THE ROLE OF FINANCE MINISTRIES IN **CARBON MARKETS**

MEF Climate Change PLATFORM

Ministries of Economy and Finance

IDB

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About the Platform

The MEF Climate Change Platform is a unique regional collaboration network between governments that is transforming the way Latin America and the Caribbean address climate challenges through fiscal policy, turning them into opportunities for economic development. Established in 2022 by mandate of the IDB Governors and led by the Ministries of Economy and Finance (MEF), it brings together 26 borrowing countries around a shared vision of sustainable financing. Through collective intelligence, it generates specialized knowledge and promotes the implementation of practical climate fiscal policy solutions, strengthening the competitiveness and resilience of the region's economies. The Platform is funded by the German Government's International Climate Initiative (IKI).

Glossary

Anthropogenic	Resulting from or produced by human activities
Carbon dioxide removal (CDR)	Anthropogenic activities removing CO_2 from the atmosphere and durably storing it in geological, terrestrial, or ocean reservoirs, or in products. It includes existing and potential anthropogenic enhancement of biological or geochemical sinks and direct air capture and storage but excludes natural CO_2 uptake not directly caused by human activities.
Carbon sequestration	The process of storing carbon in a carbon pool (any part of the climate system with the capacity to store or accumulate carbon).
CO_2 equivalent (CO_2 -eq) emission	The amount of carbon dioxide (CO_2) emission that would cause the same integrated radiative forcing or temperature change, over a given time horizon, as an emitted amount of a greenhouse gas (GHG) or a mixture of GHGs.
Decarbonization	The process by which countries, individuals or other entities aim to achieve zero fossil carbon existence. Typically refers to a reduction of the carbon emissions associated with electricity, industry and transport.
Emission avoidance	Reducing GHG emissions by avoiding the use of an emissions-producing service entirely, shifting to the lowest-emission mode of providing the service, and/or improving the technologies and systems for providing the service in ways that reduce emissions.
Greenhouse gas (GHG)	Greenhouse gases are those gaseous constituents of the atmosphere, both natural and anthropogenic (resulting from or produced by human activities), that absorb and emit radiation at specific wavelengths within the spectrum of terrestrial radiation emitted by the Earth's surface, the atmosphere itself and by clouds. This property causes the greenhouse effect. Water vapor (H_2O), carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4) and ozone (O_3) are the primary GHGs in the Earth's atmosphere.
Carbon dioxide capture and storage (CCS)	A process in which a relatively pure stream of carbon dioxide (CO_2) from industrial and energy-related sources is separated (captured), conditioned, compressed and transported to a storage location for long-term isolation from the atmosphere. Sometimes referred to as Carbon Capture and Storage.
GHG removal	Withdrawal of a GHG and/or a precursor from the atmosphere by a sink.
Mitigation (of climate change)	A human intervention to reduce emissions or enhance the sinks of GHG.
Net zero CO_2 emissions	Net zero carbon dioxide (CO_2) emissions are achieved when anthropogenic CO_2 emissions are balanced globally by anthropogenic CO_2 removals over a specified period.
Sink	It refers to any process, activity or mechanism which removes a GHG, an aerosol, or a precursor of a greenhouse from the atmosphere.

Source. IPCC Glossary Search (https://apps.ipcc.ch/glossary/).

Use of Terms

Readers will find three key terms that relate to GHG emissions: emissions, GHG, and carbon emissions. For simplicity and practicality, these are sometimes used interchangeably, though technically there are specific differences between them. According to the **United Nations Framework Convention on Climate Change** (UNFCCC), "emissions" means the release of GHG and/or its precursors into the atmosphere over a specified area and time period. In general terms, GHG refers to those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation. In this sense, GHG emissions encompass a set of gases contributing to global warming, including carbon dioxide (CO_2), methane, and nitrous oxide. Regarding carbon emissions, the specific reference is to CO_2 emissions, whereas CO_2 eq emissions is a metric used to provide a standardized measure that expresses the global warming potential of all GHGs in terms of CO_2 . This metric allows for easier comparison and aggregation of different GHGs.

According to the IPCC, "mitigation" involves human intervention to reduce GHG emissions or enhance the GHG sinks. Throughout the document, mitigation is used as an equivalent to the concepts of GHG capture, reduction, avoidance, and removal. Although not all disposal sources are equivalent, especially in terms of durability, for the purposes of simplicity in this document the terms will be used as equivalent. The document aims to analyze the institutional framework of carbon markets, in particular the role played by finance ministries, and the use of these concepts as synonyms does not alter the conclusions of the study.

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List of Acronyms

ACR	American Carbon Registry
LAC	Latin America and the Caribbean
NDBs	National Development Banks
CARB	California Air Resources Board
CBEs	Carbon emission certificates
UNFCCC	United Nations Framework Convention on Climate Change
COP	Conference of the Parties
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
ER	Emissions reductions
EPA	Environmental Protection Authority (New Zealand)
ETS	Emissions Trading System
EU ETS	European Union Emissions Trading System
GHG	Greenhouse gas
GIR	GHG Inventory and Research Center (GIR)
GST	Goods and services tax
IPCC	Intergovernmental Panel on Climate Change
ITMO	Internationally transferred mitigation outcomes
VAT	Value-added tax
KETS	South Korea's Emissions Trading Scheme
MRV	Monitoring, reporting, and verification
NDC	Nationally Determined Contribution
NZ ETS	New Zealand Emissions Trading Scheme
NGO	Non-governmental organizations
RGGI	Regional Greenhouse Gas Initiative
SBCE	Brazilian GHG Emission Trading System
UK ETS	United Kingdom Emissions Trading Schemes
VCS	Verified Carbon Standard

Executive Summary

Carbon markets are gaining prominence in Latin America and the Caribbean as tools to help countries reach their climate goals. Originally conceived primarily as mechanisms to reduce greenhouse gas (GHG) emissions and promote green technologies, these instruments are now garnering increased attention for their potential to mobilize climate finance and generate government revenue. This study, prepared by the Regional Climate Change Platform of Economy and Finance Ministries of Latin America and the Caribbean, provides a comprehensive analysis of the institutional roles these ministries can and should play in the design and implementation of carbon markets.

The study's introduction explains what carbon markets are, what is needed for decarbonization goals, and how these markets can contribute. **Section 1** elaborates on the distinctions between various types of carbon markets, highlighting key characteristics to be considered when designing and implementing both regulated and voluntary markets. Additionally, it touches on the legal nature of carbon credits, integrity issues, and discusses the implications of the adoption and regulation of Article 6 of the Paris Agreement.

Section 2 explores the intricacies of carbon market design, detailing the essential steps involved in issuing carbon credits or emission permits. **Section 3** highlights the key institutional actors engaged at each stage of market development, placing special emphasis on the critical role of finance ministries, and presenting case studies to illustrate their involvement and impact.

Section 4 summarizes the roles finance ministries can play in carbon markets, both credits and permits. Survey results point to the need to enhance both institutional capacity and human resources qualification to effectively implement these policies. Successful carbon market implementation may require strong inter-ministerial coordination, particularly between finance and environmental ministries, to a comprehensive policy design which incorporates both economic and environmental considerations. While finance ministries may have a less obvious role in this area than in the area of carbon taxes, the study shows that they do not need to be involved in every stage of market development and operation; instead, they should focus on areas where their expertise and mandate can add the most value. Key areas where finance ministries can make substantial contributions include: (i) spearheading the development of analytical tools to assess the macroeconomic effects of different carbon market designs; (ii) estimating sectoral abatement costs to inform market design and participation; (iii) determining tax treatment of carbon permits and credits and managing revenue allocation from permit auctions; (iv) integrating emissions registry data with tax systems where credits can offset tax liabilities; and (v) collaborating with financial regulators to ensure market integrity and prevent manipulation. Additionally, finance ministries play a crucial role in developing compensation mechanisms to address distributional impacts, and in coordinating policy alignment between environmental, industry, and other relevant stakeholders to ensure carbon markets harmonize with broader economic and fiscal policies.

Section 5 examines the key challenges and risks for finance ministries in their institutional engagement with carbon markets. These challenges fall into two categories: political and institutional. Political challenges emerge when addressing the distributional impacts of carbon pricing, since it creates economic "losers" who face increased costs. The institutional challenges are the fundamental capacities required for operating these markets, which include the establishment of environmental guidelines, development of skilled human resources (from lawyers to economists and technical staff), and creation of proper monitoring systems. The research also identifies specific risks that finance ministries must take into consideration in their institutional functions. These include the potential erosion over time of the initial political support for carbon markets, particularly during administrative transitions; the need to address price volatility that can create market uncertainty; and the complexities of administering compensation mechanisms, especially for low-income households.

The results of this study suggest that while finance ministries have a role to play in carbon markets, their involvement should be strategic and focused on areas aligned with their core competencies and mandates. The research provides practical guidance for finance ministries to identify and fulfill their appropriate roles in carbon market development, while acknowledging the need for flexibility in adapting to specific national contexts and institutional frameworks.

Introduction

Carbon markets are gaining interest in Latin American and the Caribbean (LAC) countries and among finance ministries, as tools to enable countries to reach climate goals. Originally thought of as solely for reducing GHG emissions and incentivizing green technologies, these instruments are now attracting attention as potential vehicles for further objectives, such as revenue generation for governments, and the mobilization of climate finance to fund the transition to an economy with a lower carbon footprint (Talbot-Wright et al., 2024).

Although carbon markets have existed since 1997 at least,[1] and the LAC region has been actively engaged with them, knowledge and experience with these markets is not widespread. Operation of these markets requires drawing up transparent and agreed-upon rules of monitoring, reporting, and verification (MRV) and trade. Non-voluntary markets also require the existence of a legal and regulatory framework, which can result in a complex institutional arrangement. In many sectors, there is still limited understanding of how public institutions should interact with carbon markets. Moreover, though there is ample literature on carbon markets, the role that ministries of finance should, or could, play in them remains mostly unclear.

This report was prepared for and by ministries of finance as part of the work of the **Regional Climate Change Platform of Economy and Finance Ministries of Latin America and the Caribbean.** It aims to assist these ministries in identifying their potential roles in the design and implementation of effective carbon markets. It analyzes the institutional setting for developing and executing carbon markets, whether voluntary or compliance based. Specifically, it examines the actors involved, their roles, and any institutional capacity weaknesses that may hinder cost-effective or politically viable market design, exploring potential misaligned incentives among actors that may conflict with ministries of finance's fiscal, debt, competitiveness, trade, and overall economic policy objectives. It identifies the institutional gaps in the design and operation of carbon markets which only finance ministries can resolve. It was prepared as a deliverable of the Platform's Working Group 2 on Incomes and Tax Incentives, and is based on a desk review, as well as on inputs, comments, and a survey conducted among the region's ministries of economy and finance.

Extensive literature exists on the design, development, and institutionality of carbon markets. This study aims to provide a concise and practical analysis on institutional aspects tailored specifically to finance ministries. The members of the Regional Climate Change Platform of Ministries of Economy and Finance expressed a need for information that could directly inform their policy decision-making in the short term. Consequently, this report focuses on identifying the possible roles and key considerations for these ministries in the design and implementation of carbon markets. By addressing their specific information needs, the report offers actionable insights to these ministries.

As is well known, GHG emissions from human activities contribute to climate change, which is already adversely impacting the welfare of people around the world and increasing the risk of further negative impacts. Economic theory identifies negative externalities as a cost imposed on society but with no reflection in market prices. Since the outset of the 20th century, economists have been proposing the creation of a price that obliges the sources of these externalities to internalize the costs they impose on others. The idea of putting a price on GHG emissions became known as

1 The 1997 Kyoto Protocol is generally considered as the framework that gave rise to carbon markets. Under the Protocol, countries must achieve their emissions reduction targets primarily through national measures. However, it offers them additional means to achieve these targets through three market-based mechanisms: (i) emissions trading, (ii) clean development mechanism, and (iii) joint implementation mechanism.
See: https://interactive.carbonbrief.org/carbon-offsets-2023/timeline.html and https://unfccc.int/kyoto_protocol.

carbon pricing, and was originally proposed to restore efficiency (i.e., the economic optimum level of pollution). However, given the difficulty in calculating this level, economists started to advocate a price on pollution as a solution to minimize the costs of reaching a target level of emissions (cost-effectiveness) and incentivize investment in research and development of new, less polluting technologies.

There are two basic ways to set a price for GHG emissions: the common route is for a regulator to set a tax per ton of CO_2 eq emitted; the other is for a regulator to create a market. Carbon markets include one market for emission permits and one for carbon credits.

In an **emission permits market**, the regulator sets a cap on the aggregate level of emissions of GHG coming from a set of sources (comprising a sector or even an economy) and issues emission permits that it allocates to the sources following different possible rules. Each permit allows (hence "allowance" is the more formal name) the source in possession to emit a unit of GHG (e.g., a ton of CO_2 e) in a given period (typically, a year). Finally, these sources have the possibility of trading the permits between themselves. In this way, the sources supply and demand of permits determine their price. In addition to setting the cap and designing a competitive market, the regulator must enforce permit holdings of the sources (to ensure that the sources do not emit more than their permit holdings allowance). Emission permits markets have several names, such as "cap and trade" systems and emissions trading schemes (ETS).[2]

In **carbon credits markets**, a carbon credit is generated when a third party certifies that it has permanently removed, mitigated or avoided a ton of CO_2 e. This credit can be bought by a source of GHG to offset its emission of one ton of CO_2 e. A market for carbon credits can be either voluntary or regulated. In the case of the former, firms buy carbon credits for commercial purposes, typically on demand from customers, investors, or strategic branding. This refers to a regulated market for carbon credits in the case of transactions driven by regulation mandating or allowing the sources of GHG emissions to offset them with carbon credits. In this latter case, the firm buys the credits to comply with a regulation or to reduce existing carbon tax liabilities, rather than for strategic reasons.

Markets for carbon permits can coexist with markets for carbon credits or be linked. In the case of the New Zealand ETS, for example, GHG sources can purchase, with some restrictions, a permit from another source or a credit from the forestry sector.

International linking of national permits or credit markets is also possible. For example, the Canadian states of Quebec and Ontario share an ETS (permits market) with California. Similarly, Union members share the European Union ETS. Moreover, international carbon credit trading is promoted under Article 6 of the Paris Agreement.

[2] There are other types of markets, such as the so-called "baseline and credit mechanism". Here, the regulator sets a baseline of emissions for sources. If sources over-comply with this baseline (i.e., emit below it), they earn credits which can be sold to sources who do not. Nevertheless, this report covers only the two types of markets described above since they are the most common and are the ones already established, or soon to be implemented, in Latin America and the Caribbean.

Carbon Taxes versus Carbon Markets

With carbon tax, the regulator sets the price of GHG emissions, while a regulated carbon market sets the maximum quantity of aggregate emissions which regulated sources are allowed to emit in a given period, leaving the market to set the price according to supply and demand. Both ways to price GHG emissions have strengths and weaknesses (Goulder and Schein, 2013).

One of the main weaknesses of carbon taxes is that to set the proper tax (the amount that would oblige the regulated firms to respond by mitigating emissions to the desired level), the regulator needs to know the sources' abatement costs.

Frequently, the ones to possess this information are the sources. The regulator can carry out estimates, but it may be too costly for these to be sufficiently precise, particularly the costs that evolve over time. If, as a result of this, authorities set the tax too high, they impose unnecessary costs on sources. Conversely, if they set the tax too low, the sources will react with higher levels of emissions than the ones aimed at. To complicate things further, sources have no incentive to reveal these costs to the regulator.

On the contrary, under a market for emission permits, a regulator does not necessarily need to know the abatement costs of the sources of GHG. Rather, it needs to set the cap of emissions over time (consistent with the country's increasing mitigation pledges included in its nationally determined contribution [NDC]) and enforce it (via the monitoring of emissions and permit holdings, and by imposing penalties for noncompliant sources).

Among the disadvantages of a carbon market over a carbon tax are the need to standardize methodologies for the issuance of emission allowances or carbon credits; potential price volatility, which creates uncertainty for businesses and other entities; and challenge of establishing the necessary institutional framework to effectively reduce emissions beyond existing levels.

How Carbon Markets Contribute to Mitigating Climate Change and What Needs to be Achieved

One premise, and a pillar of the Paris Agreement—where there is widespread agreement at the international level and in the scientific community—is that to avoid the worst consequences of climate change, the world needs to achieve net zero emissions by mid-century and substantial reductions by 2030. To achieve it, countries must promote transitions from business-as-usual economic structure to a low-carbon economy model, with the ultimate goal of complete decarbonization of the production matrix. Emission reductions and low carbon economies are often compared to decarbonization and net-zero economies, but their meanings are profoundly different:

- **Emission reductions:** the reduction of GHG emissions released into the atmosphere, which, in production, typically involves changing processes, investing in abatement technology, and the use of alternative inputs to lower the emission intensity of economic activities, without necessarily eliminating emissions entirely.

