

Voluntary and Compliance Market-based Mechanisms: a Potential Source of Funding to Protect Blue Carbon Coastal Ecosystems in Baja California and Baja California Sur

This report was prepared for the following project:

Examining Cross-Border, Nature-Based Market Solutions to Protect Blue Carbon Coastal Ecosystems in the Californias

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List of Acronyms

ACR: American Carbon Registry
CAR: Climate Action Reserve
CO₂: Carbon Dioxide
CORSIA: Carbon Offsetting and Reduction Scheme for International Aviation
COP-26: United Nations Conference of the Parties 26
ESG: Environment, social, and governance
ETS: Emissions Trading System
EU: European Union
GHG: Greenhouse Gas
ICAO: International Civil Aviation Organization
IMF: International Monetary Fund
IOA: Institute of the Americas
LEAF: Lowering Emissions by Accelerating Forest Finance
LGCC: Mexico's General Law on Climate Change
MRV: Measuring, Reporting and Verification
NDCs: Nationally Determined Contributions
REDD+: Reducing Emissions from Deforestation and Forest Degradation
SEMARNAT: Mexico's Secretary for Environment and Natural Resources
tCO₂e: Ton of carbon dioxide equivalent
TNC: The Nature Conservancy
TREES: The REDD+ Environmental Excellence Standard
TSVCM: Task on Scaling Voluntary Credit Mechanisms
UNFCCC: United Nations Framework Convention on Climate Change
UK: United Kingdom
US: United States
USD: United States Dollar
VCS: Verra
WCI: Western Climate Initiative

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Voluntary and Compliance Market-based Mechanisms: a Potential Source of Funding to Protect Blue Carbon Coastal Ecosystems in Baja California and Baja California Sur

The Institute of the Americas has established a project to examine cross-border, nature-based market solutions to protect blue carbon coastal ecosystems in Baja California and Baja California Sur (the “Las Californias Project”).

The Las Californias Project seeks to identify sources of finance to fund conservation and restoration projects of blue carbon ecosystems in Baja California and Baja California Sur, both for the richness of ecosystem services they provide to communities and for the role they can play in mitigation and adaptation of climate change. These ecosystems provide an important source of services for the surrounding communities and the state as a whole, in the form of food security, storm protection, and ecotourism. Furthermore, today’s climate crisis is putting an increasing value on carbon sequestration and climate mitigation—something blue carbon assets such as mangroves can support, which could lead to carbon credits being issued in the international carbon markets, thus providing another source of income for the conservation of these ecosystems.

This report will examine market-based carbon mechanisms (both voluntary and compliance markets) as a potential source of financing for blue carbon restoration and conservation in Mexico. It is one in a series of five papers, part of the project entitled “Examining Cross-Border, Nature-Based Market Solutions to Protect Blue Carbon Coastal Ecosystems in the Californias”.

Another stand-alone paper will examine what we believe is one of the key potential sources of funding for blue carbon projects in the Baja California Peninsula, which is cross-border funding sources under California law, including (1) the California regulatory regime for protection of specified species and related habitats (“Species and Habitat Protection”); (2) the California Cap-and-Trade Program, and (3) the California Environmental Quality Act with respect to mitigation of greenhouse gas emissions.

This report is divided into an introduction, delving into why carbon markets present an increasingly interesting funding source for blue carbon asset conservation as the transition to a low-carbon world advances; a section on regulated carbon markets, including a description of Mexico’s pilot project Emission Trading System; a section on voluntary carbon markets, including a subsection on blue carbon offsets, and a subsection on CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation) and another on the LEAF initiative (Lowering Emissions by Accelerating Forest Finance Coalition); a section on Article 6 of the Paris Agreement and its importance in regulating carbon markets and in providing them much-needed credibility to scale up; and, a section on conclusions and recommendations for policymakers and non-government organizations.

Abstract

This report examines market-based carbon mechanisms as a potential source of financing for blue carbon restoration and conservation in Mexico. Despite some protection offered to coastal wetlands in Mexico, government resources for protected areas are limited, as is the case for NGOs who have acquired lands for conservation. Furthermore, there are still many other areas without proper protection, in particular many of the coastal wetlands of Bahía Magdalena in Baja California Sur. In that sense, there is a strong case for exploring additional funding mechanisms, such as carbon offsets, which can help fund conservation efforts of these important carbon sinks. This is one in a series of five papers, part of the larger project entitled “Examining Cross-Border, Nature-Based Market Solutions to Protect Blue Carbon Coastal Ecosystems in the Californias,” spearheaded by the Institute of the Americas. This report offers an overview of market-based carbon mechanisms in Mexico and around the world, and reviews why carbon markets present an increasingly interesting funding source for blue carbon asset conservation. Mexico has the second largest mangrove restorable area after Indonesia, even though it is the country with the fourth largest mangrove extension. Yet, many of its blue carbon assets face multiple land-use pressures that lead to their degradation or destruction, and using market mechanisms is a compelling option to fund protection efforts, thus ensuring the sequestration of carbon as well as other environmental and social benefits these ecosystems provide. Lastly, the report finishes with concrete steps relevant Mexican actors should take to leverage market mechanisms as a funding source for coastal wetlands restoration and conservation in Mexico.

Introduction

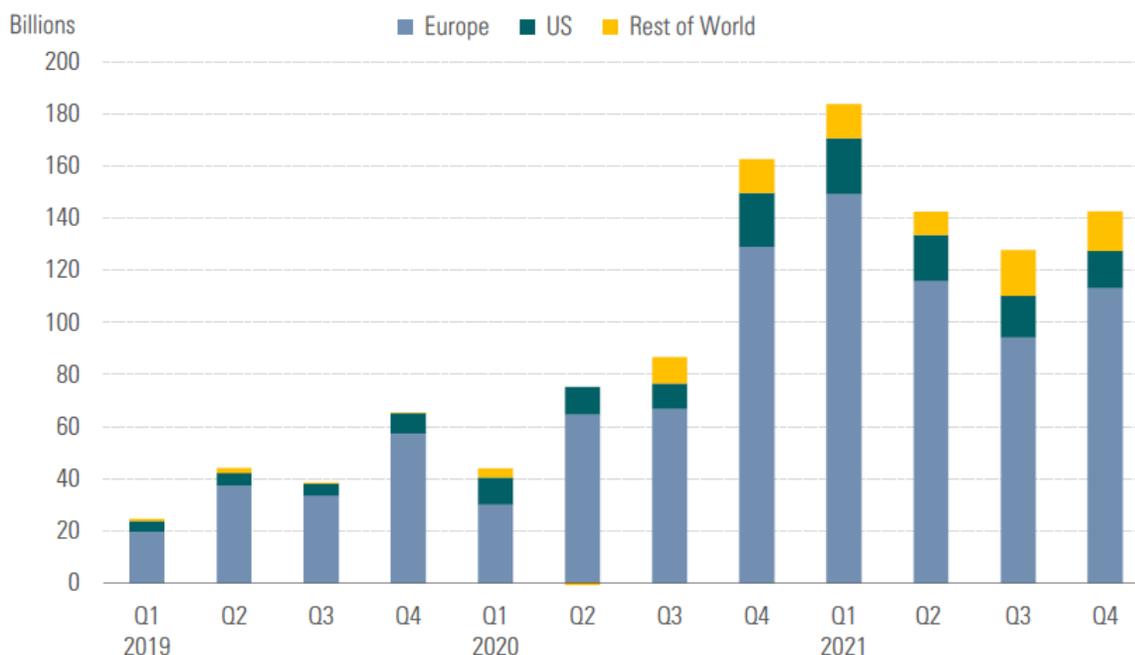
As irrefutable proof arises of the human-induced global temperature rise due to increasing concentrations of greenhouse gasses in the atmosphere, countries around the world are doubling down on efforts to mitigate climate change, through all of the toolsets currently available to us. The 26th Conference of the Parties to the United Nations Framework Convention on Climate Change (COP26) that took place in Glasgow, Scotland in November 2021, delivered three key outcomes. First, parties committed to increase the ambition of their Nationally Determined Contributions (NDCs) mitigation targets (originally set for the Paris Agreement) by the end of 2022 to align with 1.5°C of warming. Second, parties committed to phase down unabated coal-fired power generation, and roll back “inefficient” fossil fuel subsidies. A third key result from the summit was that negotiators closed a deal to establish the rules for international carbon markets, outlined in Article 6 of the Paris Agreement.

