.

- **Are there significant sustainable development benefits?** Policymakers may want to explicitly target activities that provide high sustainable development benefits, such as improved air quality, or improvements to the local communities and ecosystems. For low-income countries, for instance, policymakers might prioritize energy access activities (e.g., improved cookstoves, rural electrification). A government might identify the technology areas based on expert judgement and sectoral expertise, or it might choose to

Figure 4-2. Coverage summary of existing regional, national, and subnational crediting mechanisms



Notes: Coverage is generally based on the availability of a methodology (as at 2020), regardless of whether projects have been implemented or credits have been issued. Forestry includes Québec's Offset System as their afforestation and reforestation methodology is expected to be completed in 2021. The agriculture sector includes activities that reduce emissions in crops and livestock, including methane destruction from manure treatment.

undertake more detailed quantitative assessments of sustainable development impacts. More guidance on how to promote the sustainable development impacts of crediting projects is also provided in Section 5.3.

- **Is there potential for incentivizing new technologies and long-term decarbonization?** Policymakers could promote crediting projects that are in line with the technologies and activities needed for a net zero emissions economy. This could include, for instance, prioritizing projects that foster low- or zero-emissions technologies and innovation rather than projects that may lock in fossil fuel technologies.[19] While crediting projects that result in cleaner or more efficient fossil fuels may reduce emissions in the short term, the ramifications of locking in fossil fuel technologies will make a transition to a net zero economy by mid-century increasingly challenging.

- **Is there a potential to use simplified or standardized approaches for MRV?** Focusing on activities where the MRV process and additionality assessment can be easily standardized could streamline the project approval process and reduce transaction costs. An example of this could be project types where there are no incentives other than emissions reductions (e.g., methane or nitrous oxide destruction, or some livestock and agriculture interventions) so that additionality assessment can be standardized as part of a "positive list" of eligible activities. Another example would be project types with homogeneous outputs (e.g., electricity, steel, other heavy manufacturing or mining products), which makes it possible to use a performance benchmark for the baseline and reduce MRV costs. The challenge with the latter category, however, is that often these are the sectors already covered by mandatory carbon pricing instruments.

Additional guidance on carbon pricing scope may also be found in the PMR and International Carbon Action Partnership's revised Emissions Trading in Practice: A Handbook on Design and Implementation and the PMR's Carbon Tax Guide: A Handbook for Policy Makers. For instance, some sectors may face greater MRV and mitigation quantification challenges, or be less sensitive

[19] Betram et al. 2015; Lazarus and van Asselt 2018; Höhne et al. 2015; Wright et al. 2018.

Table 4-1. Sectoral and mitigation activity scope of some existing crediting mechanisms

Crediting mechanism	Sectoral and mitigation activity eligibility
International and Independent	
American Carbon Registry	Fuel combustion, industrial processes, land use change and forestry, carbon capture and storage, livestock, waste.
CDM	All except nuclear; some limits on forestry projects (i.e., only afforestation and reforestation are allowed).
Gold Standard	Energy efficiency, renewable energy, industrial waste handling, and land use change and forestry.
Joint Implementation	All except nuclear.
VCS	All CDM sectoral scopes.
Regional, national, and subnational	
Alberta	Agriculture, carbon capture and storage, energy efficiency, forestry, fugitive emissions, industrial gases, manufacturing, renewable energy, and waste.
Australia Emissions Reduction Fund	All sectors.
British Columbia	All sectors.
California	Currently approved activities are those relating to livestock, rice cultivation, forestry, coal mine methane, and ozone depleting substances.
China	Varies between the seven piloting regions allowing use of Chinese Certified Emissions Reduction credits. Regulation allows trading activities of GHG emissions from carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulphur hexafluoride. All pilots exclude credits from large hydropower projects.
Québec	Sectors not covered under Québec's ETS, such as waste, ozone depleting substances, agriculture, coal mine methane, forestry.
Spain	For the National Territory, sectors outside the European Union ETS. For International Territory, energy efficiency, renewable energy, and waste management projects will be prioritized.
Switzerland	Emissions from all GHGs. All sectors except for nuclear, carbon capture and storage, research and development activities, and fuel switch to natural gas in the transport and building sectors.
Climate Action Reserve	Livestock, rice cultivation, forestry, coal mine methane, and ozone depleting substances, landfill gas, livestock, nitrogen, and organic waste in the United States and Mexico.
Regional Greenhouse Gas Initiative	Landfill methane, forest sequestration (including afforestation, reforestation, improved forest management, and avoided forest conversion), and avoided methane from manure management practice.

Source: Based on Michaelowa et al. 2019.

to price signals, than others, making them less suitable to a carbon pricing approach. This may explain why, for instance, there are very few transport credits issued to date and a high volume of credits from industrial emissions, renewable energy, and fugitive emissions projects.[20] Answering some of these questions may be particularly challenging (e.g., potential for long-term decarbonization), yet important to promote environmental integrity and to ensure the mechanism meets the long-term policy objectives. Figure 4-2 provides a summary of sectoral coverage for existing regional, national, and subnational crediting mechanisms.

As shown in Table 4-1, the scope of crediting mechanisms varies considerably, with some of those focused on supplying credits for compliance purposes having a narrower scope. In these cases, eligibility is limited to those activities not covered under existing carbon taxes or ETSs and that may be encouraged with an incentive rather than by a cost. International and independent crediting mechanisms (e.g., CDM and Verified Carbon Standard [VCS]) tend to have broader coverage than those with a domestic focus.

[20] World Bank 2020.

Table 4-2. Scale of mitigation activity in some existing crediting mechanisms

Crediting mechanism	Scale of activities
International and Independent	
American Carbon Registry	Project-based
CDM	Project-based and programmatic
Climate Action Reserve	Project-based
Gold Standard	Project-based and programmatic
Joint Implementation	Project-based and programmatic
VCS	Project-based and programmatic
Regional, national, and subnational	
Alberta	Project-based
Australia Emissions Reduction Fund	Project-based
British Columbia	Project-based
California[a]	Project-based
China	Project-based
Japan (J-Credits)	Project-based and programmatic
Joint Crediting Mechanism	Project-based and programmatic
Québec	Project-based
Spain	Project-based and programmatic
Switzerland	Project-based and programmatic

Source: Adapted from Michaelowa et al. 2019.

a California has also been exploring international offset credits generated through approved sector-based crediting mechanisms issued by a subnational jurisdiction in a developing country.

4.3 SCALE OF ELIGIBLE MITIGATION ACTIVITIES

In terms of the scale of eligible mitigation initiatives, crediting mechanisms might include multiple mitigation activities of the same type at a single site, a single mitigation activity at a single site, or programmatic interventions (sometimes called "programs of activities").[21] In this sense, "scale" is not so much about the size of a given installation (e.g., 1,000 megawatt versus 100 megawatt power plant) but about the boundaries and number of different sites that might be part of the overall mitigation intervention. Allowing programmatic activities, which then must define the eligibility criteria for including specific sites or actions inside of the program for purposes of generating emissions reductions, requires additional rules and procedures. Generally, most domestic crediting mechanisms use project-based approaches, while many existing international crediting mechanisms also include programmatic approaches (see Table 4-2). Both approaches have a significant base of experience in terms of the MRV requirements. Programmatic activities offer the added advantages of being able to reach small and micro scale activities and can be more easily scaled to cover a large number of activities.

4.4 GEOGRAPHIC SCOPE

Most domestic crediting mechanisms limit activities that take place within national boundaries. This ensures that both the value of the emissions reductions and the sustainable development benefits of the project implementation are captured locally. Some jurisdictions do allow for internationally generated credits, but a detailed examination of the key elements associated with international crediting is beyond the scope of the guide. Some subnational jurisdictions have extended the scope beyond their own borders. California allows for credits from a specified list of Compliance Offset Protocols. These can be generated from anywhere within the United States. However, starting in 2021, no more than half of the quantitative limit that entities can surrender can come from projects that do not provide direct environmental benefits to the State of California. Thus, while the geographic scope of the state's crediting mechanism may go beyond its territorial borders, the program requirements ensure that California accrues a share of the extra benefits beyond the flexibility it offers regulated entities.

Restricting geographic scope can be a way of incentivizing mitigation or technology developments and ensuring enforceability against project proponents. For instance, the Regional Greenhouse Gas Initiative allows crediting projects in participating states or in jurisdictions where there is a memorandum of understanding in place.[22]

Box 4-3. Direct environmental benefits in California

Assembly Bill 398 outlined the key features of California's ETS beyond 2020, including, among other issues, new limits and qualitative requirements on the use of offsets. As of 2021, no more than half of the limit on carbon credits for compliance within the ETS can come from credits that do not provide a direct environmental benefit to the State of California. Such benefits are defined as any project that results in "the reduction or avoidance of emissions of any air pollutant in the state or the reduction or avoidance of any pollutant that could have an adverse impact on waters of the state."[a] Projects will need to comply with the statutory requirements (Section 95989[a] or Section 95989[b]) in order to be positively identified as having a direct environmental benefit. While the process is easier for projects located in California, projects out of state may also apply for a direct environmental benefit determination. Projects that meet the direct environmental benefit requirements will be flagged as such in the California Air Resources Board registry and the Offset Credit Issuance Table so that they are easily identifiable by compliance offset buyers.

[a] AB 398, Chapter 135.

[21] While some crediting approaches are exploring different types of "scaled-up" interventions (e.g., sectoral or policy-based crediting), they remain preliminary and such experiments are outside the scope of this guide.

[22] World Bank 2020.

5 DECIDING ON THE CORE ELEMENTS

At a glance

Effective crediting mechanisms need to avoid double counting, define an appropriate crediting period length, impose safeguards to avoid social and environmental harm, address non-permanence and, if desired, promote development benefits.

This chapter looks at five key elements that directly impact the environmental integrity of a domestic crediting mechanism. Section 5.1 discusses design elements to avoid double counting: policymakers need to ensure that rules are in place to minimize the risk of double issuance, double use, and the double claiming of carbon credits. This includes public and transparent registry systems; requiring legal attestations from project proponents; monitoring to ensure claimed emissions reductions do in fact result from qualifying project activities; excluding any emissions reductions required by another regulation or policy; and avoiding double claiming between the crediting mechanism and jurisdictions. Without these, there is a risk that the same emissions reduction or removal can be counted twice, inflating the climate impact of the crediting mechanism.

Section 5.2 highlights the need to decide on the length of, and the ability to renew, the crediting period—the time period that a project remains registered and credits may be claimed. Regulatory conditions are also generally fixed during the crediting period. Accordingly, the period needs to be long enough to provide investment certainty to project proponents but short enough to allow jurisdictions to respond to changing climate targets and technological developments.

Section 5.3 discusses approaches to avoid environmental or social harm resulting from the crediting projects. Policymakers may also wish to design crediting mechanisms to explicitly improve environmental and social outcomes. Existing environmental safeguards and domestic requirements for impact assessments may be sufficient but if there is concern, policymakers may need to impose additional requirements. Related to this, Section 5.4 looks at how governments can promote the development benefits of a crediting mechanism if this is an objective of the program. Requiring identification and/or monitoring of development benefits will add costs for both government and project proponents but increase positive sustainable development impacts.

Finally, Section 5.5 discusses the potential for non-permanent emissions reductions and the possible risk that the emissions removals from a crediting project will be re-released. Policymakers need to assess the risk of non-permanence, decide on the most appropriate permanence period (generally between 25 and 100 years), and determine the most appropriate mechanisms to address this risk. Most existing crediting mechanisms to date have opted for a buffer approach alongside extensive monitoring requirements.

5.1 MECHANISMS TO AVOID DOUBLE COUNTING

Double counting occurs when a greenhouse gas (GHG) emissions reduction is counted more than once toward achieving climate change mitigation.[23] A failure to address double counting can undermine the environmental integrity of the crediting mechanism.

The subsections below explain and provide examples for the three types of double counting (double issuance, double use, and double claiming) and summarize the rules and requirements existing crediting mechanisms have implemented to prevent each. Robust monitoring and accounting provisions within crediting registries can play an important role in avoiding double counting, as the following subsections detail.

5.1.1 Double issuance

Double issuance occurs if more than one carbon credit or other emissions unit is issued for the same unit of GHG emissions reduction. If multiple carbon credits exist for the same GHG emissions reductions, then the sum of the carbon credits will be greater than the actual emissions reductions the activity achieves. Each of these scenarios involves double issuance:

- Two entities claim credits for the same emissions reduction, or a crediting mechanism mistakenly issues two credits for the same emissions reduction; for example, if both the producer and the consumer of a biofuel are issued a credit for the emissions reductions associated with the same liter of fuel produced and used.
- A project is registered under two crediting mechanisms and credits are issued under both mechanisms for the same emissions reductions.
- Emissions reductions receive a credit under a crediting mechanism for emissions that are also covered by an allowance in an emissions trading systems (ETS).

To avoid double issuance, the crediting mechanism should include stringent registry and accounting procedures. Registry systems should use serial numbers to record and transparently track carbon credits, to ensure that only one credit is issued per emissions reduction. Registry procedures should also check for projects and issuances in other crediting mechanisms, to ensure that projects do not issue credits for the same emissions reductions under more than one program. Setting norms for project accounting boundaries can also help ensure that projects count only emissions reductions that accrue to them (and not emissions reductions that accrue to projects or activities upstream or downstream from them). Finally, crediting mechanisms should mandate that project proponents attest, such as by signing legal forms, that they have not been issued with credits for the same emissions reductions under another program. The mechanism should also disallow projects that overlap with an ETS (or require such projects to address the double issuance issue with the operator of the ETS).

5.1.2 Double use

Double use occurs if the same credit is counted twice toward achieving climate change mitigation. This can also be thought of as double selling and can be a type of fraud. For example, a carbon credit might be sold twice, or a singular GHG emission reduction might be certified under two carbon crediting mechanisms and sold under each. Measures, like proper serialization and tracking, that prevent double issuance can also prevent double use. However, double use relates to how actors in the marketplace use credits. For example, double use could also occur if an unscrupulous seller represents to multiple buyers that the carbon credit was retired on their behalf. Preventing this kind of behavior requires buyers and other stakeholders to act. To encourage such action, crediting mechanisms should implement registry systems that are publicly available so that buyers can check the status of credits (e.g., whether they are active or have been retired) to prevent double use in addition to the measures listed above that prevent double issuance.

5.1.3 Double claiming

Double claiming occurs when two different entities claim the same emissions reductions as contributing to achieving climate change mitigation. Like other forms of double counting, it results in the sum of the claims exceeding the actual emissions reductions achieved, which means mitigation is being claimed for emissions reductions that have not taken place. This issue typically arises when emissions reductions are claimed in multiple jurisdictions or crediting mechanisms. For example, two countries collaborating to reduce emissions through waste management and methane destruction toward Paris Agreement targets might result in both countries claiming the resulting emissions reductions. In a similar manner, there is also a risk that subnational entities and corporations working together could both claim credits under a national program for a collaborative project.

There is some debate as to what constitutes double claiming when it comes to the voluntary carbon market and the interaction with a jurisdiction's targets (such as a country's Nationally Determined Contribution [NDC] under the Paris Agreement). Some argue that if the host

[23] This section uses definitions for double counting consistent with the CORSIA Avoiding Double Counting Working Group, Schneider et al. 2019.

Box 5-1. Double counting: Paris Agreement and CORSIA

- **Paris Agreement:** Article 6 recognizes the possibility for international cooperation through the transfer of mitigation outcomes. It calls for avoiding double counting through transfers of emissions reductions by robust accounting methods. Specifically, it is envisaged that a transferring country must make a corresponding adjustment to its reported emissions balance as part of its NDC reporting to account for the reduction; the acquiring country can then reduce its reported emissions balance based on the emissions reductions that were generated in the transferring country's boundaries. However, the rules and modalities around Article 6 have not yet been agreed to.

- **Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA):** While the rules under CORSIA are not yet settled, the current working assumption is that airplane operators will likely need to secure a letter of assurance and authorization from the host country before applying any carbon credits in fulfilment of their obligations under CORSIA. Similar to the Paris Agreement process outlined above, it is likely that host countries would need to apply corresponding adjustments for any credits transferred to airplane operators in fulfilment of CORSIA obligations. The International Civil Aviation Organization will likely finalize these obligations based on the final Article 6 rules when negotiations are complete.

jurisdiction counts the emissions reductions (e.g., toward its NDC), a corporation should not be able to use the same emissions reductions to make a carbon neutrality claim. Others argue that country-level and corporate-level GHG accounting represent different ledgers that cannot be compared (for more see Box 5-1).[24]

5.2 POLICIES ON CREDITING PERIODS

A crediting period[25] is the length of time for which credits are issued for a specific emissions reduction activity. During this time, the parameters for calculating emissions reductions remain unchanged or only change under very specific conditions. Crediting periods are meant to ensure that projects do not continue to generate carbon credits beyond a predetermined time frame for which the project activity has been assessed as eligible. This is particularly important for the assessment of additionality and establishing a baseline, which can change over time because of changes to the regulatory framework, technologies, or what is considered common practice in an industry. Crediting periods are also important to provide project proponents with a level of investment certainty.

Accordingly, crediting periods need to balance the need to provide investment security to the project proponent with the need to ensure issued credits reflect market conditions, such as legal requirements, technology, or related factors. Thus, in setting the crediting period policymakers must balance environmental integrity against administrative and transaction costs.

The subsections below present guidelines for the three key decisions for policymakers: determining the length of the crediting period and the need for any differentiation on length within the mechanism; whether and how often the crediting period can be renewed; and whether and how parameters may be updated during a given crediting period. Note that these decisions interact with each other and are not mutually exclusive (for example, if changes are allowed within a crediting period, a longer period would reduce the negative impact on environmental integrity).

5.2.1 Length of crediting period

To determine the length of the crediting period, policymakers should factor in how quickly market conditions change. This includes changes to the regulatory framework, project technologies, jurisdiction GHG emissions reduction targets, and international policy. This is critical because changes to these factors can influence whether the baseline remains appropriate.[26] Accordingly, changes to these factors can often require prompt updates to parameters to maintain environmental integrity.[27] This may suggest adopting shorter crediting

[24] Also see the International Carbon Reduction and Offset Alliance's position on scaling private sector voluntary action after 2020; International Carbon Reduction and Offset Alliance 2020.

[25] Crediting mechanisms may use different terms for this concept. For example, Québec Offset System uses "eligibility period."

[26] As discussed in Section 8.2.3, a project's additionality is determined only once, at its outset, and is concerned with whether the project would have been implemented in the absence of the crediting mechanism.

[27] Broekhoff et al. 2017.

periods to allow for more frequent reassessments of the project's baseline. However, shorter crediting periods can reduce the return on the project investment and reduce investment certainty, which may reduce project development activity. In addition, the experience with Joint Implementation projects has suggested that shorter crediting periods can significantly impact ambitious projects such as those deploying less mature technology or those with higher upfront costs (e.g., district heating). These projects often have longer lead times and certainty about crediting period and project payback are key to their investment. Longer crediting periods can also decrease administrative and project development costs.

Ultimately, the decision on crediting period length must balance environmental integrity against providing investment certainty to project proponents. Importantly, the rules on crediting periods must be clear and changes should be avoided. The crediting period should not be so long as to ignore technology and policy changes, which are inevitable, but they should not be so short (or changed after project commencement) so as to discourage project investment.

Policymakers can opt to outline different crediting periods based on the project type or specific project. This more tailored approach can improve environmental integrity, as projects more subject to change (e.g., due to technological innovations) are assigned shorter crediting periods to reflect these dynamics:

- **Project type.** Under this option, the length of the crediting period can differ depending on the type of activity. Most existing crediting mechanisms differentiate by project type and use crediting periods of five to 10 years. Distinguishing by project type makes sense if a crediting mechanism has a broad scope, with project types that vary widely with respect to the payback period and speed of change. For types with generally long payback periods (e.g., district heating) and activities that require longer periods to deliver abatement (e.g., afforestation), the crediting period may need to be longer (in the Climate Action Reserve, for example, the crediting period for forest projects is 100 years). For types where change is rapid and a more frequent reassessment of eligibility is required, the crediting period may need to be shorter. For example, in Québec the crediting period is 10 years for manure and landfill projects versus five years for projects related to ozone-depleting substances. Another example of a short crediting period is for projects implementing energy-efficient information technologies (by shifting to cloud-based servers), because the technological development in IT is rapid and payback quick. Differentiation on this basis is relatively simple to implement.

- **Project-specific.** Under this option, there is a minimum project type-specific crediting period. In addition, each project can apply individually for a longer crediting period at registration (a maximum should also be defined). This option provides flexibility for project proponents and places the burden on the project proponent to justify a longer crediting period. As a drawback, project-specific differentiation requires the program administrator to assess each project's crediting period length claim, which may impede the standardization of rules and project cycle processes. This approach is therefore administratively burdensome and increases transaction costs. While it could make it easier to establish environmental integrity if standard crediting periods are short, any error when extending a crediting period can undermine that effect. Such an approach has not been used yet in any existing crediting mechanisms.[28]

5.2.2 Renewing crediting periods

All existing mechanisms include an option for renewing a crediting period.[29] Along with the choice of the crediting period length, the possibility of renewal determines the maximum time period during which a project may claim emissions reductions. During renewal, the eligibility of the project is checked (see Section 8.2.3). A project may be allowed to continue, may continue but with changed parameters, or may not be able to generate credits any longer. If, for example, regulatory changes during the crediting period mean the project activity is now mandated by law, then the project's crediting period cannot be renewed.

Crediting period renewals should not be longer than the initial crediting period, because whatever considerations or factors led to the initial decision on period length will still apply. Most crediting mechanisms use equal length crediting periods at renewal. However, Switzerland has an initial crediting period of seven years while renewals are only three years. Shorter subsequent crediting periods allow swift adjustment in case of technological progress or changes in the regulatory environment. Since project proponents base their investment decisions mainly on the length of the first crediting period, because the timing of this is certain but renewal is not, a shorter renewal period is unlikely to discourage investment.

[28] For an overview of the implementation of crediting periods in existing crediting mechanisms see World Bank 2015, especially Table A8.

[29] Some mechanisms use the word "extend" instead of "renew." The difference is mostly semantic. Under the Emissions Reduction Fund, for example, a project cannot have more than one crediting period. However, the Minister is able to "extend" a crediting period by specifying a longer crediting period in a variation to an existing method.

Most existing crediting mechanisms limit the maximum number of renewals. The total period, including renewals, may still be quite long (e.g., 21 years for all technologies other than forestry in the Clean Development Mechanism [CDM]). In addition, the administrator often defines a maximum time period during which credits are allowed to be created for a specific technology (e.g., 15 years for a boiler based on its standard technical lifetime). Therefore, it is often this maximum time period rather than the crediting periods that limits credit generation. This is true in particular for those crediting mechanisms that do not limit the number of renewals at all (e.g., Switzerland and Québec).

5.2.3 Changes to parameters during the crediting period

A crediting mechanism may allow for updates even during the crediting period. Such updates could increase environmental integrity because they account for new information (e.g., new scientific evidence, economic and technological progress, or new regulations). Updates also provide for more consistency among projects. However, the prospect of frequent or significant changes decreases investment security and therefore the willingness of proponents to design projects in the first place. It may also be difficult to clearly define which parameters are subject to possible updates and which are not. Ongoing monitoring of these parameters (e.g., based on periodic measurements) can help policymakers determine when and how these metrics should be updated. Québec's Offset System allows updates during the eligibility period, but as a general rule updates within the crediting period should be limited to extreme cases, such as evidence of gaming or fraud. Policymakers may rather opt for shorter crediting periods as an option to allow for more frequent updates of key parameters.

5.3 AVOIDING SOCIAL AND ENVIRONMENTAL HARM

Ensuring no net harm requires three components: (1) publicly demonstrating a project's ongoing compliance with specific social and environmental safeguards; (2) an obligation on project proponents to identify, mitigate, monitor, and report on risks; and (3) local stakeholder consultations.[30] However, domestic crediting mechanisms almost always rely on existing domestic law and regulations to address environmental and social harm. A few independent crediting mechanisms have put in place dedicated provisions on safeguards, since these mechanisms may support project activities in many countries, with varying degrees of local regulatory development and enforcement capacity. Domestic crediting mechanisms therefore focus on promoting compliance with the jurisdiction's legal requirements, like those mandating environmental impact assessments and local stakeholder consultations. These requirements can flag any potential social and environmental risks that project proponents may need to address. Policymakers may choose to guard against the risk of harm by building on preexisting local regulations or by defining the scope of project types eligible based, at least in part, on social and environmental concerns (e.g., only allowing project types with low risk of harm). Table 5-1 summarizes the existing safeguards used in some crediting mechanisms. It highlights that only independent mechanisms have specifically included social and environmental safeguards, to date.

The safeguard approaches of existing crediting mechanisms vary in how they address social and environmental harm, but almost all leave significant gaps—although these gaps may be less important for domestic crediting mechanisms in countries with strong local governance frameworks. In terms of international and independent crediting mechanisms, the Verified Carbon Standard (VCS) includes a no-harm principle and identifies risks but does not require follow-up unless required by other "add-on" labels.[31] Other mechanisms, including national mechanisms, address this by limiting eligible project types. Switzerland's CO_2 Attestations Crediting Mechanism, for example, excludes nuclear energy, while the California crediting mechanism and Climate Action Reserve both consider potential negative impacts when considering which project types to allow.

Based on the approaches adopted in existing crediting mechanisms, there are three options for avoiding social and environmental harm:

- **Rely solely on existing domestic frameworks and regulations**. National laws and permitting requirements (e.g., environmental impact assessments) may be designed to ensure that the projects do not cause harm. Using existing frameworks has the advantage of keeping transaction costs and the administrative burden of the mechanism low. This is the practice in almost all of the current domestic crediting mechanisms. While compliance with other national legislation is implied under the crediting mechanism, policymakers could mandate that proponents show evidence that their project meets certain regulations and standards, like other environmental or public health requirements.

[30] Schneider, Michaelowa et al. 2019.