- **Decarbonization:** the systematic elimination of the carbon footprint within an economy or specific sectors, transcending mere emission reduction efforts and encompassing a comprehensive and transformative approach. The five pillars are as follows (Jaramillo and Saavedra, 2021):

  Transitioning to zero-carbon electricity production, typically achieved through large-scale adoption of renewable energy.

  Shifting toward large-scale electrification, such as widespread adoption of electric vehicles, electric heating systems, and electric cooking.

  Expanding non-motorized and public transportation.

  Reverting deforestation, substantial improvement, and extent of low-carbon agriculture practices and conserving and restoring natural carbon-rich ecosystems.

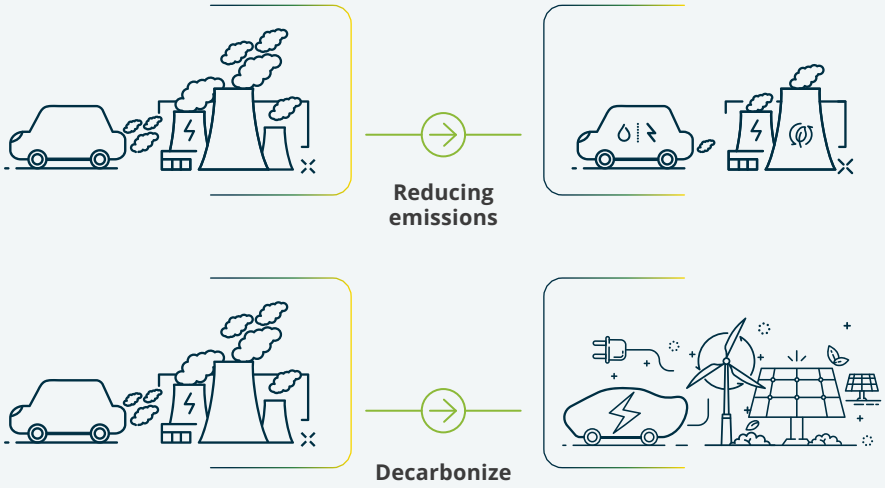
  Enhancing efficiency and minimizing waste across all sectors, with a special focus on energy and food consumption, while transitioning to less carbon-intensive industrial processes, building materials, and diets.

Emissions reductions and decarbonization have not only different meanings but also profoundly different implications. Emission reductions lead to low carbon economies, while decarbonization leads to net-zero economies with the following implications:

- A low-carbon economy has a relatively low level of GHG emissions, compared to that of a conventional economy. It involves transitioning toward cleaner energy sources, energy efficiency measures, and sustainable practices across various sectors. However, it does not necessarily imply the complete elimination of emissions.

- In a net-zero economy (Figure 1), GHG emissions are balanced out by carbon capture from the atmosphere and storage through natural or artificial means. The decarbonization required for achieving a net-zero economy demands far more ambitious and far-reaching changes than those for a low-carbon economy.

Figure 1. The transition to Net-Zero Economies requires a different set of investments than those required for a low-carbon world.



Consistent with the concepts presented in the previous section, carbon pricing instruments are often hailed as the primary solution, if not the most efficient one, for addressing the climate crisis (Nordhaus and Boyer, 2000; IMF and OECD, 2021). However, when viewed through the lens of decarbonization, the evidence shows that carbon prices are failing to produce the investments required to achieve net-zero emissions by mid-century (Lilliestam et al., 2020).

Various factors could explain the ineffectiveness of a carbon price. According to Talbot-Wright et al. (2023), one of them is that, due to the lack of support for higher prices, many countries have set carbon taxes below the level necessary to meet decarbonization targets. The argument also applies to carbon markets; in this case, countries failed to implement caps' pathways compatible with decarbonization. In addition to low levels of taxes, and levels of caps incompatible with decarbonization scenarios, carbon pricing initiatives do not generally cover a sufficiently large percentage of the countries' emissions.

In the case of voluntary carbon credit markets, they face an even further fundamental challenge: for the most part, they function as a closed system where the total emissions remain relatively unchanged. When a ton of CO_2 is reduced by one company and the resulting credit is sold, the purchaser of the credit gains the right to emit an equivalent amount of CO_2 , thus neutralizing and annulling the net effect on global emissions. This zero-sum result is almost a characteristic of voluntary carbon markets, and without an overseeing authority mandating and enforcing carbon removal,[3] these markets may be incapable of delivering increasing net emission reductions, let alone helping to reach net-zero (Allen et al., 2020). Recent regulatory developments and industry standards have begun to address this limitation through stricter oversight and new guidelines for carbon credit usage. For example, under ISO 14068-1 "Climate Change Management — Transition to Net Zero," a company must first focus on reducing their own emissions

[3] Carbon removal refers here to the process of removing emissions from the atmosphere and storing them in a stable, long-term manner. This can be achieved in a number of ways, such as cancelling a certain percentage of carbon credits before they can be used, through carbon credits from soil carbon sequestration, or direct air capture.

through operational changes and efficiency improvements, and only after demonstrating meaningful reductions can carbon credits be used to offset remaining emissions. They must also demonstrate that those emission reductions exceed regulatory requirements. These examples further support the importance of strong governance in ensuring these markets contribute to genuine emission reductions.

Aside from the apparent gap between the actual and the needed level and coverage of carbon prices to propel decarbonization, the observed ineffectiveness of carbon pricing can also be due to barriers that these mechanisms are unable to address or overcome, when applied in isolation. Such barriers include lack of alternatives or investment opportunities in cleaner technologies, restrictions on access to financing for low or zero-emission projects, and lack of information. Over and above these difficulties and in light of the ambitious carbon neutrality goals set by the Paris Agreement for the year 2050, there is the problem of how to stop viewing climate change as merely a market failure and instead approach it as the restructuring and transformation an entire society.

The scope of the transformation needed and the challenges of implementing carbon prices each call for the same policy course of action: carbon pricing should be just one component, albeit not even a necessary one, within a broader package of public policies to combat climate change, such as regulations, financial and fiscal incentives, and enhanced training of personnel in environmental policy. At politically plausible levels, carbon prices are unlikely to be particularly effective in reducing emissions from the oil and gas consumed, for example, in the transportation, commercial, and residential sectors if implemented in isolation (Delgado et al., 2023). Moreover, according to Stock (2019: 401):

> The political constraints on, and intrinsic limitations of, Pigouvian carbon pricing mean that economists need to look elsewhere for efficient climate policies. I believe that the most important place that economists can add value to the climate policy discussion now is by focusing on policies that drive low-carbon technical innovation.

This conclusion poses a challenge for most LAC countries which have scarce national resources to drive this innovation. Therefore, working with the private sector to seek investments in innovation, and addressing the existing barriers, will play a key role in the design of the optimal policy mix.

1 Carbon Markets

This report refers to two types of carbon markets: credit and permits. Credit markets can be divided into two types: voluntary and compliance (regulated) markets. Permits markets are always regulated markets (Table 1).

Table 1. Basic Features of Carbon Markets

	Credit markets		Permits markets (emissions trading schemes)
	Voluntary	Compliance	
Unit:	Carbon credit offset. Usually, the unit of measurement is 1 ton of CO_2 eq/$.		Emission permit or allowance. Usually, the unit of measurement is 1 ton of CO_2 eq/$.
Supply:	Companies or institutions		Regulator.
Demand:	Uncapped sources of GHG emissions.	Capped sources of GHG emissions.	Sources of GHG emissions.
Operating framework	Only reputational: Based on market practices without necessarily being regulated or supervised by the state.	Regulatory: The regulator may define rules for credits and transactions involving capped sources, on issues such as the origin of credits (domestic vs international projects) and MRV, among others.	Regulatory: the regulator sets (and updates) the cap, the rules of trading, monitors emissions and applies sanctions to sources non-compliant with their permit holdings.
Possible objectives	Being the result of individual voluntary behaviors, they arise spontaneously to help sources of GHG emissions meet self-imposed targets, thereby improving their reputation within their product market in a cost-effective manner.	Provide capped sources with a cost-effective mechanism to offset emissions. Mobilize/direct financing: provide potential suppliers of carbon offsets with domestic demand. Decrease the burden of an existing carbon tax. Decrease the equilibrium price of an existing ETS. Support projects which align with a company's value chain and help strengthen a marketing strategy or provide clearer traceability of the funds invested.	Reduce total emissions of GHG in a cost-effective manner. Generate revenue: via taxing the trading of these permits or by auctioning them at the start of every compliance period.
Price definition	Interaction of the corresponding supply and demand.		
Market size/price certainty	There is no market price or size certainty.	Regulators can determine maximum market size by defining what type of projects are eligible to issue credits for the capped sources. Actual market size and price are determined by the costs and benefits of these sectors.	Price uncertainty but quantity certainty (market size determined by the cap).

Table 1. Basic Features of Carbon Markets (continuation)

Fiscal impact	Only through an increase in revenues produced by the development of a new market. The amount of revenue collected depends on the tax structure chosen.	On one hand, it may increase revenues via the development of a new market. On the other, if credits can be used to exempt the carbon tax, it may decrease revenues relative to this base.	It depends on whether: (1) the initial allocation of permits is auctioned or free, and (2) there is a transaction fee.
Association with Art. 6	Voluntary market can be associated with Art.6.	Art.6 is usually associated with a regulated market (pending rules of the Paris Agreement) or is coupled with a regulated market.	Art.6 does not have necessary implications for the operation of the market unless carbon credits are included in the ETS as an alternative complying mechanism.

Source: Authors' elaboration.

1.1 Credit Markets

Voluntary market for carbon

A voluntary market arises freely between private entities who agree to purchase carbon credits under certain mutually agreed rules. Some of these markets, such as the Climate Chicago Exchange, first arose to meet the demand by companies or institutions potentially subject to emission reduction targets and with self-imposed emissions reductions targets, as proof that they could be considered early starters and have some influence over how regulations would be defined. In the absence of these regulations, voluntary carbon markets became a non-centralized and fragmented market, with non-standardized credits and a space for companies to meet their customers and investors' demands with regards climate action, and to improve their image to gain new, climate-sensitive customers. One of the main incentives for buyers to participate in a voluntary market is their reputation. The rules of trade and the quality of the credits (the extent to which they represent actual offsets of carbon and its permanence) are also determined by the market, based on the demand and willingness to pay by those companies buying credits. Private companies provide verification of the offsets.

Compliance market

A compliance market involves transactions in which the demand side participation is not entirely voluntary but serves the purpose of complying with a regulation that caps or charges its emissions. The New Zealand ETS is an example of the former. In this market, sources covered by the ETS can buy (a limited number of) credits instead of buying permits. Chile, Colombia, and Mexico are examples of carbon taxes where sources covered by the tax can buy credits and deduct this expenditure from their tax obligations (referred to herein as regulated carbon credits markets).

As illustrated in Table 1, there are important differences between emissions permits markets and carbon credits markets; apart from the units traded, one such difference is the agent on the supply side. In the case of permit markets, the agent is the regulator who supplies the allowances. The total number of units supplied is that of the cap—which usually decreases over time—and units can be supplied free or auctioned. To allocate the allowances free of charge among the participating sources, the regulator can use several possible criteria, one of which is grandfathering—that is, allocating allowances based on the relative historic emissions of sources. Usually, the regulator of an ETS does not supply all the allowances free of charge to the sources of emissions but auctions a percentage of these. In carbon credits markets, however, the agents that supply the credits are companies or institutions. Carbon markets have the following objectives:

- While the main objective of permits and credits markets is to reduce net emissions of GHG, they can also serve secondary objectives.

- Whether voluntary or regulated, markets for carbon credits could act as a tool to incentivize the mobilization of funds for financing projects that reduce, capture, avoid, or remove emissions. For this they would need to be appropriately implemented with pricing conditions and penalties that trigger investments in reduction of emissions or decarbonizing, and in combination with other policies with the same goals.

- By definition, an ETS/permit market's primary objective is cost-effective reduction of emissions. However, a secondary objective can be the generation of revenue from auctioning permits, a revenue-stream that supports the administration and enforcement of the ETS program itself as well as other programs. In all three markets, the price is determined by the corresponding supply and demand.

It is important to indicate that price volatility is an issue in carbon markets, particularly in a permit market; regulators in an ETS could set a "safety valve" to control price volatility, for example, set price ceilings and price floors, or, as in the case of the EU ETS, set a "market stability reserve" of permits to supply the market when the price reaches a certain level. When sources of GHG that are subject to a carbon tax, or sources covered by a permits market, can buy carbon credits instead of paying tax for the corresponding emitted tons of GHG at a lower price, offsets markets (credits) can also decrease the equilibrium price of an existing ETS or decrease the burden of an existing carbon tax for the regulated sources.

The fiscal impact of the operation of these markets also differs. A voluntary carbon market is a new market and as such can generate revenues by imposing regular taxes that may apply to the activity and/or the credit, since they can be considered a financial asset. However, when a credit market is associated with a carbon tax, it can have different effects. Even if the market aims to reduce the carbon tax burden, a taxable transaction can maintain or increase revenue. On the other hand, the fiscal impact of a permit market depends on the market design and its fiscal treatment. A regulator of an ETS may or may not auction permits at the beginning of the compliance period. Auctioning permits is a source of revenue for the regulator. Also, trades of allowances in this new market may be subject to regular taxation or be exonerated.

Designing Carbon Credits and their Markets

Voluntary carbon markets often function as closed systems where credits merely offset emissions, resulting in no net reduction. For these markets to make a meaningful contribution to decarbonization, they must go beyond simple emission reductions or avoidance. This means carbon credits should either certify actual removal or capture of CO_2 from the atmosphere, or else support technological change consistent with decarbonization.

Achieving these objectives requires that the rules governing issuance of credits be transparent, supported by scientific evidence, and empirically validated and verifiable. It also requires rigorous, ongoing monitoring to ensure that emission removals, captures, avoidances, or reductions claimed by credits remain intact over time—that is, that their permanence is maintained and not reversed through future events such as land use changes. This long-term durability of climate benefits is essential to minimize reversal risk. Additionally, for carbon credits to play a material role in the decarbonization route, implementation of a transparent and verifiable registry system of credits and trades is critical. Finally, infringement of these rules must be deterred by way of a credible and well-designed enforcement regime.

The key features of carbon credits and markets that can make them more aligned with decarbonization boil down to a set of fundamentals (i.e., **the Core Carbon Principles of High-Integrity Carbon Markets** and **Oxford Principles for Net Zero Aligned Carbon Offsetting),** four of which are highlighted here:

Additionality. Additionality means that a ton of CO_2 emissions which is either reduced, avoided, captured, or removed would not have occurred without revenue from the sale of carbon credits. A project that mitigates carbon is "additional" only if, without the monetary incentive from credits, it would not have been carried out. Despite the clear definition, in some LAC countries with respect to additionality there is an ongoing debate over what constitutes the contrafactual scenario to which the project must be compared in order to assess the additionality, and more specifically, whether this contrafactual scenario should be one enforced by regulations, which stipulates that the carbon offsets of a project are additional only if they go beyond the regulatory objective ("regulatory additionality"). It is worth clarifying that this issue of additionality is valid for the case of carbon markets, where the sources demanding credits do not face caps on emissions, such as an ETS. It is important to note that without additionality, the ultimate goal of carbon markets cannot be reached, since it results in a misallocation of resources to emission reduction projects which would have gone ahead without the need for additional economic incentives.

Permanence. Projects must generate real, measurable, and long-term benefits over multiple NDC implementation periods, including reparation of any setbacks or leaks. In some projects, like those related to forest conservation, afforestation, or commercial forestry vulnerable to fire, permanence could be a relatively important issue, compared to other projects where permanence is less at risk (e.g., biofuels). To address this, regulators can incorporate adjustments to counter the risk of impermanence offsetting. For example, the regulation could establish an ex-ante evaluation (estimation of quantity sequestered and risks of permanence) and an ex-post evaluation. The former should be accompanied by a mechanism whereby this information is disclosed to market participants and captured at market prices. The ex-post evaluation, on the other hand, measures and discloses theactual carbon capture, so that market prices can adjust accordingly. Nevertheless, there is no single solution as to how to deal with the risks of non-permanent sequestration of carbon owing to unforeseen or random events. This is a topic still in development. In New Zealand, for example, a source of GHG covered by the NZ ETS can buy NZ Units (permits) in the ETS market or buy a limited number of carbon credits issued by the forestry sector. Because forests may eventually be cut down, and, for simplicity, the NZ ETS accounting rules assume "immediate oxidation" (all CO_2 in the trees is liberated when the trees are cut down), the rules of the NZ ETS establish that in this case, forestry companies should reimburse the government with a corresponding number of NZ ETS units rendered from their holdings or bought in the market.