Market-based mechanisms can prove useful tools for promoting the decarbonization of the economy, by putting a cost on the negative externalities of carbon emissions and by channeling funds to the most cost-efficient mitigating options. If a common carbon trading framework is to be established at a global level, with strict rules for monitoring and verification of mitigation projects, these markets have the potential to unlock trillions of dollars of capital available for protecting key ecosystems and living biomass, building renewable power projects, and developing sustainable supply chains and technologies urgently needed to combat climate change.

As part of governments’ and regulators’ efforts to catalyze the transition towards a low-carbon economy, companies and investors are under increasing scrutiny and pressure to decarbonize portfolios, redirect investments, as well as to improve ambition and transparency of environment, social, and governance (ESG) metrics. A proof of this is the impressive growth in the amount of resources going into sustainable finance in the past few years. Global sustainable fund flows went from US\$165 billion in 2019, to US\$362 billion in 2020, to US\$590 billion in 2021.¹ See *Figure 1* below.

¹ Global Sustainable Fund Flows, Morningstar Research, January 2022.

Figure 1: Quarterly Global Sustainable Fund Flows (USD Billion), 2019 – 2022



Source: Global Sustainable Fund Flows, Morningstar Research, January 2022

As Mexico struggles to finance its own Paris-related pledges, which are calculated to cost almost US\$8 billion/year for mitigation alone according to government figures from 2018, it will need to develop a pipeline of high quality, ready-to-invest projects to attract a portion of those global sustainable finance flows, and a ripe opportunity are its vast blue carbon ecosystems (mangroves, seagrass and saltmarshes). According to a research study by Earth Security,² “the social, economic and biodiversity benefits of mangroves — i.e. their value beyond just carbon — often leads to price premiums in carbon markets” and, taking into account variability in carbon density across different types of mangrove forests, Mexico has the second largest mangrove restorable area after Indonesia, even though it is the country with the fourth largest mangrove extension.

Mexico’s blue carbon ecosystems face high rates of degradation because of land-pressures to turn them into aquaculture farms and tourism developments. Because of this, and the vast array of ecosystem services mangroves generally provide, the Earth Security study found that the financial return of mangrove restoration at a carbon price of US\$60/tCO₂ in Mexico, could be as high as US\$1.2 billion.³

² Financing the Earth’s Assets: The Case for Mangroves as a Nature-based Climate Solution, 2020. https://earthsecurity.org/wp-content/uploads/2020/12/2128_ESG_mangrove_22.pdf

³ Financing the Earth’s Assets: The Case for Mangroves as a Nature-based Climate Solution, 2020.

In that sense, it is important to understand what opportunities international carbon markets can bring to the table to help finance blue carbon projects in Mexico. More specifically, for the purposes of the project “Examining cross-border, nature-based market solutions to protect blue carbon coastal ecosystems in the Californias” for which this white paper was prepared, we look at how the recent explosion in voluntary markets, compliance emission trading systems—including Mexico’s—and more recently the finalized rulebook for Article 6 of the Paris Agreement, should be looked into as other possible financing sources for mangrove ecosystem restoration and conservation in Mexico.

Regulated Carbon Markets

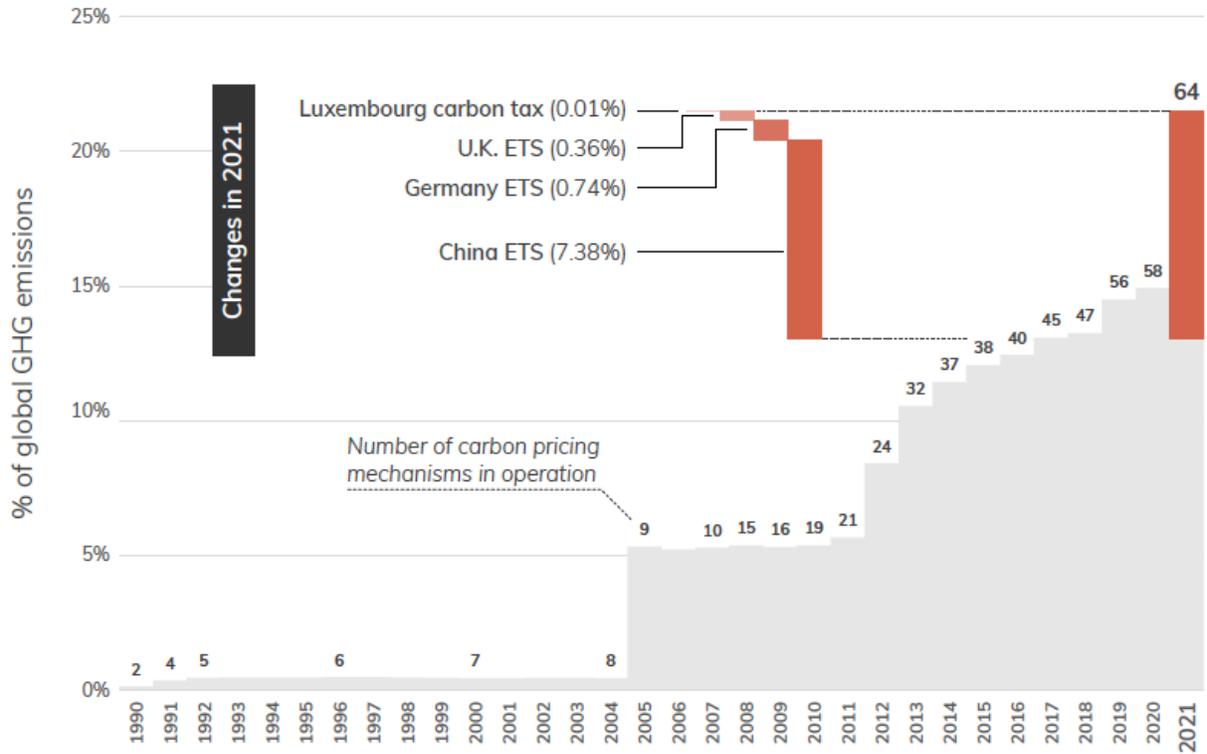
For the purpose of our work, the pricing of carbon is of interest as the carbon sequestered, or the avoidance of release of such emissions, could generate a credit that can in turn be sold in a carbon market—whether compliance-based or voluntary, domestically, in Mexico, or internationally. The proceeds of such credits can then be used to finance further mitigation, conservation or restoration purposes.