[31] For example, the Climate, Community & Biodiversity Standards (https://verra.org/project/ccb-program/) and the Social Carbon Standard (socialcarbon.org).

- **Include safeguards within the crediting mechanism**. Depending on the stringency and adequacy of these domestic social and environmental regulations, policymakers may want to explicitly address no net harm in their crediting mechanism rules. If existing regulations and consultation processes are less well developed, or if such environmental and social safeguards are the focus of current policy, the jurisdiction may find that the benefits of a more elaborate process are worth the costs of implementation, although this would raise both transaction costs and the administrative burden on government. Safeguards could include upfront testing to confirm a project's eligibility and/or ongoing requirements to monitor and report regularly on any identified risks to demonstrate that harm was being avoided. The latter would ensure that harm is avoided but would obviously further increase transaction costs and administrative burden.
- **Refer to third-party labels that include safeguards**. The mechanism rules could require that project proponents use a third-party "add-on" label, where the rules for that added certification include safeguard provisions, similar to the VCS independent crediting mechanism.

Table 5-1. Safeguards in some existing crediting mechanisms

Crediting mechanism	Safeguards against negative impacts
Independent	
American Carbon Registry	Impact assessment to ensure compliance with environmental and community safeguards best practices.
Climate Action Reserve	Safeguards are based on compliance with all applicable laws, including environmental regulations; may also include criteria in protocols to ensure against harm.
Gold Standard	Safeguarding principles derived from the United Nations Development Programme's Social and Environmental Standards, United Nations Environment's Environmental, Social and Economic Sustainability Framework, and the World Bank's International Finance Corporation Performance Standard.
VCS	Various provisions to protect against harm within agriculture, forestry and other land use (AFOLU) projects.
International	
CDM	No separate provisions for safeguards
Joint Implementation	No separate provisions for safeguards
Regional, national, and subnational	
Australia Emissions Reduction Fund	Negative list of projects that might cause adverse outcomes, but no separate provisions for safeguards.
British Columbia	No separate provisions for safeguards
California Compliance Offset Program	Analysis on potential harm for specific project types under the California Environmental Quality Act, but not project specific.
China	No separate provisions for safeguards
Joint Crediting Mechanism	Safeguard guidelines in place for projects reducing emissions from deforestation and forest degradation.[32]
Québec	No separate provisions for safeguards
Spain	No separate provisions for safeguards
Switzerland	Negative list excludes potentially harmful project types, but no project specific provisions.

Source: Adapted from Michaelowa et al. 2019; Climate Action Reserve website.

[32] For example, https://www.jcm.go.jp/opt/kh-jp/rules_and_guidelines/download/reddplus/file_24/JCM_KH_GL_SG_REDD+_ver01.0.pdf.

Figure 5-1. Types of development benefits of carbon crediting projects

Note: Original figure included climate benefits.
Source: Mayrhofer and Gupta 2016.

The decision on how to approach safeguards and avoid harm will depend on policy priorities, resources, and the availability of an existing robust domestic system for addressing safeguards and ensuring public participation under other regulations (such as environmental and social impact assessments).

5.4 PROMOTING DEVELOPMENT BENEFITS

The importance of the sustainable development impacts or "development benefits" of emissions reduction projects, particularly in the context of developing countries, has been widely acknowledged.[33] Such positive impacts could include a wide range of environmental, social, and economic impacts (see Figure 5-1). More information on the broader benefits of carbon pricing instruments more broadly can be found in the Partnership for Market Readiness' forthcoming *The Development Benefits of Carbon Pricing*.

The extent that development benefits have been explicitly recognized in crediting mechanisms to date has largely been dependent on the most common use for those credits. While independent crediting mechanisms supporting voluntary offsetting requirements have prioritized development benefits, this has not been a major focus of international, national, and subnational crediting mechanisms supplying to compliance markets.[34] Even among the independent crediting mechanisms, Gold Standard is the only one that requires identification, measurement, and monitoring of development benefits. No national or subnational crediting mechanisms have similar requirements (see Table 5-2). These are often more focused on cost-effectiveness, or—in the case of domestic crediting mechanisms—rely on the choice of project types to promote development benefits.

However, as demand grows for carbon credits that recognize development benefits, some crediting mechanisms are beginning to incorporate various forms of recognition, even if these are not requirements for credit issuance. For example, the Australian government has updated the Australian National Registry of Emission Units to allow it to include additional information for specific projects, where available. This is intended to help buyers make informed decisions on the additional benefits delivered by specific projects.[35] California is also moving toward incorporating development benefits more explicitly. Starting in 2021, no more than half of quantitative limit for offsets can come from projects that do not provide direct environmental benefits to the state (see Box 4-3).[36] This is in part because this mechanism is one of the few domestic or subnational crediting mechanisms that allows project activities outside of its jurisdiction to generate carbon credits. In addition, California policymakers wanted to have more projects developed in the state such that residents could enjoy the benefits of those projects. These benefits include not only the reduction or avoidance of GHG emissions but also the benefits associated with reduced air pollution in the state. California deems any project located within the state as one that has direct environmental benefits, although other projects will have to present evidence that they benefit the state based on "scientific, peer-reviewed information." However, California does not provide methodologies for measuring or monitoring these development benefits, and there will be no requirement to monitor them on an ongoing basis. Table 5-2 provides an overview of how crediting mechanisms have dealt with development benefits.

As the table reflects, most national and subnational crediting mechanisms do not address development benefits directly. This is in part because domestic crediting mechanisms often serve compliance buyers, which place less emphasis on development benefits than buyers in the voluntary markets, which are generally served by independent crediting mechanisms. In the voluntary markets, buyers often prioritize the development benefits and in some cases value credits with significant development benefits more than those without. Voluntary buyers are often procuring offsets to meet their environmental and social goals. Because of this, they often seek to invest in projects where they can highlight not just the carbon benefit but also the suite of associated social benefits. If targeting development benefits is a priority for a domestic crediting mechanism, policymakers may not necessarily have to start from scratch. They may be able to use labels or standards from international and independent crediting mechanisms that address development benefits, like the Climate, Community & Biodiversity Standards[37] or the Social Carbon Standard.[38] These provide detailed monitoring, reporting, and verification (MRV) rules for specific development benefits, as well as guidelines on stakeholder engagement and avoiding harm. Equally, as another potential tool that could be applied in domestic crediting mechanisms, the Gold Standard Foundation now provides dedicated

[33] Zhang and Wang 2011; Spalding-Fecher et al. 2012; Sven, Olsen, and Verles 2019; Mayrhofer and Gupta 2016; Gold Standard 2014.
[34] Boyd et al. 2009; Nussbaumer 2009; Karakosta, Doukas, and Psarras 2011.
[35] http://www.cleanenergyregulator.gov.au/ERF/Pages/News%20and%20updates/News-Item.aspx?ListId=19b4efbb-6f5d-4637-94c4-121c1f96fcfe&ItemId=753.
[36] https://ww2.arb.ca.gov/our-work/programs/compliance-offset-program/direct-environmental-benefits
[37] https://verra.org/project/ccb-program/.
[38] http://www.socialcarbon.org/.

Table 5-2. Development benefits in some existing crediting mechanisms

	Development benefits	Program requirements
Independent		
American Carbon Registry	Projects may disclose positive contributions to Sustainable Development Goals, but no particular tool or protocol	No requirement, but the registry can be combined with the Climate, Community & Biodiversity Standards
Climate Action Reserve	Program manual establishes the avoidance of negative social and environmental outcomes	Only for forestry projects
Gold Standard	Sustainability is a core requirement	Sustainability assessment to be performed both before and after
VCS	No specific sustainability objective	Only reports from environmental impact assessment
International		
CDM	Stated as one of the two main objectives of the mechanism	No United Nations Framework Convention on Climate Change rules; requirements established by host country
Joint Implementation	Requirements set by the host party	Not required for project approval; set by the host party
Regional, national, and subnational		
Australia Emissions Reduction Fund	Stated objectives of protecting the natural environment and improving resilience to the effects of climate change; registry allows tracking of additional information	Decided on a project type basis by the Minister (based on advice from independent committee)
British Columbia	Mentions the program as part of their sustainability targets	No specific sustainability requirement
California	Forest protocol requires sustainable management and a return to native species, among other criteria	Requirement that no more than one half of the offset quantitative usage limit can come from projects that do not provide direct environmental benefits in the state
China	Contribution to sustainable development is an approval criterion	Contribution to sustainable development is an approval criterion
Joint Crediting Mechanism	Part of the Joint Crediting Mechanism's purpose	Some participating countries have guidelines to evaluate projects' contribution to sustainable development. In those countries, project participants are required to conduct analysis before project implementation (as part of registration) and an evaluation after implementation (before credit issuance).
Québec	No specific sustainability objective	No specific sustainability requirement
Spain	No specific sustainability objective	No specific sustainability requirement
Switzerland	No specific sustainability objective	No specific sustainability requirement

Source: Adapted from Michaelowa et al. 2019; Australia Clean Energy Regulator; California Air Resources Board.

Box 5-2. The Gold Standard for Global Goals

The Gold Standard was the first independent carbon market standard to prioritize development benefits in its actual rules and methodologies. Only projects demonstrating development benefits are eligible under the standard. The early versions of the Gold Standard included a "sustainable development assessment matrix" with a wide range of indicators, which an auditor had to validate prior to registration. The auditor also verified any changes to these qualitative indicators during verification. After the adoption of the Paris Agreement and the United Nations Sustainable Development Goals, the Gold Standard launched the Gold Standard for Global Goals, which expands the development benefits MRV framework. It also provides quantification methodologies for other sustainable development impacts. For example, two separate standards have already been included for air quality impacts (i.e., "Methodology to estimate and verify Averted Disability Adjusted Life Years from cleaner household air") and water efficiency impacts (i.e., "Sustainable sugarcane initiative methodology to quantify water efficiency outcomes from seedling nurseries"). The Gold Standard will start piloting additional activity-specific Sustainable Development Goals impact measurement tools in 2020. This is an example of a tool or add-on label that could be referenced by a domestic crediting mechanism.

Source: Gold Standard 2020.

impact measurement standards for some sustainable development impacts as well through the Gold Standard for Global Goals (see Box 5-2). The CDM also provides a voluntary tool to track development benefits.[39] This includes a wide range of potential benefits to air quality, natural resources, soil health, job creation, balance of payments, and more. The tool allows project proponents to use a template report that provides a detailed description of the specific development benefit. However, there is no requirement for verification or methodologies for quantifying the impacts. To date, 69 projects and programs, out of more than 8,000, have applied the tool. Once finalized, Verra's Sustainable Development Verified Impact Standard (SD VISta) for assessing and reporting sustainable development benefits may provide another source policymakers can draw upon to adapt these standards to local conditions and priorities.[40]

Some options that policymakers could use to promote sustainable development outcomes appear below. The options are presented in order of increasing regulatory effort and increasing transaction costs for project proponents. As with safeguards, the approach to development benefits depends on both the policy objectives of the program and the robustness of the existing domestic regulatory environment. Policymakers need to assess whether targeting development benefits through additional requirements in the crediting mechanism justifies the increase in cost for the government and project proponents. Notably, all options are flexible in that the policymaker can decide on the priorities and tools for assessing development benefits. As discussed in Section 4.2, policymakers could also choose to include only project types with high development benefits in the scope of the crediting mechanism, rather than using project-specific requirements or MRV.

Implicit recognition without specific rules. Not having any development benefits rules keeps transaction costs and the administrative burden low, and it is possible that implicitly valuing development benefits (e.g., through the definition of the scope of the program or because of experience with climate change mitigation actions more broadly) will have an impact.

- **Implicit recognition through geographic and regional limitations**. Limiting the use of credits based on where they are developed can help ensure that project benefits accrue to that specific region, even if specific reporting of those development benefits is not required. The Alberta program, for example, only allows offsets from Alberta projects to be used in its system, in part to ensure that the full benefits (including the economic benefits) accrue to residents of Alberta. Similarly, the Regional Greenhouse Gas Initiative, which includes 10 (soon to be 11) US states, allows offsets from participating regions. Projects outside the region are allowed if there is a memorandum of understanding in place with another jurisdiction. California's direct environmental benefits requirement was also put into place in part to help ensure that benefits, including reduction of air pollution, occurred within the state. A downside of regional restrictions is that lower-cost mitigation opportunities outside of the region may be foregone.

[39] United Nations Framework Convention on Climate Change 2020.

[40] https://verra.org/project/sd-vista/.

- **Require project proponents to identify development benefits**. This approach, similar to how California requires projects to demonstrate direct environmental benefits, can be used to target particular development benefits. Policymakers could require project proponents to submit a report outlining the specific benefits, which could then be assessed and verified by the government or by certified independent experts. This would increase the chance that projects would deliver development benefits without requiring extra ongoing costs for monitoring.

- **Require use of an independent development benefits standard**. Rather than creating a new development benefits MRV approach within the crediting mechanism, the rules could require that projects use an independent label or standard (e.g., Climate, Community & Biodiversity Standards, Gold Standard for Global Goals, or the SD VISta program) to demonstrate development benefits on an ongoing basis. Complying with these independent standards would be an add-on to the other GHG-related requirements under the crediting mechanism.

- **Identify, measure, and monitor development benefits using a domestic standard**. The crediting mechanism could not only have its own rules, procedures, and tools for quantifying certain types of development benefits but could also specify how these should be monitored on an ongoing basis. These rules could specify the protocols for quantifying, reporting, and verifying development benefits impacts. This would be similar to the approach the Gold Standard adopts—albeit in a domestic crediting system.

5.5 ADDRESSING NON-PERMANENCE

Carbon credits are typically used to compensate for emissions that will increase radiative forcing in the atmosphere for a very long time—in the case of carbon dioxide, thousands of years. Reflecting this, carbon credits need to represent emissions reductions that are effectively permanent. The issue of permanence applies to projects that store or sequester emissions in ways that could be reversed over time, such as in biological systems (e.g., forests and soils) or through geological storage (e.g., carbon capture and storage). Reversing this storage or re-releasing those emissions into the atmosphere increases global GHG emissions and undermines the climate benefits of the crediting project. The following sections discuss the risks of non-permanence and options to addresses these risks.

Figure 5-2. Possible reversal risks for biological sequestration projects

5.5.1 Risk of non-permanence

Risk of non-permanence is the risk that an event will result in the release of stored emissions back into the atmosphere. For example, if a forestry project that sequesters carbon in tree and soil biomass were to suffer a fire event, some or all of this carbon could be released back into the atmosphere (see Figure 5-2 for examples of reversal risks). In addition to fire, tree and soil biomass face threats from pest and disease outbreaks and extreme weather events (e.g., hurricanes, floods, droughts, or winter storms). Humans also pose a direct threat through poor management, overharvesting, illegal logging, and encroachment for fuelwood collection.

Similarly, a geological storage reservoir that contains captured carbon dioxide from industrial processes, electricity generation, or through direct air capture could also suffer non-permanence. For example, an injection well might not be capped appropriately, and subsurface pressure could cause stored carbon to be pushed to the surface and leak over time. For both biological and geological storage projects, there are several options that can be used by policymakers to manage non-permanence risk. As a starting point, policymakers need to identify the minimum time period necessary to deem an emissions reduction or sequestration activity permanent.

5.5.2 Permanence period

Deciding on the appropriate permanence period from a policy perspective can be challenging. Most regulatory systems and even commercial contracts are challenged by long-lived duration requirements where those setting the rules will no longer be in place to assure the requirements are met. Longer time frames, however, are required because carbon dioxide emissions effectively raise atmospheric concentrations for many thousands of years.[41] International policymakers have adopted 100 years as a standard benchmark for evaluating the climate impacts of mitigation actions.[42] This time frame matches the 100-year time horizon for global warming potentials.

Crediting mechanisms, however, have varied in the permanence period they have imposed. California, for example, uses 100 years, which reflects its estimated carbon dioxide residence time. The American Carbon Registry, however, applies a 40-year project length, which it stipulates is not a proxy for permanence but rather an attempt to "strike a balance between incentivizing broad participation" and long-term storage across its program.[43,44] The Tree Canada Afforestation and Reforestation Protocol further reduces this and identifies that projects must last a minimum of 30 years,[45] and Australia's Emissions Reduction Fund allows project proponents to opt for a shortened permanence requirement of 25 years—although opting for a 25-year permanence period requires credits to be discounted by 20 percent. This discount is intended to cover the potential future cost to the Australian government should it have to replace any emission releases after the project ends (discussed more in the following section). The Québec Offset System is considering a novel approach as part of a new protocol being developed for afforestation and reforestation on private lands. To avoid including a permanence period requirement, the Québec Offset System is considering a "ton year" approach to recognize the climate benefits achieved at the time of credit issuance, based on radiative forcing. The rules for implementing this approach are still being developed.[46]

In deciding the appropriate length, policymakers will need to balance the risk of reversal and securing environmental integrity with the need to provide a manageable time frame for landowners to monitor and guarantee the permanency of the reductions.

Project monitoring requirements will need to cover the entire permanence time period. This is important and generally will require project proponents to notify the program administrator if an event has occurred that may result in a reversal of stored carbon. Policymakers may also impose more stringent MRV requirements for those projects with a higher risk of non-permanence. California's US Forest Protocol mandates monitoring, an annual submission of Offset Project Data Reports, third-party verification, and site visits at least every six years. In Australia, the Emissions Reduction Fund also requires project proponents to take reasonable steps to protect the stored carbon in their projects. Proponents need to develop a permanence plan outlining the steps they have taken—or will take—to ensure permanency, including the risk of reversal from fire where proponents are encouraged to work with local fire authorities to identify appropriate action.

Policymakers can draw from existing domestic legal frameworks to support the permanence requirements within the crediting mechanism rules. This could include, for example, requiring insurance or even requiring project proponents to provide legal guarantees on the permanence of stored carbon. For example, the Regional Greenhouse Gas Initiative's forestry protocols require landowners to obtain permanent land conservation easements, which ensure that the project is maintained for a long period of time—often longer than a crediting period. However, requiring legal guarantees has not been adopted by many existing crediting mechanisms, as the additional legal restrictions on land use can lower land values and discourage landowners from participating.

5.5.3 Approaches to address non-permanence risk

There are four main approaches to address non-permanence risks. Policymakers can also apply a combination of these approaches. They are:

- buffer reserves,
- temporary crediting,
- discounting, and
- insurance.

Each of these is outlined in turn below.

41 Mackey et al 2013.
42 Fearnside 2002.
43 American Carbon Registry 2019.
44 https://americancarbonregistry.org/carbon-accounting/old/carbon-accounting/ACR%20Forest%20Carbon%20Project%20Standard%20v2.0%20-%20peer%20review%20summary%20and%20responses.pdf.
45 Tree Canada 2015.
46 http://www.environnement.gouv.qc.ca/changements/carbone/credits-compensatoires/index-en.htm.

Box 5-3. VCS AFOLU pooled buffer account

South Africa and Colombia accept VCS as a compliance program within their respective domestic carbon tax systems. VCS's pooled buffer account manages the risk of reversal across the entire portfolio of AFOLU projects. Project proponents use the AFOLU non-permanence risk tool[a] to analyze the risk of reversal and determine the number of credits to deposit in the pooled buffer account, which includes a portfolio of credits from projects from across the VCS. Auditors assess this analysis and pooled buffer account contribution.

Credits are non-tradable and are used to compensate for project reversals that have occurred. When a project reversal occurs, the project proponent completes a loss event report (using the VCS template[b]) and submits it to Verra, the VCS administrator. Verra places credits equal to the reported loss "on hold" until the auditor reviews the event. Reflecting the auditor's findings, credits equal to the loss event are canceled from the pooled buffer account. Any credits sold by the project remain valid verified carbon units, as the cancelation of buffer credits from the pooled buffer account compensates for the project's loss event.

[a] See https://verra.org/wp-content/uploads/2019/09/AFOLU_Non-Permanence_Risk-Tool_v4.0.pdf
[b] See https://verra.org/wp-content/uploads/2018/03/VCS-Loss-Event-Report-Template-v3.2.doc.

Buffer reserves

Under the buffer reserve approach, projects that are subject to non-permanence or reversal risk contribute a portion of their emissions reductions and removals to a pooled buffer account that the program administrator manages. Some programs, like the Gold Standard, require projects to contribute 20 percent of their emissions reductions or removals to the buffer account. Others, like California's US Forest Protocol for carbon credits, require projects to conduct a project-specific reversal risk assessment and contribute an amount to the buffer account based on the reversal risk associated with the project (see Box 5-3, which discusses this concept for domestic crediting mechanisms that use the VCS).

If an unintentional[47] reversal event occurs, the amount of carbon released into the atmosphere is estimated and a corresponding number of buffer credits is canceled from the pool. This accounts for the fact that projects will not all suffer reversal events simultaneously and the buffer reserve will be able to absorb a certain number of reversal events that may occur. Thus, the buffer needs to be geographically dispersed to a degree that a rare, large-scope event would not affect the entire pooled buffer.[48] For instance, in California, forest owners need to notify the California Air Resources Board (CARB) within 30 days of identifying an unintentional reversal and submit a verified estimate of current stocks within 23 months of the discovery of the reversal. Based on this, CARB assesses whether offset credits need to be retired from the pooled buffer account. However, for intentional reversals, this is not done through the buffer. Rather, the project proponent must submit a verified report within a year of the reversal and compensate for this change by submitting a corresponding number of valid instruments (such as carbon credits) for retirement.[49] Policymakers should also consider the level of diversification of activities included in the pooled buffer. For example, the American Carbon Registry buffer accepts any type of credit in its pool, which ensures that if a forest accidently reverses its carbon stock, other types of emissions reductions can compensate for that loss.

Buffer reserves have proven to be an effective and least-cost way to compensate for reversals when necessary. In the long run, a buffer reserve supported with a requirement that project proponents hold commercial third-party insurance could be an option to address the residual non-permanence risk not covered by buffer reserves.

Buffers can however present a "moral hazard" problem, if used to compensate for human-caused reversals, such as intentional harvesting. If a landowner faces no penalty for harvesting trees for timber other than through contracting provisions—because reversals caused by harvesting

[47] Intentional reversals are not typically allowed and if they do occur, project proponents are generally required to compensate for them.
[48] For further considerations relating to stocking a buffer reserve, refer to the Canadian Council of Forest Ministers n.d.
[49] See Sections 95983(b) and (c) of Article 5, Title 17, California Code of Regulations.

would be compensated out of the buffer reserve—then the landowner may face an incentive to harvest. Such perverse incentives must be mitigated through oversight and penalty enforcement to cover intentional or avoidable reversals.

While setting up a buffer reserve may impose additional costs, the approach of South Africa and Colombia highlights that mechanisms can also build on, or outsource to, other mechanisms, such as VCS. When addressing non-permanence risk, policymakers should follow the following guidelines:

- To determine the appropriate buffer pool contribution, risk estimates should be conservative and cover the permanence period. It can be assessed at the methodology or the project level.
- Buffer accounts need to maintain a sufficient number and diversity of buffer credits to cover any losses; this includes rare but large events that could destroy the entire buffer.
- Risk assessment should reflect the fact that, as climate change progresses, the reversal risk for most project types increases. For instance, climate change is a contributing factor to increasingly severe and frequent forest fires, as well as bark beetle outbreaks.
- The buffer reserve also needs to be designed, through monitoring and enforcement, to counter moral hazards such as landowners intentionally overharvesting trees without being liable for the resultant carbon loss (such as by imposing penalties).

Temporary crediting

The CDM uses the temporary crediting approach, in which projects that are subject to non-permanence risk are issued credits that expire after a predefined period. However, temporary crediting has not gained traction, primarily because the approach transfers risk from the project proponent to the credit buyer by requiring buyers to replace their temporary carbon credits. Buyers have not been prepared to accept this liability and the market for temporary credits has therefore been nonexistent. In addition, temporary credits add significant administrative complexity because of the need to track timing and replacement of credits, which can increase program administrative costs.

Discounting

A third option is to apply a discount factor to emissions reduction calculations based on the risk of non-permanence. Australia's Emissions Reduction Fund applies this approach in addition to a buffer. Under the fund, project proponents can opt for either a 25- or a 100-year permanence period. If the former is chosen, the number of credits issued is reduced by 20 percent. This discount is intended to cover the potential cost to the government in the event emissions are re-released from the project after the project has ended. This is on top of the 5 percent reduction that goes into the buffer. To date, Australia is the only region to use an explicit discounting approach. Establishing a conservative baseline and applying a buffer pool contribution, however, could be viewed as forms of implicit discounting.

Insurance

Through the liability and insurance approach, policymakers decide who will compensate for reversals (project proponents, the government, or other parties); the time period of that liability; and whether to provide or require a form of insurance to help cover the liability. Insurance would typically be provided by third-party commercial insurers and could serve as an alternative, or as a supplement, to other risk management options, such as buffer reserves. Many insurance companies offer forest insurance for protection of commercial forest assets from fires and pests and extending this to forest carbon is logical. To date, however, forest carbon insurance has not been widespread and obtaining insurance is not a requirement under any existing crediting mechanisms. However, it has been a suggested approach to mitigate permanence risk in several US pieces of legislation, including the latest comprehensive climate bill (the Waxman-Markey Bill) in 2009.

6 DEVELOPING METHODOLOGIES

At a glance

Methodologies provide the detailed rules, standards, and procedures that a project proponent must apply to their project to generate carbon credits. They are an essential component of a crediting mechanism as they set the rules for project eligibility, quantifying greenhouse gas (GHG) emissions, demonstrating additionality, safeguards against environmental or social harm, and project monitoring. Policymakers need to establish standards to guide methodology creation and ensure the environmental integrity of carbon credits.

Methodologies can employ either a project-specific approach that relies on analysis of an individual project's characteristics and circumstances, or a standardized approach where key components (additionality and the baseline scenario and emissions) are uniformly assessed or determined for specific classes of project activities.