Measurement. This entails accurately quantifying emission avoidance, reductions, capture, or removals using recognized measurement approaches and tools. This ensures that each carbon credit represents a verified, real avoidance, capture, reduction, or removal of one metric ton of CO_2 e. The correct measurement must be followed with a good tracking system and transparency. A carbon-crediting program should utilize a registry solely to identify, record, and track mitigation activities and issued carbon credits. This ensures credits can be securely and unambiguously identified. Transparency requires that all credited mitigation activities are comprehensively documented and publicly accessible in an electronic format. Registries prevent double counting, where two parties claim the same carbon avoidance, removal, capture, or emission reduction and enable traceability back to the original project.

Governance/legal nature of carbon credits. A carbon market policy should have an effective governance arrangement to ensure transparency, accountability, continuous improvement and overall quality of carbon credits. This is a topic yet to be defined in most LAC countries. Clear governance will make it possible to establish an appropriate regulatory framework for the market. The legal nature of a carbon credit is relevant for determining how it can be bought and traded, and whether it should be taxed and accounted for. Without clear legal characterization, the market faces risks of fragmentation, inefficiency, and diminished trust among market participants. In other words, whether the carbon credit is legally treated as a commodity or a financial asset will affect aspects such as the liquidity of the market or whether these can be used as collaterals to take credits, and which institution should provide oversight and have a say in the rules of issuing and trading the credits. A discussion on the legal nature of carbon permits follows in a later section.

An efficient system for continuous measurement, and a credible certification standard, are the building blocks for improving the quality of credits. Together with an effective and transparent registry system, they could enhance market credibility. Another important aspect regarding carbon markets is benefit sharing. This aspect, underdeveloped in most carbon markets, is extremely important to guarantee the projects' integrity. Understanding payment and remuneration chains, as well as establishing the minimum social and environmental safeguards of the projects, is essential to ensure that there are no harmful collateral effects for communities or groups in the surrounding areas.

In general, the essential features required to design a carbon market should not differ significantly from those of a standard financial market. For instance, when a company wants to participate in the stock market, it must meet a series of requirements to ensure that the market has all the necessary information to accurately price the asset. Confidence in the market among participants is crucial for its effective functioning.

1.2 Article 6 of the Paris Agreement

Article 6 is a complex topic with a long history of ongoing international discussions, numerous intricacies, technical complexities, accountability challenges, and issues still in the process of being defined. Many papers and reports (TNC, 2024) have been written on the subject, and an attempt to summarize all this information here would be an overwhelming task. Furthermore, the information would not only quickly become outdated but also the Conference of the Parties (COP) falls outside the scope of this study. Instead, the focus is on the institutional aspects and the implications for the role of the ministries of finance. To this end, the section provides a quick overview of Article 6, and its "rulebook," for laying the groundwork in understanding the implications for the operation and institutional framework of carbon permits and credits markets.[4]

[4] This research was conducted between January and November 2024, prior to the 29th Conference of the Parties (COP29) in Baku, Azerbaijan. While new agreements were reached at COP29 regarding Article 6 implementation, particularly on carbon credit trading authorization, registry tracking (Article 6.2), and rules for a centralized carbon market within the UN framework (Article 6.4), these developments do not fundamentally alter the institutional roles of finance ministries outlined in this paper.

Article 6 of the Paris Agreement acknowledges that parties may voluntarily choose to "cooperate" in the implementation of their NDCs. In the spirit of Article 6, "cooperate" means agreeing to exchange mitigation of GHG and adaptation efforts through a market transaction or other alternatives (Paris Agreement, 2015), such as technology transfers.

Paragraph 2 of Article 6 (referred to as Article 6.2) allows countries to transfer emissions reductions between each other. This can involve bilateral or multilateral agreements and include the use of carbon markets. Article 6.2 introduced the concept of internationally transferred mitigation outcomes (ITMOs) from the mitigation of GHG, to be traded under this mechanism. Article 6.2 also calls for countries engaging in "cooperative approaches that involve the use of ITMOs" to ensure that these trades provide actual mitigation of GHG through transparent rules of accounting and governance of these trades, to avoid, inter alia, double counting. The nature of these agreements gives countries some freedom to develop these rules.

Article 6.3 states that the ITMOs to be used by countries to implement their NDCs must be authorized by the participating parties. The concept of authorization is introduced in this article of the Paris Agreement and allows an ITMO to help achieve a third party's NDCs. Basically, the authorization allows a mitigation outcome (MO) to become an ITMO (OECD, 2022).

Article 6.4 establishes a mechanism for countries to cooperate to effect emission reduction. This mechanism, known as the Article 6.4 mechanism, or the Paris Agreement Crediting Mechanism, is a centralized mechanism that works under the authority and guidance of the United Nations. It is considered the successor to the old "Clean Development Mechanism" of the Kyoto Protocol, allowing public and private entities to participate in cross-border mitigation activities, through emission reduction and removal credits called emission reduction (ER) that, once authorized, can be used to contribute to the host party's NDC, or be transferred to other parties, becoming ITMOs and acquiring all rights, limitations, and reporting requirements under Article 6.2. Under Article 6.4, units non-authorized to reach an NDC and therefore in no need of a corresponding adjustment, are called mitigation contribution (TNC, 2024).

Articles 6.5–6.7 establish that a traded ITMO cannot be used by both buyer and seller countries to demonstrate achievement of its NDCs, and that the COP must ensure that a share of the proceeds from the trading of ITMOs should finance the administrative costs of the Mechanism, as well as the adaptation of vulnerable parties. Finally, they also stipulate that the COP should adopt rules for the Mechanism of Article 6.4 (Box 1). Lastly, Articles 6.8–6.9 establish the possibility of agreements on other (non-market) mechanisms, such as technology transfer and capacity building (not addressed herein, since they are unrelated).

Box 1. Main Differences between Article 6.2 and 6.4

These two articles present distinct approaches to international carbon market cooperation. This paper focuses on the most relevant differences in terms of the institutional frameworks necessary for designing and operating carbon markets.

Article 6.2 provides a flexible, country-led approach where nations can develop their own carbon credit systems and engage in direct bilateral trading. It offers greater freedom but with less centralized oversight.

In contrast, Article 6.4 establishes a centralized, UN-supervised carbon market with rules, standardized credits, and mandatory contributions to adaptation funding and overall emission reductions. This mechanism provides a more structured and regulated approach to global carbon trading.

These differences have significant implications for the institutional structures necessary for implementing each approach effectively. While Article 6.2 may call for robust national systems and bilateral agreements, Article 6.4 necessitates a comprehensive international framework and oversight body.

Source: Authors' elaboration based on UNFCCC (2021a; 2021b).

The Institutionality of Carbon Markets under Article 6

The so-called rulebook for Article 6, approved at COP26 in Glasgow in 2021, establishes basic rules and defines the instruments to be traded and institutions to govern this trade under the two mechanisms created by Articles 6.2 and 6.4.

Regarding Article 6.2, the Decision 2/CMA.3 (UNFCCC, 2021a) agreed upon in Glasgow, provides guidance on the definition of ITMOs and defines participation in the mechanism and corresponding adjustments in the accountancy of emissions between cooperating countries for avoiding double counting, reporting, review, recording, and tracking. For the purposes of the present study, the following guides should be highlighted:

- ITMOs are any mitigation outcome that has been authorized under the guidelines of Article 6.3 of the Paris Agreement and transferred (e.g., sold, exported, traded, or granted) to a third party in a cooperative approach under the guidelines of Article 6.2 of the Paris Agreement, for the use of meeting its NDC. Thus, an ITMO can potentially take the form of a Colombian or Mexican Emission Reduction Certificate, or a Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) (OECD, 2022).

- ITMOs can be measured in metric tons of CO_2 eq or another non-GHG metric, such as units of electricity, agreed upon by participating countries on condition that it is consistent with the NDC metrics determined by the parties involved in the transfer (UNFCCC, 2021a). A6.4ERs (carbon credits generated under the Crediting Mechanism created by Article 6.4) can classify as ITMOs when authorized by the host country for use toward achievement of NDCs, or other international mitigation purposes (World Bank, 2022).

ITMOs may be used for achievement of NDC targets, voluntary carbon markets, and other international purposes (such as their use for CORSIA, the scheme for reducing and compensating carbon in international aviation). To avoid double counting, ITMOs must be authorized by the host country of the project when destined for use by the buyer country in its NDC or other similar international purposes. When the transaction of an ITMO for these uses is authorized, a corresponding adjustment must be made according to the rules set in the guidance. (The host country of the project must subtract the mitigation from its inventory, which is then added to that of the buyer country).

- Unauthorized international transactions could be used privately for corporate objectives.

- Domestic transactions in a carbon market or bilateral transactions do not require authorization.

Regarding Article 6.4, Decision 3/CMA.3 (UNFCCC, 2021b) defines the rules and procedures operating rules of the Mechanism's supervisory board, responsibilities of participating countries (i.e., parties), and cycle of the activity generating emissions reductions. The most important decisions regarding the Crediting Mechanism are as follows:

- It creates the supervisory body of the Crediting Mechanism, responsible for establishing the rules, procedures, and methodologies for the operations. The supervisory body will accredit operational entities and certify, register, and issue the UN-backed A6.4ERs credits.

- The methodology for calculating emissions reductions resulting from the proposed project can be proposed by the host country but must be approved by the supervisory board (provided that they comply with the general guidelines of the methodology approved by the Intergovernmental Panel on Climate Change (IPCC) and the COP.

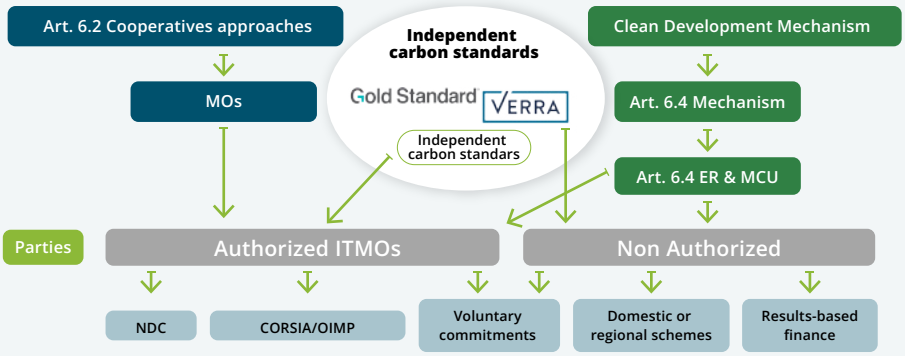
- A6.4ERs may or may not be approved by the host country. If not approved, they may enter the voluntary market. If approved they qualify as ITMOs and therefore may be used for NDC purposes, other international mitigation purposes (such as CORSIA), as well as the voluntary market.

- It defines certain rules for the use of certified emission reductions (CERs) of the Clean Development Mechanism in the NDCs.

Figure 2 illustrates the differences between the mechanism created by each article (Diagne, 2024).

Figure 2. Carbon Markets under Article 6

Carbon credits transactions under Article 6 of the Paris Agreement



All autorized ITMOs are subject to corresponding adjustments to avoid double counting. They can not be used by the Host party to meet its NDC.

Source: Diagne (2024).
Notes: Mitigation contributions units refer to credits issued for voluntary climate action or domestic carbon pricing compliance.

Both the cooperative approaches of Article 6.2, and the Crediting Mechanism of Article 6.4, set active roles for the national governments of participating countries. Under Article 6.2, each party shall submit the initial report, annual information, and maintain a recording and tracking database of their ITMOs. They are also responsible for making the corresponding adjustments after trade, among many other activities. In the Mechanism:

> The host party shall provide an approval of the activity to the supervisory body, authorizing public or private entities' participation in the activity under the Mechanism, specifying whether it authorizes A6.4ERs issued for the activity for use towards achievement of NDCs, and/or for other international mitigation purposes, among other requirements" (UNFCCC, 2021b).

Modalities, procedures, and governance arrangements for Article 6 mechanisms are still being negotiated and finalized by parties in the Paris Agreement. The Climate Change Conference in Bonn in June 2023 did not turn up many novelties regarding Article 6 and some issues remain contested, for example, the treatment of non-permanent removals.[6] On other issues, such as the inclusion of avoided emissions in the scope of the Article 6.4 system, it was agreed that more time was needed in the decision-making process.

To the best of the authors' knowledge, no analysis of possible roles of ministries of finance within the institutional framework of these mechanisms created by Article 6 has been produced by any scholar, NGO, or other institution. ITMOs can be treated and understood in the same way as carbon permits or credits. However, the main difference lies in their international character and in that sense, it can be concluded that ministries of finance do have a role where public projects are generated, and where it is necessary to determine the budgetary treatment of the income generated. If ITMOs are produced by private projects, the role will be to determine the tax treatment that these projects should or should not pay.

[6] "Bonn climate talks: Key outcomes from the June 2023 UN climate conference". https://www.carbonbrief.org/bonn-climate-talks-key-outcomes-from-the-june-2023-un-climate-conference/

1.3 Legal Nature of Carbon Permits and Credits

The legal nature of emission allowances and carbon credits is an issue that may have practical implications in terms of liquidity of the carbon market. This is due to its impact on their legal treatment areas such as insolvency, taxation, accounting, and criminal justice (European Commission, 2019; BenMcQuhae and Co. and Hong Kong Green Finance Association, 2023).

One of the main practical implications of the legal nature of permits lies in the consequences for public authorities, regarding their ability to request the return, reversal, or cancellation of permits. For example, if the government needs to modify the number of allowances allocated free of charge, and if these permits are understood as an administrative right, it has the administrative power to request the reversal of the allocation. However, if these permits are defined as property rights, such reversal may be considered an expropriation and must be evaluated under the specific property laws of that country, giving those affected the possibility to demand compensation for returning their permits.

It has been the practice for the directives establishing the rules of an ETS or its legislation, to not define the legal nature of allowances in sufficient detail, leaving the discussion as to whether they should be treated as property or administrative rights to the judicial system. Property rights can be traded and used as securities or financial instruments, since they are freely alienable and tradable. Administrative rights can also be traded and used as financial instruments but are defined as intangible rights connected to a specific decision made by the state or competent authority. Another possible interpretation of the legal nature of allowances is that they represent neither property nor administrative rights; in this view, they fall into the category of "other" intangible property, as they do not give the holder a "right" to emit a certain quantity of GHGs but represent an exemption from imposition of a fine for emitting those gases (Fieldfisher, 2023).

The legal treatment of carbon credits, as mentioned in a previous section of the study, is an issue pending address by many LAC countries. Without clear legal characterization, the market faces risks of fragmentation, inefficiency, and diminished trust among market participants. In other words, whether the carbon credit is legally treated as a commodity or a financial asset will affect aspects such as the liquidity of the market, the possibility that they can be used as collaterals to garner credits, and which institution should provide oversight and guidance in issuing and trading credits (Sim, *et al.* 2024).

Rights related to the use of carbon credits are likely to be affected by the rules of Article 6, under which governments have the right to decide whether or not the mitigation outcomes achieved by a project within their jurisdiction are authorized as ITMOs (Klaczynska et al., 2022). The right to generate may be partially affected in the new context, for example, if governments incentivize some removal activities (but not others). Article 6 may sooner or later compel governments to define the legal and accounting treatment of carbon credits. Meanwhile, project developers will face a period of uncertainty while governments are establishing policies and procedures to manage carbon market activities. Therefore, they must move at least at market speed.

2 Design of Carbon Markets

Markets for carbon credits or offsets may differ in processes and organization from country to country or region to region. Despite this, there is a set of basic issues that defines their design. For ease of exposition, the basic steps of carbon credits/offsets markets and the basic steps of cap-and-trade systems are presented in separate subsections. It is important to point out that the following description of these basic steps refers more precisely to the case of regulated markets. Non-regulated markets are voluntary and therefore the role of ministries of finance is no different to that usually applicable to all other goods and services transactions.

2.1 Carbon Credits Markets

While different carbon markets may vary in features, it is important to address the following key issues when designing them:

- **Definition of the objectives to be achieved:** In general, carbon markets aim at reducing emissions or removing CO_2 from the atmosphere, but countries should also consider whether they should be designed to drive technological change toward decarbonization.