Carbon pricing mechanisms can be implemented through a carbon tax (a fee charged and collected by a government and imposed on carbon-intensive goods), or through an emissions trading systems (ETS). An ETS set caps for greenhouse gas emissions on selected sectors of the economy in a certain jurisdiction, through a requirement that each ton of CO₂ or CO₂ equivalent (CO₂e) emissions must be matched by a carbon credit issued by the government, allocated without cost or auctioned, and then traded through markets, where the available credits are reduced over time, in effect setting a lower emissions cap. Reductions in available credits are generally accompanied by increased minimum bids in auctions where covered entities can purchase credits. The ETS mechanism forces entities covered by the ETS to reduce emissions and/or buy carbon credits, which will become increasingly expensive over time.

In the case of a carbon tax, the recipient government is often required by law to use the proceeds for environmental or climate change expenditures (which could include, for example, the protection of blue carbon assets). In the case of an ETS, the carbon credits may include compensation mechanisms, or offsets, with one offset issued for each ton of carbon sequestered or avoided, where the proceeds from the sale of the offsets are then used to carry out the protective measures which are the basis of the offsets in the first place. In the case of Mexico, offsets from CO₂ sequestered or avoided as a result of protection of blue carbon resources could then be sold to companies or entities covered by a regulated ETS, with the proceeds used to carry out the necessary protective measures.

Between 2020 and 2021, global emissions covered by carbon pricing instruments in operation increased from 15.1% to around 22% (largely due to the launch of China’s national ETS). See *Figure 2* for the percentage of global coverage of emissions through a carbon market mechanism over time through 2021, and *Figure 3* for a timeline of carbon pricing mechanisms adopted around the world.

Figure 2: Share of Global GHG Emissions Covered by Carbon Taxes and Emissions Trading Systems



Source: State and Trends of Carbon Pricing 2021, World Bank.

Figure 3: Timeline of Carbon Pricing Instrument Implementation Worldwide from 1990 to 2018

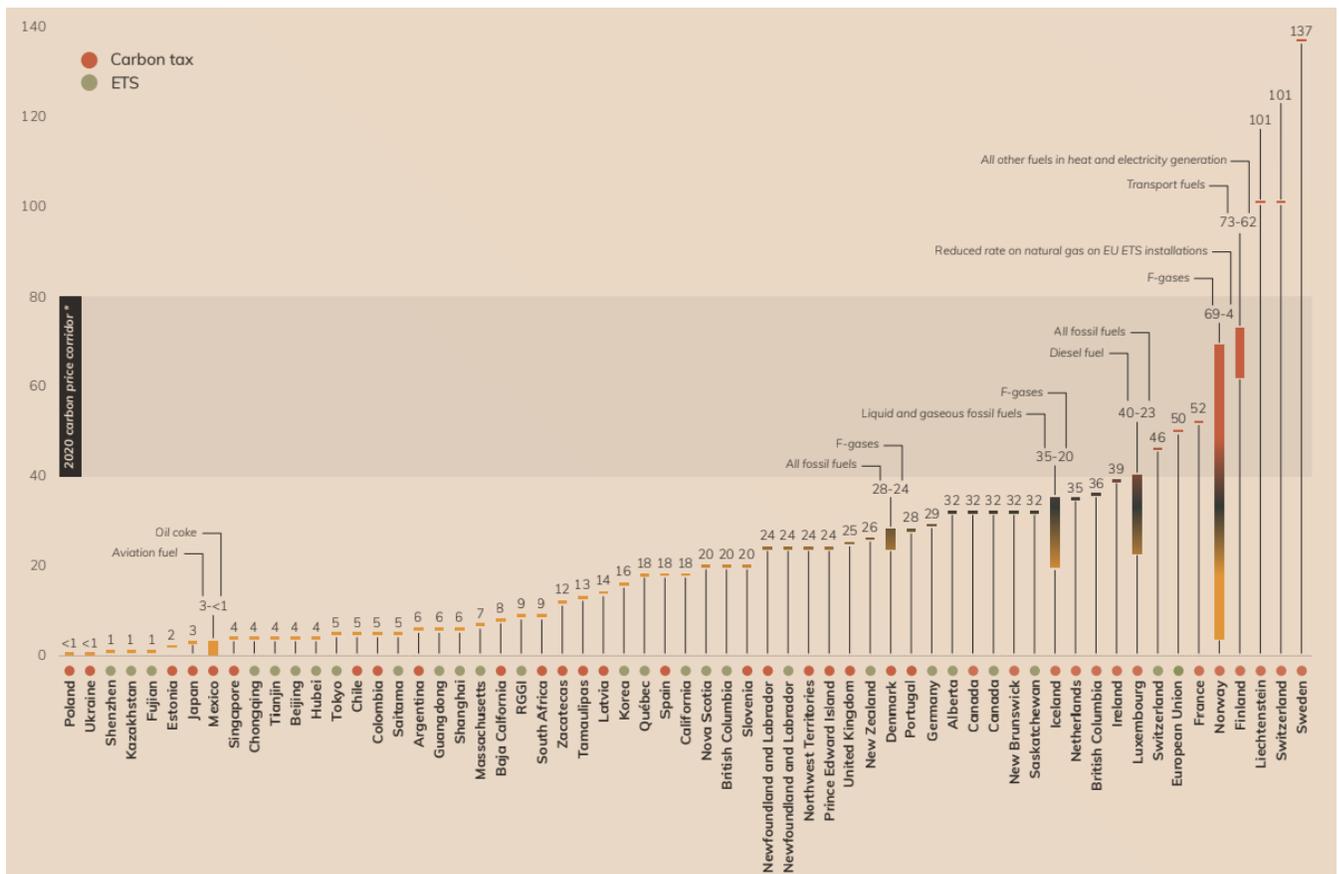


Source: Institute for Climate Change

A 2017 study⁴ by the Carbon Pricing Leadership Coalition and the World Bank showed that carbon pricing needs to be in the US\$40–80/tCO₂e range by 2020 (and in the US\$50–100/tCO₂e range by 2030) to meet the 2°C temperature goal. However, a majority of carbon prices in 2020 were far below that range—or close to the bottom of it, in any case. Only 3.76% of global emissions are covered by a carbon price at or above this range, and all of them in European markets (Luxembourg, Switzerland, the EU, France, Norway, Finland, Liechtenstein, and Sweden).