This chapter covers the essential elements of methodologies that crediting mechanisms must establish to ensure both environmental integrity and program efficiency. Section 6.1 highlights the differences between project-specific and standardized approaches. A standardized approach, where practicable, can reduce transaction costs for project proponents by simplifying project development and auditing. However, standardized approaches can be resource-intensive to establish and maintain for program administrators and are not suitable for all project types. Existing crediting mechanisms use a combination of both standardized and project-specific approaches.

Section 6.2 covers project eligibility (i.e., which activities are allowed under the crediting mechanism). High level eligibility can be program-wide but specifics about how projects within a crediting mechanism's scope are assessed are generally set out in a methodology. Section 6.3 covers additionality, a crucial part of demonstrating the environmental integrity of carbon credits. Typical additionality tests are outlined. Section 6.4 looks at GHG quantification and reporting, which should be in line with GHG accounting principles, such as with ISO 14064-2 and the GHG Protocol for Project Accounting, to promote environmental integrity and provide additional guidance to project proponents and auditors.

Monitoring project performance over time is essential, as many factors that affect emissions can change over the project life cycle. This is covered in Section 6.5.

6.1 USING PROJECT-SPECIFIC AND STANDARDIZED APPROACHES

Methodologies provide the detailed rules, standards, and procedures that a project proponent must apply to their project to generate carbon credits. It is important that the format and content of methodologies is consistent within and across mitigation activities. Policymakers can opt for a project-specific or a standardized approach for demonstrating additionality and determining the baseline scenario and emissions. This section introduces both approaches and provides a comparison of their relative merits.

Where possible, a standardized approach is preferable because it offers efficiencies and can reduce costs, particularly for project proponents. However, standardized approaches are not always possible. Accordingly, when developing methodologies, policymakers need to determine whether additionality and baselines can be standardized, or whether a project-specific approach is required. Importantly, standardized and project-specific approaches are not binary alternatives—policymakers may incorporate a combination within a methodology or different methodologies across the crediting mechanism.

6.1.1 Project-specific approaches

This approach analyzes each individual project's characteristics and circumstances. For example, to demonstrate additionality a project proponent developing a hydroelectric power plant in a remote location might be required to identify the barriers that had previously prevented the project from being implemented. These barriers might include the fact that the project requires construction of a new road and electricity transmission lines because of its remote location. Barriers will vary across projects depending on a range of factors, including the project size, location, and other local social or economic factors, such as electricity tariffs. Similarly, monitoring and the quantification of emissions reductions may also depend extensively on unique, project-specific parameters and contextual factors. Most existing carbon crediting mechanisms rely heavily on project-specific approaches.

6.1.2 Standardized approaches

Standardization provides a generic process for specific classes of mitigation activity to demonstrate additionality or establish a baseline scenario. This streamlines the development and assessment process for individual projects. The performance of individual activities can be evaluated against predefined criteria or thresholds to determine eligibility. It provides a clear set of requirements that—if followed and met—will result in activities that are deemed to be additional or simplify baseline emissions quantification. Note, these standardized approaches are distinctly different from the use of uniformly applied parameters or defaults (such as default grid emission factors) within a methodology. While existing crediting mechanisms widely use project-specific approaches, standardized approaches are increasingly being applied (see Box 6-1).[50]

6.1.3 Comparing the two approaches

Generally speaking, project-specific approaches are more flexible and impose a lower upfront administrative burden for the policymaker. However, they require more work from the project proponent in terms of data collection and analysis. Project-specific approaches also require more effort from auditors, who verify the project data and documentation. Standardized approaches can help eliminate the need for unique project-specific analyses, which can reduce costs. However, such an approach is not always possible, as some project activities may be heterogenous or have complex systems, making them difficult to standardize. For example, agricultural practices vary widely across regions, so a practice that might be considered additional in one region might be business as usual in another region.

Similarly, adoption of different transport modes varies from region to region and developing standardized approaches for the transport sector can be challenging. Standardization also has higher upfront administrative costs for policymakers and can require significant data to develop. Some of these upfront costs can be reduced if policymakers can use approaches from existing crediting mechanisms. However, as highlighted in Chapter 3, the approach taken from the existing crediting mechanism needs to be adjusted to appropriately reflect the domestic context. This can make it difficult to adopt standardized approaches used in existing crediting mechanisms, since their standardized components may only be valid in specific circumstances (e.g., predefined geographic regions). Policymakers must also periodically review the standardized approaches in a methodology to ensure that they continue to provide an appropriate basis for demonstrating additionality and determining the project baseline.

Box 6-1. California US Forest Projects Protocol—an example of standardized approaches

The California US Forest Projects Protocol determines additionality by using both the legal requirement test and a performance standard evaluation.

The legal requirement test evaluates whether a project exceeds the obligations required by any law, regulation, or other mandate. Modeling of the baseline for forestry projects also has to factor in any legal constraints. Finally, if the project is for avoided conversion, project proponents need to demonstrate the anticipated land use is allowed (e.g., forestry owners have obtained all necessary approvals).

The performance standard evaluation is a standardized approach, which applies a common practice test for evaluating the project's impact based on the US Forest Service Forest Inventory and Analysis data at the regional level. This approach uses activities and average forest growth rates in the region where the project is located to establish a conservative business-as-usual baseline. A project's impact is calculated against this uniformly applied performance standard metric, with growth beyond the national average considered additional. This eliminates the time-consuming task of establishing a model of forest growth that accurately reflects the forest and its management practices before the project was implemented.

[50] World Bank 2016. This trend has continued from 2016 to this guide's publication in 2020.

Table 6-1. Project-specific versus standardized approaches

	Project-specific approaches	Standardized approaches
Applicability	Provides a flexible approach if the crediting mechanism has a wide sectoral coverage and scope (i.e., may include project types for which standardized approaches would be difficult). Can take project-specific conditions into account.	May be difficult to apply to some sectors or project types; for example, heterogeneous activities (e.g., land-use projects) or activities involving complex systems (e.g., transportation). Often can only be used in a particular geographic region.
Development time and data needs	Methodologies can be developed more rapidly, because existing tools can be referenced for determining additionality and baseline scenario.	Methodologies take longer to develop, because additionality and/or baseline scenario for the class of project activities must be established up front. Extensive (typically sector-wide) data collection and analysis is required to evaluate common practices across a geographic area, define performance standards, and determine conditions or thresholds that distinguish additional from non-additional activities.
Burden on project proponents	Increases cost of producing project documents (e.g., project-specific data and more exhaustive analysis is required), thereby increasing project development costs. In addition, because of the heterogeneous nature of projects, auditing costs are typically higher.	Simplified, more transparent and streamlined process. Requires less project-specific data, which can reduce costs and streamline project reviews.
Burden on program administrators	Requires more effort from program administrators and an ongoing in-depth project evaluation is necessary for each individual project. Project reviews often have subjective components.	Requires more upfront effort to develop approaches that are standardized but can reduce the level of ongoing effort required for review because additionality and/or baseline scenario is determined up front in the methodology. Can also reduce the subjective nature of project reviews.
Certainty	Gives less certainty to project proponents and investors because project additionality and/or the baseline scenario must be determined on a case-by-case basis.	Provides greater certainty to project proponents and investors by making eligibility easier to determine. In addition, when baselines can be standardized, the volume of carbon credits and return on investment are easier to assess.
Frequency of methodology revisions	Methodologies should be periodically reviewed and updated but may occur on a more ad hoc basis than methodologies adopting standardized approaches.	Methodologies must be updated on an ongoing basis to reflect changes in practices and technologies.

Table 6-1 above compares the two approaches.

Generally, standardized approaches may make the most sense where the crediting mechanism has a narrow scope, covers mitigation activities with similar or consistent contextual factors (e.g., like electricity, which has a homogenous output), or where a top-down methodology development approach is preferred (see Chapter 7).

In practice, methodologies need not be exclusively either project-specific or standardized (see Box 6-2). For example, some Clean Development Mechanism (CDM) methodologies employ at least some standardized baseline and quantification assumptions, while still prescribing project-specific additionality determinations. Conversely, other crediting mechanisms, such as California's Compliance Offset Program (COP), apply standardized additionality tests (as well as project-specific approaches) but also have project-specific requirements associated with baseline, monitoring, and quantification methods. The most significant distinction between methodologies is often whether they require standardized or project-specific additionality determinations, because additionality can be difficult to demonstrate yet is important for environmental integrity.

Box 6-2. Combined project-specific and standardized approaches

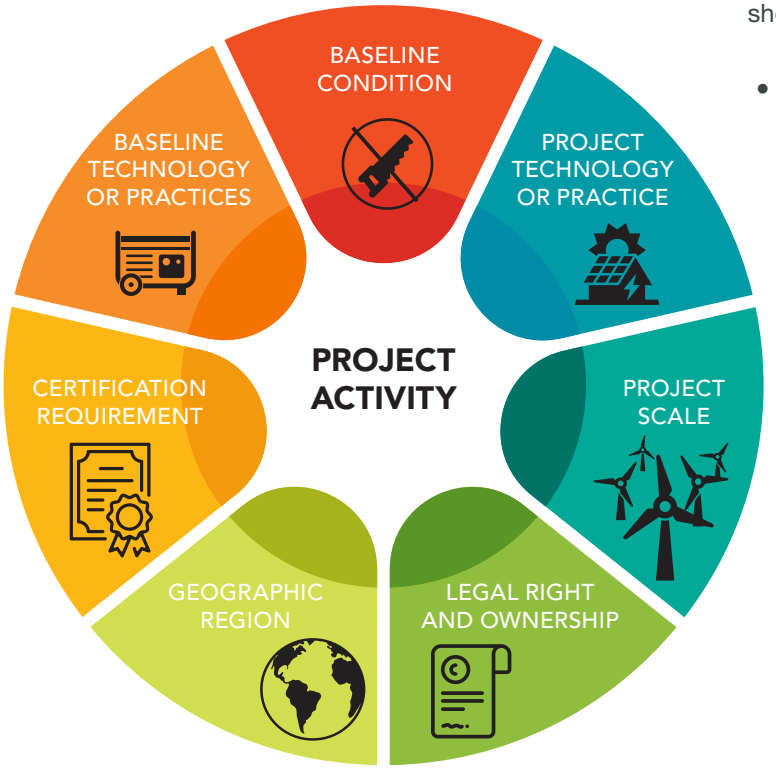
Australia's Emissions Reduction Fund provides two soil carbon methodologies. One adopts a project-specific approach, whereby project proponents undertake soil sampling to evaluate the accumulation of carbon. A separate methodology applies a standardized approach, adopting a default carbon accumulation rate in tons of carbon per hectare per year for a given region and land management activity, derived from the Australian national GHG inventory.[a]

[a] Australian Government 2018. See https://www.legislation.gov.au/Latest/F2018C00126.

6.2 DETERMINING PROJECT ELIGIBILITY

The conditions set out in a methodology outline the limits and restrictions under which a specific activity can be registered and receive credits under the crediting mechanism. Methodologies may restrict projects based on the following aspects (summarized in Figure 6-1):

Figure 6-1. Considerations for project eligibility



- **Baseline technologies or practices:** activities that displace certain technologies (e.g., diesel generators to produce electricity) or practices (e.g., clear-cutting a forest).
- **Baseline conditions:** proposed projects with specific preconditions (e.g., for reforestation, no commercial logging may occur in the 10 years prior to project initiation). Such applicability conditions can guard against moral hazard, such as clear-cutting a forest and immediately beginning carbon credit generation through reforestation.
- **Project technologies or practice:** certain technologies (e.g., solar photovoltaic panels) or specific practices (e.g., selective timber harvest) employed by the project.
- **Project scale:** minimum or maximum project size (e.g., hectares of project area or megawatts generation capacity).
- **Legal right and ownership**: require that project proponents demonstrate they have the legal right or consent to undertake the project. This criterion can be particularly relevant to land-use activities, where legal title over the land or right to operate the project and accrue its benefits (including carbon credits) may not be clear.[51] Policymakers operating within a jurisdictional context where identifying legal ownership presents challenges should review existing good practice guidance.[52]
- **Geographic region:** specific jurisdictions or other geographical areas. Such geographic limitations can ensure project development benefits accrue to targeted populations.
- **Certification requirements:** activities that have received specific independent certifications (e.g., Forest Stewardship Council certification). Such applicability conditions leverage established certifications to achieve development benefits or avoid duplicating the evaluation work performed in pursuit of a certificate, thereby saving time and effort for the program administrator.

[51] Australia's Emissions Reduction Fund experienced challenges with this issue and enacted legislation explicitly to address carbon rights in 2011.
[52] For instance, see United States Agency for International Development 2012.

Box 6-3. Positive and negative lists to filter for additionality

A crediting mechanism can filter out activities that are less likely to be additional or focus on those activities that are more likely to be additional. This can be done through positive or negative lists. Project types under a positive list are automatically deemed additional, whereas negative lists outline what is not allowed and excludes project types that are deemed to be harmful or undesirable. Negative lists are often implemented at the program-level and positive lists at the methodology level, through eligibility criteria to ensure that a methodology applies only to projects that meet certain requirements.

Negative list

This is used in the Verified Carbon Standard (VCS) and Gold Standard to exclude certain renewable energy projects. Both crediting mechanisms exclude grid-connected renewable energy projects and any projects that are above 25 megawatt capacity in specified regions. These program-level eligibility restrictions limit renewable energy projects to activities that are more likely to be additional (e.g., off-grid renewables in a region with identified barriers to uptake).

Positive list

VCS and Gold Standard methodologies for off-grid renewable activities would therefore establish eligibility criteria to ensure only off-grid activities qualify to apply the methodology. This is often referred to as a positive list because the project must satisfy the stated criteria (e.g., that it is not connected to a centralized distribution grid). Another example of a positive list applicability condition relates to baseline technology and practice. For many off-grid renewable energy projects, the baseline scenario is likely to be diesel generators (for electricity) or kerosene lamps (for lighting). Thus, applicability conditions could restrict the eligibility of the methodology to projects that can demonstrate that in the absence of the project, diesel generators or kerosene lamps would be the likely scenario and therefore represent the baseline.

As these aspects suggest, eligibility conditions not only affect scope but can be adopted to filter for additionality or achieve other policy objectives, such as through the adoption of positive or negative lists (see Box 6-3).

Eligibility conditions can be used to prioritize crediting projects that deliver specific development benefits. Eligibility conditions under the Gold Standard methodologies, for instance, consider the project's community impact as part of the project design in order to maximize development benefits and reduce any unintended harm. The small-scale methodology "thermal energy from plant oil for the user of cooking stoves" requires, for instance, that plant oil be produced with sustainable management practices and not sourced from existing plantations to the detriment of other existing uses.[53]

6.3 DEMONSTRATING ADDITIONALITY

A proposed project activity is considered additional if it would not be implemented in the absence of the crediting mechanism (e.g., the price signal from the carbon credit market), holding all other factors constant.[54,55] Additionality is an essential element to ensure carbon credit quality. However, determining additionality can be challenging as it requires an assessment against a counterfactual (that is, what would have happened in the absence of the crediting mechanism). This is both challenging and has an element of subjectivity. Additionality risk refers to the possibility that a project is not additional. The policymaker must determine how much risk is acceptable. Good practice is to use informed assumptions and ensure there is sufficient evidence to have a high level of confidence in a proposed project's additionality. A summary of typical tests is provided in Box 6-4, noting that these tests are not mutually exclusive and in practice crediting mechanisms generally use a combination of tests to demonstrate additionality. This is the approach taken in California (see box 6-5).

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[53] Gold Standard n.d.

[54] Gillenwater 2008.

[55] A note on the applicability of additionality: additionality is not exclusive to crediting mechanisms; additionality considerations are used also for some subsidies and development cooperation projects, to ensure that scarce public resources are used effectively where they are most needed and not to support business-as-usual activities that are commercially viable even without support.

Box 6-4. Typical additionality tests

Additionality tests adopted by existing crediting mechanisms include:

- A **regulatory surplus test** that asks whether the project activity is required by law, mandate, court order, or regulation. Required activities are deemed non-additional. Exceptions may be made when a policy or regulation is generally not widely followed or enforced.
- A **financial or investment test** that analyzes whether the project activity is economically and financially viable. If the proposed project in question is economically viable without the carbon credit revenue, it would be deemed non-additional. This test is often operationalized in the form of an estimated internal rate of return for the proposed project relative to a contextually relevant investment benchmark. Another option is to compare the net present value of the project to a reference level. The project is considered non-additional if the internal rate of return is above the benchmark or the net present value of the project is higher than the reference level.
- A **barrier test**, whereby project proponents need to identify obstacles to implementation. Additionality is demonstrated if the incentive from the crediting mechanism helps the project proponent overcome defined financial, technological, institutional, or regulatory barriers, which otherwise are preventing the project activity.
- A **common practice test** or technology/practice penetration level test that considers the proposed project's technology or practice within its context (e.g., sector, region, and industry). If the technology or practice is established common practice and would likely occur even without the crediting mechanism, then the project or program is deemed to be non-additional.

Additionality tests may be applied to individual activities (such as through eligibility criteria) or at the program level, such as automatically classifying types of activities, practices, or technologies as additional (for example "positive lists"), or conversely excluding certain project types deemed unlikely to be additional. In practice, crediting mechanisms typically use a combination of tests to provide a robust method for assessing additionality. For example, a landfill methane capture and destruction project activity might pass a regulatory surplus test (because it is in a jurisdiction that does not require implementation of this technology) and a financial or investment additionality test (because it did not make sense to install this technology from an economic perspective), but it could still fail a common practice test if in the surrounding region 90 percent of similar landfills have installed the technology without the additional financial benefits from carbon credits.

The difficulty of demonstrating additionality varies among project types. For example, it is generally easy to show that industrial gas destruction projects are additional, as only legal mandates or carbon credits provide practical incentives to undertake them. By contrast, renewable energy and energy efficiency projects require careful scrutiny, as they may be undertaken even in the absence of the crediting mechanism (e.g., because of revenues from energy sales). See Section 4.2 for a further discussion of approaches to avoid low-additionality project types.

Crediting mechanisms have several options to increase the likelihood that activities are additional. This can be done through

- program-wide requirements (e.g., by excluding project activities unlikely to be additional, often called a "negative list"—like those described in Box 6-3);
- methodologies that carefully specify their applicability conditions to filter out project activities that are likely to be non-additional; and
- intensive project reviews at the point of registration request.

As previously discussed, additionality can be determined on a case-by-case basis using a project-specific approach, or for a whole class of projects using a standardized approach. In practice, the effect of a crediting project or program is typically context specific. For example, a crediting mechanism may incentivize a mitigation activity in one location or context (meaning it is additional there) but not in another. Furthermore, the additionality assessment will change over time (meaning an activity may be additional at present but not in five or ten years). This highlights the benefits of a project-specific approach to determining additionality and is one reason why standardized approaches to additionality have been difficult to develop.

Box 6-5. Multiple additionality tests: California

In California, projects must comply with two tests for additionality. The first is a requirement to show legal additionality. This ensures that only project activities that are not required by law are eligible. If, for instance, the project is generating credits for one program, like a voluntary carbon offset program, it cannot also generate compliance offset credits for the California cap-and-trade program. The second test applies performance standards that vary according to the project type. This evaluation provides an assessment of the level of common practice of a specific technology or process and its technological parameters, as well as considering the prevalence of barriers to development of the project. For example, the additionality requirements for California's Rice Cultivation Compliance Offset Protocol focus on specific regions, which mitigates against the risk that certain practices and activities may be common in one part of the country and not in others.

For each of California's Compliance Offset Protocols, the performance standards are outlined for specific activity types. For instance, the protocol on mine methane capture distinguishes between active underground mine ventilation air methane activities, active underground mine methane drainage activities, active surface mine methane drainage activities, and abandoned underground mine methane recovery activities.

6.3.1 Project-specific approaches

Project-specific approaches determine additionality through a tailored analysis that typically uses a combination of tests to demonstrate that the project would not have been implemented without the crediting mechanism. In the project-specific approach, additionality tests are used as the basis for developing an additionality tool, such as CDM's "Tool for the demonstration and assessment of additionality." For more information on how to use additionality tests to develop additionality tools and methodological tools, see the Partnership for Market Readiness' (PMR) Carbon Credits and Additionality: Past, Present, and Future.

6.3.2 Standardized approaches

Standardized approaches determine additionality by applying conditions, requirements, a performance standard, a performance benchmark, or any combination of these tools. Projects must meet stated conditions and requirements, or outperform the performance standard or performance benchmark, to be considered additional. A performance standard is typically a list of technologies or practices, and projects will need to implement one or more of these to pass the standard. A performance benchmark is an emissions intensity–based approach whereby projects need to achieve a specific emissions rate per unit of product or service (e.g., tons of carbon dioxide equivalent per metric ton of clinker produced for a cement sector methodology). Benchmark standards are best suited to sectors or activities where standard outputs or services can be easily identified and measured and technologies and fuels do not have widely varying emissions rates. Standardized approaches may only be feasible for certain sectors or activities (e.g., grid-connected energy generation, fuel switching for specified technologies) determined by contextual factors for potential projects within the designated sector or activity type. The PMR's Guide to Greenhouse Gas Benchmarking for Climate Policy Instruments has additional detail on developing GHG benchmarks.[56]

One way of implementing standardized approaches is through a "positive list" (see Box 6-3), which identifies specific activities that are deemed to be additional and eligible to use certain methodologies.[57] For instance, the Climate Action Reserve US Livestock Project Protocol employs a technology-specific threshold based upon an evaluation of manure management practices in applicable project locations. Further applicability conditions constrain the types of projects that are eligible to use the methodology, such as specific baseline conditions (e.g., technologies or practices present in the baseline scenario) and minimum time that the baseline conditions were operational.

The standardized approach accepts that some non-additional projects will meet the applicability conditions and be deemed additional (false positives) and that some additional projects will not meet the conditions and therefore be deemed non-additional (false negatives). The risk of false positives and false negatives can be minimized, but not eliminated. Regular review, evaluation, and refinement of the methodology (particularly the additionality tests) reduces this problem.

[56] https://openknowledge.worldbank.org/handle/10986/26848

[57] See, for example, https://verra.org/wp-content/uploads/2018/03/VCS-Guidance-Standardized-Methods-v3.3_0.pdf

Issuing credits to non-additional activities can result in an overall increase of emissions, because the recipient would otherwise implement alternative mitigation actions. Non-additional credits also dilute the value of other credits in the market. If buyers factor in this risk, it may lower the price, dampening the mitigation incentive of the crediting mechanism. Using non-additional carbon credits would displace the use of additional credits or the direct emissions reductions by the compliance entity/buyer.

As highlighted in Chapter 1, the presence of non-additional credits makes it more expensive for jurisdictions to meet their emissions reduction targets, because the government would need to incentivize or mandate emissions reductions elsewhere in the economy to achieve its target. This undermines the role of crediting mechanisms in achieving cost-effective emissions reductions.[58] This is illustrated in the two scenarios below:[59]

- **Carbon tax scenario**. Use of a non-additional credit, in part, to meet an entity's compliance obligation, would reduce the carbon tax revenue otherwise paid to the government.
- **ETS scenario**. Use of a non-additional credit to meet an emissions compliance obligation effectively results in emissions covered by the ETS exceeding the ETS cap.

The decision of how to approach additionality depends on the crediting mechanism's objectives and scope and the national context. Based upon the discussion in this chapter and the factors to consider when determining the level of standardization (Section 6.1), policymakers must determine whether additionality can be standardized effectively for each project type. Key to this determination is whether resources are available to support the development of a standardized approach and maintain it over time. Existing crediting mechanisms, like the CDM, California, and VCS, among others, provide a substantial body of methodologies that policymakers could draw from. If standardization is not feasible, the project-specific approach may be preferable, at least in the early stages of the crediting mechanism.

6.4 QUANTIFYING EMISSIONS REDUCTIONS

Methodologies set out rules, procedures, and formulae so proponents can quantify GHG emissions reductions through:

- specifying the GHG accounting boundary;
- establishing the baseline scenario and estimating baseline emissions;
- estimating project emissions; and
- quantifying net GHG emissions reductions.

6.4.1 GHG accounting boundary

The GHG accounting boundary describes the GHG sources, sinks, and reservoirs (SSRs) either directly or indirectly impacted by the activity that should be included in the quantification of emissions reductions. The GHG accounting principles (see Box 6-5) of relevance and completeness should inform the approach to developing methodological guidance to define a project's accounting boundary. Appropriately defining the GHG accounting boundary through programmatic guidance and methodological requirements ensures that all SSRs are considered when GHG impacts are quantified. This is discussed in Chapter 4 on determining the boundaries in the PMR's Developing Emissions Quantification Protocols for Carbon Pricing: A Guide to Options and Choices for Policy Makers.

Methodologies should ensure the project boundary appropriately accounts for the project activity's SSRs. Specifically, methodologies

- should specify the relevant SSRs for the project activities to which they are applicable;
- should address data monitoring and reporting requirements (see Section 6.5) that may be specified for types of SSR or specific SSRs within individual project methodologies;
- may exclude SSRs below a prescribed threshold of significance (the "de minimis threshold") to reduce the burden on project proponents and auditors; and
- should account for leakage emissions (see Box 6-7) in the estimate of net GHG emissions reductions, if significant.

[58] Broekhoff et al. 2019.
[59] World Bank 2016.

Box 6-6. GHG principles

GHG accounting principles underpin and guide all aspects of quantification and reporting of GHG emissions reductions. They are therefore an important element in ensuring carbon credit quality. The principles serve as a guide to project proponents and auditors, particularly where the rules and requirements of the crediting mechanism provide flexibility or where there is uncertainty. Note that these accounting principles apply to quantification and reporting only. Two foundational documents set out the GHG accounting principles used by crediting mechanisms—ISO 14064-2 (Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emissions reductions or removal enhancements) and the GHG Protocol for Project Accounting. The six principles are:

- **Relevance**. Select the GHG emission sources[a], data, and methodologies appropriate to the specific project type.
- **Completeness**. Include all relevant GHG emissions and removals; include all relevant information to support criteria and procedures.
- **Consistency**. Enable meaningful comparisons in GHG-related information.
- **Accuracy**. Reduce bias and uncertainties as far as is practical.
- **Transparency**. Disclose sufficient and appropriate GHG-related information to allow intended users to make decisions with reasonable confidence.
- **Conservativeness**. Use conservative assumptions, values, and procedures to ensure that GHG emissions reductions or removal enhancements are not overestimated.