- **Definition by sector and type of project:**

  this involves the joint definition of the following interrelated issues:

  - Whether all capped sectors may participate in the market.
  - Definition of maximum individual share of emissions that can be retired against compliance obligations with credits.
  - The type of projects that can generate credits, for example, forestry, waste, change of vehicle fleet, boilers, etc.

- **Definition of the certification, registration, and accountability rules and procedures:** issuance of carbon credits must be certified by a third party to ensure actual mitigation of emissions and transparency. This certification needs to be credible; the credibility of the certificates depends on the reputation of the certification rules, which in turn depend on the methods used and the transparency of the accounting methods and registry rules. Regulators could validate the certification by private firms and/or develop regulatory certification procedures. In the first case, it should define the criteria that certifying companies must meet. In the latter, regulators should develop processes to audit or review the certification mechanism and registry records.

- **Links between domestic and international markets under the rules of Article 6 of the Paris Agreement:** it will be necessary to determine whether foreign actors will be allowed to participate in the purchase/sale of credits, and the approval process of such transactions, which in turn will determine whether the mitigation outcomes are accounted for in favor of the host country or in the buyer's country.

- **Link to carbon tax:** In Chile, Colombia, and Mexico, carbon credit markets for sources covered by the existing carbon tax have the option to buy carbon credits from offsets projects and use this expenditure to cancel tax obligations for the same amount. This possibility, as well as the maximum amount of tax that can be offset through the purchase carbon credits, should be defined at the design phase.

- **Compensation mechanism for vulnerable firms and households:** defines the amount and the mechanism by which vulnerable firms and households will be compensated for the increase in production and consumption costs owing to implementation of the carbon credit market.

- **Evaluation:** the design of the carbon market should include evaluation of its outcomes, and the requirements for the processes to generate the data necessary for this evaluation.

2.2 Carbon Permits Markets

In the case of markets for carbon permits, the relevant issues to address in the design phase include the following:

- **Definition of the objectives to be achieved:** ETS seek to cap emissions from a certain number of sources and sectors, but countries also need to consider whether carbon markets should be designed to drive technological change toward decarbonization.

- **Assessment of the market's impact on the income of specific sectors and households:** defining the set of sources whose emissions are to be capped should include an estimation of the abatement costs of the candidate sources and thereby assess the impact of the regulation on the competitiveness of these sources, and the possible pass-through of these costs to consumer prices and impact on vulnerable households.

- **Definition of the cap and sources covered:** given the objectives and potential of the impacts, the regulator must define the maximum volume of emissions (ton/year) that regulated sources are allowed to emit on aggregate (the cap). This decision is in practice jointly taken with the sectors and sources that are obliged to participate in the market. Similarly, the regulators will be obliged to monitor the evolution of this cap and coverage over the years.

- **Definition of the yearly allocation of permits:** in keeping with the objectives defined, the regulator must determine how permits will be allocated among sources at the beginning of each compliance period, usually on an annual basis. Alternatives include auctioning permits or distribution free of charge based on historical emissions, a combination of the latter, or other.

- **Definition of the tax treatment and allocation of revenues:** must define whether the trading of allowances will be subject to the normal tax regime or an exemption, and whether the fiscal resources generated by the taxation of these transactions, as well as the auction of permits, will be used for general funding purposes of the public budget or to finance, for example, green public projects, or the operationalization of the cap-and-trade system itself.

- **Link between permits and credits markets:** defines whether sources covered by the ETS can buy carbon credits as an alternative to using regulated allowances.

- **Definition of monitoring and enforcement strategy:** covered entities are typically required to report their emissions and permit holdings to the regulatory authority. To verify these reports and ensure compliance with regulatory requirements, the authority conducts inspections to assess compliance with permit holdings. In the event of violations to permit holdings or fraudulent activities, monetary sanctions, or other forms of penalties should be applied as deterrents. To support these activities, a budget is established to cover costs associated with the administration and operation of the system, including monitoring, enforcement, and public outreach.

- **Legal nature of emissions permits:** may have practical implications on the liquidity of the carbon market, and thus must be addressed.

3 Actors and Institutions in Carbon Markets

This section describes the functioning of, and actors involved in, the operation of markets for carbon credits and emission permits. Drawing examples from country experiences globally, its purpose is to help ministries of finance better understand the overall institutional architecture required for these types of markets to function and the role of the different actors within this architecture. It should be acknowledged from the outset that in carbon markets the role of ministries of finance is less clear than in carbon taxes. Nonetheless, there are plenty of instances and examples where the involvement, or even the full engagement and leadership of ministries of finance, is required in both carbon credits and permits markets.

3.1 Functioning and Institutionality of Carbon Credits/Offsets Markets

Above and beyond the steps necessary for the design of a carbon credits/offsets market, a number of phases, institutions, and actors are involved in the implementation and operation of these markets. This section outlines the actors involved by phase and role, based on a review of guidelines from recognized carbon credits programs and certification standards bodies and registries, as well as on industry best practices and guidance documents from various environmental NGOs, academic works, and consulting firms. It is not an exhaustive analysis of the many possible standards and procedures, but rather a general description of the typical phases and actors and a reference point for defining the role of ministries of finance in each of these.

Phases and actors involved in carbon credit markets

1. Project proposal

Before the removal or reduction of carbon takes place, the proponents of the project must submit a project design document (PDD) proposal for certification. Apart from describing the project, the PDD provides crucial information, such as the amount of carbon mitigated and the methodology by which this removal, capture, avoidance, or reduction of emissions is measured, as well as the MRV plan over time. It must also demonstrate additionality, based on its financial information. Depending on the standards of the certification body and possibly also on the regulation of the carbon market, the PDD may include other components, such as a description of relevant stakeholders, an environmental and social impact assessment, and a risk management plan. Actors typically involved in this phase include the following (Figure 3):

- **Investors:** Companies and financial institutions providing funding for the project.

- **Project proponents:** Typically, governments, companies, entities, and NGOs that manage the planning, design, and execution of emissions reduction projects. They oversee day-to-day operations, coordinate with contractors, and ensure project milestones are met and ultimately benefit from the project's success.

- **Certification standards bodies and registries:** These are governmental and non-governmental organizations that have developed proprietary standards or criteria for project eligibility, baseline establishment, additionality and permanence assessment, and MRV, as well as for processes and registries related to measuring, reporting, verifying, and serializing carbon credits from offset projects across sectors such as forestry, renewable energy, and agriculture, among others. Carbon offset standards include the Gold Standard, the Verified Carbon Standard (VCS) by Verra, and the American Carbon Registry (ACR), but many others exist. A new standard is expected to develop under the mechanism created by Article 6.4 of the Paris Agreement. Aside from the ones mentioned, other major private sector firms operating in this space include Climate Action Reserve SCS Global Services, and EPIC Sustainability Services, among others.

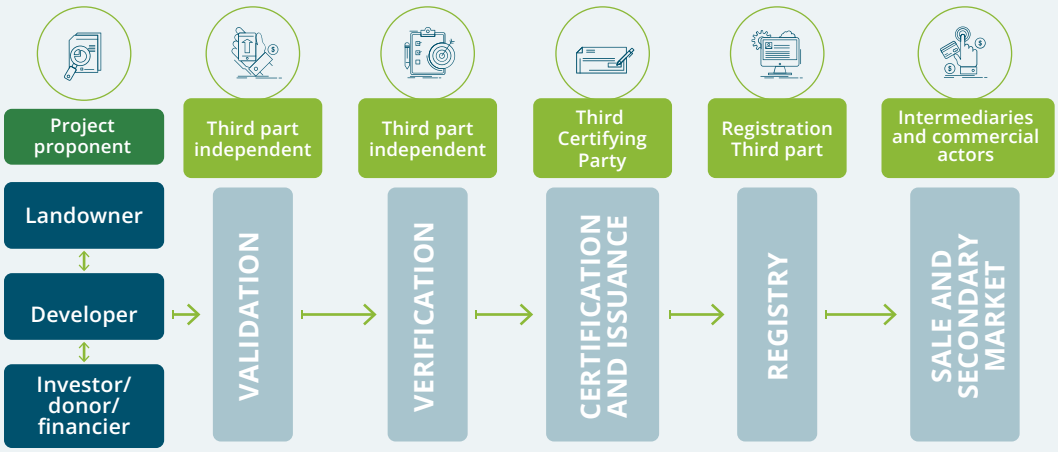
Each of these standards are frequently referred to as programs, but they are not necessarily the same; a program encompasses the entire process by which carbon offset projects are evaluated, certified, and issued. Programs provide guidance and support to project developers throughout the certification process, from project inception to credit issuance. They may include administrative procedures, documentation requirements, training resources, and technical assistance to help projects meet the standard's criteria. Usually, programs are managed by the standard-setting organization itself (as in the case of VCS and Gold Standard) or by accredited entities acting on its behalf, such as certification bodies, validators, and verifiers. Project developers typically choose a specific program under a recognized standard that aligns with their project objectives, geographic location, and target market for carbon credits. There are three main types of standards for certification:

- **International credit mechanisms** are administered by the UNFCCC, formerly under the Kyoto Protocol and currently under the Paris Agreement. While these mechanisms are created as a tool to help countries meet their international treaty commitments, some credits have also been used for voluntary purposes.

- **Independent carbon standards and programs** for private, for-profit, or not-for-profit companies issue carbon credits used primarily for voluntary purposes (e.g., corporate carbon neutrality declarations). These standards currently issue the vast majority of credits on the market (e.g., VCS, ACR, Gold Standard, and Social Carbon Standard).

- **National and subnational credit mechanisms** are often an integral part of regional, national, and subnational carbon pricing instruments, allowing carbon credits to be used for the fulfillment of NDCs. These credits are intended for use within national voluntary or compliance programs. Countries with a carbon tax in conjunction with carbon credits (to offset the carbon tax) may need to set national credit mechanisms. Whichever the case, projects that wish to issue voluntary credits must comply with certain independent carbon standards or labels.

Figure 3. Actors Typically Involved in Carbon Credit Markets



Source: Authors' elaboration.

2. Validation/verification, certification, and issuance

- **Validation:** The selected verification entity, either independently, or via an independent third-party validation team (auditing firm), determines whether the proposed project meets with all methodological documentation and accounting requirements to verify its claimed mitigation. The third-party validators conduct audits and prepare reports for this purpose. Some of the most common auditing standards are: American Institute of Certified Public Accountants' Sustainability Assurance Standard (AICPA), ISO 14065 (to validate and verify environmental information statements), or ISO 14064 (to verify and validate statements on GHG emissions), among many others.

- **Verification:** Independent third-party verification firms or companies review and approve the validation report prepared independently, or by a separate auditing team. These verification entities can conduct their own audits and assessments to determine whether the proposed emissions reduction, avoidance, capture or removal project fully complies with all the documentation, accounting, and methodology requirements set forth by their specific verification protocol or carbon standard.

- **Certification and issuance:** Once verified, the mitigation is certified and deemed to have achieved real, measurable, additional, permanent, and independently verified emission reductions, avoidance, or carbon removals and capture. With this certification carbon credits can then be issued.

3. Registration

Refers to the phase of registering the certified carbon credits generated by the project in a recognized registry. Commonly, there are two types of registries; the first is the registry of the firm trusted to provide the verification of the mitigation outcomes (such as ACR or Gold Standard mentioned previously). These registries keep track of credits generated and traded, ensuring that the credits are not sold more than once. The second type of registry is the official one, normally in operation by the ministry of the environment, to keep track of the amount of carbon mitigated or sequestered domestically. In many cases, there is no national registry, and private companies take the lead on tracking and registration. The following are some examples of institutions and actors involved in GHG national registries:

- **Mexico:** The National Emissions Registry (RENE) is the responsibility of the Ministry of Environment and Natural Resources (SEMARNAT).
- **Colombia:** The National Registry for the Reduction of GHG Emissions (RENARE) is the responsibility of the Ministry of Environment and Sustainable Development (MADS).
- **Chile:** The Registry of Emissions and Transfers of Pollutants (RETC) is administered by the Ministry of the Environment (MMA).
- **United States:** The Climate Action Reserve is the largest registry, with protocols for livestock projects, landfills, ozone-depleting substances, forestry, and boiler efficiency.

4. Market accounting

There is no unified global market for carbon credits; each market has intermediaries and commercial actors at the trading phase, which mainly denotes carbon exchanges, (i.e., trading systems where carbon credits are bought and sold). Some of the largest are the Carbon Trade Exchange, Xpansiv, Toucan Protocol, AirCarbon Exchange, Texas Climate, and Carbon Exchange. This secondary market requires oversight of its activities to avoid fraud and double selling. For this, a system to account for credits bought and sold by various sources should be put in place. However, in practice, this service is provided by companies other than the providers of the certification of credits and includes the accounting of the retirement of credits from the registry by the selling entity (e.g., forestry firm), and the certification of this retirement by the certification entity (e.g., Verra). The certificate is sent by the seller to the buyer as proof of the transaction. The buyer must also hold an account in the registry. If the buyer of the offsets is the direct user, these are retired from the market (accounted for as offsets of emissions in a given period) and cannot be resold. Nevertheless, the carbon units or credit generated can be bought by retailers, firms that buy credits and resell them to third parties. The certificate of the transaction contains information on the following:

- Name of the project
- Where the offsets come from
- Name of the providers of the certification of the offsets
- Project location
- Percentage of the total amount of credits transacted that come from each project, price, terms, and conditions.

Companies such as Green-e Climate certify the retail activity (chain-of-custody) by audits of supply and sales.

Market ratings: To improve the availability of information on carbon credits, ratings agencies were instituted to provide users with a fair reflection of the quality of carbon credits and a breakdown of the drivers, regardless of the type of carbon project issuing the credit. This allows both buyers and traders to compare the quality of carbon credits from the same or different types of projects, as well as to make informed decisions on purchases and claims. Some agencies dedicated to this activity are Sylvera, BeZero, and Calyx. Based on the review above, ministries of finance do not appear to have a direct role to play in the design and everyday operation of carbon markets; nonetheless, as fiscal policy makers, ministries of finance have the power to set the tax treatment of carbon credits issuance and trade. Similarly, ministries of finance have a fundamental role in the allocation of revenues generated by this treatment. They may exempt participating companies in the carbon market from income tax, either partially or entirely, for example. The MEF may also exempt carbon credit transactions from value-added tax (VAT). Ideally, this decision is made alongside an evaluation of its impact on the carbon market and investments in green technology.

A further issue is the treatment of carbon credits under tax codes. There are arguments as to whether the trading of credits should be treated in the same way as other goods, securities, or assets for tax purposes, or whether special tax treatment, as in tax deductibility, should be considered; each of these perspectives merit consideration. Regulation for their tax treatment is yet to be established, and therefore the decision rests with finance ministries. Likewise, if sources of GHG are allowed to use carbon credits from national voluntary markets to offset carbon tax liabilities, ministries of finance must be involved in national registries for the accounting of carbon credits.

Box 2. Carbon Taxation and Carbon Credits Interactions: Chile, Colombia, and Mexico

In Chile, Colombia, and Mexico, sources of GHG emissions subject to the carbon tax can meet or decrease their tax liabilities if they offset their emissions by purchasing carbon credits. In Chile, Article 16 of Law 21.210 of 2020, established such a compensation mechanism, on a per ton basis. The process is regulated by Decree DS 4/2023, and other resolutions. These specify the requirements on MRV for sources and external auditors and other relevant aspects. Offsets projects must be national and apply to the ministry of environment. Validating the emissions reductions of the project must follow established methodologies and requires a certification issued by an external auditor, authorized by the environmental superintendent (SMA). Once validated, the ministry issues a certificate, and projects are entered in the registry for emissions and transfer of pollutants (RETC in Spanish).

In Colombia, the carbon tax was introduced in Article 221 of Law 1819 in 2016, with similar provisions for the compensation of tax liabilities via carbon credits. Decree 926 in 2017 outlines the rules for this mechanism. To qualify as offsets, emissions mitigated must fulfil specific criteria, such as being domestic and certified by verification organizations, accredited by Colombia´s national accreditation organism (ONAC) or any accreditation organism member of the International Accreditation Forum, based on international methodologies. Additionally, emissions reductions from voluntary initiatives are eligible if verified in accordance with ISO 14064-2:2006 standards. Through this mechanism, GHG sources can compensate up to 50 percent of their emissions subject to the carbon tax.