However, the World Bank found that many countries increased their carbon tax rates and adopted more ambitious trajectories in 2021, that pilot ETs are being considered in a number of new countries, and in general, that carbon mechanisms are under review by countries related to their Paris-related climate goals. See *Figure 4* below for a chart of carbon credit prices under compliance markets around the world.

Figure 4: Compliance Mechanism Carbon Prices on April 2021, in US Dollars



Source: State and Trends of Carbon Pricing 2021, World Bank.

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https://static1.squarespace.com/static/54ff9c5ce4b0a53decccfb4c/t/59b7f2409f8dce5316811916/1505227332748/CarbonPricing_FullReport.pdf

An Overview of GHG Emissions Covered by an Emissions Trading System

Up to 2021, around 16% of global GHG emissions were covered by an ETS. The share of emissions covered by this mechanism has increased more than threefold since the launch of the EU ETS in 2005, when only 5% of global GHG emissions were covered. This trend was even visible through 2021. As of January 2021, there were 24 ETS in force. Per World Bank data, by January 2022, there were already 30 systems in place, covering 38 national and 29 subnational jurisdictions. New initiatives implemented in 2021 or 2022, or scheduled for implementation in years to come, are China's national ETS, Germany's national ETS, New Brunswick's provincial ETS in Canada, Tamaulipa's state-wide ETS in Mexico, UK national ETS, Washington state-wide ETS (scheduled for 2023), and Ontario's provincial ETS (scheduled for 2022). Plus, Virginia state in the U.S. became part of the Regional Greenhouse Gas Initiative (RGGI) too. See Maps 1 and 2 in the appendix for details.⁵

Given supply and demand for carbon credits traded through these systems, dynamics that are mostly influenced by policy and regulations, prices differ greatly—from below US\$5 to US\$40. See the ETS marks under *Figure 4* before. Furthermore, even though reduced economic activity as a result of COVID-19 saw allowance prices dip, there is evidence they quickly recovered in most compliance markets.

Selected National Emission Trading Systems

European Union

The EU's ETS was the first compliance market to become operational, in 2005. In 2021, the EU started the market's Phase 4 with a steeper annual cap reduction factor of 2.2%, revised free allocation benchmarks, and launched the Modernization and Innovation Funds⁶. The linkage with the Swiss ETS became operational in September 2020, and as of January 2021, UK installations are no longer covered by the EU ETS.

This market mechanism is a cornerstone of the EU's climate policy and it covers approximately 40 percent of the region's emissions (from the power sector, manufacturing industry, and aviation within the European Economic Area). It is now the second largest ETS in the world. Its GHG emission reduction target by 2030 is of at least 55 percent below 1990 GHG levels. As the EU advances with more stringent climate policies, it is expected to soon implement carbon leakage regulation to avoid production, and climate pollution, transferring to outside the regulated countries to avoid constraints.

⁵ EMISSIONS TRADING WORLDWIDE, The state of play of cap-and-trade in 2021, ICAP from https://icapcarbonaction.com/en/?option=com_attach&task=download&id=723

⁶ The Modernisation Fund is meant to support ten lower-income EU Member States in their transition to climate neutrality. The Innovation Fund is one of the world's largest funding programs for the demonstration of innovative low-carbon technologies.

On the other hand, the United Kingdom launched its own ETS in early 2021, after 2020 was the last compliance year for UK installations under the EU ETS. The UK ETS design mostly mirrors the EU ETS Phase 4. The cap is initially set at 5 percent below the UK's notional share of the EU ETS cap, which will be reduced annually, and is aligned with the country's legislated net-zero target for 2050. The UK is currently considering expanding the scope beyond power, industry, and domestic aviation.

North America

California

California's Cap-and-Trade Program began operation in 2012 and the first compliance obligation period started in January 2013. California has been part of the Western Climate Initiative (WCI) since 2007 and formally linked with Quebec's in January 2014. This program is covered in detail through a white paper, also part of this project, entitled "Potential Sources of Funding under California Law to Protect Blue Carbon Coastal EcoSystems in Baja California and Baja California Sur".

Quebec

Quebec's ETS became operational in 2013 and it too is a member of the WCI. Quebec formally linked its system with California's in January 2014 and with Ontario's in January 2018. The system covers fossil fuel combustion and industrial emissions in power, buildings, transport, and industry. It has a GHG emission reduction target of 20% reduction from 1990 GHG levels by 2030 and 37.5% reduction from 1990 GHG levels by 2050. All revenue from the program goes towards climate change measures. Quebec has also recently updated its climate action plan to include carbon neutrality by 2050.

Latin America and the Caribbean

An ETS is currently under consideration in Chile and Brazil. Colombia is in the midst of designing one, with technical elements currently under revision and its pilot phase expected to start between 2023 and 2024.

Mexico

Mexico's pilot ETS started operating in January 2020, mandated by Transitional Article 2 of the General Law on Climate Change (as amended in July 2018). The pilot ran for two years, plus one year of transition to the full operational ETS. It covered direct CO₂ emissions from those entities in the energy and industry sectors generating at least 100,000 tCO₂ per year from stationary sources. It effectively applies downstream (at the point of fuel combustion). Aviation will be added once it starts its compliance period, in 2023.

Approximately 300 entities are covered by the pilot as of today, corresponding to ~40% of national emissions. The GHG emission reduction targets by 2030 is 22 percent below the BAU scenario, and a target of 50 percent below 2000 GHG levels by 2050. The caps for the pilot phase for 2020 and 2021 were, respectively, 271.3 MtCO₂ and 273.1 MtCO₂.⁷ SEMARNAT is expected to release regulation of the operational period of the ETS in 2022. To date, there is no information as to the emissions cap for the fully operational phase, or of the use of eventual proceeds from allowance revenue.

The pilot used free allocation (grandfathering), and depending on market behavior, Mexico's Ministry of Environment and Natural Resources (SEMARNAT) had the possibility to auction allowances from the auction reserve. Three reserves will be filled each year with allowances additional to the cap:

- Auctions reserve (equivalent to 5% of the cap);
- New entrants reserve (equivalent to 10% of the cap, for new entrants as well as increases in production among existing regulated entities); and
- General reserve (equivalent to 5% of the cap, for ex-post adjustment allocation for entities with higher emissions relative to their baselines).

Mexico recognizes the ETS as an important pillar of its national climate policy, and the latest submission of the country's Nationally Determined Contribution (NDC) to the UNFCCC in December 2020 makes a reference to the emissions trading system. This potentially shields the ETS moving forward as it is ingrained in a signed international agreement—that has equal legal standing as Mexico's Constitution.

Mexico's General Law on Climate Change foresees possible linkages with ETS in other countries. In light of that, Mexico signed a Memorandum of Understanding with California in 2014 and Quebec in 2015, to include cooperation and possibly linkage among their ETS. In August 2016, Mexico, Quebec, and Ontario issued a joint declaration on carbon market collaboration.