The application of principles is a core element of ensuring carbon credit quality. Crediting mechanisms should establish principles in line with ISO 14064-2 and the GHG Protocol for Project Accounting and require project proponents and auditors to follow these principles.

[a] World Resources Institute and World Business Council for Sustainable Development 2005.

If methodologies fail to account for leakage emissions, projects will overestimate net GHG emissions reductions. Therefore, methodologies must estimate leakage when leakage is an issue and make the necessary deductions when net GHG emissions reductions are calculated. Leakage is most common in forestry and land-use projects. For example, VCS has developed a tool (the "VT0004 JNR Leakage Tool v1.0") for quantifying leakage from reduced emissions from deforestation and land degradation projects. Furthermore, methodologies typically provide procedures for leakage quantification specific to the project activity(ies) included in the methodology (if applicable). It is advisable to review similar methodologies to support development of leakage quantification procedures.

6.4.2 Baseline scenario and emissions

The baseline scenario is a prediction made before the project begins of what would have occurred in the absence of the project (for example, installed equipment or technology). The baseline scenario should thus be based on evidenced assumptions of behavior and technology.

The baseline scenario is an important part of quantifying emissions reductions because the emissions under the project scenario are compared to emissions in the baseline scenario to determine the emissions reductions generated by the project. For this reason, it is critical that the baseline scenario emissions are conservative—baseline scenarios should err towards underestimating emissions.

Estimates of GHG emissions under the baseline scenario are generally a product of two factors: the level of activity associated with a process that generates GHG emissions (which could be expressed using a variety of metrics) and the GHG intensity of technologies or practices involved in that process (commonly expressed as an emissions factor). Estimates of GHG emissions under the baseline scenario are generally produced as part of the project proposal. Baseline emissions must be set conservatively so as not to overstate them, as overstating could lead to over-crediting, undermining the environmental integrity of the credits.

There are three key issues that must be considered when determining the most appropriate approach for baseline setting:

- determine the level of standardization;
- define baselines on either an absolute or intensity basis; and
- determine an appropriate method for developing a baseline scenario.

Each of these issues is considered below. Policymakers must evaluate and determine the best-fit approach for estimating baseline emissions and set out the approach in the project methodologies. For a more detailed look at baseline setting, refer to the PMR's technical note on Options and Guidance for the Development of Baselines.[60]

Level of standardization

Approaches to determining the baseline scenario can adopt various levels of standardization.

Taking **project-specific** circumstances into account means conducting an individualized assessment to determine the most appropriate baseline practice or activity for a proposed project, or configuring baseline modeling parameters using project-specific data and information. The CDM stipulates project-specific approaches for baseline emission calculations for afforestation and reforestation activities because activities can occur in diverse geographies with varying baseline considerations.

Standardized approaches to determining baseline emissions are established using sector-wide data. They can be applied to certain types of activity, provided activities have homogenized contexts to ensure accuracy. In cases where the baseline scenario involves a technology with an industry or performance standard, this standard may be used to establish a baseline emissions level. For example, an existing industry standard for natural gas boilers indicates the baseline emissions for a renewable heating project that reduces carbon dioxide emissions through displacing such boilers. Alternatively, a single generic reference technology or practice can serve as a baseline scenario (for example, a livestock anaerobic digester project that will capture and destroy methane may establish the standardized baseline scenario for an uncontrolled anaerobic system).[61] California's COP applies a standardized baseline for its US Forest Projects Protocol because the methodology constrains project activities to a geographic region across which baseline considerations are similar.

Box 6-7. Leakage

Increases in GHG emissions outside the project's GHG accounting boundary that occur as a result of the project's implementation are called leakage emissions.[a] Leakage, sometimes referred to as "secondary effects,"[b] can be categorized as follows:

- **Upstream or downstream effects** are associated with the operating phase of a project activity—either the inputs used (upstream) or the products produced (downstream) of the project activity. For example, a biomass energy project might increase demand for biomass. This in turn increases biomass harvesting frequency by timber companies, and the increased use of harvesting equipment increases emissions.
- **Upstream or downstream effects involving market response** occur when a project activity changes market supply and demand and alternative providers or users of an input or product react to the change. For example, an improved forest management project activity might reduce the harvesting frequency of a forest plot, thus reducing supply of wood products. The market demand signal leads an adjacent forest owner to increase harvesting to meet unmet demand.
- **One-time effects** result from construction, installation, and establishment, or decommissioning and termination, of the project activity (for example, a reforestation project may require clearing of the existing non-forest land cover prior to forest establishment).

[a] Offset Quality Initiative 2008.
[b] The GHG Protocol for Project Accounting highlights that the definition of leakage varies from context to context and can be defined with respect to a range of factors, including physical project boundaries or responsibility for GHG emission sources.[62]

[60] Broekhoff and Lazarus 2013.
[61] See Chapter 8.1 in https://openknowledge.worldbank.org/handle/10986/21824
[62] World Resources Institute and World Business Council for Sustainable Development 2005.

As outlined above, a project-specific approach to baselines will produce a more accurate outcome[63] but require more detailed project-level data and information. For instance, project proponents would need to identify and calculate all baseline scenario SSRs. A standardized approach will increase the upfront burden on policymakers but can reduce the costs for project proponents. However, because a standardized approach to baseline setting essentially adopts an average across all applicable project activities, there is a potential for inaccuracies in a specific project's baseline emissions calculation. This increases the importance of using conservative assumptions when adopting a standardized approach to baseline setting.

The crediting mechanism's objectives, scope, and local context should act as a guide. For example, the Québec Offset System applies standardized baselines to selected sectors to make project development and emission calculations easier. Québec looked at targeted sectors against data availability and the program administrator's capacity. As Québec had key industry-wide data, it could establish uniformly applicable baseline scenarios for activities within these sectors. Furthermore, the provincial government had sufficient capacity to develop the standardized baselines for each applicable scenario for project methodologies and had allotted time for this process.

Absolute or emissions intensity

Baseline emissions may either be absolute or based on emissions intensity. The project activity type usually dictates which approach is appropriate.

Absolute baselines, for example, are appropriate where mitigation activities affect the activity level of a process, such as reducing landfill methane or industrial gas emissions, or reducing emissions from deforestation. Intensity baselines are applicable where a mitigation intervention is unlikely to (significantly) change activity levels, but instead reduces emissions per unit of activity, such as in renewable energy or energy efficiency projects. Most existing crediting methodologies employ some form of intensity baseline. Additional detail is available in the PMR's technical note on Options and Guidance for the Development of Baselines.

Methods for estimating baseline emission

A variety of methods can be used to project baseline emissions, including simple extrapolation from historical data, more detailed modeling of future trends, the use of comparison groups, or some combination of these. Existing crediting mechanisms typically allow for each of these methods depending on the type of mitigation activity involved. Additional detail on each of these approaches and their advantages and disadvantages is available in the PMR's technical note on Options and Guidance for the Development of Baselines.

6.4.3 Project emissions

Project emissions are the emissions associated with the implemented project activity. In this way, project emissions are quantified in a very similar way to those required for mandatory GHG emissions reporting programs. The PMR's Developing Emissions Quantification Protocols for Carbon Pricing: A Guide to Options and Choices for Policy Makers provides specific guidance on calculating project emissions. Two key issues are discussed below: functional equivalence between the project and baseline scenario, as well as avoiding underestimation.

Functional equivalence means equal goods or services are produced. Project SSRs, as identified by methodologies, must propose a project scenario that is functionally equivalent to the baseline scenario. For example, a facility that implements energy efficiency process improvements must still provide the equivalent lighting, heating or cooling, or processing capacity to that assumed to have occurred in the baseline scenario. If the project results in the addition of new direct or indirect SSRs to the project boundaries, it may still provide functional equivalence, and the program administrator evaluates the overall system function for equivalent function. The project's GHG accounting boundaries must reflect functional equivalence of the project and baseline scenario.

Project emissions must be based on conservative assumptions so as not to underestimate them (or overestimate the amount of emission removals). An underestimation of project emissions would lead to over-crediting the project activity, just as would overstating baseline emissions. Both would contribute to an overestimation of GHG emissions reductions, undermining the environmental integrity.

[63] Standardized baseline emissions will likely result in under- or over-crediting compared to the project's actual impact. This is because the standardized baseline is essentially an average across all applicable project activities.

6.4.4 Net GHG emissions reductions

The project's net GHG emissions reductions result from subtracting the project emissions from the baseline emissions. This is often done on an annual basis, but the period can potentially be shorter or longer to align with the monitoring requirements, as set out in Section 6.5.

For example, Project X's estimated baseline emissions are 50,000 metric tons of carbon dioxide equivalent (tCO_2-e)/year and estimated project emissions are 38,500 tCO_2e/year. This can be calculated as:

Baseline emissions – project emissions = net GHG emissions reductions

50,000 (tCO_2-e/year) – 38,500 (tCO_2-e/year) = 11,500 (tCO_2-e/year)

Any potential leakage emissions must be incorporated into the calculation of net GHG emissions reductions by adding leakage emissions to the left side of the example equation above. A range of tools can be used to capture various aspects of leakage and policymakers can draw from tools used by existing crediting mechanisms. For example, the VCS has a specific module to quantify market leakage[64] and a specific module to quantify activity-shifting leakage[65] for land-based projects.

After net GHG emissions reductions are calculated for each project, programs may require contribution of credits to the buffer reserve or make other risk-of-reversal or discounting subtractions from the net GHG emissions. The remaining emissions reductions are issued by the crediting mechanism as carbon credits.

Dealing with negative abatement

It is possible that emissions during the project period may be greater than those in the baseline, especially for absolute emission baselines. Depending on how this is addressed, it can result in "negative abatement" (meaning more emissions actually occur through the project compared to the baseline).

This concept is demonstrated in Figure 6-2, which presents an illustrative example of a project with an established baseline of 100 tCO_2e and project emissions that vary from year to year.[66] If credits are only allocated in years when project emissions are lower than the baseline, the project would receive credits for merely achieving business as usual with annual variation.[67] There are two main approaches to address negative abatement:

- **Zeroing.** Where any negative abatement at the end of a reporting period is disregarded and no adjustments are made to total abatement calculations. Zeroing is a simple approach that lowers risks to project proponents but it increases the risk of over crediting (see example in Figure 6-2).

- **Netting out**. Where the amount of negative abatement in a reporting period is recorded and accounted for—usually by reducing abatement in subsequent reporting periods. This is a more conservative approach that would lead to higher environmental integrity.

The potential for negative abatement is often associated with land sector projects due to the natural variation that can occur with these projects (e.g., climatic and seasonal variation). Such variability is also present in nonbiological systems (e.g., increased heating in the winter and cooling in the summer). Economic conditions, such as interest rates, foreign exchange rates, and international demand for products, can dramatically shift production as compared to forecasts. There are also examples where economic variability can result in negative abatement. This can occur where improvements in emissions performance are directly linked to changes in underpinning economic conditions.[68] Negative abatement should be treated consistently across all project types and sectors.

[64] See VCS Agriculture, Forestry and Other Land Use Project Market Leakage Module (https://verra.org/methodology/afolu-project-market-leakage/).

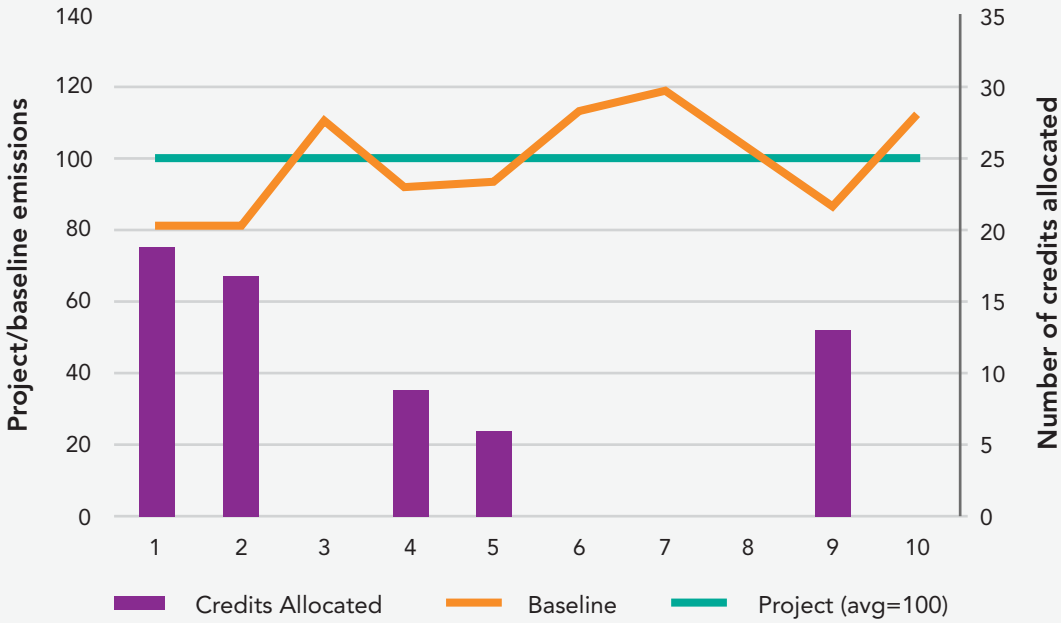
[65] See VCS module on the Estimation of Emissions from Activity-Shifting Leakage (https://verra.org/methodology/vmd0032-estimation-of-emissions-from-activity-shifting-leakage-v1-0/).

[66] Note that the average project emissions over the 10-year period is 100.

[67] In this example, the project would be allocated over 60 credits in total, as any negative abatement in a given reporting period is disregarded (zeroing).

[68] For example, if a methodology awards credits for improving emissions intensity, negative abatement may result where a baseline has been established during a period of high production (perhaps due to strong economic growth) and there is a sharp fall in production during a reporting year (perhaps due to economic downturn). Negative abatement would result where the emissions intensity is highly correlated to the level of production (e.g., due to economies of scale).

Figure 6-2. Over-crediting annual variation through zeroing negative abatement



6.5 MONITORING PROJECT PERFORMANCE OVER TIME

Monitoring project performance ensures the project continues to meet the eligibility requirements, and it generates data to quantify baseline, project, and leakage emissions. Monitoring helps to safeguard against social and environmental harm and track development benefits as discussed in Chapter 5. Methodologies describe the data and parameters that need to be monitored, including the sources of data and units of measurement, as well as the procedures for monitoring including monitoring frequency and measurement techniques.

Collecting data is essential to supporting monitoring objectives. For instance, projects that estimate emissions reductions from installed renewable energy that displaces grid electricity must collect activity data (kilowatt hours of electricity generated) in the form of a meter reading. In this example, the methodology would specify the frequency of collection and acceptable types of activity data (e.g., monthly meter readings) and the frequency of emission factor checks (e.g., annual checks of emission factors).

Methodologies must also supply instructions relating to cleaning instruments, inspection, field check, and calibration activities, including the role of individuals performing these duties, and quality assurance or quality control provisions to ensure that data acquisition and meter calibration are carried out consistently and precisely.

Examples of project monitoring parameters include

- inputs (including fuel, electricity, waste);
- outputs (including fuel, electricity, waste, by-products);
- operations data (including quantity of steam, temperature, moisture, hours of operation);
- equipment is operated consistent with manufacturer recommendations;
- emissions factors for power sources (e.g., grid electricity, generators, alternative fuel types);
- project size (e.g., area of forest under improved management); and
- sample plots and growth rates (e.g., biological sequestration projects).

Monitoring procedures cover estimation, modeling, and direct measurement calculation approaches and guide project proponents in managing data quality. Methodologies should also include specific guidance to monitor for potential leakage emissions—see the VCS Validation and Verification Manual for an example.[69] In some cases, crediting mechanisms provide supplemental guidance to assist auditors in ensuring that monitoring has been conducted appropriately. For example, the VCS Manual describes information on monitoring requirements that auditors must assess in their project reviews. The PMR's Designing Accreditation and Verification Systems: A Guide to Ensuring Credibility for Carbon Pricing Instruments provides further guidance.

Monitoring may extend beyond the project crediting period for projects that have non-permanence risk (e.g., forest projects, carbon capture, and storage as discussed in Section 5.5).

The methodologies should provide sufficient information for the project proponent to conduct monitoring and for the auditor to assess whether monitoring has been performed appropriately. For uncertain parameters, conservative values should be selected. The CDM Guidelines for Completing the Project Design Document (CDM-PDD) and the Proposed New Baseline and Monitoring Methodologies (CDM-NM), for example, provides further explanation of the elements that should be included in a monitoring methodology (Chapter III) and guidance for developing a monitoring plan (Chapter B.7).

To help promote transparency, assist with verification, and help prevent procedural errors, policymakers may include requirements for project proponents to develop a monitoring plan. Monitoring plans describe the procedures for obtaining, recording, compiling, and analyzing monitored data and parameters. This should include, among others, the roles, responsibilities, and competencies of the personnel who conduct project monitoring; procedures for recording and storing data; quality assurance and quality control procedures; and any sample approaches used. Alternatively, some crediting mechanisms, like in Australia, outline minimum requirements in the methodology rather than mandate a monitoring plan.

[69] https://verra.org/wp-content/uploads/2018/03/VCS_Validation_Verification_Manual_v3.2.pdf.

7 ADOPTING, REVIEWING AND REVISING METHODOLOGIES

At a glance

The processes for developing and maintaining methodologies are an important consideration for policymakers. Policymakers should establish consistent and transparent rules for how methodologies can be added to the crediting mechanism, including procedures for developing and approving new methodologies. In addition, crediting mechanisms need clear procedures for revising methodologies (for example, correcting errors or adjusting parameters) and updating them (including expanding their scope or modifying methodological procedures).

Options for adding new methodologies include replicating them from existing crediting mechanisms—either with or without modification to suit the domestic context and program goals—or developing and approving them through "bottom-up" or "top-down" processes. Policymakers can also adopt a mix of these approaches. Section below outlines these approaches in more detail. Section 7.2 discusses important procedural considerations that may arise depending on which approaches are chosen. Section 7.3 summarizes the three main considerations policymakers will need to factor in: (1) how quickly new methodologies are needed, (2) available program resources, and (3) how much control policymakers need over methodological choices and project types.

Section 7.4 discusses considerations for reviewing and changing methodologies over time in order to keep them current and aligned with program goals. Policymakers should clearly communicate what types of changes are allowed, when they may be required, how frequently they may occur, and whether (and for how long) older versions of methodologies may continue to be used and under what circumstances. Additional guidance on the process for developing, reviewing, and revising quantification methodologies is given in the Partnership for Market Readiness' (PMR) Developing Emissions Quantification Protocols for Carbon Pricing: A Guide to Options and Choices for Policy Makers.

7.1 APPROACHES FOR ADDING NEW METHODOLOGIES

A crediting mechanism should adopt methodologies for all mitigation activities falling within its scope (as defined in Chapter 4). There are three main ways that methodologies can be added to a crediting mechanism:

- **Adopt methodologies developed by existing crediting mechanisms**. Under this approach, project proponents are allowed to use methodologies developed by an existing crediting mechanism. Policymakers can allow project proponents to directly use these methodologies or modify them to suit domestic circumstances. Policymakers may prioritize certain methodologies above others in line with the crediting mechanism's scope and policy objectives. Where appropriate, this approach can be a fast and cost-effective option for policymakers. Even if adjustments are required, building on the existing methodologies can still expedite methodology adoption. Both the Chinese Certified Emissions Reduction CCER Pprogram and Korea Offset Program have followed this approach, either allowing the domestic use of Clean Development Mechanism (CDM) methodologies or designing methodologies based on CDM methodologies.

- **Allow bottom-up development of new methodologies by external parties**. Under this approach, external parties, usually prospective project proponents, develop methodologies and submit them to the domestic crediting mechanism for review and adoption. The costs of developing a methodology are largely borne by the external parties, although program administrators will need to expend some time and effort to review and approve their submissions. Independent reviewers (see Chapter 9) can do an initial review of submitted methodologies to reduce the technical burden on program administrators. External demand largely drives when and which methodologies are developed and submitted. However, program authorities have an important role in reviewing methodologies to ensure that they are sufficiently robust, promote environmental integrity, and align with program objectives and criteria before they are finally adopted. To streamline new methodology development and promote consistency, it is good practice for policymakers to provide guidance on the required contents and structure of methodologies, along with minimum requirements for meeting environmental integrity criteria (see Chapters 5 and 6). The Verified Carbon Standard (VCS) Methodology Requirements v4.0, for example, outlines general requirements for methodologies along with essential methodology components.[70] In addition, some mechanisms provide methodological tools to help develop and promote consistency across methodologies. The CDM, for example, has established multiple generic tools covering different methodology components, including additionality determinations and methods for quantifying different sources of emissions. Although guidelines and tools require upfront cost to develop, once adopted they can make bottom-up methodology development far more efficient. The majority of existing crediting mechanisms allow some form of bottom-up methodology development (see Table 7-2).

- **Have program staff directly develop new methodologies (top-down)**. Under a top-down approach, policymakers or program administrators develop methodologies that are then formally adopted by the crediting mechanism's rulemaking authority (see Chapter 10). The burden of methodology development is mostly borne by the jurisdiction itself, although external experts and stakeholders may help guide development. Under a top-down approach, policymakers can prioritize which methodologies to develop first and when they will be approved. In addition, although it is always good practice to be transparent about general methodology requirements (see Chapters 5 and 6), crediting mechanisms that rely exclusively on top-down development do not need to develop extensive methodology guidance and tools, as is beneficial when using a bottom-up approach. Several existing crediting mechanisms exclusively use a top-down approach for developing and adopting new methodologies, including the California Carbon Offset Program, the Climate Action Reserve, the Québec Offset System, Australia's Emissions Reduction Fund and the US Regional Greenhouse Gas Initiative (see Table 7-1).

[70] https://verra.org/wp-content/uploads/2019/09/VCS_Methodology_Requirements_v4.0.pdf.

Table 7-1. Approaches to developing methodologies and key actors involved

Approach	Typical methodology development procedure	Examples of this approach
Use methodologies from existing mechanisms	1. Policymakers or the program administrator determine which methodologies to recognize and approve from external programs. 2. (Optional) external stakeholders are invited to review and comment on methodologies selected. 3. The program's rulemaking authority makes a final decision about which methodologies to formally approve, with modifications as appropriate to reflect domestic circumstances.	China's CCER program; Korea Offset Program; VCS; Gold Standard
Bottom-up	1. External actors (e.g., project proponents) develop and submit a methodology for approval. 2. (Optional) independent auditors conduct an initial review of the submitted methodology. 3. (Optional) an advisory panel of technical experts provides technical input and advice on the methodology. 4. (Optional) external stakeholders are invited to review and comment on the methodology. 5. The program administrator reviews the methodology and makes a recommendation on whether to approve or reject. 6. The program's rulemaking authority approves or rejects the methodology or sends it back for modification.	CDM; VCS; Gold Standard; American Carbon Registry; China's CCER program; Alberta Emission Offset System
Top-down	1. Program administrators develop a methodology. 2. (Optional) advisory panel(s) consisting of external stakeholders and/or technical experts are convened to advise on methodology development; this may be done concurrently with the work of program staff, or after they have completed a draft of the methodology. 3. (Optional) external stakeholders are invited to comment on a penultimate draft of the methodology. 4. The program's rulemaking authority formally approves and adopts the methodology developed by staff, after final revisions reflecting stakeholder comments.	Climate Action Reserve; California Carbon Offset Program; Québec Offset System; Regional Greenhouse Gas Initiative; Australia Emissions Reduction Fund

Crediting mechanisms can incorporate all three of these approaches. For example:

- China's CCER program, VCS, and the Gold Standard all use CDM methodologies (or modified versions of these methodologies) and also adopt new methodologies using a bottom-up approach.

- The Korea Offset Program uses CDM methodologies and has also adopted new domestic methodologies through both bottom-up approaches (submitted by project proponents) and top-down approaches (developed by government for high-priority domestic project types). As of the end of 2017, the government had approved 34 methodologies (31 developed by governments and three developed by project proponents) and adopted 211 CDM methodologies.

- All methodologies under the CDM were initially developed in a bottom-up fashion; however, over time CDM staff have also applied a top-down process of combining methodologies for similar project activities into single "consolidated" methodologies with broader applicability.

7.2 IMPORTANT PROCEDURAL CONSIDERATIONS FOR METHODOLOGY DEVELOPMENT

Several procedural questions are important to consider when deciding on how methodologies will be developed and adopted. For all approaches, it is important to specify rules for external stakeholder engagement in the process of methodology development and approval. If a bottom-up approach is used, policymakers should decide how methodology review and validation will be performed, as well as whether to allow concurrent approval of a methodology and an associated project when they are submitted together.

7.2.1 Involvement of external stakeholders in methodology review (all approaches)

Both bottom-up and top-down approaches typically require some form of expert or stakeholder input into methodology development. Even where policymakers decide to simply incorporate methodologies from existing crediting mechanisms, some stakeholder consultation on whether to do this and which methodologies to adopt may be beneficial. This step adds time to the development process, along with some incremental work for program administrators or policymakers, but is critical as it helps ensure that methodologies are robust and effective. Moreover, if methodologies are developed as part of a formal regulatory process, some form of public consultation may be legally required before they are finalized and adopted. Stakeholder consultation may also be useful when adopting methodologies are developed under existing programs, as a way to check their applicability in a domestic context. More information on stakeholder consultation can be found below.