Mexico's carbon tax was introduced through the fiscal reform of 2013, as a special tax on production and services (IEPS). Additionally, some states added subnational carbon taxes. In December 2017, the "general rules for the optional payment of the special tax on production and services for fossil fuels through the delivery of carbon bonds", established how carbon credits can be used to reduce the tax liability. The Mexican regulation specifies that to be valid for the carbon tax compensation, a carbon credit must have been generated from a new (post-2014) domestic project. Unlike Chile and Colombia, the Mexican tax compensation mechanism operates on a monetary basis.

Additionally, emissions reductions from voluntary initiatives are eligible if verified in accordance with ISO 14064-2:2006 standards. Through this mechanism, GHG sources can compensate up to 50 percent of their emissions subject to the carbon tax.

Source: United Mexican States, Secretariat of Finance and Public Credit (2017); Caffera et al. (forthcoming).

Participation of national development banks in carbon credits markets

For many years, national development banks (NDBs) have supported the global effort to combat climate change. These state-owned financial institutions, traditionally focused on fostering economic growth and development, have been expanding their mandates to address the pressing need for climate finance and sustainable development. As governments worldwide grapple with the challenges of transitioning to net-zero economies, NDBs operate in a niche line of work, promoting economic development, while addressing market gaps usually occurring in second-tier financial institutions (Smallridge and Henderson, 2017). They are therefore uniquely positioned to bridge the gap between public policy objectives and private sector investment in climate mitigation projects.

National development banks play a strategic role in catalyzing climate action by leveraging their financial resources, local knowledge, and—in some cases—their ability to influence policy. They can play a multifaceted role in developing, supporting, and scaling carbon market mechanisms. From providing project financing and mitigating risks, to building capacity and fostering innovation, they are instrumental in supporting the technological transformational investments that net-zero economies need and can contribute to solving one of the problems carbon markets face—namely, that they are not driving investments consistent with the decarbonization objectives of the Paris Agreement. Their financial capacity not only helps to mobilize additional climate finance, but also ensures that countries transition from inadequate emissions reductions interventions to decarbonization. The following are four examples of opportunities for NDBs:

1. Project financing

By providing grants and loans with financial terms tailored to mitigation projects associated with carbon emission reductions, removals, or emissions avoidance and capture projects, NDBs may help to overcome one of the primary barriers to climate action: the high upfront costs often associated with clean energy and other decarbonization and emission reduction technologies. These financial instruments can range from direct project loans to more complex structured finance solutions that can include concessional financing terms for green projects through lower interest rates, longer repayment periods, and more flexible conditions compared to commercial loans. This approach renders projects more financially viable and helps attract additional private sector investment by enabling the bankability of climate initiatives.

2. Risk mitigation

They can also play a vital role in addressing the inherent uncertainties and risks associated with climate-related projects, particularly those involving new business

models, new, or untested technologies, and projects in sectors perceived as riskier, such as land-use relatedprojects. By providing guarantees and other risk-sharing and mitigating mechanisms, these institutions can help attract private sector investment that might otherwise shy away from climate initiatives, due to perceived high risks or uncertain returns. These guarantees can take various forms, such as credit guarantees, performance guarantees, or political risk insurance, effectively lowering the risk profile of projects and making them more appealing to commercial lenders and investors.

3. Aggregation

These banks often provide support to enhance the viability and attractiveness of projects, particularly for smaller-scale projects that might otherwise struggle to access carbon markets or secure investment. By bundling multiple smaller projects together, the banks can create larger, more diversified portfolios that are more appealing to investors, due to reduced risk and improved economies of scale, including access to local, and potentially international, capital markets. This approach allows smaller projects, such as community-based renewable energy installations, or small-scale forestry initiatives, to overcome the high transaction costs and complex certification processes often associated with carbon markets. National development banks may act as aggregators themselves or provide support to third-party aggregators, helping to standardize project methodologies, streamline monitoring and reporting processes, and centralize the management of carbon credits.

4. Capacity building

This area is a fundamental aspect of NDBs' role in fostering technological change and supporting the issuance of carbon credits. These banks serve as knowledge hubs and facilitators, potentially offering crucial technical assistance to project developers and local entities seeking to engage in carbon market activities. Support could encompass a wide range of services, from providing guidance on project design and implementation, to assisting with the complex process of carbon credit certification and verification. In addition, they can carry out workshops, training sessions, and mentorship programs to enhance the technical skills and market understanding of local stakeholders.

Given that ministries of finance often oversee or play a significant role in NDB governance, they are strategically positioned to leverage these institutions' potential in carbon markets. By aligning the NDB mandates and activities with national climate goals and carbon market development strategies, ministries of finance can enhance NDB effectiveness in supporting climate finance initiatives. Potentially, such alignment can ensure that the banks' interventions in carbon markets are consistent with broader fiscal and economic policies, maximizing their impact on both emissions reduction and sustainable economic development. As such, the synergy between ministries of finance and NDBs represents an interesting tool in advancing the institutionalization and effectiveness of carbon markets at the national level.

3.2 Functioning and Institutionality of Carbon Permit Markets

These markets, similar to credit markets, have various stages, rules, and actors involved in the implementation and operation of permits markets or ETS. These encompass allocation and trading of permits, the functioning of the primary and secondary markets, and other rules governing the market, such as the link with international trade under Article 6 of the Paris Agreement. This section describes the actors involved at each stage and their respective roles.

Phases and actors involved in carbon permit markets

Carbon permits markets such as ETS are intricate policy instruments that require elaborate institutional frameworks and the involvement of multiple stakeholders to function effectively. The institutional arrangements vary greatly across different systems. Institutional structures and responsibilities can diverge significantly among emissions trading systems, contingent upon jurisdiction, the economic sectors encompassed, and the overall design and objectives of the system. For instance, the European Union (EU) ETS operates within a multilevel governance structure, involving intricate interactions between EU institutions, such as the European Commission, the European Parliament, and the Council of the European Union, as well as the national governments of member states. This complex interplay of actors demands extensive coordination and cooperation at both EU and national levels.

Despite the inherent complexities, some common institutional arrangements and responsibilities are observed across various emissions trading systems (ADB, 2018; IOSCO, 2023; European Commission, 2015; PMR and ICAP, 2021):

1. Regulatory authority

A government agency or regulatory body is typically responsible for establishing and overseeing the permits market/ETS. This authority sets the overall emissions cap, allocates allowances or permits, and enforces compliance. While ministries of environment and environmental protection agencies tend to dominate, there are several other types of institutional arrangements. Listed are some examples of main regulatory authorities:

- **China:** The Ministry of Ecology and Environment for the National Emissions Trading System.
- **New Zealand:** The Environmental Protection Authority (EPA) for New Zealand Emissions Trading Scheme (NZ ETS).
- **European Union:** The ETS is under the European Commission.

- **South Korea:** South Korea's Emissions Trading Scheme (KETS) is mainly under the ministry of environment, although the ministry of economy and finance historically has played a significant role, and, for around two years, even became the main regulatory authority of the KETS (Box 3).

- **For the Cap-and-Trade Program in California:** The California Air Resources Board (CARB) is the regulatory body. CARB is a public, government agency in the State of California that regulates and enforces air pollution control measures.

2. Registry and tracking system

A central registry is established to track the issuance, holding, transfer, and retirement of emissions allowances or permits. These registries are necessary to ensure transparency and accurate accounting of emissions trading activities, and are, in essence, electronic accounting systems operated by designated institutions, made up mostly of ministries of environment or environment agencies. Despite extensive research there is no evidence of a ministry of finance assuming this type of role in a carbon permits market. The following are some examples of institutional arrangements for managing these systems:

- The **EU Registry** is run by the European Commission; nonetheless, it is worth mentioning that before 2012, member states operated individual national registries, and those domestic registries were under the responsibility of a variety of institutions, including the following:[7]

    - **Germany:** The Emissions Trading Authority (DEHSt) within the German Federal Environment Agency.

    - **France:** The Caisse des Dépôts et Consignations, a public sector financial institution.

    - **Italy:** The Ministry for the Environment, Land, and Sea.

    - **Spain:** The Spanish Carbon Fund (Fondo de carbono para una economía sostenible), managed by the Ministry of Agriculture and Fisheries, Food, and Environment.

    - **Poland:** The National Centre for Emissions Management, which operated under the supervision of the Ministry of the Environment.

    - **Norway:** The Norwegian Emissions Trading Registry, operated by the Norwegian Environment Agency.

[7] The EU ETS applies in all EU Member States, the European Free Trade Association countries (Iceland, Liechtenstein, and Norway), as well as Northern Ireland for electricity generation (under the Protocol of Ireland and Northern Ireland). See: Scope of the EU Emissions Trading System.

- **United Kingdom:** The environment agencies in England and Wales, Scotland, and Northern Ireland.
- **Korea's KETS:** The emission trading registry system is operated by the GHG Inventory and Research Center (GIR), which falls under the jurisdiction of the ministry of environment. While the ministry oversees the GIR's operations, it does not directly manage the ETS itself. The GIR is a public entity.
- **United States:**
    - **Regional Greenhouse Gas Initiative (RGGI):** The RGGI CO_2 Allowance Tracking System is operated by the RGGI, Inc., a non-profit cooperative association of member states.
    - **California Cap-and-Trade Program:** The Compliance Instrument Tracking System Service is still operated by the California Air Resources Board (CARB).
- **Canada's Western Climate Initiative:** Registries are still operated by provincial authorities, such as the Ministry of Environment and Climate Change Strategy in British Columbia.
- **New Zealand's Emission Unit Register** by the Environmental Protection Authority (EPA).
- Ministry of Ecology and Environment for **China's National Emissions Trading System.**
- **The Tokyo Cap-and-Trade Program registry** Managed by the Bureau of Environment under the Tokyo Metropolitan Government.
- **The Swiss Emissions Trading Registry**: Operated by the Federal Office for the Environment (FOEN) and in turn the Swiss environmental agency, a division of the Federal Department of Environment, Transport, Energy, and Communications.

3. Monitoring, reporting, and verification

Regulated entities (e.g., power plants and industrial facilities) are obliged to monitor and report their emissions regularly, while various different institutions are responsible for overseeing and conducting MRV activities, for example, independent third-party verifiers, or accredited organizations, validate the reported emissions data to ensure accuracy and credibility. The authors found no examples of ministries of finance with this role. Below are some examples of institutional arrangements for MRV systems:

- **European Union Emissions Trading System:**
  - **Accredited independent verifiers:** Private sector verification bodies accredited by national accreditation bodies are responsible for verifying emissions reports submitted by regulated entities.
  - **National accreditation bodies:** Institutions such as the United Kingdom Accreditation Service and the German Accreditation Body, accredit and oversee the verifiers.
  - **European Commission and competent authorities in member states:** Responsible for developing MRV regulations and guidelines, as well as for overseeing the overall MRV process.
- **California Cap-and-Trade Program:**
  - **California Air Resources Board (CARB):** Responsible for developing and enforcing MRV regulations, as well as for accrediting and overseeing third-party verification bodies.
  - **Accredited third-party verification bodies:** Independent organizations accredited by CARB to verify emissions data reports submitted by regulated entities.
- **New Zealand Emissions Trading Scheme:**
  - **Environmental Protection Authority of New Zealand:** Responsible for overseeing the MRV process, accrediting third-party verifiers, and enforcing compliance.
  - **Accredited third-party verifiers:** Independent organizations accredited by the EPA to verify emissions data reports.
- **South Korea Emissions Trading Scheme:**
  - **The GIR (under the Ministry of Environment):** Oversees the MRV process, develops guidelines, and accredits third-party verifiers.
  - **Accredited third-party verifiers:** Independent organizations accredited by GIR to verify emissions reports submitted by regulated entities.

4. Oversight, compliance, and enforcement

The regulatory authority is usually also responsible for monitoring compliance with the emissions trading system. Penalties or fines may be imposed for non-compliance, such as failing to surrender sufficient allowances or permits to cover emissions. Below are some examples of institutions responsible for compliance and enforcement under different carbon permits markets, which for the most part are also the regulatory authority, with only a few differences:

- **European Union Emissions Trading System:**
  - **European Commission:** Responsible for overall compliance and enforcement at the EU level, including the review of member states' enforcement activities.
  - **Competent authorities in member states (e.g., environmental ministries and agencies):** Responsible for monitoring compliance, imposing penalties, and enforcing regulations within their respective countries.
- **The California Air Resources Board (CARB):** The primary regulatory authority responsible for enforcing the cap-and-trade program's regulations, including imposing penalties for non-compliance.
- **The Environmental Protection Authority of New Zealand:** Responsible for monitoring compliance, conducting audits, and enforcing regulations, including imposing penalties for non-compliance.
- **The Greenhouse Gas Inventory & Research Center (GIR) under the Ministry of Environment of Korea:** Responsible for overseeing compliance and enforcement activities, including imposing penalties for violations.
- **The Bureau of Environment, under the Tokyo Metropolitan Government:** Responsible for enforcing the cap-and-trade program's regulations, monitoring compliance, and imposing penalties for non-compliance.
- **China's Ministry of Ecology and Environment:** The primary regulatory authority responsible for enforcing compliance with the national ETS regulations and imposing penalties for violations. However, provincial and local environmental authorities are responsible for monitoring compliance and enforcing regulations at the provincial and local levels.

5. Market oversight and regulation on trading activities

Financial regulatory bodies or designated market authorities oversee the trading activities and ensure market integrity. They may impose rules and regulations to prevent market manipulation, insider trading, or other abuses. Several institutions are responsible for overseeing and regulating the trading aspects of these systems, some of them being ultimately regulated or supervised by finance ministries:

- **European Union Emissions Trading System:**
  - European Securities and Markets Authority (ESMA): Responsible for overseeing the carbon market and coordinating with national financial regulators to prevent market abuse, such as insider trading and market manipulation.

    National financial regulators (e.g., the Financial Conduct Authority in the UK and the Autorité des Marchés Financiers in France): Responsible for regulating and supervising trading activities.

- The Autorité des Marchés Financiers, under the supervision of the Ministry of Economy and Finance, exercises regulatory authority over various financial activities, including securities markets, investment services, asset management, and financial intermediaries.

- **United Kingdom Emissions Trading Schemes (UK ETS):** The UK's Financial Conduct Authority operates as a public, independent regulatory body tasked with overseeing the conduct of financial firms to ensure the integrity of the financial markets and protection of consumers. It is funded by fees levied on the financial services industry.

- **California Cap-and-Trade Program:**

  - The **California Air Resources Board (CARB):** Oversees the auctions and trading activities of the cap-and-trade program, including setting market rules and monitoring for potential market violations.

  - **California Attorney General's Office:** Investigates and prosecutes cases of market misconduct or fraud related to the cap-and-trade program.

- **New Zealand Emissions Trading Scheme:** The **Financial Markets Authority** is public institution that oversees trading activities and ensures market integrity within the New Zealand ETS. While considered an independent government agency, it is under the responsibility of the Ministry of Commerce and Consumer Affairs.

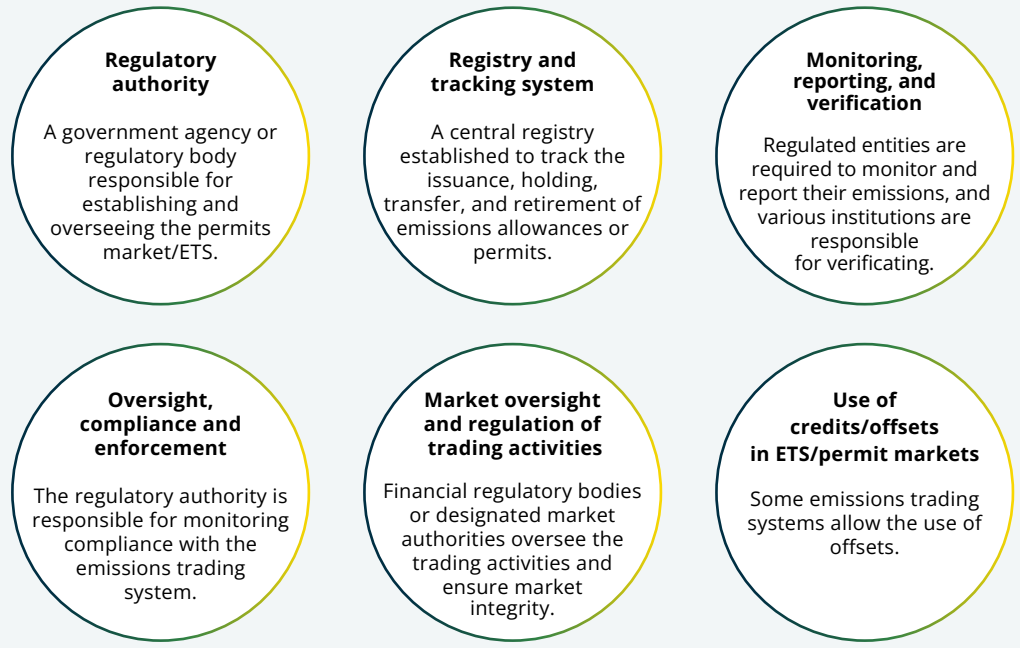
- **South Korea Emissions Trading Scheme**

  - **Korea Exchange** The platform responsible for overseeing and regulating trading activities within the ETS. It is the sole securities exchange in the country, and, as a stock exchange, is accountable to government authorities responsible for overseeing financial markets. This includes the Financial Services Commission and the Ministry of Economy and Finance, which set policies and regulations governing the operation of financial markets.