In that spirit, in December 2017, the governments of Canada, Chile, Colombia, Costa Rica, Mexico, as well as the U.S. states of California and Washington, and Canadian provinces including Alberta, British Columbia, Nova Scotia, and Qubec, announced the creation of the *Declaration on Carbon Pricing in the Americas*, which creates a platform for cooperation among countries in the region.⁸ Such declaration was re-launched during COP26 in Glasgow⁹ with the purpose of deepening collaboration and experience-sharing on carbon pricing mechanisms amongst countries, with the ultimate goal of achieving net-zero by 2050.

⁷ According to SEMARNAT, the Cap increase between 2020 and 2021 is due to an increase in the sectoral allocation for regulated entities categorized as "others."

⁸ <https://www.carbonpricingleadership.org/blogs/2018/9/24/declaration-on-carbon-pricing-in-the-americas-building-momentum-among-continents>

⁹ <https://www.newswire.ca/news-releases/quebec-launches-the-glasgow-declaration-on-carbon-pricing-in-the-americas-to-strengthen-collaboration-among-governments-832429271.html>

Per the agreement by which the preliminary rules of the pilot ETS were established, published in the Official Mexican Gazette (Diario Oficial de la Federación) in 2019,¹⁰ the program contains a provision to allow “flexible compliance mechanisms.” These can be (a) compensation credits (generally identified internationally as offset credits or simply offsets), and (b) the recognition of “early actions” that have received offset credits issued by accredited certification organizations before the implementation period of the pilot program. It also mentions that market participants may only compensate for up to 10 percent of their obligations through compensation credits. Semarnat will be in charge of issuing the eligible compensation credits for mitigation actions, under certain compensation protocols.

For market participants to obtain such credits, the projects or mitigation activities should comply with certain prerequisites:

- i. For the actions to be developed under said compensation protocols established by SEMARNAT;
- ii. For the actions to be developed under national territory, or in zones in which the (Mexican) Nation exerts sovereignty and jurisdiction;
- iii. For the mitigation undertaken to be verified and validated by a recognized and authorized organism; and,
- iv. For the reductions, sequestration, or in case, avoided emissions, to be real, quantifiable, permanent, verifiable and enforceable.

It is noteworthy here that the listed criteria for reductions, sequestrations and avoided emissions resulting in compensation credits, e.i. that they be real, quantifiable, permanent, verifiable and enforceable, does not include a requirement of additionality, meaning that they be in addition to any GHG emission reduction otherwise required by law or regulation and any other GHG emission reduction that would otherwise occur.

Apart from compensation credits issued by SEMARNAT, as discussed above, this government agency can also recognize compensation credits granted by accredited certification organizations for early actions (i.e. before the pilot project came into effect), as long as projects that meet the following prerequisites:

- i. For the actions to be developed under national territory, or in zones in which the (Mexican) Nation exerts sovereignty and jurisdiction;
- ii. For the actions under consideration to be verified and validated under a national or international recognized protocol, and that at the same time, coincides with those protocols developed by SEMARNAT; and,
- iii. That the actions have received compensation credits issued by an accredited certification organization before the start of the implementation of the pilot program, provided that SEMARNAT receives a document that proves the cancelation of such

¹⁰ https://www.dof.gob.mx/nota_detalle.php?codigo=5573934&fecha=01/10/2019

credits by the issuing organization equivalent to the amount of compensation credits that will be then issued.

For the above, according to the agreement, Semarnat will draft and make public a set of compensation protocols that define what projects and mitigation actions will be eligible to receive compensation credits. It will also establish which national and international compensation protocols can be used by interested parties. At the time of writing, such protocols have not yet been made available. As SEMARNAT carries out the process of designating the accepted protocols, blue carbon mitigation should be taken into consideration, as this could provide an important financing stream for projects with high mitigation and adaptation potential. As this ETS becomes operational, and covered entities are obligated to comply with their emissions limit, demand for eligible offset credits will increase as some of the covered entities fail to reduce their own emissions.

It is important to note that Mexico also approved a Carbon Tax in 2013 under its broader fiscal reform presented by the administration of former President Enrique Peña Nieto. The tax is imposed midstream, on fossil fuel suppliers, and on any given fuel's CO₂ emissions in excess of the emission rate of natural gas (i.e. natural gas is exempt).

A 2017 WRI study¹¹ found that, by increasing the carbon price to US\$15/tCO₂ (from the current approx. of US\$3/tCO₂), Mexico could meet 12% of the emissions reductions needed to meet the objectives of its Paris-related commitments (of 22% below 2000 levels by 2030 and 50% by 2050). According to a 2021 IMF Working Paper,¹² increasing carbon prices from current levels to US\$75/tCO₂ by 2030, would help Mexico achieve the entirety of its mitigation pledges. The analysis also points out that, “Compared with other national schemes, carbon pricing in Mexico currently has reasonably good coverage but very low prices”.

In theory, proceeds from the tax collected could be applied to climate measures and to help finance those actions stipulated in Mexico's NDCs, such as Nature-based Solutions—including blue carbon restoration projects—however revenues are not known to be earmarked for specific purposes.

Voluntary Carbon Markets

Voluntary carbon markets allow carbon emitters (such as oil and gas majors, technology and power-consuming sectors—like cement, aviation and others) to offset what are, in theory, unavoidable GHG emissions, by purchasing carbon credits. Credits come from projects targeted at removing, reducing or avoiding GHG emissions—such as reforestation projects, community-based solar plants and clean cooking installations. Each credit, known as a carbon offset,

¹¹ https://files.wri.org/d8/s3fs-public/Achieving_Mexicos_Climate_Goals_An_Eight_Point_Action_Plan_0.pdf

¹² A Comprehensive Climate Mitigation Strategy for Mexico, IMF, 2021.