Soliciting stakeholders' input can help ensure their concerns are heard and adequately addressed, facilitating eventual approval and implementation of projects. Soliciting input from experts familiar with technical, legal, and policy aspects of project development, implementation, quantification, and monitoring can help to ensure the technical rigor of methodologies. Stakeholder and expert input may also be required when methodologies are updated (see below). The extent and nature of their involvement—if any—will likely be shaped by jurisdiction-specific norms and rules on the regulatory process. Two broad options for policymakers include

- **Involving stakeholders and/or experts throughout the methodology development process**. This option engages experts and stakeholders (such as environmental groups, project proponents, industry experts, and academics) in the process of methodology development from start to finish. This allows for a robust process that can anticipate challenges and increases the likelihood of having a usable methodology that satisfies stakeholder concerns about quality but also works for project proponents. This option is typically used in top-down processes of methodology development (though it could be used voluntarily in a bottom-up approach, it is rarely if ever required; for adoption of methodologies from existing programs, it is largely irrelevant). However, these kinds of working group processes can require significant resources and can be quite lengthy. California, for instance, has an extensive stakeholder consultation process in line with general legislative and regulatory requirements. This includes publicly accessible meetings, soliciting public comments on draft documents, and a Compliance Offset Protocol Task Force. The task force is composed of a wide array of stakeholder groups, including scientists, tribal representatives, environmental justice, and labor and workforce advocates, as well as carbon market and sector-specific experts. They will provide a final report with recommendations to the California Air Resources Board on new potential offset protocols. The task force members and charter were officially approved on January 23, 2020, and will provide the final report with recommendations in early 2021.

Table 7-2. Choosing an approach for methodology development

Methodologies from existing crediting mechanisms are typically used in the following circumstances	A bottom-up approach is typically used in the following circumstances	A top-down approach is typically used in the following circumstances
• it is important to rapidly adopt a portfolio of methodologies, including methodologies for priority project types; • methodologies from other mechanisms are (a) aligned with domestic crediting mechanism criteria and requirements and (b) appropriate to national circumstances (e.g., based on assumptions or default parameters) or (c) can be adapted with minimal effort; or • program administrators lack sufficient resources or capacity.	• appropriate or desired methodologies are not available from existing mechanisms; • program administrators lack sufficient resources or capacity; • targeting specific project types is less important; or • policymakers do not intend to rely exclusively on standardized approaches to methodologies.	• policymakers intend to adopt standardized approaches to methodologies; • program administrators have sufficient capacity and resources; • there is no urgent need to quickly develop (a large number of) methodologies; • policymakers desire a high degree of control over methodological choices; or • targeting specific project types is a high priority.

- **Consulting stakeholders and experts before final revision and adoption**. This typically involves soliciting public comments and responding to those comments prior to the final revision and adoption of a methodology. It can provide an important check on a draft methodology to ensure it meets stakeholder expectations and requires a less intensive engagement process. A number of existing crediting mechanisms employ this form of consultation, including Alberta's Offset Program, the British Columbia Offset Program, the Joint Crediting Mechanism, the Gold Standard, and VCS. Expert consultations, by contrast, generally take the form of a formal review by a panel of experts familiar with the type of mitigation activities involved. The CDM Methodologies Panel, for example, performs this function for the CDM. A potential drawback to this approach is that it can make it more difficult to anticipate stakeholder concerns or technical issues early in the development process, potentially leading to larger revisions and delays.

7.2.2 How methodologies are reviewed and assessed prior to adoption (bottom-up approaches)

Where a bottom-up approach is adopted, the methodology approval process should use independent technical reviewers to assess proposed methodologies and make a recommendation about whether program authorities should approve or reject them. Some existing crediting mechanisms (e.g., CDM) make this an optional step, while others have relied heavily on technical reviews in making approval decisions. Relying on technical reviewers to assess proposed methodologies can help reduce administrative costs, but it may also have implications for quality control if program administrators fully delegate this responsibility and do not exhaustively review methodologies themselves. Alternatively, policymakers or program administrators could do the review entirely on their own, without external expertise. While this would give policymakers or program administrators greater control over methodology reviews and approvals, it requires more resources and a greater level of internal technical capacity. A third option is a combined approach, whereby reviews are undertaken by both external experts and policymakers or program administrators. Most existing crediting mechanisms that allow for bottom-up methodologies use a combined approach.

7.3 CHOOSING AN APPROACH TO METHODOLOGY DEVELOPMENT

The preferred approach to methodology development will depend on a crediting mechanism's specific needs. Key factors in this decision include the speed with which methodologies need to be adopted, program resources, and whether policymakers have specific priorities in terms of the scope or methodology specification (see Table 7-2). Most existing crediting mechanisms combine a number of approaches to methodology development. Equally, these approaches may change over time; policymakers may use existing methodologies at the outset, giving them time to develop their own methodologies, if desirable.

The answers to the questions below should guide the selection of an approach.

(a) Timing

- **How important is it to rapidly establish methodologies covering a range of activities?** Adopting methodologies developed under other crediting mechanisms is typically the quickest approach. If this is not feasible (for example, if existing methodologies are not aligned with the scope or policy requirements of the domestic program), a bottom-up approach is typically the second-best alternative. A top-down approach affords the greatest control over methodology development but is generally slower than other options because it relies on program staff to do most of the work.[71]

(b) Program resources

- **What resources can jurisdictions devote to methodology development?** Adopting methodologies from existing mechanisms typically requires the least amount of time and effort for policymakers and administrators. A top-down approach is typically more resource intensive and higher cost for policymakers. The bottom-up approach is typically less of a burden on program administrators; however, policymakers should not underestimate the resources and other costs associated with reviewing and assessing methodologies developed by external parties.

(c) Priorities for methodology scope and specifications

- **How important is it to have methodologies for specific types of projects?** Stakeholder concerns, or the need to channel investment into specific sectors, may make it important to prioritize methodologies for certain project types. If methodologies for those projects already exist under existing crediting mechanisms, then simply adopting those same methodologies can be expedient. Otherwise, a top-down approach affords the most control over methodology adoption for specific project types. A bottom-up approach will give policymakers less control as to whether methodologies can be adopted for specific project types, since it depends on external parties to develop and propose them.

- **How important is control over methodological choices and approaches?** To ensure environmental integrity and achieve other policy objectives, policymakers may prefer greater control over methodological requirements, methods, and criteria. Typically, top-down approaches provide the greatest control over methodological choices. Replicating methodologies from existing mechanisms offers the least control, though if these methodologies are already aligned with domestic priorities this may not be an issue. It is also possible to adapt other methodologies to align them with domestic requirements before allowing their use. However, depending on the scope of changes needed, the resources required to do this may be similar to what is involved in a bottom-up or even a top-down approach.

- **Is there a preference for using standardized approaches in methodologies?** Standardized approaches allow for the determination of additionality and baselines using performance standards and other predefined rules or criteria (see Chapter 6). Developing these standards is typically a data-intensive and time-consuming process. Standardized approaches are therefore typically developed using a top-down approach. Although some existing crediting mechanisms allow standardized approaches in bottom-up methodologies (e.g., CDM and VCS), the pace of such submissions has been slow. In addition, it is difficult to adopt standardized approaches used in existing crediting mechanisms, since their standardized components may only be valid in specific circumstances (e.g., predefined geographic regions). Adapting them for use in a different context therefore requires additional work and calibration. For several project types, for example, the Climate Action Reserve maintains separate methodologies ("protocols") for projects based on whether they are located in the United States, Mexico, or Canada.

[71] One qualification here is that under a bottom-up approach, prospective project proponents may be reluctant to be the first to propose new methodologies, since it is less costly for them if they can simply use a methodology that others have developed and proposed. This can be a disincentive to rapid methodology development. In practice, however, crediting mechanisms with bottom-up approaches have been able to adopt more methodologies more quickly than those using only top-down approaches.

7.4 PROCEDURES FOR REVIEWING, REVISING AND UPDATING METHODOLOGIES

It is important for policymakers to review, revise, and update methodologies over time to ensure they continue to align with the program goals. Chapter 8 of the PMR's Developing Emissions Quantification Protocols for Carbon Pricing: A Guide to Options and Choices for Policy Makers contains detailed guidance on this step. It is good practice to establish rules regarding (1) the types of changes that may be made to methodologies and associated procedures for making them; (2) how frequently changes to methodologies may (or must) be made, and what circumstances may trigger a review and revision or update; (3) whether, and under what conditions, the changes apply to existing projects (e.g., immediately, or when crediting periods are renewed).

Existing crediting mechanisms typically distinguish between two kinds of methodology changes (though their terminology for each may differ):

- **Revisions**. Methodology revisions include clarifications, corrections, minor technical changes, and parameter updates. Program administrators can typically undertake these types of changes without formal external consultation or formal approval by the program's rulemaking authority. Usually, these types of changes are routine or will not have a material effect on mitigation activity design or the quantification of emissions reductions. One exception may be fixing clerical errors that do have a material effect, such as correcting a misplaced decimal or an incorrect numerical constant in a formula. Program administrators should use their judgment in determining how to proceed with such corrections. In most cases, a methodology revision (of whatever sort) will apply to all projects using the methodology, including projects that have already been registered (that is, existing projects are not allowed to continue using an unrevised version).
- **Updates**. Methodology updates include changes to the scope of eligible mitigation activities (for example, expansions to the list of eligible activities or project configurations), or major changes to how emissions reductions are quantified, monitored, and verified. They can include, for example, new requirements or additional options related to additionality tests, methodological procedures, measurement or monitoring methods, and verification practices. The process for undertaking a methodology update is usually similar to the process required for new methodology development and approval, including external consultation with experts and stakeholders, and formal approval by the program's rulemaking authority.

When a methodology is updated, one question is whether projects that have already registered under a prior version are required to transition to the updated version. Typically, such projects are permitted to continue using the older version of the methodology, at least until the end of their current crediting period. As highlighted in Chapter 5, this provides policy certainty to project proponents, reducing investment risk in mitigation activities. Projects may be required to use an updated methodology if the previous version had major methodological flaws, as it would otherwise undermine the project's environmental integrity. However, such cases are rare. Policymakers need to establish clear rules on when (and for how long) older versions of a methodology may continue to be used, and when new versions are required.

Crediting mechanism documentation should clarify the rules and criteria that program administrators will use to distinguish between these two types of revisions. They should also indicate how revisions and updates will be communicated, including announcements for when they are initiated, procedures for making them, notice before the changes apply, and any opportunities for public consultation and input (often in line with domestic requirements for regulatory administrative procedures).

Policymakers should also provide an indication of the timing and frequency expected for revisions and updates. Options here include

[72] Hayashi and Michaelowa 2013b.

- **Revising or updating on an ad hoc basis**. A common approach is to make revisions or undertake updates as issues with existing methodologies are identified or new data become available. Policymakers should establish clear rules indicating the circumstances that may trigger an ad hoc review and revision or update process. Typically, these circumstances include corrections or concerns submitted by external parties, or issues that come up as program administrators apply a methodology to different projects. For example, the VCS provides general guidance and indications for when methodologies (including those using standardized approaches) may, or must, be updated in its Methodology Requirements program document.

- **Conducting periodic reviews and revising or updating as necessary**. Periodic reviews of methodologies occur on a regular basis. Methodologies adopting standardized approaches, for example, typically need to be updated on a regular basis because they employ default criteria, parameters, and performance standards that need to be updated over time to maintain their accuracy and applicability.[72] If periodic reviews are required, program administrators should communicate the expected schedule for such reviews in advance. For example, the CDM requires standardized baselines to have a predefined "validity" period (with a default of three years) after which they must be updated in order for a methodology to continue to be used.

II

GOVERNANCE AND ASSURANCE FOR DOMESTIC CREDITING MECHANISMS

8 DECIDING ON THE PROJECT CYCLE

At a glance

The term "project cycle" refers to the various phases and procedures relevant to a crediting project, including the project application, review and approval, monitoring and verification, and credit issuance. Two different models are in use among existing crediting mechanisms: a full project cycle and a streamlined project cycle. A full project cycle has distinct steps for determining and validating a project's eligibility and the verification of its emissions reductions. In contrast, a streamlined project cycle incorporates the validation of a project's eligibility into the initial verification of its emissions reductions after it has started implementation.

A full project cycle imposes higher costs and administrative burden, but provides greater assurance about environmental integrity and can give project proponents more initial certainty about the eligibility of their projects. A full project cycle is recommended for complex mitigation activities, projects using project-specific methodologies (see Chapter 6), and the early phases of a crediting mechanism.

A streamlined project cycle assesses and validates a project's eligibility after it has started implementation. This can create uncertainty for project proponents, because they will not know until after a project starts whether it will be approved by program administrators. However, it can significantly reduce their transaction costs, and can reduce administrative burdens for program administrators. A streamlined approach is most suitable where eligibility criteria are clearly defined and simple, such as when standardized approaches to methodologies are used (see Chapter 6), or where the project type involved is relatively simple with low additionality risks.

As a general rule, newly implemented crediting mechanisms are potentially subject to greater risks to environmental integrity, as project proponents, auditors, and program administrators gain familiarity with the rules and requirements and their respective roles. As a result, it may be prudent for newly implemented crediting mechanisms to start with a full project cycle. After program administrators and stakeholders acquire more experience, the streamlined system may be introduced where appropriate—for example, for small-scale, standardized mitigation activities or those that otherwise face a low environmental integrity risk.

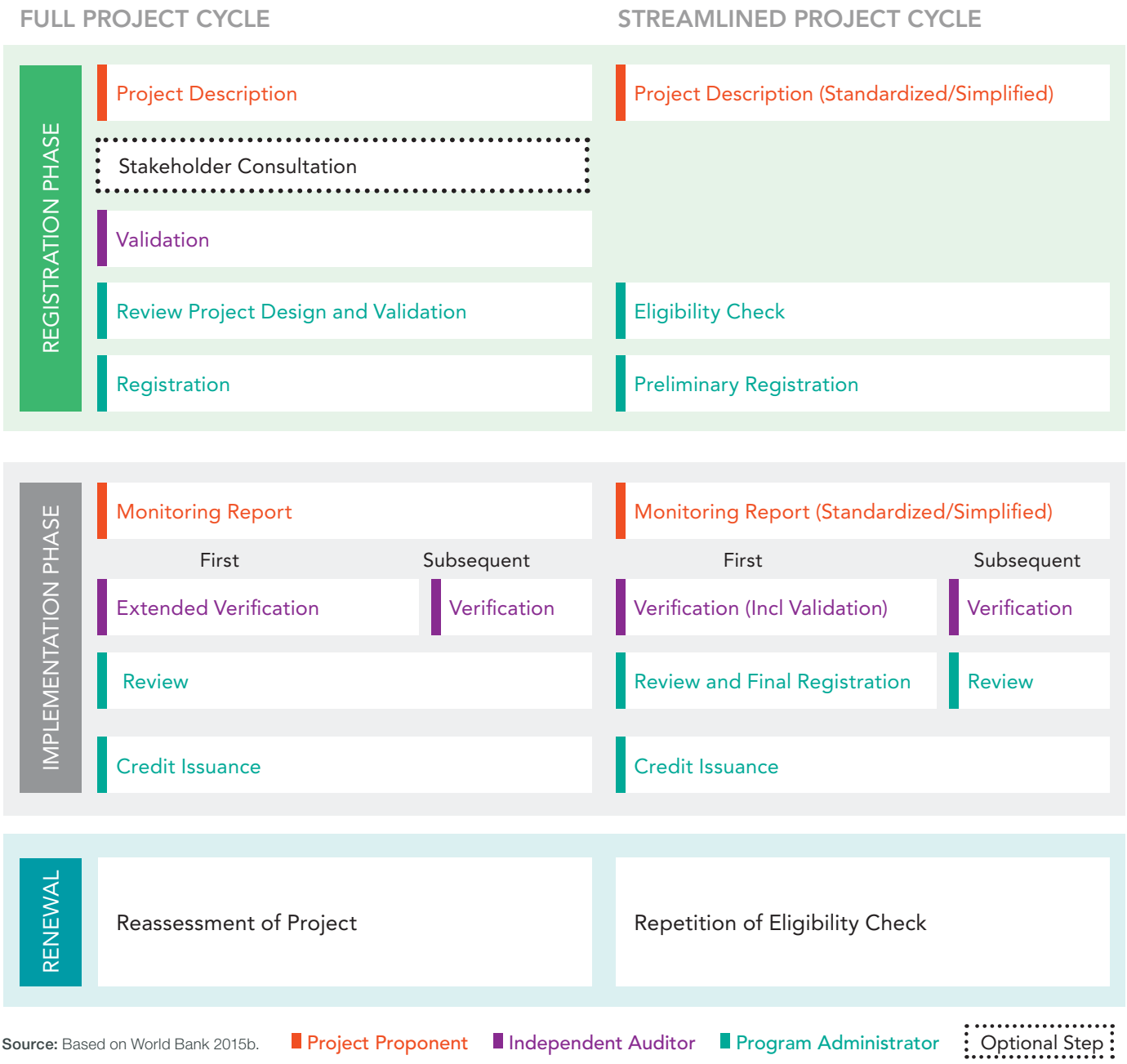
Regardless of the choice, it is important for policymakers to identify and communicate the project cycle to all parties, particularly potential project proponents. A well-documented process, with a clear set of criteria that lead to the issuance of credits, is key to enhancing trust in a crediting mechanism.

This chapter describes the project cycle options and their procedural requirements, as well as any advantages and disadvantages (Sections 8.1 to 8.3). Section 8.4 then discusses considerations for selecting the most appropriate option, noting the potential trade-offs between governmental burden and transaction costs on the one side and environmental integrity on the other.

8.1 PROJECT CYCLE OVERVIEW

Policymakers must decide whether project proponents need to comply with a full project cycle or a streamlined one. Figure 8-1 provides an overview of the various components of these two approaches.

Figure 8-1. Project cycle options



Source: Based on World Bank 2015b.

A project cycle consists of three different phases: a registration phase, an implementation phase, and a renewal phase. The specific requirements for each of these phases differs depending on the type of project cycle. Under a full project cycle, for example, projects are fully approved and registered at the end of the registration phase. Under a streamlined project cycle, only a preliminary registration is provided at the end of this phase (sometime called listing or provisional approval to distinguish this from full registration). The implementation phase requires submission of regular monitoring reports along with verification of those reports. For each type of project cycle there is the potential for renewal once a project reaches the end of its crediting period (see Section 5.2).

The key difference between the two approaches is the level of independent checks, especially during the registration process. Full project cycles require a detailed validation by a third-party auditor during registration. In contrast, streamlined project cycles require only an eligibility check by the administrator (resulting in a preliminary registration). Because this initial registration is only provisional, under streamlined project cycles, project proponents carry the risk that their project will be deemed ineligible after it has been implemented.

Box 8-1 provides examples of the type of project cycle used in various crediting mechanisms.

Box 8-1. Use of full versus streamlined project cycles in existing crediting mechanisms

The Clean Development Mechanism (CDM) has served as a blueprint for the full project cycle. Under the CDM's project cycle, a project proponent drafts a description of their project in line with the requirements of an applicable methodology. An independent auditor then validates that the project meets the methodology's eligibility criteria, based on the description. In conjunction with this, the CDM requires a local stakeholder consultation. The project is registered after a positive validation and final check by the administrator. After the project's implementation, the project proponent drafts a monitoring report, which must be verified by a second independent auditor. Similar project cycle approaches are used by the Switzerland Offset Program, the China Certified Emissions Reduction Program (CCER, Korea Offset Program, Verified Carbon Standard (VCS), and the Gold Standard.[a] However, stakeholder consultations on the specific project are not required under the Switzerland Offset Program.

A number of national, subnational, and independent crediting mechanisms use a streamlined project cycle, as validation is performed simultaneously with the project's first verification. These mechanisms include the Australia Emissions Reduction Fund, California Compliance Offset Program, Québec Offset System, and Climate Action Reserve. Consultation on specific projects are not required in these crediting mechanisms, except for the Climate Action Reserve, which requires stakeholder consultations for projects located in Mexico.

Under the Joint Crediting Mechanism and VCS, project proponents have the option to pursue either a full or a streamlined project cycle. Both require stakeholder consultation on specific projects.

Sources: World Bank 2015a, 2015b, 2020.

[a] Under the Gold Standard, however, "micro scale" projects (those that reduce less than 10,000 metric tons of carbon dioxide equivalent per year) can opt to forgo independent validation and verification and instead submit their own validation and verification reports that are directly checked by program administrators.

The relative advantages and disadvantages of the two approaches are outlined in Section 8.4. Existing international and independent crediting mechanisms, including the CDM, provide documentation templates for each phase of the project cycle (for example, templates for project descriptions, monitoring reports, validation and verification reports, renewal applications, etc.). These templates can be leveraged by domestic policymakers.[73] In addition, the Partnership for Market Readiness' (PMR) Options to Use Existing International Offset Programs in a Domestic Context[74] provides more information on the project cycle and options used in various existing crediting mechanisms.

8.2 USING A FULL PROJECT CYCLE

Most existing international and independent crediting mechanisms employ a full project cycle. The main steps for a full project cycle were developed under the CDM, and these steps have largely been replicated in other crediting mechanisms adopting a full project cycle. To help promote consistency and a level of standardization, it is good practice for the policymaker to clearly define the requirements and procedures—along with documentation templates[75]—for each of the phases outlined below.

8.2.1 Registration phase: Project design, validation, and registration

Under a full project cycle, the registration phase takes the project from the initial concept and development by project proponents up to the formal approval for inclusion in the crediting mechanism.

Development of a project description

The project cycle begins with the project proponent drafting a project description in a standardized format. To do this, the project proponent must follow whatever minimum requirements are set out in a methodology appropriate to the project type (see Chapters 6 and 7). The project description must include a detailed description of the project and all information necessary to assess whether the project is eligible to use the methodology. This typically includes

[73] For example the CDM (https://cdm.unfccc.int/), the Gold Standard (https://www.goldstandard.org/project-developers/standard-documents), or the Verified Carbon Standard (https://verra.org/project/vcs-program/).

[74] World Bank 2015a.

[75] For an example of such templates, see the CDM webpage: https://cdm.unfccc.int/Reference/PDDs_Forms/index.html.

- a description of the mitigation activity (including the applied technology or practice);
- details on the project boundary, including the greenhouse gas (GHG) accounting boundary and included GHG sources;
- a description of the baseline scenario;
- details on how the project meets the methodology's additionality requirements;
- a description of how the methodology will be applied to calculate baseline emissions, project emissions, and leakage;
- a description of how emissions reductions will be calculated, according to the methodology;
- the project's expected lifetime;
- a monitoring plan, which defines measurement methods, data collection procedures, and calculations that will be used to determine a project's emissions and prescribes the contents of future monitoring reports; and
- an estimate of emissions reductions.

Optional: Stakeholder consultation

Prior to validation (see next step), existing international and independent crediting mechanisms generally require project proponents to consult with stakeholders potentially affected by their project. This involves outreach to local communities or other parties to solicit their feedback and input on project design and implementation. This adds time and cost to project development but can increase public acceptance and environmental integrity and ensures any relevant concerns can be factored in at an early stage, including those related to sustainable development or equity. Fixed deadlines for consultation, objections, and appeals can help minimize any time delays (see Chapter 10 for more details). Any accommodations in project design to address concerns raised by stakeholders should be incorporated in the project description prior to validation by an auditor. A variety of different crediting mechanisms all require stakeholder consultations for projects, including the CDM, VCS, Gold Standard, and China's CCER.

For many regional, national, and subnational domestic crediting mechanisms (for example, in Alberta, Australia, California, Quebec, the Republic of Korea, and Switzerland), this step is seen as unnecessary, typically because projects are already subject to existing domestic regulatory requirements that included significant stakeholder consultation in the program or mechanism design. Where existing regulatory requirements and programmatic stakeholder consultation is not deemed sufficient, project-level stakeholder consultation may be advisable.

Validation

Validation is the process by which an independent auditor (see Chapter 9) assesses a project's eligibility and its conformance with an applicable methodology and other rules of the crediting mechanism. Having an independent auditor validate the project description is good practice, as it imposes an additional, objective assessment of the project before it is implemented. Validation should be in-depth, systematic, independent, and follow a documented process. The auditor should identify any potential errors or ambiguities that the project proponent may need to resolve.

Specific requirements for validation should be provided in each program-approved methodology (see Chapters 6 and 7). In addition, policymakers should outline the process for validation, along with general guidance for auditors conducting validations (see Section 9.4). Typically, project proponents choose an auditor to perform validation and pay them for their services; however, only fully accredited and certified auditors should be allowed to perform validation (see Chapter 9).

Auditors provide a professional opinion on the eligibility of a project and only projects receiving a positive validation opinion can progress through the registration process.

Project review and approval by program administrators

In the next step, the project proponent submits the project description and accompanying validation opinion to the program administrator. Under most crediting mechanisms, this submission must occur either before the project's implementation or within a short time thereafter (typically three to six months). This is because, if a project commences well before it registers to receive carbon credits, there is a higher risk of it being non-additional.[76]

The program administrator reviews all documents and makes the final decision as to whether the mechanism's requirements have been met. This is an important step. The environmental integrity of the crediting mechanism depends on the ability of the program administrator to reject projects that are non-additional, could lead to over-crediting, or are based on faulty evidence.

The decision of the program administrator is typically based on the project's validation report, but it may be that the program administrator rejects a project even if it received a positive validation opinion (for example,

[76] A long period of operation without being issued any credits would suggest the project did not require carbon credits as an incentive, and therefore is not additional (see Chapter 6).

Table 8-1. Typical elements of a monitoring report

Content	Calculation/metrics
Emissions reduction claim	The claim results from calculating baseline emissions, project emissions, and leakage. Those elements are determined with data collected in line with the GHG Accounting Principles (see Chapter 6).
Monitoring equipment	The required frequency, accuracy of measurement, calibration of the monitoring equipment, and responsibilities as determined in the monitoring plan.
Implementation	Description of how the project activity is implemented.
Location	Geographic location of the project activity.
Key dates	Documentation of relevant dates such as the implementation date (e.g., first significant financial commitment), the start of the actual emissions reduction activities, or the monitoring period.
Any changes after registration	If the project has not been implemented in line with the project description, this needs to be documented in the monitoring report alongside any other operational or legal issues. If there are substantial deviations (such as using a different technology from that outlined in the original project documentation), a revalidation may be required.

if the independent auditor missed relevant aspects). If the program administrator approves the project, it can progress through the registration process. If it is rejected, the project proponent may choose to either discard the project or repeat the preceding steps after updating the design, depending on the reason(s) for the rejection.