  - **The Financial Supervisory Service** Responsible for monitoring and enforcing rules related to trading activities within the ETS and falls under the oversight of the Financial Services Commission, which is responsible for rulemaking and licensing.

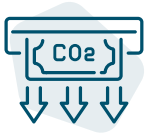
- **China Securities Regulatory Commission (CSRC)** Responsible for overseeing and regulating trading activities within the national ETS. The Commission is not directly accountable to the ministry of finance but instead, operates under the authority of the State Council of the People's Republic of China.

Figure 4. Institutional Frameworks



Source: Authors' elaboration.

Other important features of permit markets



1. Use of credits/offsets in ETS/permits markets

Some emissions trading systems allow the use of offsets, which are carbon credits from projects outside the capped sectors of the trading system. For instance, the EU ETS previously accepted credits from the clean development mechanism projects, but due to its national emission reduction target the decision was to stop using international credits to comply with the EU ETS beyond 2020. However, in such cases, specialized government institutions may be required to approve, verify, and issue these offset credits. The institutional aspects of these offset markets is not discussed here but covered in detail in Section 3.

2. Allocation of proceeds from allowance auctions

Governments can adopt various approaches when dealing with the proceeds obtained from auctioning ETS allowances. Governments have employed various approaches when it comes to the treatment of proceeds obtained from auctioning emission trading system allowances:

- **National public budget allocation:** In some countries, the revenue generated from auctioning ETS allowances is directed to the national public budget. This approach allows governments to have more flexibility in allocating funds across various sectors and priorities. For instance, in the EU ETS, several member states, such as Germany and the Netherlands, initially allocated the auction proceeds to their general budgets.

- **Earmarking for specific purposes:** When possible, other governments earmark a portion, or all, of the auction proceeds for specific purposes, such as supporting climate change mitigation and adaptation efforts, promoting renewable energy, funding energy efficiency programs, or providing relief to low-income households affected by increased energy costs. In practice jurisdictions can also employ a combination of these approaches, balancing budgetary needs, environmental priorities, and economic considerations in the utilization of auction proceeds. Examples of earmarking are the following:

    - In California's Cap-and-Trade Program: A significant portion of the auction proceeds is allocated to the Greenhouse Gas Reduction Fund, which supports projects aimed at mitigating GHG emissions.

    - The Regional Greenhouse Gas Initiative (RGGI): With presence across several U.S. states, typically invests a portion of the auction proceeds in energy efficiency programs, renewable energy projects, and other initiatives to mitigate emissions.

- **The United Kingdom:** A portion of its EU ETS auction proceeds has been used to support the development of renewable energy sources and energy efficiency measures.

- **Revenue recycling:** Some governments opt to recycle or redistribute a portion of the auction proceeds back to regulated entities or specific sectors to mitigate the potential economic impacts of the ETS. This approach aims to maintain competitiveness and alleviate the burden on industries or consumers affected by the carbon pricing mechanism. For instance, in New Zealand's ETS, a portion of the auction proceeds is used to provide free allocation of allowances to emissions-intensive, trade-exposed industries.

- **Combination of approaches:** Finally, governments may employ a combination of these approaches, allocating portions of the auction proceeds to different purposes, such as the national budget, funds earmarked for climate-related initiatives, and revenue recycling mechanisms.

3. Tax treatment of carbon permits/allowances

Another issue that ministries of finance may wish to consider is the treatment of trading permits under tax codes. There are arguments on both sides as to whether the trading of carbon permits or allowances should be treated in the same way as other goods or assets for tax purposes, or whether special tax treatment should apply. While both perspectives hold merit, the focus of analysis for this study are the specific roles and responsibilities ministries of finance should have in carbon markets. Box 3 illustrates how some finance ministries have approached taxation of emissions trading systems. Examples of how different jurisdictions treat emissions trading for tax purposes include the following:

- **European Union:** In the EU ETS, the trading of emissions allowances is subject to VAT in member states. The European Commission has issued guidance clarifying that the purchase and sale of emissions allowances should be treated as a supply of services for VAT purposes.
- **New Zealand:** In New Zealand's emissions trading scheme, the transfer of emissions units is subject to a goods and services tax (GST).
- **California:** In California's Cap-and-Trade Program, the sale of emissions allowances is generally considered a taxable event for state income tax purposes. However, certain exemptions or favorable tax treatments may apply, depending on the specific circumstances of the entity involved in the transaction.
- **South Africa:** South Africa's carbon tax—effectuated in 2019—applies to the purchase of emissions allowances in certain cases. However, there are specific tax exemptions and offsets available for companies participating in the country's proposed carbon trading system.

Box 3. Mexican ETS Pilot

The Mexican ETS began with a pilot program with two phases: a pilot phase between 2020 and 2021, and a transition phase in 2022. Throughout 2023 and 2024, the government—with the support of various organizations—has been analyzing the outcomes of the pilot phase to ensure the effective implementation of this system.

1. Regulatory authority: The Ministry of Environment and Natural Resources ("Secretaría de Medio Ambiente y Recursos Naturales", SEMARNAT) is the primary regulatory authority responsible for establishing and overseeing the emissions permits market in Mexico, which is still in development. SEMARNAT is supported by the technical expertise of the National Institute of Ecology and Climate Change (INECC) and the Advisory Committee of the Emissions Trading System (COCOSCE).

2. Registry and tracking system: Created during the trial phase of the Mexican emissions trading system, the Emission Rights Tracking System (Sistema de Seguimiento de los Derechos de Emisión) is the electronic platform where emission allowances and offset credits issuance, trade, and cancellation is registered. Through this platform, participants interact to fulfill their obligations.

3. Monitoring, reporting, and verification: All sources with annual emissions exceeding 25,000 tons of carbon dioxide equivalent (tCO_2 e) are required to report their emissions in an annual operation report (COA). This report serves as the primary information tool of the Registry of Emissions and Pollutants Transfers (RETC), in compliance with the National Emissions Registry (RENE) regulations.

4. Oversight, compliance, and enforcement: SEMARNAT is responsible for the oversight, compliance, and enforcement of the emissions trading system in Mexico. In the pilot phase, there were no monetary penalties (Article 6).

5. Market oversight and regulation on trading activities: SEMARNAT oversee trading activities in the carbon market to ensure market integrity. Additionally, emissions reductions from voluntary initiatives are eligible if verified in accordance with ISO 14064-2:2006 standards. Through this mechanism, GHG sources can compensate up to 50 percent of their emissions subject to the carbon tax.

Source: Secretaría de Medio Ambiente y Recursos Naturales (2019).

Roles of finance ministries

The role of finance ministries is less clear in the case of carbon markets than in the case of carbon taxes. Nonetheless, the involvement or even full engagement and leadership of ministries of finance may be required in both carbon credits and permits markets. This is unsurprising in the case of roles that depart from their traditional mandates, such as defining tax treatments of allowances, and the collection of the corresponding revenues. Nevertheless, it may be argued that ministries of finance should play an active role in issues such as allocation of revenues from auctioned permits, or market financial oversight. Moreover, finance ministries have played a notable role; an example is South Korea's KETS operation (Box 4), where the ministry of economy and finance has historically become the main regulatory authority of the ETS.

Box 4. Ministry of Economy and Finance in the Governance Framework of South Korea's Emissions Trading Scheme

The Ministry of Environment was responsible from the outset for managing all aspects of the KETS operation. This changed in June 2016 with the Amendment to ETS Act, which restructured the ETS oversight, arguing that the Ministry of Strategy and Finance (now the Ministry of Economy and Finance) should assume responsibility for the overall system operation and

support of Korea's carbon market, given the interplay between emission mitigation, economic growth, and industrial competitiveness. This responsibility included the following: regulating the volume of allowances in circulation, by managing the allowance reserve fund, and overseeing the allocation of allowances and compliance process through working closely with four sectoral ministries.

In June 2017, the Ministry of Economy and Finance released the second master plan for KETS. However, since the beginning of Phase II in 2018, the KETS governance was returned to the Ministry of Environment, which became responsible for the KETS operation and for the overall achievement of the national GHG emission mitigation target.

After the 2018 restructuring, the Ministry of Economy and Finance remained actively involved in KETS, forming part of the Inter-Ministerial Working Committee, to strengthen cooperation between the relevant ministries and provide advice to the Ministry of the Environment. In collaboration with the Ministry of Environment, the Ministry of Economy and Finance is also involved in the development of the KETS basic plans.

Source: ABD (2018).

A recent regional experience in ETS design has an active role from the ministry of finance, in collaboration with the environmental authority. This is Brazil's proposed ETS (Brazilian GHG Emission Trading System (SBCE), included in Bill #182 of 2024, awaiting approval in the Senate.

Brazil´s bill with a federal ETS

- **Background:** The current administration has reestablished climate change as a policy priority and consistently mandated the ministry of environment and the ministry of finance, among other institutions, to review and identify significant shortcomings in several bills related to carbon pricing and climate in Congress (one issue identified was the lack of foresight in law enforcement), in order to prepare a comprehensive new bill.

- **Legislative process:** The bill was presented to the Senate and approved with several changes, the most significant being the exclusion of the agricultural sector. The House of Representatives approved it with comments, and it is now back in the Senate for final approval.

- **Design:** The design of the cap-and-trade system for inclusion in the new bill was a collaboration between the MA, MH, eight additional ministries, and several agencies and professional associations. Tasks were assigned to these institutions according to their capabilities. It was based on studies conducted between 2015 and 2019 by the MH, the World Bank, and the Partnership for Market Readiness (PMR). These studies included socioeconomic regulatory impact assessments, and economic impact assessments using a general equilibrium model. The new bill followed the policy recommendations that

emerged from such exercises. Special attention was also given to issues such as the legal nature of allowances, their tax treatment, and the registration obligations of assets (allowances and credits).

- **Objectives:** The Brazilian federal ETS aims to help the country achieve its NDC targets cost-effectively, and to comply with its National Climate Change Plan. In the long term, the ETS is expected to become a more relevant instrument, covering more emissions.

- **Coverage:** Apart from the agricultural sector, coverage is not defined in terms of economic sectors, but on emissions' thresholds. These thresholds are, for annual emissions exceeding 10,000 tons of CO_2 e, an obligation to report emissions and, for annual emissions exceeding 25,000 tons of CO_2 e, an obligation to participate in the ETS. It is expected to cover large industries, the energy sector, and part of the transportation sector. Currently, it covers 35 percent of emissions, which is expected to increase if under controlled deforestation.

- **Implementation:** The current design of the Brazilian federal ETS foresees a further one or two years for drawing up a definition of the basic rules, along with the following three phases:

    - **Phase I:** One additional year of emissions reporting, without trading. This phase is expected to start with large sources (over 50,000 tons of CO_2 e per year) and gradually lower the threshold to 10,000 tons.

    - **Phase II:** Second and third years; first phase of transactions with free allocation of allowances, starting with large sources (over 200,000 tons of CO_2 e) and lowering to a minimum of 25,000 tons.

    - **Phase III:** Trading with an initial auction of permits begins.

- **Connection with the Paris Agreement:** The bill links the ETS with Article 6 of the Paris Agreement (ITMOs).

- **Connection with credits markets:** The ETS includes the possibility of purchasing a percentage of carbon credits to cover emissions, in addition to permits. This percentage is defined annually by the regulator.

- **Governance:** Governance of the SBCE will be shared by (i) a "superior" deliberative body, (ii) managing body, and (iii) permanent consultive technical committee (Article 6). The superior body will be subordinated to an interministerial committee of climate change. Among the responsibilities of this committee are: (i) approval of the national allocation plan; (ii) establishing technical groups to provide support, and presenting recommendations for the improvement of the SBCE; (iii) approval of the annual plan for the allocation of resources originating from the SBCE revenue, in accordance with the priorities established in this Law (Article 7). The superior body comprises the ministry of finance, which will be its president, and representatives from the president´s office, the ministry of the environment, and representatives from other ministries, as well as the Senate, the House of Representatives, states, and municipal governments. The managing body has extensive responsibilities in the

bill. Among these, to (i) regulate SCBE; (ii) define the monitoring methodologies and present information on emissions, emission reductions, and GHG removals, in accordance with this Law and the guidelines of the SBCE's superior and deliberative body; (iii) define the activities, facilities, sources, and gases to be regulated within the scope of the SBCE for each commitment period; (iv) establish thresholds for reporting and trading; (v) define the requirements and procedures for measuring, reporting, and verifying emissions from regulated sources and facilities; (vi) implement the national allocation plan in each compliance period; (vii) create, maintain, and manage the SBCE Central Registry; (viii) issue CBEs (Carbon Emission Certificates); (ix) conduct auctions and manage the CBE auction platform; (x) evaluate the monitoring plans submitted by operators; (xi) receive and evaluate emissions and GHG removal reports; (xii) receive reports and conduct the periodic reconciliation of obligations; (xiii) define and implement mechanisms for stabilizing CBE prices; (xiv) establish the requirements and procedures for accrediting and de-accrediting methodologies for generating Verified Emission Reduction Certificates (CRVE); (xv) accredit and de-accredit methodologies for generating CRVE; (xvi) establish rules and manage potential processes for linking the SBCE to emission trading systems of other countries or international organizations, ensuring functionality, cost-effectiveness, and environmental integrity; (xvii) investigate infractions and apply sanctions resulting from non-compliance with SBCE rules; and (xviii) propose measures to protect the competitiveness of regulated sectors in the face of external competition, within the scope of its attributions.

4 Survey Results:

Five Insights into the Role of Finance Ministries in Carbon Market Design and Implementation

Countries have existing norms, regulations, and conventions that define the institutional structure of the executive branch and outline the mandate and functions of the ministries. Such frameworks, drawn up by the constitution, government organization acts, ministerial acts or statutes, executive orders, and decrees, as well as conventions and traditions, particularly in countries with a parliamentary system, are often outdated and therefore may not specifically delineate or address institutional responsibilities related to the more contemporary issues of climate change and carbon markets. To understand how ministries of finance perceive their institutional role in the design and operation of carbon markets, and what legal frameworks they believe support this understanding, a survey was conducted among members of the Platform with responses from nine countries.

4.1 Key Insights from the Survey

1. Governments tend to focus on developing mechanisms that best suit their objectives.

Regards the type of market already in effect, or in development, responses showed that voluntary credit markets and regulated markets existed in equal measure, encompassing both credit and emission permit markets. This suggests that there is no strong trend toward the development of either regulated or non-regulated emission reduction mechanisms. Instead, it indicates that governments are generally focusing on developing mechanisms which best fit their objectives, resources, and constraints. Nevertheless, some countries reported not having or developing any of these systems.

2. Finance Ministries have the role of linking the national carbon market with the national carbon tax.

Specifically regarding credit markets, when countries were asked about the role that ministries of finance should play in the design and implementation of these systems, there was a consensus that they should assume their historical and mandatory roles, such as (i) linking the national carbon market to the national carbon tax, (ii) the tax structure of the carbon market, (ii) the compensation mechanism, and (iv) the allocation of revenues collected by taxing carbon market activity. Surprisingly, there was also consensus that ministries of finance should play a leading role in defining the objectives of the carbon market. Additionally, many emphasized the importance of connecting the national market with the international market to ensure coherent policy and expand opportunities.