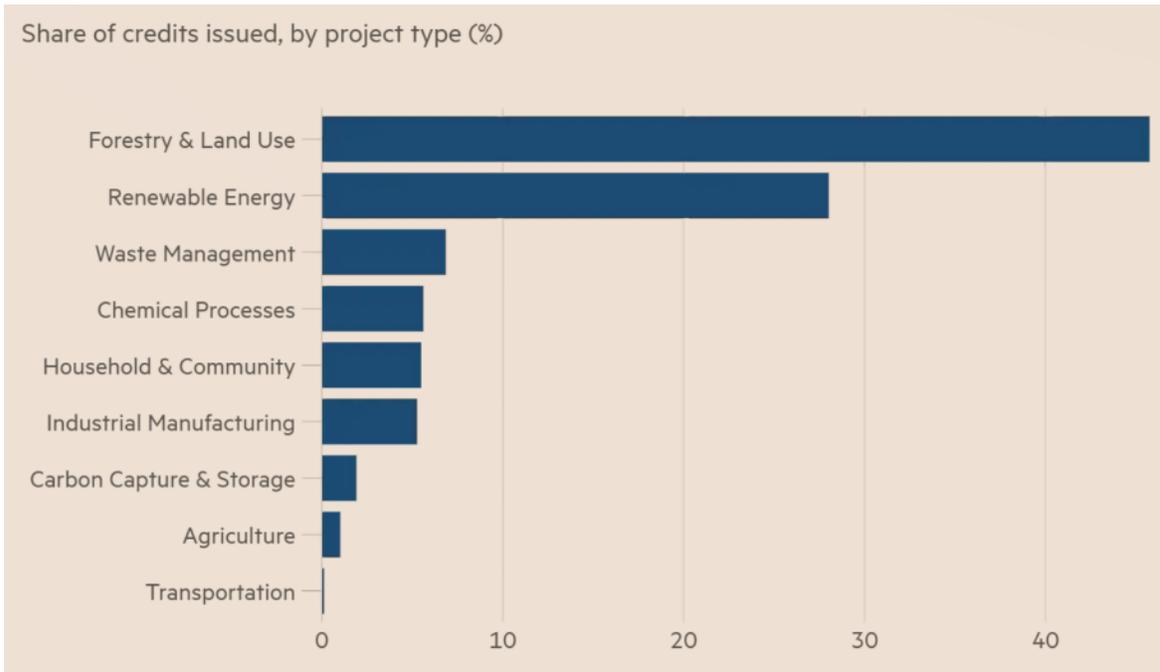
represents a ton of carbon dioxide equivalent that has been avoided or removed from the atmosphere that would not have occurred if not for the project that generated them and absent the extra revenue from the selling of these credits, as the project would have not been undertaken. In that sense, they must strictly represent additional carbon mitigation. Likewise, buyers of these offsets are to use these credits only for those emissions that cannot be abated through technology upgrades or for parts of their supply chain on which they do not have direct influence over—essentially as a last resort.

According to information from the Task on Scaling Voluntary Credit Mechanisms (TSVCM), the price of voluntary credits has remained mostly below US\$ 5 and these low prices are partly the result of a glut of offsets that were generated in the past, when standards were less robust than today. Likewise, voluntary credits have always remained cheaper than those from regulated markets. However, demand is on the rise. Since 2021, demand for carbon credits boomed, driven by corporate net-zero targets and stricter environmental regulations in many jurisdictions, particularly in the EU.

The weighted average price per ton for credits from forestry and land-use projects (the most common offset issued by type—see *Figure 5* below) has been rising steadily from US\$4.33 in 2019 to US\$4.73 per credit in 2021, with a spike to US\$5.60 in 2020. Offset prices specific to Nature-based projects have also risen quickly and steadily through 2021 from under US\$ 5 to US\$ 7 (see *Figure 6* below). This is because demand for nature-based project credits continues to increase; volume of demand more than doubled in 2021 from 2020's already-record high levels. Similarly, transaction of REDD+ specific-credits (projects that reduce emissions from deforestation and forest degradation) also exploded in 2021, growing 280% between 2020 and 2021 year-to-date.¹³

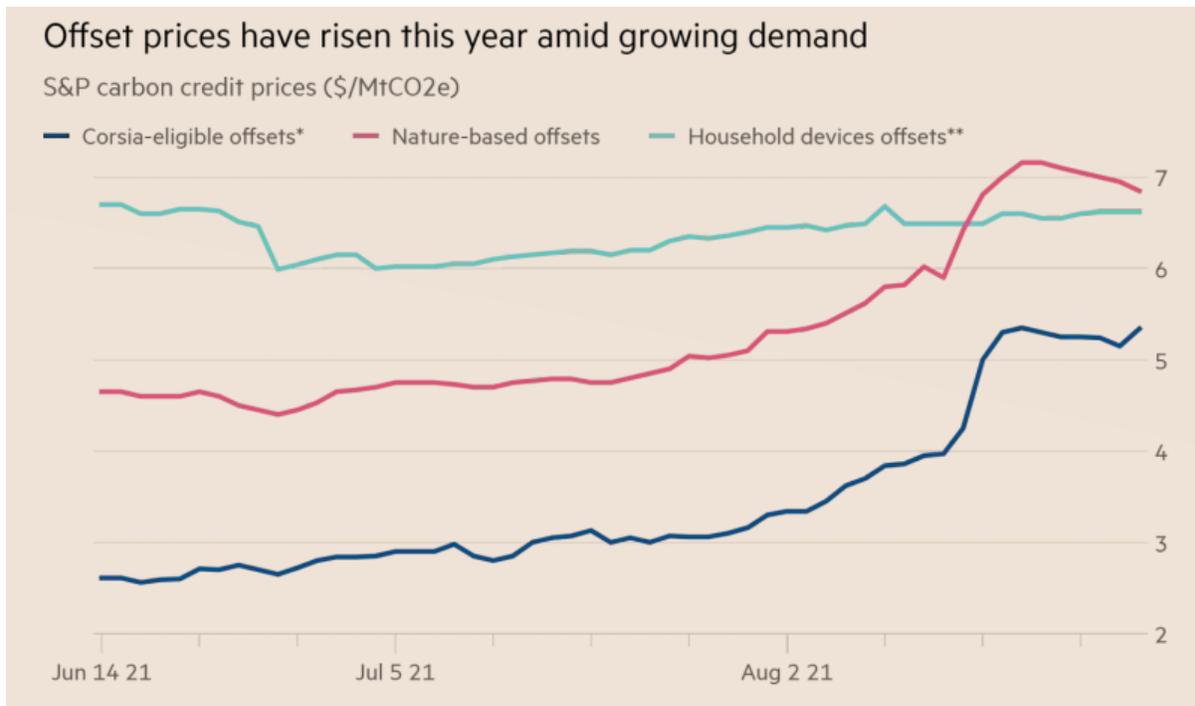
¹³ <https://www.ecosystemmarketplace.com/articles/press-release-voluntary-carbon-markets-rocket-in-2021-on-track-to-break-1b-for-first-time/>

Figure 5: Percentage Share of Carbon Credits Issued by Project Type



Source: *Carbon offsets, a licence to pollute or a path to net-zero emissions?* Financial Times, 2021

Figure 6: Selected Offset Prices in 2021, in US\$/MtCO₂e



Source: *Carbon offsets, a licence to pollute or a path to net-zero emissions?* Financial Times, 2021

Furthermore, an analysis by McKinsey & Co.¹⁴ shows that in the first eight months of 2021, voluntary carbon markets saw a near-60% increase in value from the previous year, and the markets are expected to hit the US\$1 billion mark in transactions in 2021. The TSVC estimates that overall, the market for carbon credits could be worth upward of US\$50 billion by 2030.¹⁵

It is also noteworthy that it is now not just companies wanting to offset emissions who are buying carbon credits, but there is now increasing demand from the financial sector. As more industries and sectors fall into regulated markets, climate pledges increase ambition, and regulations to mitigate climate pollution tighten around the world, demand for carbon offsets will continue to increase.