Registration

Once a project is approved by program administrators, they formally register the project by marking it as approved in the crediting mechanism's registry system (see Chapter 10) and making the final project description publicly available. The latter is important to promote transparency. It also allows subsequent projects to build on methodological details implemented in approved projects, where those details are not prescribed in the methodology. This may include the method used for data collection, assumptions on materiality thresholds, or evidence used to demonstrate additionality. Transparency requirements should include provisions to allow project proponents to remove commercially sensitive information, such as financial data.

8.2.2 Implementation: Monitoring, reporting, and verification (MRV)

Following a successful registration, the project proponent can implement and monitor the project. If a project has not already commenced implementation at the time of its registration, it should begin soon thereafter. Typically, for example, projects are given a time limit of six months to commence (with a possibility for an extension), although this can depend on the project type.[77] Different crediting mechanisms define the start of implementation in different ways, with some variations based on the type of activity involved. A common milestone for crediting mechanisms using a full project cycle is to use the date of the first significant financial obligation (for example, the date of contract with a construction company).[78]

Monitoring report

After a certain operational period (often called a reporting period), the project proponent develops a monitoring report, using a predefined format, that collates all of the monitoring data for that period.[79] The maximum length of a reporting period will depend on the project type and is typically defined in project methodologies (see Chapter 6). Too long of a reporting period can make it more difficult for auditors to credibly verify monitoring data. For example, if too much time passes between when the data were generated and when the auditor can check

[77] Such a time limit is required because circumstances determining project eligibility can change over time; if project owners wait indefinitely before beginning a project, this can call into question the validity of the initial eligibility decision, including the project's additionality determination.

[78] Note that this is usually not the point at which the project starts generating emissions reductions. For crediting mechanisms using a streamlined project cycle, project start dates are more typically linked to the commencement of emissions reductions, largely because projects are not typically registered until after this date.

[79] For more guidance on how to monitor, report, and verify emissions and set up MRV frameworks see the PMR's Developing Emissions Quantification Protocols for Carbon Pricing: A Guide to Options and Choices for Policy Makers.

a project's measurement systems, it may not be possible to provide assurance about the accuracy of older data. An appropriate reporting period also helps to manage risks that projects are being implemented correctly, since monitoring reports provide a useful checkpoint for the program administrator. At the same time, it is important to allow project proponents to manage cash flows and administrative costs. To balance these objectives, existing crediting mechanisms typically require a first monitoring report within one year of the date on which the emissions reductions started; subsequent reports are typically required within one to three years after the preceding one.[80] In most cases, project proponents have the option to generate and submit monitoring reports more frequently, but must get special exemptions from program administrators to submit them less frequently.

Table 8-1 lists typical elements of a monitoring report (for further details on monitoring see Section 6.5).

Verification

Verification is the process by which an independent auditor (see Chapter 9) reviews a project's monitoring reports, confirms that the project has been implemented in accordance with the crediting mechanism requirements (including any methodology requirements), and confirms that GHG reductions have been correctly quantified and reported according to the project's applicable methodology. In most cases, every monitoring report for a project should be individually verified.[81]

Verification of project monitoring reports is an essential procedure for all crediting mechanisms. Specific verification requirements should be provided in each approved methodology (see Chapters 6 and 7). In addition, policymakers should outline the process for verification, along with general guidance for auditors conducting verifications (see Section 9.4). Typically, project proponents choose an auditor to perform verification and pay them for their services; however, only fully accredited and certified auditors should be allowed to perform verification (see Chapter 9).

Auditors should provide a professional opinion about whether a monitoring report provides a fair and accurate representation of a project's performance and its associated emissions reductions and indicate the level of assurance (see Section 9.4) provided by their opinion in an official verification report. Program administrators should only issue credits to a project based on monitoring data that have been successfully verified to the mechanism's required level of assurance.

The verification of a project's first monitoring report is usually more complex and time consuming than subsequent verifications, in part because issues may arise that were not anticipated during project design and registration (such as problems measuring some parameters), such that certain aspects of the project description have to be revised. Subsequent reports usually do not face these challenges and, in addition, can build on the first monitoring report.

Review

The program administrator reviews all documents, conducts a final check, and finally approves each monitoring report, conditional on a positive result for each of the preceding steps.

Credit issuance

The program administrator issues credits in the registry for emissions reductions that occurred during the period(s) covered by each verified and approved monitoring report. The policymaker may reserve the right to revoke or invalidate credits if the registration or issuance was based on false claims, or in the case of fraud (see Chapter 10).

8.2.3 Renewal/extension of crediting periods

Most existing crediting mechanisms allow crediting periods to be renewed after the first crediting period has expired (see Section 5.2). The number of allowable renewals should be outlined in the mechanism's rules. For a renewal, project proponents must repeat the steps of the registration phase (validation and reapproval). However, policymakers typically reduce the requirements for what must be assessed as part of crediting period renewals because many elements of a project will remain unchanged. Stakeholder consultations, for example, are typically not required for renewal.

The most important aspect of a project to assess at renewal is whether its original baseline scenario remains valid. This can include an evaluation of how the regulatory environment has changed (for example, whether new laws or policies have made the project

[80] The period will depend on the nature of the project and its data collection systems. For industrial gas projects, for example, it can be important for auditors to regularly check the calibration of measurement instruments. For forestry projects, longer reporting and verification periods are typical, given the rate at which trees grow and the measurement methods involved.

[81] Some crediting-type mechanisms, such as Australia's Emissions Reduction Fund, use a risk-based approach that allows explicit verification of only a subset of a project's monitoring reports, as long as a project meets certain criteria (for example, projects are small scale, homogeneous, and/or rely on digital verification technologies with few sources of uncertainty). This introduces greater uncertainties, however, and introduces risks to environmental integrity. As a result, such an approach is only suitable in specific circumstances.

activity mandatory) and any changes in baseline parameters or technology assumptions. The full scope of what should be evaluated is typically specified in the project's applicable methodology. Once the baseline is reassessed, a new baseline may be established for the next crediting period. In some cases, this may reduce—or even eliminate—the possibility for the project to generate creditable emissions reductions. For example, if the project concerns an activity that is now required by law, the baseline and project will be effectively the same, meaning it cannot generate creditable reductions.[82]

8.3 STREAMLINED PROJECT CYCLE

As noted above, a streamlined project cycle can be more efficient for both project proponents and program administrators, as the project proponent provides only a simplified project description during the registration phase. This may be implemented, for example, by using a standardized form that includes a list of eligibility criteria (for example regarding technology, availability of data to calculate emissions reductions, geographical region, project scale, or confirmation that activity has not yet commenced). While the program administrator checks the eligibility criteria, there is no independent validation. If the criteria are met, the administrator preliminarily registers the project and it may proceed to implementation.

Project eligibility must still be validated by an auditor during the implementation phase in conjunction with verification of the project's first monitoring report. Registration is finalized by program administrators after the project demonstrates eligibility as part of its first verification (see Figure 8-1). The other implementation-phase steps in a streamlined project cycle—monitoring, reporting, verification, review, and credit issuance—are not substantively different from those same steps in a full project cycle (though monitoring and reporting may be somewhat simplified if standardized approaches to methodologies are used).

A streamlined project cycle works best where the eligibility criteria for a project—including additionality requirements—are unambiguous and require little analysis or interpretation, as is the case when standardized approaches to methodologies are used (see Chapter 6). California, Québec, and the Climate Action Reserve, for example, all use streamlined project cycles for methodologies that adopt standardized approaches.

Box 8-2. Digitizing MRV and automating project cycle management

Traditionally, MRV has required substantial manual collection and data reporting, such as reporting the amount of power generated by a wind farm or survey information for transport or community projects. These means of data collection are well established, but there remain issues related to time and cost required, precision and completeness of data, and even potential corruption, which undermines trust.[a]

Digitization and automatization have progressed significantly in recent years and it is now possible to digitize many steps and procedures in the project cycle. This may include all aspects of data collection, including the systematic use of electronic power and gas meters to the use of sensors, or the Internet of Things. Also, the combination of remote sensing and artificial intelligence may provide new low-cost and trusted approaches on tracking, such as land-use changes.[b]

When the entire project cycle management is moved to digital systems, in combination with blockchain and smart contracts, verification may be automated by embedding the monitoring rules, for example in smart contracts on a blockchain. In this approach, measurements, such as those provided by power or gas meters, are directly fed into cryptographically safe and tamper-proofed digital systems and subsequently recorded in trusted databases (such as blockchain or a trusted governmental database). Once a third party verifies the entire MRV system and the related rules in smart contracts, data verification can be automated, leading to considerable efficiency gains and savings in transaction costs.

[a] See Climate Ledger Initiative 2019, Section 2.2, for further detail.
[b] See Climate Ledger Initiative 2019, Section 3.1, for further detail.

[82] This is sometimes interpreted to mean the project is "no longer additional." Technically, however, it is some or all of the project's emissions reductions that are no longer additional (relative to the baseline). A project's additionality is determined only once, at its outset, and is concerned with whether or not the project would have been implemented in the absence of the crediting mechanism.

There are two reasons why clear and unambiguous eligibility criteria are important. First, since final registration of the project is postponed to the implementation phase, the project proponent faces the risk that the project may not be approved, even after investments are made and implementation has commenced. Objective and transparent eligibility requirements can help minimize this risk. For risk-averse project proponents, policymakers can also let them opt for a full project cycle that includes validation. The Climate Action Reserve, for example, effectively allows project proponents to request a "desktop verification" (resulting in "de facto validation") prior to project implementation in order to validate a project's eligibility.[83]

The second reason relates to potential conflicts of interest on the part of auditors. This is because the same auditor usually validates a project (i.e., during the verification of the first monitoring report) and verifies its emissions reductions. Accordingly, this auditor may have an interest in offering a positive validation opinion in order to secure future verification business. This perverse incentive can be countered by requiring less judgment, analysis, or interpretation when determining project eligibility. Under a full project cycle, policymakers typically address this perverse incentive by requiring separate auditors for validation and verification. This can be done under a streamlined project cycle but increases transaction costs (see Chapter 9).

The renewal of a crediting period in a streamlined approach includes a revalidation of the project's eligibility. Typically, this occurs in conjunction with verification of the project's first monitoring report under the new crediting period. If a standardized baseline approach has been used, the crediting period renewal may require updated baseline parameters, as well as a check against legal requirements and other conditions.

8.4 CONSIDERATIONS FOR PROJECT CYCLE APPROACH

Policymakers should specify detailed project cycle requirements, including whether project proponents must follow a full or a streamlined project cycle (or whether they may be allowed to choose between the two options based on the type of project and methodology involved). Table 8-2 lists the respective advantages and disadvantages of these options and identifies the conditions under which each may be appropriate.

Ultimately, in deciding between a full or streamlined cycle, policymakers face a trade-off between higher transaction costs and governmental burden or a higher level of environmental integrity. Environmental integrity risks can be reduced under a streamlined cycle if project eligibility criteria are clearly specified and require little judgment or interpretation on the part of auditors.

Table 8-2. Full cycle versus streamlined cycle

Advantages	Disadvantages	Suitable for
Full project cycle		
Greater certainty for project proponents once project is registered. More experience from existing crediting mechanisms.	Higher transaction costs, especially for the developer.	Complex projects. Project-specific approaches to methodologies. Initial phase of crediting mechanism.
Streamlined project cycle		
Lower administrative costs for project proponent (especially in the registration phase) and program administrator.	Project proponent risks not obtaining final approval after implementation has begun. Integrity depends on having clear and objective eligibility criteria, which may not easily accommodate unique or unusual project configurations.	Small-scale projects. Standardized approaches to methodologies. Well-established project types with low additionality risk.

[83] http://www.climateactionreserve.org/wp-content/uploads/2017/02/2017-Verification-Program-Manual.pdf.

9 OVERSEEING AUDITORS

At a glance

Project validation and verification are important functions that are essential to the credibility and environmental integrity of crediting mechanisms. Typically, these functions are performed by independent auditors rather than program administrators. It is essential for crediting mechanisms to ensure that auditors are well qualified and perform validation and verification functions competently. Policymakers should establish formal qualifications for auditors, define how they must perform validation and verification activities, and establish procedures that program administrators will use to oversee auditors and ensure the consistency and rigor of validation and verification. This chapter discusses the key responsibilities for policymakers.

The first section looks at standards and procedures for accrediting and approving auditors (Section 9.1), followed by developing standards for validation and verification (Section 9.2). Section 9.3 outlines rules and requirements for managing conflicts of interests between auditors and project proponents before concluding with a final section on rules and procedures for regularly reviewing auditors' performance (Section 9.4).

The Partnership for Market Readiness' (PMR) guidebook Designing Accreditation and Verification Systems provides detailed guidance related to implementing verification systems and establishing accreditation procedures for ensuring auditor competence.

9.1 ACCREDITING AND APPROVING AUDITORS

To ensure that validations and verifications are performed rigorously, consistently, and competently, crediting mechanisms should only permit qualified firms and organizations to perform these services (see Box 9-1). Typically, crediting mechanisms will approve only firms or organizations that are professionally accredited to perform project validation and verification. Policymakers must establish rules and standards for accreditation and for formally approving entities allowed to perform validation and verification services for project proponents.

In this guide, "auditor" refers to firms and organizations that are accredited and approved to perform validation and verification services. Among existing crediting mechanisms, these entities are sometimes referred to as "verifiers" or "validation and verification bodies." Auditors typically employ multiple staff to validate or verify a project; employees are referred to here as "auditing staff."[84] Part of accrediting and approving auditors may involve ensuring that auditor staff are properly trained and certified.

Accreditation is the process of formally assessing the competence of an auditor to carry out project validations and verifications according to the crediting mechanism's standards. Accreditation typically looks at firm-level qualifications and processes, such as data management systems, internal procedures, and appropriate staffing needed to conduct validations and verifications. Most existing crediting mechanisms accredit firms or organizations rather than individuals. This is because it is more difficult for individuals to possess the breadth of expertise and the systems necessary (e.g., record keeping and data management) to validate or verify emissions reduction projects that can be technically complex. In addition, accrediting firms or organizations can provide for a greater level of accountability. Auditors, for example, are typically required to carry insurance to cover potential liability for errors or omissions in verification opinions; individuals may lack the resources to maintain this liability coverage. However, crediting mechanisms should

[84] In other contexts, individual personnel performing auditing tasks are sometime referred to as "auditors." This guide uses "auditing staff" to clearly distinguish between firms or organizations ("auditors") and their personnel. In rare cases, crediting mechanisms may approve individuals to perform auditing tasks rather than firms or organizations.

Box 9-1. Using auditors to perform validation and verification

Validation is the process by which an auditor assesses a project's eligibility and its conformance with an applicable methodology and other crediting rules. Verification is the process by which an auditor reviews a project's monitoring reports, confirms that the project has been implemented in accordance with the crediting mechanism's requirements (including any methodology requirements), and confirms that greenhouse gas (GHG) reductions have been correctly quantified and reported according to the project's applicable methodology. Validation and verification are important procedural steps to ensure that projects adhere to methodological requirements for quantifying emissions reductions and meet all relevant criteria.

In principle, program administrators could conduct project validation and verification themselves. In practice, all existing crediting mechanisms outsource these tasks to independent auditors. Validation and verification of projects involve a potentially large—and variable—volume of work. Supporting technical capabilities for program administrators to perform these functions is expensive, and potential fluctuations in carbon credit demand and supply could result in significant periods of underutilized capacity. Thus, policymakers have found it more efficient to delegate validation and verification to independent auditors, while putting in place systems to ensure the quality of their work and avoid potential conflicts of interest.

consider auditing staff-level certification in addition to firm-level accreditation (as discussed below).

As outlined in Chapter 3, one option for policymakers is to rely on existing crediting mechanisms for auditor accreditation. In this case, the policymakers would simply allow projects to be validated and verified by auditors accredited (and specifically identified) under an existing crediting mechanism. For instance, auditors approved under the Clean Development Mechanism (CDM) are eligible to undertake verifications under China's Certified Emissions Reduction (CCER) mechanism and the Joint Crediting Mechanism. Relying on these accreditations could generate administrative savings, but domestic crediting mechanism methodologies, policies, and procedures must closely align with those of the crediting mechanism accrediting the auditors, as the auditors might otherwise lack the expertise and training appropriate to the domestic crediting mechanism.

If accreditation is not outsourced, policymakers will need to establish a domestic accreditation process. Key considerations for doing this are outlined in the following subsections.

9.1.1 Deciding on an accreditation standard

Policymakers must specify an applicable accreditation standard for auditors that defines, for example, the principles that auditors are expected to uphold or demonstrate; general eligibility requirements (including legal status, governance arrangements, and liability coverage); required competencies; requirements for internal systems to manage communications; data retention; and conflicts of interest.

Many existing crediting mechanisms use the International Organization for Standardization (ISO) 14065,[85] which is a general accreditation standard specific to auditors of claims involving GHG accounting, including for GHG mitigation projects. ISO 14066 covers competency requirements for auditing staff (i.e., individuals within an organization), which can also be useful as part of overall accreditation (see below). Alternatively—or in addition—policymakers can establish their own accreditation rules and procedures or tailor the principles and requirements of these standards for domestic purposes. This would ensure the standards meet the specific needs of the crediting mechanism but can be time-consuming and resource intensive.

9.1.2 Defining scopes for accreditation (optional)

For smaller crediting mechanisms with a narrower scope, it is often sufficient to define general accreditation requirements for auditors. For mechanisms that cover a wide range of different project types, however, it may be important to distinguish accreditations for auditors based on competencies with respect to certain kinds of mitigation activities. The competencies and management systems needed to verify industrial gas destruction projects, for example, may be different from those needed to verify forestry projects. Likewise, given the importance of accurate validation to promote environmental integrity and the additional expertise and judgment needed to perform validations, some crediting mechanisms distinguish between auditors accredited to perform both validation and verification, and those accredited only for performing verifications. The Climate Action Reserve, for example, defines different scopes of accreditation based on these competencies and an auditor's expertise related to different project types.

[85] https://www.iso.org/standard/60168.html.

9.1.3 Deciding on auditing staff-level certification requirements (optional)

Firm-level accreditation improves confidence in the capacity of auditors and promotes consistency across audits by ensuring they have appropriate internal policies, standards, and management systems. However, relying on firm-level accreditation can raise issues in organizations with high staff turnover, which can result in inconsistencies in the skills and experience of individual auditing staff. Policymakers should therefore consider whether to establish certification and training requirements for auditing staff and make accreditation and approval of auditors conditional on having professionally certified staff.

Certification of auditing staff focuses on an individual's skillset and experience, rather than the systems and processes of an auditing firm. As with firm-level accreditation, policymakers can rely on existing standards for personnel certification, such as the ISO/International Electrotechnical Commission 17024:2012 Standard,[86] and elaborate on these standards with requirements specific to their jurisdiction.

9.1.4 Deciding on training requirements, procedural requirements, and renewals

Many crediting mechanisms require auditing staff to undergo training to ensure they possess the appropriate qualifications and skills. This also helps the auditing staff become familiar with the mechanism's validation and verification. Crediting mechanisms typically provide training—and administer examinations—related to specific project types and methodologies, as well as any general requirements. Alternatively, trainings may be outsourced to professional training firms.

Before the final accreditation some crediting mechanisms also require a witnessed assessment of the auditor in order to evaluate whether it has the appropriate internal systems in place and that auditing staff have appropriate skills. This is true for the Climate Action Reserve and California, for example. Under the Chinese national crediting mechanism, the Ministry of Ecology and Environment approves and registers auditors or auditor firms based on an assessment that looks at both on–site performance and a review of relevant documents.

Finally, auditors should be required to renew accreditation periodically and to take appropriate (re) training regarding new crediting mechanism policies or requirements. Policymakers should establish clear rules that outline how frequently renewals are required and what is required for reaccreditation.

9.1.5 Deciding who is responsible for accreditation

Accreditation can be managed by program administrators, professional accreditation bodies, or a combination of the two:

- **Program administrators**. This option affords greater control but is also more costly and administratively burdensome. Having program administrators provide accreditations could make sense, however; if crediting mechanism requirements are highly specialized, policymakers should ensure that auditors are fully acquainted with them. The California Air Resources Board (CARB) performs its own accreditation, for example, to ensure that auditors are competent to perform verification activities specific to California's unique methodologies. This ensures a robust pool of qualified auditors, including smaller companies who may not have membership in a more costly national accreditation body.

- **Professional accreditation bodies**. Multiple independent and domestic crediting mechanisms rely on professional accreditation bodies to formally accredit auditors for their programs. In North America, for example, the American National Standards Institute and the Canadian Standards Association perform accreditation of auditors and certification of auditing staff for the Climate Action Reserve, the American Carbon Registry, and the Alberta Offset Program. Where professional accreditation bodies are available to provide these services, this can be a cost-effective option. Such bodies should be vetted by policymakers to confirm that they have the expertise to oversee and accredit auditors according to the specific standards and requirements of the domestic crediting mechanism.

- **Hybrid approach**. Policymakers can rely on professional accreditation bodies while also imposing additional requirements for formal qualification under the domestic crediting mechanism. For example, auditors could seek generic accreditation from a professional accreditation body, then register with program administrators to become eligible to perform auditing services under the mechanism. To register, auditors could be required to demonstrate particular proficiencies or meet other eligibility requirements. This option entails some higher administrative costs for program administrators, but also affords more control and oversight. For example, program administrators would retain the ability to de-register auditors who no longer meet the jurisdiction's requirements.

[86] https://www.iso.org/standard/52993.html.

Regardless of which approach is used, once auditors are formally accredited they should be officially approved by program administrators to perform audits in accordance with the scope of their accreditation. Crediting mechanisms typically provide a list of eligible, accredited auditors for project proponents to consult when seeking validation and verification services.

For further information on designing accreditation systems for auditors, see the PMR guidebook Designing Accreditation and Verification Systems.

9.2 DEVELOPING STANDARDS AND GUIDELINES FOR VALIDATION AND VERIFICATION

Crediting mechanisms should establish validation and verification standards. The main goal here is to ensure consistency across projects under the crediting mechanism. Detailed, relevant procedures ensure the quality of the validation and verification. A standard approach helps streamline review and reduces overall transaction costs for project proponents.

Key elements of validation/verification standards and guidelines include the following:

- **Procedural and substantive requirements**. Procedural requirements detail the steps involved in validation and verification and how they must be conducted. A commonly used reference for procedural requirements is the ISO 14064:3 Standard[87] (see Table 9-2). Typical requirements also include designating the required composition of auditing teams. The Alberta Offset Program, for example, requires teams to have a lead auditor, subject matter expert(s), peer reviewer, and independent reviewers. Substantive requirements could include general requirements for reviewing all monitored data, appropriate methods for conducting reviews, and requirements for the format and content of verification reports (for example, requirements for reporting on both methods and results).

- **Specification of a "materiality threshold."** The materiality threshold for verification indicates the crediting mechanism's tolerance for any discrepancies between a project proponent's reported information and what an auditor can confirm. Materiality thresholds may be qualitative, quantitative, or both. A qualitative materiality threshold defines material misstatements as any statement that does not conform with the prescriptive requirements in a relevant methodology. For example, if a project fails to gather monitoring data in accordance with the methods prescribed in a methodology, this would constitute a material nonconformance. A quantitative materiality threshold is a numeric cap on the magnitude of the error. Many existing crediting mechanisms define graduated numeric thresholds based on the size of mitigation activities (see Table 9-2).

- **Required level of assurance.** Policymakers should establish a required "level of assurance" for auditors' validation and verification opinions. The level of assurance prescribes to the depth of detail and rigor that an auditor must use in identifying any material errors, omissions, or misstatements in project descriptions or monitoring reports (see Chapter 8). It indicates the degree of confidence an auditor is able to provide regarding the accuracy of reported information and data. For example, the level of assurance can be "limited" or "reasonable," in line with the definitions of these terms in financial assurance auditing.[88] A limited level of assurance requires less detailed verification activities but carries a higher risk that a misstatement or noncompliance will be missed. Most existing crediting mechanisms require a reasonable (or "positive") level of assurance.

- **Rules for when validation and verification must be conducted**. These include whether validation must be performed prior to implementing the mitigation activity (as is typically required under a full project cycle; see Chapter 8), and whether events (like natural disturbances) may trigger a required (additional) verification.

- **Rules for the required frequency of verification**. Crediting mechanisms typically specify the maximum length of time allowed between verifications,[89] along with what recourse is available if a project does not meet the required schedule or project proponents choose to forgo verification for some periods. For many types of mitigation activities, programs typically require verification every year at a minimum. Crediting mechanisms will typically refrain from issuing credits for mitigation that is not verified within this time frame, unless project proponents request and are granted an extension (for example, for extenuating circumstances).

[87] https://www.iso.org/standard/66455.html.

[88] See, for example, http://www.iaasb.org/.

[89] The maximum time length/minimum frequency can vary by type of project, with specific requirements spelled out in individual methodologies. The required time between verifications can be longer for forestry projects, for example, than for methane capture and destruction projects.

Modifications to the standard rules and processes for validation and verification may be made to manage transaction costs. For instance, auditors can bundle small-scale projects together for verification under China's CCER as a way to manage costs for small and mid-size entities or projects.

To develop these rules, it can be helpful to consult established standards and guidelines in existing crediting mechanisms. For example, many existing mechanisms have adopted rules similar (or identical) to those established under the ISO 14064, Part 3 standard. Because of this, many auditors who are accredited under existing crediting mechanisms are already familiar with these rules and can apply them easily within a new domestic crediting mechanism, even if they have been tailored or modified for domestic purposes. As Table 9-2 indicates, most mechanisms follow common high-level validation and verification standards, but differ in details related to materiality thresholds and verification frequency. Again, the PMR guidebook Designing Accreditation and Verification Systems provides detailed guidance on defining requirements for auditors.