3. Finance Ministries take the lead in the design and implementation of compensation mechanisms.

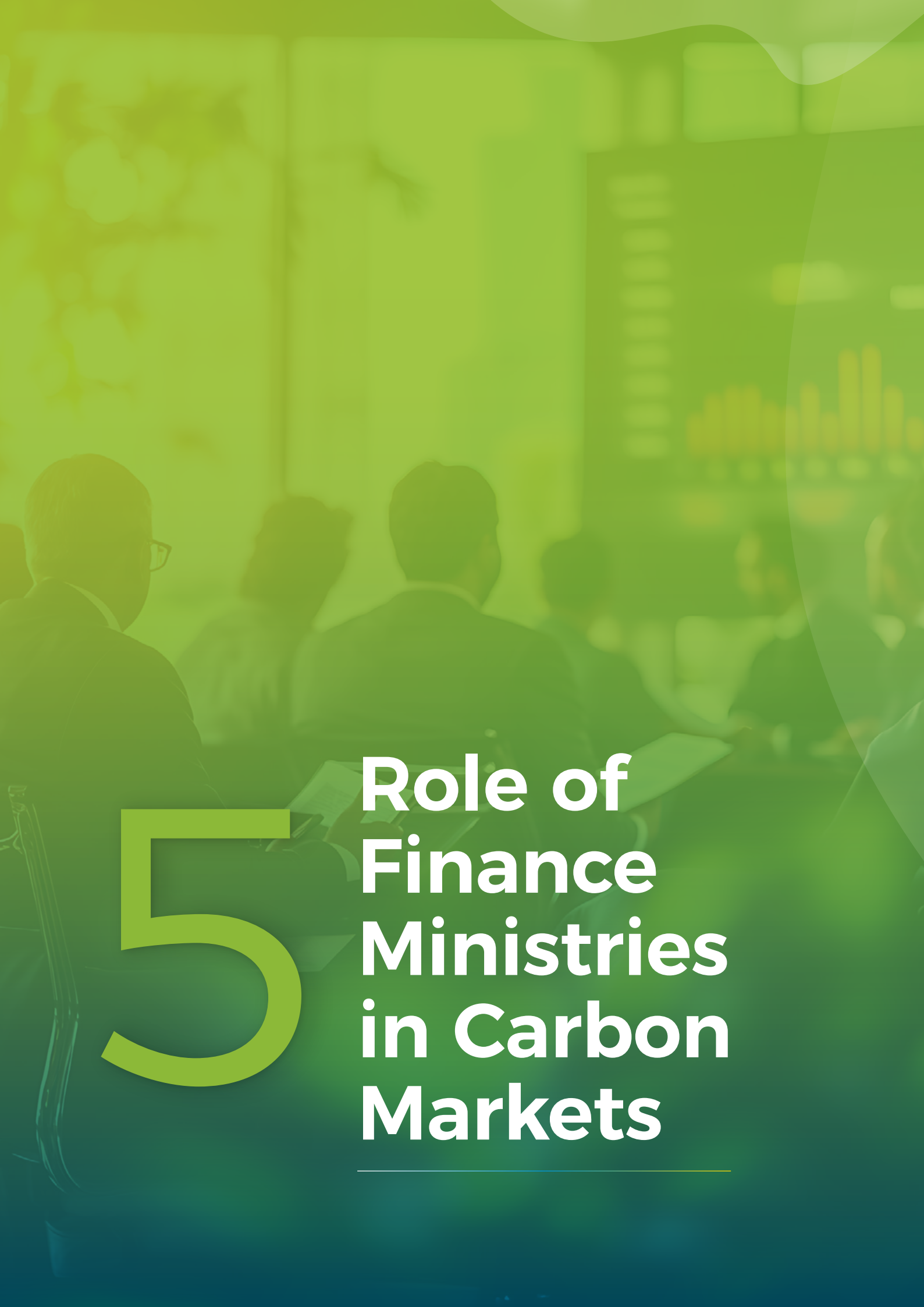
When asked about the role ministries should assume regarding the operation of credit markets, there was widespread consensus on designing and implementing a compensation mechanism. Tasks less historically associated with ministries, such as sales, validation, or registration, garnered less consensus. Considering both questions, it can be concluded that ministries of finance are generally expected to focus on the design and subsequent implementation of these systems. They may also take on other tasks if necessary, but with a lower priority.

4. Ministries have various roles to play in the design and implementation of an ETS.

Regarding emission permits markets, there was strong consensus that the ministries should address budget management, compensation mechanisms, establishing a robust financial structure, revenue allocation and tax structure, impact assessment of the instrument to understand its implications on key economic variables, and permit allocation to determine the best strategy for distributing permits among participating companies initially. Other tasks such as monitoring, defining penalties for non-compliance, or inspections, which are crucial for the proper design and operation of these systems, had lower consensus among ministries.

5. Finance ministries require more qualified resources to implement these policies.

Finally, when asked to identify any barriers which may hinder or prevent the design and implementation of a carbon market in their country, the most frequently mentioned response, by a significant margin, was the lack of skilled human resources. This indicates a substantial deficit in personnel with the necessary skills and knowledge to design and operate carbon markets, highlighting the need for investment in training and professional development. Another recurring response was related to institutional barriers, suggesting structural issues within the ministry or in its interaction with other institutions that impede progress, indicating the potential need for internal reforms in the ministry and better coordination and collaboration with other government agencies and relevant stakeholders. Lastly, barriers less frequently mentioned were the lack of monitoring and verification systems, or insufficient funding.



5 Role of Finance Ministries in Carbon Markets

This section identifies the possible roles of ministries of finance in the design, implementation, and operation of carbon credits markets , which are less clear cut than their roles in carbon taxes. Ministries of finance could foster the use of basic analytical tools that point to the macroeconomic effects of different carbon markets design, thereby providing estimations of abatement costs of the different sectors. These simple calculations could help determine which sectors should participate in regulated markets in the short and long run, the potential trade gains, the amount of funds this market is expected to mobilize, and what proportion of these markets could contribute to the overall funds required to meet the NDC targets.

The estimation of abatement costs of participating sectors could also inform the design of a permits markets/ETS in relation to the possible definition of price floors and ceilings or stability reserves. Ministries of finance could advance the economic analysis of climate policies through a platform to help ministries and other public offices formulate and analyze climate policies (e.g., climate change general laws).

The link between domestic and international carbon markets via **Article. 6 of the Paris Agreement** is crucial. LAC countries may have to define the rules by which carbon credits generated by national sectors can be exported without restricting the freedom of trade of the generating sectors. In the language of Article 6.2., the government of a transferring country needs to authorize the transfer of ITMOs for the acquiring organization or country to use them for their NDC or other purposes. If the ministry of the environment lacks the capacity in economic analysis, the transferring country risks transferring credit from the lowest-abatement-costs projects abroad and keeps the higher-abatement-cost project to meet their own NDC objectives. A carbon tax offsetting mechanism could help to avoid this possibility. In any case, ministries of finance can inform this decision through either requesting or performing the calculation of "abatement cost curves" for the different possible removal or mitigation projects and coordinating the drafting and approval of an "authorization rule."

5.1 Carbon credits markets

Project proposal phase

With principal actors and primary stakeholders including investors, project developers, project owners, local communities, and other ministries or governmental agencies, the role of ministries of finance in the project proposal phase of a voluntary or a regulated carbon credit market seems minimal. The development of technical guidelines for preparing a proposal or its evaluation would likely be led by the designated verification entities and environment ministry, without requiring direct finance ministry involvement at this phase. Some of the indirect roles the finance ministry may play include the following:

1. Fiscal incentives

The finance ministry may structure and administer fiscal incentives (tax credits, subsidies, etc.) to promote private sector investment in development and promotion of creditable emissions mitigation projects.

2. Public financing

For public, sector-led project proposals by government agencies, the finance ministry could be involved in budgeting, allocation of funds, and financial appraisal of proposed projects. This could also be closely coordinated with NDBs.

3. Representation on approval boards

Finance ministry officials could have representation on inter-agency boards/committees that evaluate and approve project proposals to ensure fiscal/economic considerations are factored in. In particular, they could assist in the evaluation of the projects' additionality based on their financial information.

Validation and verification phases

Currently, ministries of finance do not have a direct role in the validation and verification phases of voluntary and regulated voluntary carbon credits markets carried out by private sector auditors and verifiers that apply rules and methodologies of specific private carbon crediting and auditing programs/standards or national governmental or multilateral organizations. Technical evaluation of whether a specific project proposal meets the carbon crediting standards and methodological requirements are led by the designated verification entities and the environment ministry, without requiring direct finance ministry involvement at this phase. Nonetheless, where carbon credits are used as offsets against tax liabilities, finance ministries may be motivated to ensure validation and verification processes are rigorous to maintain environmental and fiscal integrity of approved credits. The core technical work of conducting validation audits, documentation reviews, assessing emissions calculations, and ultimately determining if a project meets criteria for validation and verification should rest with accredited third-party auditors and verifiers per established carbon crediting program rules and methodologies. Nevertheless, ministries of finance could collaborate with environmental ministries in evaluating the need for a government-led accreditation of independent firms which conduct validation and verification, whereby carbon credits could be allowed to offset carbon tax liabilities.

Certification/issuance phase

No direct role has been assigned to ministries of finance in the technical certification process of determining whether an emissions mitigation project satisfies the additionality, permanence, monitoring, and other criteria required by a given carbon crediting standard before credits can be issued. Nevertheless, for tax purposes, a ministry of finance would need to decide whether issued carbon credits should be treated as capital assets, investment instruments, commodities, or as a separate asset class. This determination would impact how credits are taxed when issued to project owners and when traded/transferred between buyers and sellers, even in the secondary market. Where carbon credits can be used to offset tax liabilities such as carbon taxes, finance ministries should set clear rules on what types of issued credits from which certification programs or standards qualify as eligible offsets.

Registration and market phases

Where carbon credits can offset tax liabilities, the ministry of finance should streamline the national emissions registry data with tax reporting and collection systems. This could involve: (i) developing protocols for tax filers to report and claim approved carbon credit offsets, (ii) verifying offset claims against emissions registry data during tax assessments, and (iii) accounting for fiscal impacts of approved offsets in revenue forecasting. Robust registration systems with clear chains of custody are critical for ensuring the environmental integrity of carbon markets, and for convincing regulators and buyers that credits represent real, verified emissions mitigation, whilst also preventing the double-counting, or double-selling of credits. For countries allowing carbon tax obligations to be compensated with credits, the registration data is essential for properly accounting for domestically generated credits and aligning with national emissions reporting under the Paris Agreement, and thus, registration is crucial for finance ministries to accurately validate ownership and for the accounting of credits claimed as offsets against taxes owed.

Revising norms and regulations for finance ministries' role in carbon credit markets

Given that existing norms, regulations, and conventions defining the institutional structure and mandates of ministries may not have anticipated contemporary issues such as climate change and carbon credit markets, several legal and regulatory amendments may be necessary to reflect the new functions for ministries of finance in operating carbon markets and overseeing carbon credit registries. Some potential areas that could require updates include the following:

1. Climate change laws/acts

Many countries have overarching climate change laws or framework acts that establish national goals, principles, and institutional arrangements for addressing climate change. These laws may need to be revised or amended to accomplish the following:

- Explicitly assign responsibilities to the ministry of finance regarding carbon market governance, oversight of offset mechanisms, integration with tax systems, etc.

- Outline cooperation and coordination mechanisms between finance ministries and environment ministries on carbon market policies.
- Establish principles and criteria that finance ministries must consider when evaluating carbon credits for tax offsetting purposes.

2. Government organization laws/acts

The core laws defining the organizational structure, mandates, and powers of different ministries and public bodies may require updates that achieve the following:

- Formally expand the mandate of finance ministries to include climate change mitigation responsibilities related to carbon pricing and markets.
- Authorize finance ministries to issue regulations, guidelines, and administrative procedures for carbon credit registries and offset mechanisms.
- Delineate jurisdictional boundaries between finance and environment ministries on carbon market governance.

3. Tax laws/codes

To offset tax obligations such as carbon taxes, tax laws, and regulations, reforms are needed to realize the following:

- Define qualifying criteria and verification requirements for carbon credits used as tax offsets.
- Establish accounting procedures for integrating approved offsets into tax assessments and revenue forecasting.
- Grant finance ministries authority to audit carbon credit claims and associated tax filings.

4. Carbon market regulations

Depending on the market structure, new regulations may be needed to govern carbon market operations, issuance procedures, oversight, and enforcement mechanisms. These could accomplish the following:

- Assign roles to finance ministries in market monitoring, prevention of manipulation, and ensuring fiscal integrity.
- Establish requirements for data sharing and integration between carbon registries and government financial systems.
- Outline finance ministry sign-off requirements for accreditation of third-party verifiers and commercial registries.

5. Inter-ministerial coordination laws/policies

Countries may need to enact new laws, executive orders, or formal coordination policies to achieve the following:

- Define cooperative governance models between finance, environment, and other relevant ministries on carbon market policies.
- Establish inter-ministerial committees, data sharing mandates, and dispute resolution mechanisms related to carbon markets.
- Update institutional decision-making processes to ensure finance ministry involvement in carbon market and climate policy development.

5.2 Carbon permits markets

There are several potential roles for the finance ministries in these markets. Ultimately, they should be determined through close collaboration and coordination with environmental ministries and other relevant stakeholders. Striking the right balance between economic considerations and environmental objectives, while leveraging the respective expertise and mandates of different government agencies is key for the successful design and operation of carbon permits markets or ETS. Even without being the leading institution in charge of an ETS, ministries of finance could facilitate coordination and policy alignment between environmental ministries, industry ministries, and other relevant stakeholders. This could ensure that the design and implementation of carbon markets are harmonized with broader economic and fiscal policies, promoting a comprehensive and cohesive approach.

Market oversight and regulation

Ministries of finance could play a central role in overseeing and regulating ETS markets, given their responsibilities and expertise in economic policy, public finance, fiscal policies, and regulation of financial markets and securities. While there is no single prescribed recipe that could work, or be desirable, for all ministries of finance, possible roles are the following:

- Lead the design and operation of ETSs.
    - To obtain a careful balance between environmental objectives and economic competitiveness concerns, the ministries of finance could facilitate design and operation, leveraging their expertise in economic analysis and industry impact assessments (in coordination with other relevant ministries).
    - Economies that rely heavily on manufacturing or export-oriented sectors may need to merge carbon market policies with ones that have broader economic and industrial policies. Ministries of finance could take the lead to coordinate these efforts effectively.
- Collaborate with financial regulatory bodies or designated market authorities to establish rules and regulations to prevent market manipulation, insider trading, or other abuses.
- Supervise and coordinate with national financial regulators to ensure market integrity and transparency.
- Provide guidance on the application of existing financial regulations or develop new ones specific to carbon trading activities.

Tax treatment and revenue allocation

Concerning the implications on the overall fiscal policy and the short and long-term impact on revenues, ministries of finance need to define the treatment of carbon permits or allowances with taxes such as the VAT or GST. They should also determine the allocation and utilization of revenue generated from auctioning allowances, balancing environmental priorities and any economic or fiscal needs.

Economic impact assessment and competitiveness considerations

Given their responsibility and institutional mandate in economic analysis and industry competitiveness, ministries of finance could assess the potential economic impacts of carbon pricing mechanisms on different sectors and industries. This could inform policy decisions around revenue recycling mechanisms, exemptions, or support measures to mitigate potential adverse effects on trade-exposed industries or low-income households.

Revising norms and regulations for finance ministries' role in carbon permits markets

Carbon permits markets are complex policy instruments that require comprehensive institutional frameworks and the involvement of various stakeholders to operate effectively. The specific institutional arrangements and distribution of responsibilities among government entities can vary significantly across jurisdictions, depending on factors such as the economic sectors covered, overall design and objectives of the system, and existing legal and regulatory frameworks.

In many countries, the institutional structures and mandates of government ministries, including ministries of finance, are defined by a range of legal and regulatory instruments, such as constitutions, government organization acts, ministerial statutes, executive orders, and conventions. However, these frameworks often pre-date the emergence of carbon markets as a policy tool to address climate change. As a result, current norms may not explicitly delineate the roles and responsibilities of ministries of finance in relation to the design, implementation, and oversight of carbon markets or ETS. As governments are increasingly interested in these types of instruments, it is crucial to assess and, if necessary, amend, existing legal and institutional frameworks to ensure that ministries of finance have the necessary mandate and authority to effectively contribute to the adequate operation of these systems. Thus, the following types of norms, regulations, and laws could or should be revised:

1. Government organization acts or laws

Laws that define the structure, functions, and responsibilities of government ministries and agencies could be amended to explicitly include the roles and responsibilities of the ministry of finance in relation to carbon markets or ETS, such as market oversight, regulation, tax treatment, and revenue allocation.

2. Climate change laws or environmental protection acts

Countries may have specific laws addressing climate change mitigation and adaptation, or general environmental protection. These laws should be revised to clearly define the roles and responsibilities of different government entities, including the ministry of finance, in the context of carbon markets. The amendments should ensure proper coordination and collaboration between the ministry of finance and the primary regulatory authorities, such as the ministry of environment, or environmental protection agencies.