Mexico was not an exception to the trend, as demand for voluntary credits in 2021 exploded there too, doubling the number of transactions seen in 2020; 2021 was the best year to date. The largest share of demand was driven by corporations. This is a trend that is likely to continue, as the implementation of Mexico's ETS advances and when/if the United States applies a carbon border adjustment.

Blue Carbon Offsets

Carbon offsets follow guidelines or standards, created by organizations, usually NGOs, which “certify that a particular project meets its stated objectives and its stated volume of emissions. Standards have a series of methodologies, or requirements, for each type of carbon project.” There are now several standards today that verify blue carbon credits, such as Verra (VCS), the American Carbon Registry, and Climate Action Reserve. Currently, the dominant voluntary market for blue carbon is the VCS, the American Carbon Registry (ACR), the Climate Action Reserve (CAR) in California, and the Markit Environmental Registry.

However, these standards are fairly recent. Verra published its first methodology for tidal wetlands and seagrass restoration in 2015, and only in September 2020 did it expand rules to cover wetland conservation. According to a Yale University blog,¹⁶ only a few mangrove-specific projects are or have been developed for carbon offsets, including Colombia, Kenya, India, Madagascar, Senegal and Sumatra. A project focused on seagrass is currently underway in the Chesapeake Bay in the U.S., led jointly by the Virginia Institute of Marine Science and The Nature Conservancy (TNC)—a first of its kind. So far, according to the referenced blog, Verra has issued a total of under 970,000 credits (970,000 tCO₂e) to blue carbon projects.

Carbon offsets from blue carbon projects have been sold anywhere from US\$12/tCO₂ in a project in Kenya, to US\$20/tCO₂ in Madagascar. Both of these were small-volume projects focused on

¹⁴ [A blueprint for scaling voluntary carbon markets | McKinsey](#)

¹⁵ <https://www.mckinsey.com/business-functions/sustainability/our-insights/a-blueprint-for-scaling-voluntary-carbon-markets-to-meet-the-climate-challenge>

¹⁶ <https://e360.yale.edu/features/why-the-market-for-blue-carbon-credits-may-be-poised-to-take-off>

the social and environmental benefits of mangrove restoration. In other projects proposed in Florida, the carbon prices examined were US\$5, US\$7.50, and US\$15 per metric ton. This implies that generally prices for blue carbon offsets are higher than for other projects (which as mentioned earlier, are trading at an average of US\$5/tCO₂), although there is no baseline yet, as blue carbon-specific offsets are relatively new. Furthermore, in general, nature-based carbon offset prices (of which blue carbon are a subset), have increased by 199% from the first assessment in June 2021, at US\$4.65, to US\$13.9 in November 2021.¹⁷

See *Table 1* below for details on the blue carbon projects that have so far listed carbon credits through some verification methodology.

Table 1: Wetland-Based Carbon Projects that Have Verified and Listed Credits¹⁸

Project	Price	Extension (Hectares)	Total Credits (tCO ₂)	Verification Methodology
India Sunderbans Mangrove Restoration (Project developer is for-profit)	Unknown	4,403 Ha	1,024,976 tCO ₂	VCS
Livelihoods' mangrove restoration grouped project in Senegal (Project developer is for-profit)	Unknown	10,415 Ha	1,457,945 tCO ₂	VCS
Indonesia (Project developer is for profit)*	Unknown	5,000 Ha	2,494,121 tCO ₂	VCS
Myanmar restoration) (Project developer is non for profit)	Unknown	2,146 Ha	3,680,125 tCO ₂	VCS
China (Zhanjiang Mangrove Afforestation Project)	Unknown	400 Ha	5,880 tCO ₂	VSC
Mikoko Pamoja Mangrove Restoration Project in Kenya	Average US\$12/tCO ₂	125 Ha	4,224 tCO ₂	Plan Vivo

¹⁷ <https://www.spglobal.com/platts/en/market-insights/latest-news/energy-transition/112321-cop26-confirms-role-of-voluntary-carbon-market-verra>

¹⁸ Sources:

- Berkeley Carbon Trading Project's Voluntary Registry Offsets Database
- <https://www.reddprojectsdatabase.org/view/projects.php?keyvar=keyproname&nameordesc=name&type=project>
- <https://www.planvivo.org/mikoko-pamoja>
- <https://blueventures.org/communities-in-madagascar-launch-the-worlds-largest-mangrove-carbon-conservation-project-2/>

Madagascar (funded by GEF)	Average US\$20/tCO2	1,200 Ha	1,300 tCO2/year (approx. 26,000 tCO2)	Plan Vivo
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*Currently under validation and verification.

According to Earth Security,¹⁹ “the social, economic and biodiversity benefits of mangroves — i.e. their value beyond just carbon — often leads to price premiums in carbon markets. This is opening the opportunity to develop new types of credits that can bundle together climate adaptation benefits for coastal resilience with carbon credits for corporate buyers”. This is why certification organizations Verra and TNC are working on a third-party verified framework for *Blue Carbon Resilience Credits*, supposed to be published since 2021, that aims to bundle together the mitigation component with adaptation benefits of these blue carbon projects (in the form of flood protection benefits). TNC estimates that these credits could mobilize up to US\$320 million/year for coastal conservation and restoration projects as corporate demand grows.

On the other hand, the Earth Security study adds that so far, few compliance markets accept credits from forestry or wetland offsets, and no project has earned credits in these markets as of yet. In that sense, coastal ecosystems are still being largely overlooked by global climate finance, as they account for just 1% of the total climate finance flows for adaptation from public and private actors.

The potential for unlocking climate finance through large-scale mangrove restoration is large. According to this analysis, mangrove restoration could sequester up to 380 million tCO2 over a 20-year period, yet at current carbon offset prices, restoration efforts on this scale are not feasible. However, it also explains that, if the wide range of social benefits and other ecosystem services provided by mangroves were fully accounted for in the price of carbon, blue carbon from mangroves could be priced at up to US\$417/tCO2.

Organized Voluntary Markets

CORSIA

A latent source of demand for blue carbon credits is the aviation sector as it looks to mitigate GHG emissions through CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation). International aviation was one of the only two sectors not covered in the 2015 Paris Agreement (along with international shipping). As such, many airlines started using carbon offsets to limit their net carbon emissions, either on a voluntary basis or to comply with national or regional regulations.

¹⁹ Financing the Earth’s Assets: The Case for Mangroves as a Nature-based Climate Solution, 2020.