9.3 MANAGING CONFLICTS OF INTEREST BETWEEN AUDITORS AND PROJECT PROPONENTS

Since audits are typically paid for by project proponents, conflicts of interest can arise for auditors because of a financial incentive to maintain a business relationship with a project proponent. This can compromise, or appear to compromise, an auditor's ability to perform a fully independent validation or verification. For example, an auditor may be incentivized to give positive opinions to please project proponents and secure future business with them. The effects of this can be insidious, as more rigorous auditors may find it hard to acquire clients or may lose existing ones, leading to a "race to the bottom" in the quality of validation and verification services. This can compromise a crediting mechanism's effectiveness and environmental integrity. Policymakers should therefore establish robust standards and procedural requirements that limit the potential for conflicts of interest.

A conflict of interest can occur between individuals within an auditing firm or on a project team, or at the organizational level, between an auditor and the project proponent or its parent company or organization. Thus, it is good practice to address potential conflicts of interest at multiple levels. Common measures employed by existing crediting mechanisms include

- **Requiring auditors to have robust internal policies for managing conflicts of interest as a condition for accreditation**. As part of the auditor accreditation process, it is important to ensure that auditors have adequate internal procedures and management systems in place for assessing and avoiding conflicts of interest with prospective clients. This is a common requirement across existing crediting mechanisms. The ISO 14065 Standard on Accreditation, for example, addresses procedures and practices auditors can put in place to ensure impartiality.

- **Requiring evaluation of conflict of interest risk and appropriate risk mitigation for all auditing services**. It is good practice for program administrators to require auditors to perform self-assessments of any conflict of interest risks before validating or verifying a project and to take steps to mitigate these risks where possible. Program administrators should then review these self-assessments. If risks are high and cannot be effectively mitigated, auditors should be barred

Table 9-1. California's auditor conflict of interest risk assessment guidelines

Risk is high if…	Risk is medium if…	Risk is low if…
The auditor and project proponent share (or recently shared) senior management staff or directors. Auditing staff members have performed certain types of consulting or other services for the project proponent within the last five years. The auditor has provided any kind of incentive to the project proponent in order to win its business. The auditor has provided verification services more times than is allowed under program rules.	The conflict of interest risk is not deemed to be high or low, and/or there are personal or familial relationships between the auditor and the project proponent.	No circumstances indicating a high risk have been identified, and any non-verification services provided in the past five years are valued at no more than 20 percent of the current verification contract.

Source: Adapted from Title 17, California Code of Regulations, Section 95979.

Table 9-2. Validation and verification standards among selected existing crediting mechanisms

Program	Validation performed by…	Validation standard	Verification performed by…	Verification standard	Materiality threshold	Frequency of verification
CDM	Designated operational entity	CDM validation manual	Designated operational entity (DOE) (different from the one that performed validation)	CDM verification manual, ISO 14064:3	Depends on quantity of emissions reductions or removals reported and project type, ranges from 0.5% to 10%.	A first verification is required at the latest one year after registration or the starting date of the crediting period; subsequent verification is decided by project proponent.
Joint Implementation	Accredited independent entity	CDM validation manual	Accredited independent entity (can be the same entity as the one that performed the validation)	CDM verification manual, ISO 14064:3, ISO14065	5% for projects that average less than 100,000 metric tons of carbon dioxide equivalent ($mtCO_2e$) per year; 2% for projects that average more than 100,000 $mtCO_2$-e per year.	A first verification is required at the latest one year after registration or the starting date of the crediting period; subsequent verification is decided by project proponent.
Québec	ISO-accredited auditor	ISO 14064:3	ISO-accredited VVB	ISO 14064:3	5%; all errors identified must be corrected.	Verification required for the first reporting period, some flexibility allowed subsequently, but any project for which credits are issued must be verified.
California*	California Air Resources Board (CARB)-accredited auditor	N/A	ARB-accredited auditor (same as validation)	Cap-and-trade regulation	5%; all errors that can be identified must be corrected.	Annual verification for non-sequestration projects; six years for sequestration projects; and two years for projects reporting less than 25,000 $mtCO_2e$.
Climate Action Reserve*	American National Standards Institute (ANSI)-accredited auditor	N/A	ANSI-accredited auditor (same as validation)	Verification Program Manuals, ISO 14064:3, ISO14065	5% for projects reporting 25,000 $mtCO_2e$; 3% for projects reporting greater than 25,000 $mtCO_2e$ but less than 100,000 $mtCO_2e$; 1% for projects greater than 100,000.	Annual verification for non-sequestration projects, six years for sequestration projects, and two years for livestock projects.
VCS	ANSI accredited auditor or designated operational entity	Verified Carbon Standard program manual, ISO 14064:3	ANSI-accredited auditor or DOE	VCS program manual, ISO 14064:3, ISO14065	5% for projects less than 300,000 $mtCO_2e$ and 1% for project more than 300,000 $mtCO_2e$.	A first verification is required at the latest one year after registration or the starting date of the crediting period; subsequent verification is decided by project proponent.
Alberta*	ANSI, Standards Council of Canada, International Accreditation Forum accredited auditor	Standard for Validation, Verification and Audit V5.0	ANSI, Standards Council of Canada, International Accreditation Forum accredited auditor	ISO 14064:3 and Canadian Auditing Standards	5% for projects reporting less than 500,000 $mtCO_2e$ per year; 2% for projects reporting more than 500,000 $mtCO_2e$ per year	First verification required at the end of the first monitoring period and is submitted prior to serialization; subsequent verifications are at the discretion of program administrator.

* No separate validation step is required; validation is effectively performed at first verification. **Source:** Modified United States Agency for International Development 2014.

from validating or verifying the project. California's Compliance Offset Program (COP), for example, classifies conflict of interest risks as high, medium, or low depending on certain standardized criteria (see Table 9-1). Auditors with a high risk of conflict may be barred from a particular project. Where there is a medium risk, the auditor must implement risk mitigation measures specific to the type of conflict that might be present. Where there is a low risk of conflict, validation or verification can proceed.

- **Requiring the use of different auditors for validation and verification of the same project**. Under a full project cycle (see Chapter 8), validation occurs separately from verification. Existing crediting mechanisms that employ a full project cycle frequently require the use of separate auditors for validation and verification. The CDM requires this, for example, for all large-scale projects (those that exceed certain size thresholds in terms of capacity or total emissions reductions). This reduces the risk that an auditor will provide a positive validation opinion in order to secure future verification business for the same project. However, this approach also increases transaction costs for project proponents. Under a streamlined project cycle, the same auditor validates a project at the same time it performs the project's initial verification, which creates an inherent conflict of interest. However, existing crediting mechanisms using a streamlined project cycle typically try to establish very clear and unambiguous eligibility criteria for projects, reducing the need for auditor discretion in validation opinions and therefore reducing the potential risk of a conflict of interest.

- **Limiting the number of repeat verifications for a project by the same auditor**. Many mechanisms limit the number of verifications an auditor may conduct for a project proponent. This reduces the risk of auditors developing a long-term business relationship with a particular proponent. It also has the benefit of enabling multiple auditors to review the same mitigation activities, thus providing an additional check on the consistency and appropriateness of the emissions reduction claims. Requiring different auditors may not be viable, however, if there is an insufficient number of eligible auditing firms. Alternatively, policymakers may require audit firms to change auditing staff for subsequent verifications for the same project.

Some additional options for limiting the financial relationship between project proponents and auditors include the following. To date, however, no existing crediting mechanisms have employed these options.

- **Having the crediting mechanism pay for auditing**. Making the program administrator the "client" rather than the project proponent removes a source of financial leverage project proponents may have over auditors. Costs could be covered, for example, through the collection of fees from project proponents, based on standard cost estimates for validating and verifying the type of projects they propose (auditing costs can vary significantly by project type and size). However, if project proponents can still choose which auditors are used for their project, this may not fully address potential conflicts of interest.

- **Limiting the ability of project proponents to choose auditors**. Program administrators could assign auditors to proponents or allow them to select auditors from a predefined subset of eligible auditors.

9.4 REVIEWING AUDITOR PERFORMANCE

Crediting mechanisms should regularly review the performance of auditors to ensure adequate quality control. Reviews are typically performed by having program administrators conduct an in-depth evaluation of a sample of each auditor's validation and verifications. The specific audits to be reviewed are chosen at random (and should be identified with little or no advance notice to the auditors). The review process can also allow program administrators to observe the implementation of methodologies in order to inform future revisions or improvements to them (see Chapters 6 and 7).

Typically, the review process involves observing all aspects of validation and verification processes and starts when an audit commences. The individual conducting the review participates in initial meetings, site visits, reviewing all project documentation, and conducting data checks. The reviewer then provides feedback to the auditor regarding instances of nonconformance with methodology requirements or verification procedures and makes suggestions for improvement.

It is typically not necessary to review every validation or verification performed by auditors, but program administrators must conduct enough reviews to provide an accurate picture of overall (program-wide) performance and to review the performance of every auditor. To capture a representative sample of the work, they must consider the type of mitigation activities being verified and where the most risk to the program is (for example, in terms of the potential for over-crediting). Policymakers should establish criteria for selecting mitigation activities for review, such as the type of activity being verified and whether the auditor conducting the work is experienced. If program administrators suspect an auditor is performing poorly, they may need to examine a greater number of verification reports to establish where and why there is an issue and how it can be rectified.

Finally, it is important to establish clear penalties and sanctions for poor performance by auditors. These can vary depending on circumstances and the type of shortcomings involved (for example, carelessness or incompetence versus deceptive practices). Sanctions can include, for example, fines, suspensions, requirements for retraining, revocation of the ability to provide auditing services, or even revocation of accreditation (if the program administrator serves as the accreditation body).

If administrators suspect an auditor is performing poorly, they may need to examine a greater number of verification reports to establish where and why there is an issue and how it can be rectified.

10 ESTABLISHING GOVERNANCE AND SUPPORTING FRAMEWORKS

At a glance

Regulating and administering a carbon crediting mechanism requires institutions that can execute policy authority, provide oversight, and deliver rulemaking and implementation functions. The institutions responsible for these functions will vary and likely be jurisdiction specific. However, they often include a high-level decision body with overall authority to design and oversee the mechanism, an executive body that develops rules based on the overall regulatory environment and mandate, and an administrator to execute the rules and guidance. These institutions are often supported by technical advisory bodies.

Institutional and governance choices will affect transaction costs and the administrative burden on government. Section 10.1 looks at the general governance structure for crediting mechanisms. Policymakers will need to find an institutional arrangement that is efficient, transparent, and predictable. This will give confidence in the crediting mechanism and can streamline both management of and participation in the mechanism. In deciding the role of civil society and the private sector in governance, key considerations will be the potential for conflicts of interest versus the benefits of more inclusive governance and diverse perspectives.

Because of the financial and legal implications associated with the creation and transfer of carbon credits, it is important to assign liability for the quality and quantity of the credits (e.g., to deal with cases of errors, omissions, or fraud that lead to the cancellation or revocation of credits). In addition, crediting mechanisms should have clear processes for appealing decisions and for resolving any disputes. The assignment of liability and an appeals process are outlined in Section 10.2.

Finally, many crediting mechanism functions are implemented through online registries, which provide the technical infrastructure for issuing, transferring, and retiring credits, as well as making information on credits and projects publicly accessible. Key governance questions on the registry infrastructure are outlined in Section 10.3. This includes how a registry will be built and operated and what types of information it must be able to support. The Partnership for Market Readiness' (PMR) Emissions Trading Registries: Guidance on Regulation, Development, and Administration covers the design options and requirements of registry systems in more detail.

10.1 PROGRAM GOVERNANCE AND REGULATORY SYSTEMS

Having effective and transparent governance arrangements is important for any policy. Efficiency is important for both project proponents and administrators to ensure the crediting mechanism runs smoothly. In finding the appropriate solution, policymakers will need to balance the efficiency of pooling functions and minimizing unnecessary bureaucracy against the importance of separating powers and responsibilities to promote the integrity of the mechanism. Transparency relates not only to the crediting rules (as discussed in previous chapters) but also to how the crediting mechanism is governed. Policymakers need to outline the roles and responsibilities of various agencies and departments and establish new bodies or institutions where necessary. Together, this can ensure robust decision-making, protect the integrity of the mechanism, and boost confidence in the crediting mechanism from both project proponents and the broader public. It can also minimize the potential for politicizing decisions, resulting in more predictable decisions and processes.

A jurisdiction's specific circumstances will influence what these institutional arrangements look like in practice. Constitutional or other legal arrangements, for instance, may already delineate areas of responsibility or tasks to specific bodies. If a crediting mechanism is put in place to

offer flexibility for a carbon tax or emissions trading system (ETS), policymakers may want to consider whether the same authorities could run the crediting mechanism. While this would have efficiency gains, those authorities may not have the capacity and technical expertise to manage both policies. In California and Switzerland, the ETS and the crediting mechanism are run by the same body (the California Air Resources Board and Federal Office for the Environment, respectively). However, in South Africa and Colombia, different ministries run the carbon tax and the crediting mechanism. For jurisdictions with experience in the Clean Development Mechanism (CDM), the country's Designated National Authority could be a possible candidate for taking on many of the administrative functions of the domestic crediting mechanism, given the similarities in the skills required. This is the case for South Africa, where the Designated National Authority in South Africa's Department of Mineral Resources and Energy administers the crediting mechanism.

Equally, as discussed in Chapter 3, the extent to which policymakers rely on, or outsource to, other crediting mechanisms will also affect the governance arrangements. For instance, if a domestic crediting mechanism uses methodologies from an existing international crediting mechanism, then policymakers would only need to assess the suitability of the international crediting mechanism at the outset. They would not need the level of technical expertise and input required if they were to draft these methodologies from scratch. Yet, even if there is a high level of reliance on existing crediting mechanisms, some domestic institutions will be needed for general policy coordination, oversight, and rulemaking.

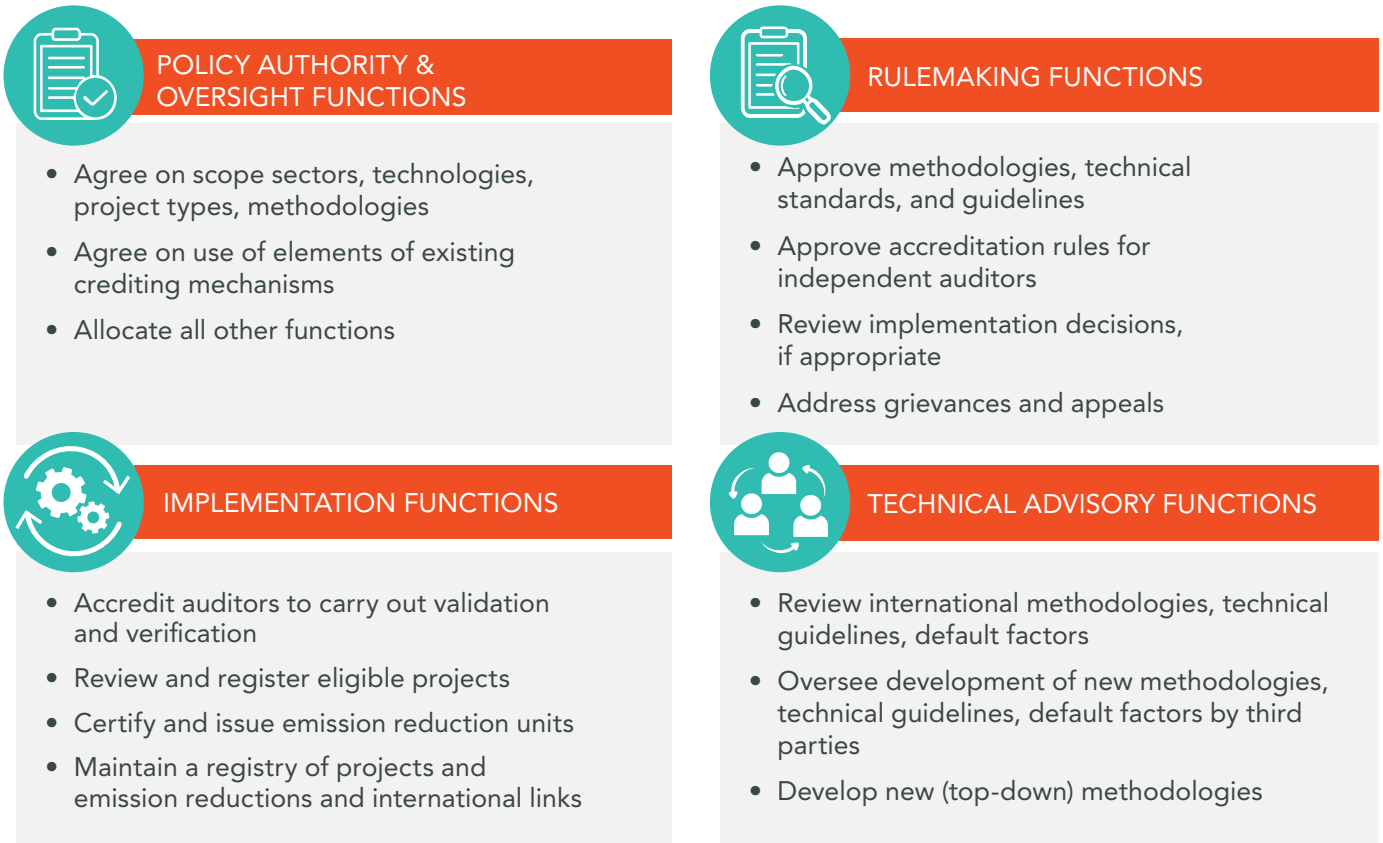
10.1.1 Institutional arrangements and administrative elements

Designing effective institutional arrangements requires an understanding of the functions needed for a crediting mechanism. These can be divided into four categories: policy authority and oversight; rulemaking; implementation; and technical advisory (see Figure 10-1). This section addresses each of these in turn.

Policy authority and oversight

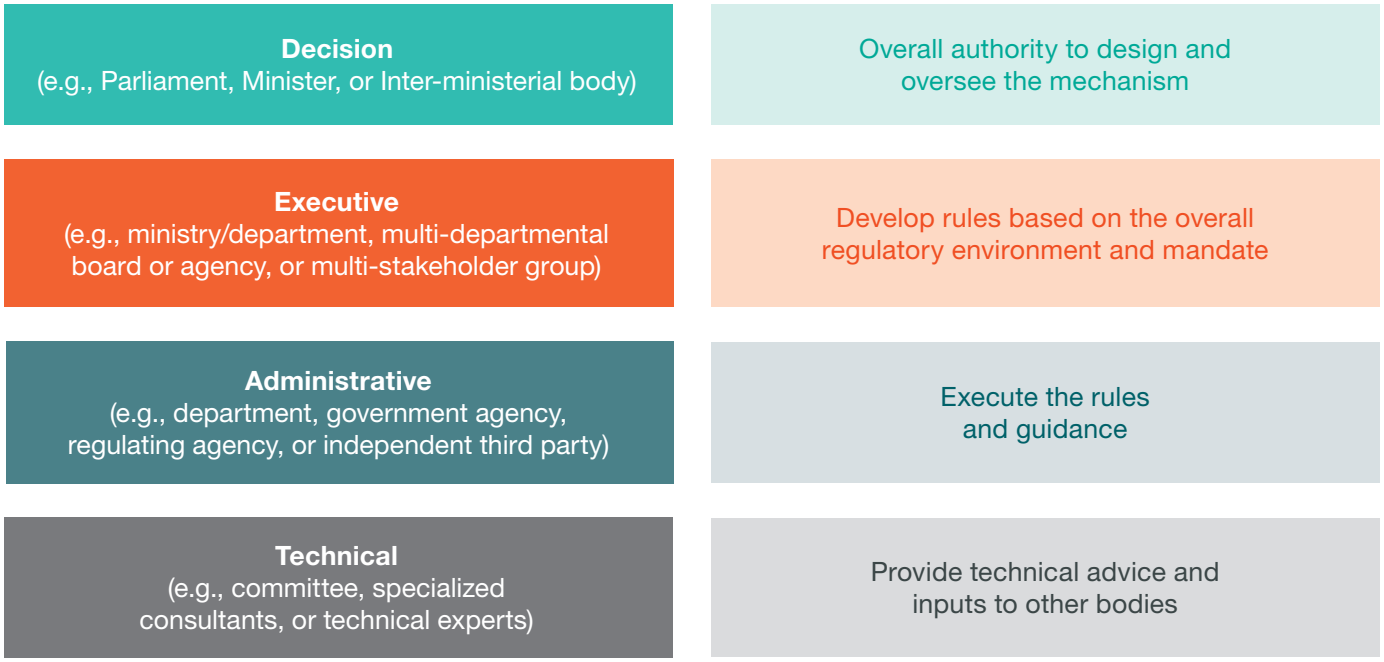
These functions focus on the macro decisions for the crediting mechanism, like the coverage and level of reliance on existing crediting mechanisms. As these decisions determine the general policy direction, they are generally undertaken by high-level political decision-makers, like a government minister or agency chief executives. These functions will likely draw on existing governance arrangements, including those established by existing constitutional and legal frameworks, including those for climate policy.

Figure 10-1. Governance functions for crediting mechanisms



Source: Adapted from Spalding-Fecher et al. 2017, 2018.

Figure 10-2. Key institutions in domestic crediting mechanisms



These functions will generally establish the high-level framework for the crediting mechanism, including policy objectives, any necessary primary legislation, and rules for compliance and enforcement (such as penalties for noncompliance). The responsible institution may also be required to make final decisions regarding scheduled reviews of the crediting mechanism and implementing any broad design adjustments (e.g., in scope) to the mechanism. The responsible institution will generally allocate subsidiary functions to other executive or administrative bodies. Figure 10-2 provides an indication of the types of institutions required to deliver all the functional requirements.

Rulemaking

Rulemaking functions focus on all the secondary rules and regulations needed to flesh out the crediting mechanism in line with the high-level policy direction. This can range from developing methodologies under a top-down approach; to approving methodologies, standards, and guidelines for the crediting mechanism; to reviewing decisions by the administrator and addressing any grievances and appeals. For the latter, this body will need to have the ability to properly enforce its decisions. Though some understanding of the sectors covered by the crediting mechanism and a familiarity with carbon pricing may be needed here, the responsible institution(s) will often draw on the technical and policy skills of existing institutions (such as those in existing government departments). Though not covered in this guide, if policymakers are considering linking, for instance through Article 6 of the Paris Agreement or through the Carbon Offsetting and Reduction Scheme for International Aviation, the institutions responsible for rulemaking need to be aware of the international policy frameworks being established to ensure the details of the crediting mechanism are consistent with international rules and requirements.

Implementation

A focus on implementation ensures that the rules and regulations of the crediting mechanism are adhered to, as well as overseeing the mechanism's day-to-day administration. These functions are generally carried out at a lower administrative level and will require greater technical capacity to understand the application of the crediting rules and sector- or technology-specific issues, in order to properly review and register projects. A specialized agency could, for instance, be established or adapted within an agency, department, or ministry to exercise these functions. Other functions include certifying and issuing credits, accrediting auditors, and managing the registry.

Technical advisory

This refers to the technical capabilities that are not traditionally held within the government or can benefit from being delivered by independent experts. This will consist of experts with the appropriate sector, business, technical, or legal expertise needed to help ensure the rules and general direction of the crediting mechanism are robust, tailored to local conditions, and implemented correctly. Technical advice could be sourced from committees set up to serve other climate policy functions, such as those focusing on emissions reduction target progress tracking or United Nations Framework Convention on Climate Change reporting. Alternatively, there may be bodies serving sectoral functions—for instance, advising on energy policy development—that may have relevant insights for the crediting mechanism. Depending on the coverage and complexity of the mechanism, policymakers may need to draw on experts across several departments, as well as consider the involvement of external experts, like academics or consultants. This function can interact with multiple aspects of the crediting mechanism, such as reviewing or developing methodologies, standards, guidelines, and default factors.

Functions for key institutions

There is a range of options for different institutions to provide the necessary functions to successfully govern and administer a crediting mechanism. Ultimately, the choice of specific institutions delivering those functions is dependent on jurisdiction-specific circumstances, including the ability and desire to rely on existing institutions and the level of reliance on existing crediting mechanisms. Figure 10-3 illustrates the flexibility in the range of functions covered by specific institutions.

10.1.2 Stakeholder engagement in project approval

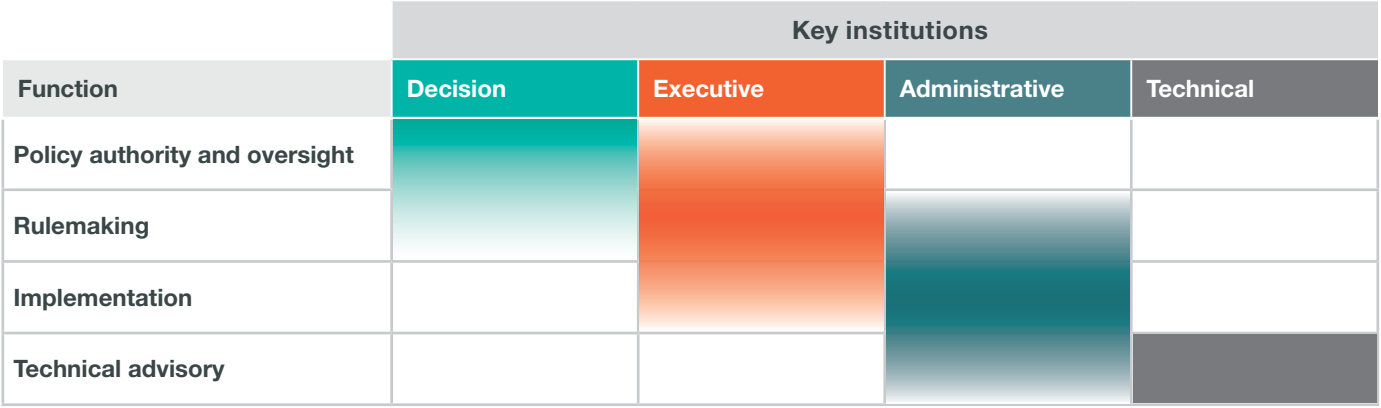
Policymakers must also consider the roles, involvement, and inclusion of other stakeholders. Certain functions may be outsourced to overcome capacity or knowledge gaps in government. Over time, as these gaps close, governments can reconsider whether they want to move these functions in-house. While no existing crediting mechanisms adopt this outsourcing approach, other carbon pricing instruments have. For example, partners in the Regional Greenhouse Gas Initiative, an ETS consisting of 10 (soon to be 11) states in the United States, contract third-party private companies to monitor the market, track allowances, run the auctioning platform, and register offsets.