3. Financial market regulations

Existing financial market regulations, such as securities laws or regulations governing financial institutions, should address the specific aspects of carbon market trading. These amendments should clarify the supervisory and regulatory roles of the ministry of finance, or relevant financial regulatory bodies, in overseeing the trading activities and ensuring market integrity in carbon markets or ETS.

4. Tax laws or revenue codes

Tax legislation or revenue codes should be revised to provide clarity on the tax treatment of carbon permits or allowances, including issues such as VAT, GST, or income tax implications.

5. Public budget laws

Laws governing public financial management, such as budget laws or fiscal responsibility acts, may need to be amended to reflect the potential revenue streams from carbon markets or ETS and to establish clear rules for the allocation and use of these funds. The amendments should define the roles and responsibilities of the ministry of finance in managing and overseeing these financial resources.

6. Executive orders or decrees

In countries where the executive branch has the power to issue orders or decrees, these instruments can be used to clarify the roles and responsibilities of the ministry of finance in carbon markets or ETS, until more permanent legislative changes can be implemented.

The specific amendments required will depend on the existing legal and institutional frameworks in each country and the chosen approach for involving the finance ministry in carbon markets or ETS. The process of amending these laws and regulations should involve close consultation and collaboration among relevant government entities—including the ministry of finance, ministry of environment, and other stakeholders—to guarantee a coherent and effective legal and institutional framework for the operation of permits markets.

6 Challenges and Risks

6.1 Challenges

Putting a price on GHG emissions to control pollution was first proposed at the beginning of the 20th century (Pigou, 1920) for two main theoretical reasons: (i) efficiency/cost-effectiveness, meaning that below a specific pollution price, the sources conducting the abatement will be those with the fewest resources to put it into effect, and (ii) to act as an incentive to develop alternative technologies. The cost-effectiveness argument usually ignores the regulatory costs that are based on the government costs of administering and enforcing the pollution control program. There is clear cost increase that reduces cost-effectiveness, thus there is still a case for the argument but a more subtle one (Caffera, 2011). Nevertheless, as seen above and in other documents of the Platform (Talbot-Wright et al., 2023), there are challenges in implementing a pollution price. These can be grouped in two categories.

Political challenges

The implementation of carbon pricing could generate political challenges associated with its economic and distributional impact. The minimization of social costs that pollution prices deliver may be less important in political terms than its distribution. Putting a price on pollution will increase costs. This creates losers (those whose costs increase due to higher input costs, or who must adopt more expensive and less carbon-intensive technologies) who will oppose the mechanism and lobby against it.

The higher the price, the stronger the opposition. Therefore, setting a price on emissions demands political will and involves a political cost. Ideally, the political will to set a price would be a response to the social demand to resolve the problem and the political cost would be minimum. But in practice, a broad social demand for carbon prices has not yet emerged in most communities, and what has been seen so far is that putting a price on carbon can create significant opposition, as occurred in France in 2015. In addition to short term opposition, the incentives to develop new technologies are greater as the carbon price gets higher, but this could take time. Therefore, for a number of years, costs for losers could remain higher than in the business-as-usual scenario.

Furthermore, in distributive terms, the impact is usually greater among the most disadvantaged sectors. An important group of losers could be those with fewer alternatives, given their location, (rural population) or means (low-income households). Carbon prices usually impose higher costs on these groups, and this is the main reason why compensation mechanisms should be put in place.

Institutional challenges

Aside from political will, the implementation of economic incentives or prices on emissions requires an institutional capacity that LAC governments usually do not have (Russell and Powell, 1996). Institutional capacity includes environmental and other type of norms, coordination of environmental agencies at all government levels, and skilled human resources (e.g., lawyers to write the laws, economists to design the calculate costs and benefits, together with engineers and technical staff to operate

the technology needed to effectively design, administer, and monitor emissions to enforce these instruments).

Other challenges include the lack of infrastructure capacity needed to support the development of lower carbon energy technology economy-wide, such as the transmission and distribution infrastructure needed to provide electricity (Heal and Schlenker, 2019, Rosenbloom et al., 2020). Another potential challenge is the lack of a properly functioning credit market, which may prevent sources from accessing the necessary funds to install the technology needed. Moreover, access to credit may become stringent depending on the initial capital investment, as is the case for installing renewable infrastructure at significant scale (Fazekas et al., 2022).

Both the political and institutional challenges mentioned above were actively binding in the case of the first pollution taxes and markets tried out in LAC (Caffera, 2011; 2017). Carbon prices are no exception. The two main differences between carbon pricing and pricing other conventional pollutants are as follows:

- The reason for implementing carbon prices is to contribute to a global public good, thus national policymakers must incur political costs, while possibly imposing net negative costs to the country (the costs are national, but the benefits are global, and the action of any LAC country does not change the global emissions trajectory or its consequences).

- Given the seriousness of the consequences of climate change, in the case of GHG emissions, the long-term policy objective is carbon neutrality. In other words, the policy objective is as close as possible to zero gross emissions.[8] Conceptually, this would require a relatively high carbon price to be in place while sufficiently low-cost alternative technologies are being developed.

Given these differences, implementing such a carbon price could have significant political costs for any government.

6.2 Risks

In addition to the political and institutional challenges reviewed above, other challenges put long-term carbon prices at risk. These risks include the following scenarios:

- Governments succeed in implementing carbon prices, meaning that they overcome whatever initial opposition, using some of the tested strategies (communication, gradual introduction, etc.). Nevertheless, the initial political support may erode over time, especially if a party opposing the tax enters government.

- Price volatility creates additional risk to the market (Goulder and Shein, 2013). An example is the EUETS Market Reserve.

[8] Cost-effectiveness makes no sense if the policy objective is zero gross emissions, because all emissions must be abated and there are no emissions left to allocate cost-effectively. It makes more sense: (1) to mitigate all net emissions, where there remain gross emissions to allocate cost-effectively, and (2) within a predetermined period where the technology is expected to emerge and/or decrease its price during this time, particularly in those sectors with higher mitigation or abatement costs.

- By putting in place either a mechanism to compensate losers from carbon prices, particularly low-income households, or a mechanism whereby sources levied by a carbon tax can compensate their tax liabilities, buying carbon credits imposes additional challenges on authorities. In the case of the former, for example, such a mechanism requires information on occupants and household location, and the institutional capacity to effectively deliver the compensations, which is not always present (Missbach, et al. 2023). In the case of the latter, for example, a proper mechanism requires its administration and enforcement to avoid double counting of credits.

Implementing a carbon price requires significant inter-ministerial coordination capacity to address the different dimensions required by the policy. Therefore, it is important to establish an interdisciplinary team to address the challenges in a comprehensive manner. In this sense, it is important to combine the capacities of the finance ministries with the responsibilities and knowledge of the environment and social development ministries so that important safeguards are not overlooked.

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Annex:
Survey Results

When asked about the type of carbon market in existence or development, five ministries declared having voluntary carbon credits markets, three had regulated carbon credits markets, two had emissions permits markets, and two had no market (see Figure A1).

Figure A1. Which type of carbon market exists or is being developed in your country?

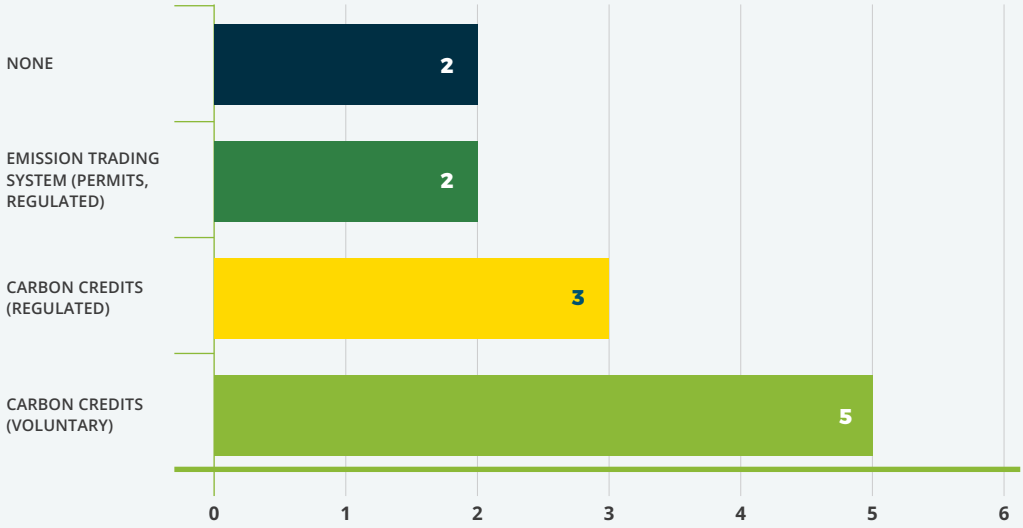


Figure A2 illustrates the responses to whether or not, in their opinion, ministries of finance should play a role in the aforementioned actions that go toward the process of designing and implementing a carbon credit market. Unsurprisingly, there is consensus that the ministries of finance should play a leading role in the issues most related to their mandated, historic roles, such as linking the national carbon market with the national carbon tax, the tax structure of the carbon market, the compensation mechanism, and the allocation of revenues collected by taxing the carbon market activity. Surprisingly, there is also consensus that the ministries of finance should play a leading role in the definition of the objectives of the carbon market. There was a heterogeneity in opinions regarding other possible roles for ministries of finance. Most of the ministries of finance show a favorable opinion to playing a leading role in linking the national and international markets and to the definition of the participating sectors. A minority of ministries declare that they should have a leading role in the selection of certification firms and the enforcement of the market.

Figure A2. According to your ministry's vision, what is understood to be its role in the process of designing and implementing a carbon credit market (whether voluntary or regulated)?

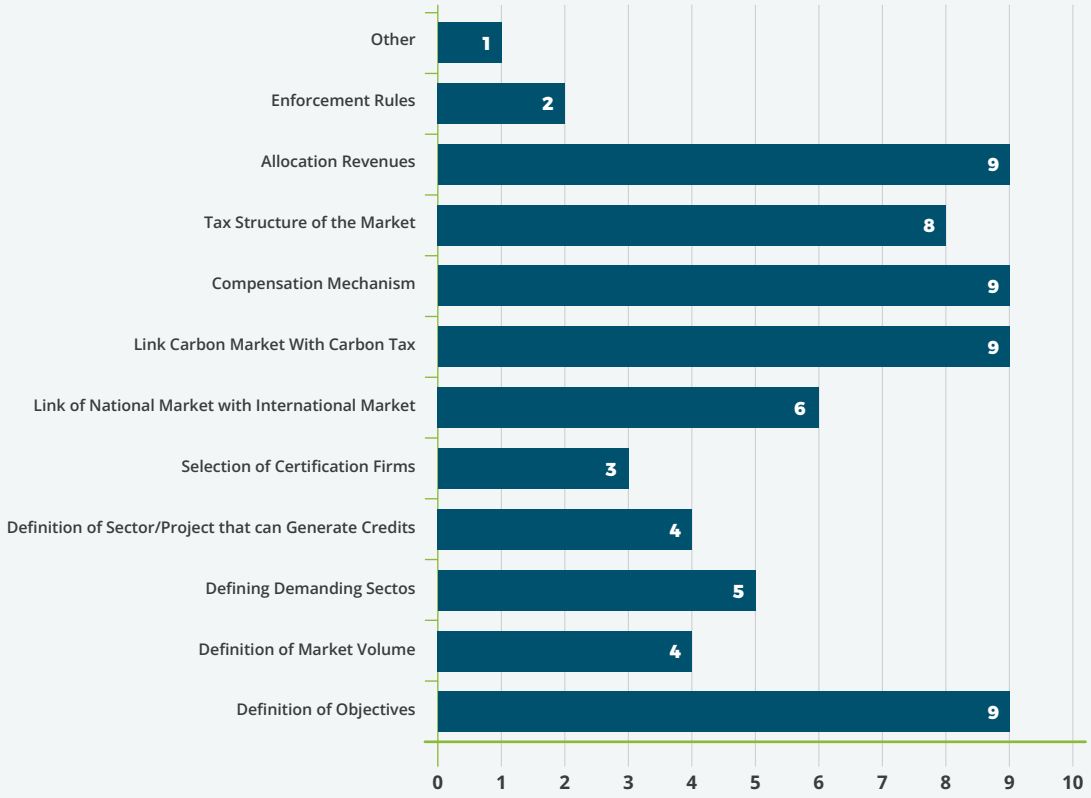


Figure A3 illustrates the distribution of responses to the question of what the role of the role of ministries of finance should be the operation of a market for carbon credits. A minority of ministries think they should play a leading role in activities such as validation, verification, registration or sale of carbon credits. Most of the MoFs see their contribution as primarily linked to financial aspects, particularly that of establishing the system where entities subject to carbon taxes can present carbon credits acquired in the market to offset or reduce their tax liabilities.

In the case of the markets for emission permits, Figure A4 shows that almost all ministries of finance believe they should play a role in the activities commonly developed by these ministries (definition of the tax structure of the market activity, allocation of revenues from these taxes, and the budget allocated to the functioning of the market). Most ministries hold the opinion that they should participate in studies to assess the impact of the market on firms' profits and households' incomes. A minority of ministries think they should play a role in the definition of issues commonly reserved for the ministry of the environment, such as defining the market cap, the participating sectors, and the allocation rules of the permits.

Figure A3. **According to your ministry's vision, what should be its role in the operation of a carbon credit market (whether voluntary or regulated)?**

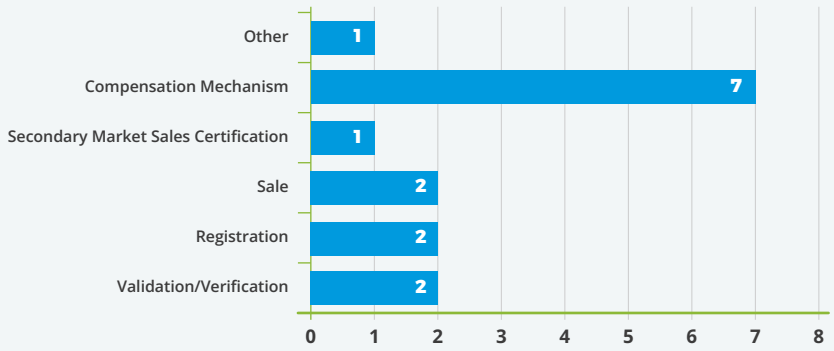
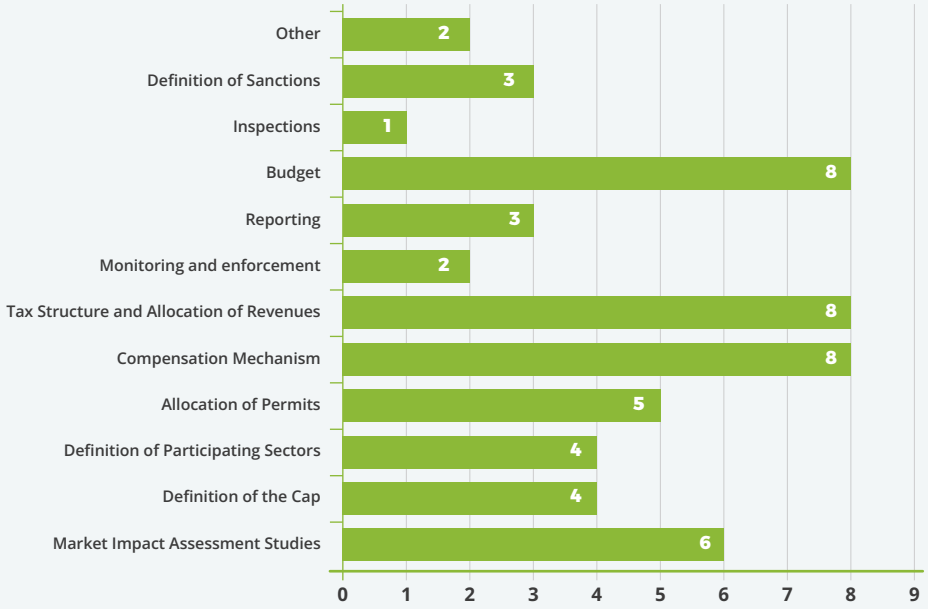


Figure A4. **According to your ministry's vision, what should be its role in the process of designing and implementing a trading market for emission permits?**



Ministers were also asked about the legal regulations or mandates that allow them to play these roles in carbon markets. Five ministries mentioned specific norms and four mentioned general rules. Lastly, they were also asked to identify barriers to the fulfillment of these identified roles. The most important barrier (identified by eight of the nine ministries) was the lack of human resources, followed by other institutional barriers, such as the need to modify laws and regulations, and the lack of an institutional setting that clearly defines the role of each ministry.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