Stakeholder involvement must also be considered as part of policy design and the project cycle. As discussed in Chapter 2, involving stakeholders as part of policy design (for example, during comment periods and hearings) can help ensure a transparent and robust crediting mechanism. Having these other voices feed into the technical advisory functions may be helpful and a means of establishing ongoing stakeholder engagement on the mechanism. In addition, it is possible to incorporate stakeholder input as part of the project approval process, as discussed in Chapter 8. While this is not common in regional, national, and subnational crediting mechanisms (in most cases because they would duplicate existing requirements in national law on public participation), international and independent crediting mechanisms often include stakeholder consultation as part of the project approval process. Multi-jurisdictional crediting mechanisms include this type of engagement to

- draw out technical knowledge that can inform project design to ensure implementation success,
- identify and reduce risks and build community acceptance, and
- ensure that projects meet social and environmental safeguards and promote development benefits.

However, as noted in Chapter 8, this adds time and cost to project development, and should only be included where the jurisdiction does not already have a robust framework for approving new investment projects.

Figure 10-3. Example of range of functions for key institutions



10.2 ENFORCEMENT, LIABILITY, AND APPEALS

Like other carbon pricing instruments, a crediting mechanism needs to ensure the administrator has sufficient powers to enforce rules and obligations and impose any required penalties. The reporting and validation/verification steps in the project cycle (see Chapter 8), as well as the use of auditors (see Chapter 9) are core components of the enforcement and compliance regime. In some cases, penalties may be required to promote compliance. For instance, in cases of non-permanence (see Section 5.5) or over-crediting (see below) or where auditors are performing poorly (see Section 9.4). Penalties can range from naming-and-shaming (e.g., publishing the name of noncompliant entities), to deregistration (e.g., revoking auditor accreditation or a project's eligibility status), or to fines or more serious criminal charges (e.g., in cases of fraud). The exact nature of these penalties should be sufficiently strict to incentivize compliance but not overly punitive to deter participation.

A related governance aspect is how policymakers elect to manage the financial and legal implications of a crediting mechanism. Liability needs to be assigned for both the quality and the quantity of the credits (note: liability in the case of emissions removals is addressed in Chapter 5). Liability can be attached to sellers, buyers, the program, or a combination approach. This will be important in cases where credits are found to be invalid or over-crediting occurs. To correct these cases, policymakers generally require credits to be canceled or revoked, or mandate the retirement of additional credits. The possibility of credits being revoked or invalidated should also force low-quality credits out of the market.

10.2.1 Assignment of liability

In terms of potential liability, the most common types are for (1) over-crediting, where project proponents received more credits than the program's requirements and methodologies allots them; (2) double issuance (also addressed in Chapter 5); and (3) noncompliance, where projects may have violated other legislation (e.g., health and safety, air quality permits). All these can result in issued carbon credits becoming invalid.[90]

Ultimately, all the policy design elements discussed in the preceding chapters are intended to promote environmental integrity and reduce the risk of invalidation. With this in mind, the risk of invalidation is relatively low. In California, for instance, only 0.3 percent of credits issued have been invalidated.[91]

Given the multiple actors involved in an invalidation situation, it can be challenging to assign responsibility for mistakes. To illustrate this, consider the following scenario: A proponent of a mitigation activity overestimates emissions reductions. An auditor reviews the calculations but fails to catch the mistake. Program administrators also do not notice the error when reviewing the auditor's verification report, and issue credits based on the faulty estimation. A buyer conducts due diligence under the assumption that the proponent, auditor, and administrators executed their duties appropriately and also fails to identify the error, and purchases and retires the credits. The original proponent committed the error. The auditor did not meet the obligation of identifying it. The program administrator bears ultimate responsibility for issuing credits. The credit buyer's due diligence did not identify the error, either.

Clear policies are needed to assign responsibility for errors, omissions, accidents, or fraud. This allows disputes to be resolved efficiently, and all parties understand their risks and responsibilities. Programs can select seller, buyer, or program liability. A tiered approach to such policies can also be used. Policymakers need to decide whether the credit seller or buyer or the jurisdiction is better equipped to evaluate the credit quality and deal with potential invalidation.

Seller liability is the most common among existing crediting mechanisms to date. Seller liability assigns responsibility for the mitigation activity to the first recipient of the credits: the project proponent. If, for example, a case of over-issuance occurs, then the project proponent is responsible for obtaining and retiring extra credits equal to the over-issued credits in question. This compensates for the over-issuance and safeguards the environmental integrity of any credits that have already been issued. In most mechanisms, the only exception is cases of gross negligence in verification activities, at which time the auditors are at fault.

The primary advantage of seller liability is that it effectively means that, from a buyer's perspective, any credit issued is free from risk. This can facilitate a more liquid market, supporting secondary transactions and reducing transaction costs. A more liquid market can help channel greater investment into mitigation

[90] As discussed in Chapter 5, a reversal of an emissions removal is generally not grounds for invalidation.

[91] For a livestock project in violation of health and safety regulations in Michigan, a livestock project in Wisconsin which was not in compliance with pollutant discharge permit requirements, and an ozone depleting substances project, which was in breach of a federal operating permit. For more see https://ww2.arb.ca.gov/sites/default/files/classic//cc/capandtrade/offsets/final.determination.svd.01.30.20.pdf, https://ww2.arb.ca.gov/sites/default/files/2020-09/Final_Determination_Central_Sands_Dairy_Offset_Investigation.pdf, and https://ww2.arb.ca.gov/sites/default/files/classic//cc/capandtrade/offsets/ods_final_determination.pdf respectively.

Box 10-1. Buyer liability: California

Policymakers in California viewed carbon credits primarily as regulatory compliance instruments and facilitating market liquidity was not identified as a major priority. California's ETS allows credits to be generated anywhere in the United States, but it would be challenging to have regulatory oversight outside its jurisdiction. By placing the liability on regulated entities (that may use credits for compliance), California could still have offsets outside of the state, ensuring sufficient supply, while having regulatory oversight over the companies under the California ETS.

Contrary to some early expectations, California has a fairly robust market for carbon credits. Credit use has actually increased under the California ETS, with regulated entities using offsets to meet 6.4 percent of their compliance obligation from 2015 to 2017 (second compliance period), compared to 4.5 percent from 2013 to 2014.[92] Various players have stepped in to provide insurance guarantees for certain credits, which protects buyers against invalidation. A tiered market for credits has developed, where "gold" credits, which have guarantees against revocation, sell at a higher price than credits that still carry risk.

activities. The disadvantage as compared to buyer liability is that it puts more onus on proponents, auditors, and program administrators to ensure the validity of credits. Seller liability reduces the risk to everyone else, and as a result credit prices may be higher than under a buyer liability approach.

Buyer liability assigns responsibility to any party that holds credits at the time an over-issuance is identified. Program administrators cancel affected credits from any accounts that hold the credits. If affected credits were retired against a compliance obligation, then the entity that retired the credits would be responsible for replacing them. Depending on the compliance due dates, the amount of time needed for replacement can also mean buyers will have to pay a higher price for replacement credits. This is the approach adopted in Alberta and California (see Box 10-1 on California).

While buyer liability theoretically encourages buyers to conduct due diligence procedures, it can be challenging for buyers to do this, as the information necessary to undertake such an assessment is not always available. Buyer liability also encourages buyers to insert key contracting provisions with sellers that effectively reassign potential liability. The disadvantage of this approach is that it can dampen demand by creating higher transaction costs, as buyers must implement stronger review mechanisms or negotiate legal agreements that protect them from revocation risk. This may in turn reduce demand in the secondary market, as agreements must be reassigned to successive buyers. At the same time, buyer liability can result in greater market transparency about the relative quality of credits, with credits selling at different prices based on differences in the perceived risks associated with certain mitigation activities (or types of mitigation activities).

Program liability assigns liability to the crediting mechanism itself; however, no crediting mechanism currently uses this approach. In effect, this means the program administrator guarantees the validity of credits and, if an over-issuance occurs, agrees to compensate for the over-issuance to maintain environmental integrity. To make good on this commitment, policymakers could establish a "buffer" account of credits used to compensate for over-issuance or hold professional liability insurance that would pay the mechanism to obtain and retire compensating credits.

The advantage of program liability is that it relieves program participants from any direct risk, which in turn could facilitate a more robust credit market. The disadvantage is that it imposes costs—in the form of either a buffer set-aside requirement or additional program fees needed to pay for insurance—that would reduce revenues for mitigation activity proponents and/or raise costs for credit buyers.

A tiered approach could also be adopted that uses a combination of seller, buyer, and/or program liability. In this approach seller liability might generally apply but other models would apply under specific conditions. The Québec Offset System adopts a tiered approach, whereby seller liability is applied but the government provides additional protections to guarantee carbon credits and ensure buyers bear no risk. The government protections would only be used in situations where the project proponent was not able to satisfy its liability obligations (e.g., the project proponent no longer exists). The Québec Government has established an Environmental Integrity Account to fund any future liabilities, which is funded by the automatic withholding of 3 percent of all offset credits issued. The government has not yet had to replace any credits.

[92] Sutter 2020.

The advantage of a tiered approach is that it could more fairly balance responsibilities and avoid some potential transaction costs associated with negotiating risk allocation in legal contracts. For example, project proponents would not necessarily need to negotiate with auditors about who bears responsibility for any ultimate errors or omissions. A tiered approach could also reduce ambiguity in determining liability and reduce risk to buyers. The disadvantage is that it requires policymakers to describe in detail all the possible scenarios for risk and to clearly assign responsibilities under each. Furthermore, program administrators would need to apply and interpret these rules whenever over-issuance or invalidation occurs and disputes arise.

10.2.2 Establishing an appeals process

Policymakers will need to outline an appeals process and clearly set out which decisions are subject to appeal and which are not. Elements of the appeals process include

- How the overall appeals process will work, including procedures for submitting an appeal, provision of legal standing (who can submit an appeal and on whose behalf), permitted justifications for appeals (appeals based on misinterpretation or misapplication of methodology requirements are typically allowed), and the rules for accepting or rejecting them.
- The parties involved in hearing the appeal. This typically includes program staff and/or the program's governing authority.
- Time frames for the appeals process. The appeals process should have specific timelines tied to it so that project applicants can build the time frame into project development planning.

10.3 REGISTRY INFRASTRUCTURE

Operating a crediting mechanism requires the establishment of basic administrative systems, including information systems needed to track implementation and verification of mitigation activities; providing for public transparency; and creating, transferring, and retiring carbon credits. The IT infrastructure needed to perform these functions is commonly referred to as a "registry." The PMR guidance document Emissions Trading Registries: Guidance on Regulation, Development, and Administration covers the design options and requirements of registry systems in detail. This section provides a summary of the main functions required of crediting mechanism registries, along with key design choices and requirements.

Registry systems for crediting mechanisms serve three interrelated purposes:

- to promote transparency by providing publicly accessible information on mitigation activities involved in the program;
- to facilitate the issuance, transfer, and use of uniquely identifiable credits that are clearly linked to, and convey a claim to emissions reductions or removals achieved by, registered mitigation activities; and
- to help prevent double counting and double issuance of emissions reductions and removals. Linking to other registries can also reduce the risk of double issuance and use.

These three functions are essential for ensuring credits are tradable emission-reduction assets that can be used in conjunction with a carbon tax or an ETS—or in carbon markets more generally. To achieve these goals, crediting mechanism registries generally have two main components:

- a credit tracking registry system, used to issue, transfer, and cancel credits; and
- a mitigation activity database system, used to record and make publicly available information on individual mitigation activities involved in the program.

These two components may be maintained and administered separately, but together are commonly referred to as the program registry. If administrators have already established (or will establish) an emission trading registry (for example, for a domestic ETS), this may also serve as a credit tracking system for a domestic crediting mechanism. In this case, the only additional system needed is a mitigation activity database. However, administrators should make sure that the emissions trading registry has all the necessary functionality to meet the crediting mechanism requirements, including any tracking and information requirements needed to avoid double counting of emissions reductions or removals.

10.3.1 Credit tracking functions

A credit tracking system is essential for creating a tradable carbon asset and (related to this) ensuring an exclusive claim to emissions reductions by avoiding double counting (see Section 5). At a minimum, a crediting mechanism's registry should[93]

[93] For further discussion of these requirements and their relation to avoiding double counting, see Centrum Wiskunde & Informatica, Meridian Institute, and Stockholm Environment Institute 2019 and Schneider, Broekhoff et al. 2019.

- be capable of securely and transparently effectuating the issuance, transfer, and cancellation of carbon credits;
- allow the tagging of each credit with a unique identifier (typically a serial number) so that
  - each credit is clearly associated with a specific issuance and vintage related to quantified and verified emissions reductions or removals and
  - each credit can be connected to other information relevant for potential buyers or needed to avoid double counting;
- make relevant information on credits available to registry users and the public (e.g., details about the projects to which they were issued); and
- incorporate credit cancellation procedures that ensure that cancellation is clearly indicated, irreversible, and unambiguously designated for an intended purpose, such as
  - meeting an entity's offsetting requirement under a domestic carbon tax, ETS, or other regulatory requirements;
  - achieving voluntary offsetting goals;
  - compensating for excess issuance;
  - addressing non-permanence; or
  - removal from the registry for the purpose of re-issuance by another mechanism or entity.

10.3.2 Mitigation activity database functions

A mitigation activity database is a centralized repository of information on all mitigation activities reporting under the crediting mechanism. Such a database is essential for making information available to participants about mitigation activities and their status. Information on each project's stage in the project cycle and any credits issued should also be made available. The project database can also be used to manage the project cycle, as project proponents should be reporting progress in the system. Finally, a project database can serve an important function for outside stakeholders, including voluntary credit buyers. At a minimum it can provide them information about the quantity and types of activities that are registered with the mechanism and allow them to identify projects that align with their preferences. If a buyer had a preference to support projects in a specific geographic region or of a specific type, like renewables or forestry projects, this information can be easily identified in the registry. It is good practice to also make basic documentation, like project design documents and verification reports, available to outside stakeholders.

The project database should use the same unique identifier for each project used in the credit tracking system. At a minimum, a project database should contain the following information and documentation:

- a description of the project, including information on the mitigation activity involved;
- the emission sources, sinks, and greenhouse gases included in the calculation of the project's emissions reductions or removals, along with the location(s) of all relevant sources and sinks;
- the geographic location where the project is implemented;
- any other information needed to unambiguously identify the project; and
- details of the project proponents and/or developers.

It is good practice for crediting mechanisms to require this information from project proponents prior to project registration and to make it publicly available, generally on the mechanism's website.

The PMR's Emissions Trading Registries: Guidance on Regulation, Development, and Administration identifies three primary design decisions for registries: deciding on a legal framework; establishing an institutional framework and administrative structure; and deciding on IT system procurement and development.

Carbon credits issued by a crediting mechanism and tracked in a registry will have financial value corresponding to their eligibility for meeting regulatory compliance obligations for fulfilling market demand. One function of a registry is to sustain this value, in part by legally defining a credit as an asset, including how it may be held, transferred, and used. Basic options include

- **Supporting basic crediting mechanism functions (register model)**. A register can support basic crediting mechanism functions (such as transfer and use of credits for regulatory compliance) but lacks the full functionality of a transaction registry. A standalone crediting mechanism may find a register approach sufficient without having to legally address, for example, aspects of financial regulation and criminal enforcement.
- **Supporting broader market functions (transaction registry model)**. A transaction registry has a legal framework that fully supports consideration of credits as financial assets. In most cases,

crediting mechanisms require a legal framework that incorporates at least some elements of a transaction registry—especially if policymakers envision a robust market with trading among different types of account holders. A transaction registry model is most appropriate, for example, if a crediting mechanism is linked to a domestic ETS.

Other design decisions related to a registry's legal framework include account holder classifications and specifications. Options include

- **Defining accounts for basic regulatory functions**. A crediting mechanism designed primarily as a tool for regulatory compliance might distinguish between two types of accounts: those for project proponents (into which credits are issued), and those for regulated entities (from which credits are retired to meet compliance obligations).

- **Defining multiple account types to support market functionality**. A full transaction registry might allow for additional account types, including accounts for intermediary buyers (traders/brokers), voluntary buyer accounts, and even observer accounts (which external stakeholders use to access market data within the registry system). In a transaction registry, it is important to implement know your client procedures to ensure that entities with accounts are legitimate and to safeguard against fraud. This can add to administrative costs.

Further, there is the question of accessibility. In general, registries should be publicly accessible to maintain transparency to support market and environmental integrity. The legal framework for a registry should define the terms under which different types of data and information may be accessed (in both the credit tracking and project database components of a registry).

10.3.3 Registry administration

Administrators must oversee and monitor registry activity. Required administrative structures and procedures will depend on the registry's legal framework, the governance and administrative structure for the crediting mechanism as a whole, and cost considerations. A primary consideration is deciding who performs day-to-day registry operation, including credit issuance, authorizing transfers, approving retirements, and implementing cancellations. Some mechanisms handle all of these functions in-house—that is, assign them to administrators. Others outsource some or all of these functions. Those that use partial outsourcing typically delegate subsidiary functions like approving the transfer of credits, while administrators perform primary functions like project registration, or credit issuance and retirement. Outsourcing may involve independent registry service providers. Alberta's Emission Offset Registry is operated, for instance, by the Canadian Standards Association in coordination with the Alberta government. Alternatively, policymakers can rely on existing mechanisms to oversee registry operations (see Section 2.1.5). Outsourcing can save on costs but removing program staff from day-to-day oversight could make it more difficult to monitor registry functions and identify problems as they arise.

Another primary consideration is whether a fee should be charged for registry use and what the fee structure should be for different users. Typically, crediting mechanisms charge fees for establishing and maintaining registry accounts, as well as for issuing credits (often applying a standard charge for each credit issued). The fee structure will depend on overall administrative costs, funding sources, and overall financial viability.

10.3.4 IT procurement and development

Registries require various IT systems to operate. There is a range of options for establishing the technical infrastructure of a registry and providing registry services. Key decisions include

- **Whether to develop, adapt, share, or outsource registry information systems**. Different options will have different advantages and disadvantages in terms of cost, degree of control, and customization to a domestic crediting mechanism's needs and requirements.

- **Anticipating needs for linking and interoperability**. Interoperability of registry software with the systems of other crediting, carbon taxes, or ETSs may be desired if linkages with those programs are expected.

- **Defining functional specifications**. These can include, among others, specifications for the functionality of different account types; implementation of credit issuance, transfer, cancellation, and retirement actions; and various accessibility options.

- **Technical specifications**. These include requirements for the technology infrastructure needed to support registry functions.

Establishing robust IT systems early and in conjunction with developing the design of the crediting mechanism can help streamline implementation and promote the overall success of the crediting mechanism.

ANNEX I: TYPES OF CREDITING APPROACHES

There are various types of carbon crediting approaches. They work at essentially different scales and scopes of aggregation and range from individual project-based crediting to sector or policy crediting. Table A-1 provides a summary of the four main types of crediting approaches, including examples of each type. Strengths are marked in green and weaknesses are in red.

Table A-1. Types of crediting approaches

	Objective	Methodology	Strengths/weaknesses	Examples
Project-based	Support individual investment projects	Baselines and monitoring, reporting, and verification (MRV) based on technology assessment	Relative simplicity Allows for pure private sector transactions Limited opportunities to scale up	Clean Development Mechanism (CDM) Australia Emissions Reduction Fund California Compliance Offset Program American Carbon Registry
Example: *Capturing the landfill gas that would have been vented into the atmosphere and flaring the methane, which then reduces methane emissions to the atmosphere. If there is no regulatory requirement to flare the gas and no other source of revenue other than carbon credits, then the most likely alternative would be to continue venting the gas.*				
Programmatic	Support a larger number of similar projects, often small and micro scale, mostly by not requiring identification upfront of specific locations	Baselines and MRV based on technology assessment Often associated with an incentive program	Relative simplicity Allows scaling up through replication Allows reaching small and micro scale activities	Programmatic CDM Standardized crediting framework
Example: *Developing a program for distributing solar cookstoves to families in a region before knowing how many cookstoves will be distributed and/or where they will be used. Emissions reductions result from the decreased burning of biomass in conventional firewood stoves. Estimates of emissions reductions are often based on default use rates, and sampling is mostly used for monitoring. The program additionality is based on the argument that solar cookers are more expensive than alternatives and would therefore not be accessible to low-income families in the region in the absence of a similar incentive to the one provided by the program.*				
Policy	Support a policy intervention (e.g., energy subsidy removal, carbon pricing)	Baselines and MRV based on economic modeling	Large scale High transformative effect High complexity High preparation costs Limited role of private sector	Transformational Carbon Asset Facility
Example: *Supporting fossil fuel consumption subsidy removal (for example, eliminating gasoline pump-price subsidies for consumers) through a policy package that includes targeted alternatives to low-income families who are hurt by the removal of that subsidy. Emissions reductions result from comparing emissions in the subsidy-supported sector before and after the removal of the subsidy.*				
Sectoral/ jurisdictional	Support overachievement of sectoral/ jurisdictional mitigation benchmarks/targets	Sectoral/jurisdictional baseline Crediting only at aggregate level	Large scale Low risk of leakage and perverse incentives Low incentive for private sector participation High delivery risk	Jurisdictional and nested reduced emissions from deforestation and land degradation
Example: *setting a target at jurisdictional level for the carbon sequestration resulting from the maintenance and increase of carbon stocks (e.g., protecting or restoring an existing native forest).*				

Source: Adapted from World Bank n.d.

ANNEX II: SCALED-UP CREDITING

Scaled-up crediting mechanisms focus on a large number of projects or even whole sectors of a country's economy instead of individual projects.[94] Examples of scaled-up crediting include policy crediting, sectoral crediting, and jurisdictional crediting. Key features that distinguish scaled-up approaches from project-based or programmatic crediting include the following:

- Baseline emissions are established on a policy, sectoral, or jurisdictional level. Credits are issued or recognized based on aggregate reductions achieved across all included greenhouse gas (GHG) sources.
- Actions that reduce GHG emissions can be diverse, reflecting the actions of multiple entities responding to incentives, rather than a single implementing entity.
- Government bodies instead of single-project proponents may receive credits.

Scaled-up crediting is in part a response to the limitations of project-based crediting. While the latter supports discrete projects that can easily be predicated on the will of a single agent, scaled-up crediting can support policy implementation and sectoral reform.

Project-based crediting has often been criticized for rewarding the best performers without taking into consideration the evolution of an entire sector or industry. In other words, a program could be awarding credits to a facility in relation to a project, but the same operator of that facility could elsewhere, in a different facility, increase its emissions without the project accounting reflecting this harm.

By supporting both policy and programmatic levels, scaled-up crediting holds the potential to support transformative change and increase in climate ambition (see Box A-1).

At the same time, scaled-up crediting involves interventions that are usually more complex than single projects. Given the focus of the assessment is the policymaker, using the monitoring, reporting, and verification (MRV) protocols of project-based methodologies is generally impossible. Designing MRV protocols for sector-wide interventions is a significantly different challenge than project-level MRV and usually requires a different set of tools and skills, including economic modeling and policy analysis.

Scaling-up crediting also may not be an option for domestic crediting approaches but rather for international crediting. It may well require levels of carbon or climate finance that domestic sources cannot generate. Given that limitation, interest in crediting at sector or policy level will typically come both from governments that wish to increase more effectively their purchase of credits and generate more transformational, systemic change and from initiatives that seek to make carbon crediting a more effective tool in a more carbon-constrained world. See Box A-1 for examples.

[94] Partnership for Market Readiness 2017.

Box A-1. Example of piloting scaled-up crediting

Transformative Carbon Asset Facility

Transformative Carbon Asset Facility is an innovative facility that supports ambitious policy or sectoral mitigation programs in developing countries. Larger programs create greater momentum for sustainable development and economy-wide transformation, as well as low-carbon development. By mobilizing international climate finance for results-based payments and transfers of mitigation outcomes under Article 6 of the Paris Agreement, the facility supports middle-income countries in scaling up their climate commitments and accelerating socioeconomic growth. Working with national policymakers, it helps shape domestic environmental, energy, and climate change policy to reach meaningful scale and create a lasting, transformative social impact. Transformative Carbon Asset Facility also develops knowledge products to inform the international process for Article 6 and build capacity for the developing countries to integrate crediting and market mechanism into its NDC implementation strategy.[a]

Standardized Crediting Framework pilots

The Standardized Crediting Framework is a new approach to crediting emissions reductions owned and managed by the potential transferring country, which allows for more comprehensive geographic coverage, flexibility, lower transaction costs, and increased private sector engagement. The framework is important for several reasons. First, it proposes a systematic approach to quantifying carbon credits. Second, simplification and standardization improve the transparency of the carbon market and reduce transaction costs. Finally, country-driven frameworks like the Standardized Carbon Framework support capacity building of transferring country institutions, improve coordination among domestic entities, and help align climate change policy goals with sectoral ones.[b]

[a] For more information, see https://tcafwb.org/

[b] For more information, see https://www.ci-dev.org/knowledge-center/A%20Program%20Protocol%20for%20the%20Standardized%20Crediting%20Framework%20Pilot%20in%20Rwanda.

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