CORSIA is the first international effort to curb emissions from international travel. It is a program run by the International Civil Aviation Organization (ICAO) to limit carbon emissions from international aviation and meet the industry's goal to achieve carbon neutral growth beginning in 2020. The pilot phase will run until 2022, followed by a voluntary phase from 2023-2026, and will begin a mandatory phase for all countries in 2027. Under CORSIA,²⁰ airline offsetting has a chance to take off. Depending on how the industry grows in the coming years, this program is expected to generate between 1.6-3.7 billion tCO₂e of demand for offsets between 2021-2035 alone. S&P Global Platts priced CORSIA-eligible carbon credits at \$8.71 CO₂e in November 2021—a gain of 989% since the first assessment on Jan. 4, 2021, at 80 cents.²¹

The finalized set of rules and guidelines for 2023 for the compliance phase is still in the works, including those regarding compensation credits (or allowable offsets). Only in December 2021, ICAO approved eligibility of REDD+ projects, certified under TREES (The REDD+ Environmental Excellence Standard), for CORSIA compliance compensation credits.²² Furthermore, ICAO has also mentioned the possibility of authorizing blue carbon projects for compensation credits under CORSIA, if they meet VERRA's methodology and certain other requirements.

The LEAF Coalition

The Lowering Emissions by Accelerating Forest finance (LEAF) Coalition is a voluntary, global coalition bringing together companies and governments to scale climate finance for tropical and subtropical forest conservation. It seeks to provide large-scale finance to help tropical and subtropical forest jurisdictions achieve their forest protection and halt deforestation and forest degradation by 2030.²³ Proposals to the LEAF Coalition must meet the ART-TREES standard requirements,²⁴ which embeds ambitious reference levels, strong requirements for managing uncertainty, leakage risks and permanence, as well as robust environmental and social safeguards.

During the World Leaders Summit on November 2020—as part of COP26—the LEAF Coalition announced it had already mobilized its initial goal of US\$1 billion of public and private finance. The initial call for proposals in 2021 was based on a combination of forward purchase agreements of emission reduction credits and a floor price commitments at US\$10 per ton of CO₂e.

²⁰ https://www.forest-trends.org/wp-content/uploads/2018/10/CORSIA_infographic.pdf

²¹ <https://www.spglobal.com/platts/en/market-insights/latest-news/energy-transition/112321-cop26-confirms-role-of-voluntary-carbon-market-verra>

²² <http://mexico2.com.mx/noticia-ma-contenido.php?id=688>

²³ Initial participants include the governments of Norway, the UK, the U.S. and a group of large companies with a global reach, including Amazon, Airbnb, Bayer, BCG, GSK, McKinsey, Nestlé, Salesforce and Unilever. It has now over 20 members. Emergent, a US non-profit organization and participant in the coalition, will serve as the administrative coordinator of LEAF.

²⁴ The REDD+ Environmental Excellence Standard (TREES) specifies requirements for the quantification, monitoring, reporting and verification of GHG emission reductions from REDD+ activities at a jurisdictional and national scale.

ART: Architecture for REDD+ Transactions.

According to the coalition's statement, the initiative is meant for companies and governments to go beyond the emissions reductions that they can achieve in their own supply chains and countries, and contribute immediately to an essential component of the global climate solution. By this means, LEAF will contribute to the climate fight through verified, high-quality carbon credits for REDD+ projects, while allowing supplier jurisdictions to use the underlying mitigation results towards their Nationally Determined Contributions (NDCs). As they function through project proposals, the coalition established a set of priorities and requirements that must be met by the proposing jurisdiction, and the proposing entity must be a national or a subnational government (no more than one administrative level down from the national level).

The LEAF Coalition established the following priorities for governments seeking LEAF financing, which will bear on the selected projects that get financed:

- Proposals will be selected based on their ability to meet the ART-TREES requirements, and their ambition and their readiness to reduce deforestation to generate emission reductions (ERs) while ensuring the full and effective participation of relevant stakeholders — in particular, indigenous people and local communities. Furthermore, TREES participants or the participant's national government shall include forests in their NDCs.
- Suppliers demonstrating political willingness to make or maintain/reinforce durable policy changes that enhance ambition under the Paris Agreement would greatly strengthen their proposals. In line with the Paris Agreement, suppliers' countries are expected to have an NDC that represents their highest possible ambition.
- Proposals will be prioritized from suppliers in countries or supplier-countries with clear and credible pathways towards net zero emissions in line with the latest science, and have established, or have plans to establish as soon as possible, a 2050 Long-Term Strategy to implement this global net zero goal.

Mexico moved forward a National Strategy for REDD+ (ENAREDD+), published in 2017 through the LGCC, and is a signee of the Cancun Accord of COP16. Furthermore, forests and REDD+ projects are included as part of the strategy to achieve the country's NDC. According to the government's own analysis, REDD+ strategies have the potential to deliver up to 22% of the unconditional mitigation target by 2030—the third most important sector after power generation and transport. Mexico's economy-wide mitigation target is to reduce GHG emissions from its BAU scenario in 22% by 2030 (and up to 36% with international assistance), and 50% by 2050.

Mexico ratified the Paris Agreement in April of 2016. It was in fact the first developing country to submit its Intended Nationally Determined Contribution (INDC) in 2015 prior to COP21. The country ingrained its Paris commitments into its national legislation by referring to the NDC in a 2018 amendment to its LGCC. Furthermore, although it has not established a net zero target to the time of writing, it has delivered a Long-Term Strategy to the UNFCCC. Along the same lines, the current government developed and published a Special Program on Climate Change 2021-

2024²⁵ to advance both climate mitigation and adaptation through a pipeline of investment-ready projects. In that sense, Mexico is ripe to become a candidate for LEAF funding.

In fact, proposals for the Mexican states of Jalisco and Quintana Roo have already been submitted to LEAF in response to the 2021 Call for Proposals, and have “successfully completed an initial technical screening process led by a panel of technical experts”.²⁶ The ART-TREES standard provides that “participants registering subnational accounting areas may be a national government or a subnational government.” It is not clear whether the Jalisco and Quintana Roo proposals were submitted by Mexico’s federal government or by the respective state governments. If it was at the national level, there is at least a possibility that Baja California and Baja California Sur could piggyback on earlier applications.

On the issue of scale for LEAF applications, no thresholds apply to national participants with national accounting areas. However, where a subnational accounting area is registered by a national or subnational government, the total subnational accounting area must be comprised of a total forest area of at least 2.5 million hectares (ha)—according to LEAF’s latest requirements. Given that the entire Baja California Peninsula’s mangrove extension covers around 25,553 ha according to government’s 2020 figures,²⁷ that would foreclose an application by the two state governments. On the other hand, a national government can aggregate forested areas from several states as part of a national government submission of a subnational accounting area. If the Jalisco and Quintana Roo applications were submitted by Mexico’s federal government, Baja California and Baja California Sur could request to be added to the federal government submission and take advantage of the forested area of Jalisco and Quintana Roo through aggregation. Those states must have already meet the area extension requirements—since their applications met a technical screening.

It is important to note that payments under the LEAF mechanism will go to the national or subnational government that is the participant in the project being proposed. This corresponds to the measurement of emission reductions across the entire jurisdiction, to be driven by policy measures, regulations, enforcement and public finance instruments (taxes, transfers, subsidies) established by the participant government. This presents the need for the participant government to designate an institution for the receipt, management and investment of payments received, and the further need to determine how the proceeds should be used for the protection of the forests that are the subject of the emissions reduction effort.

²⁵ <https://www.gob.mx/cms/uploads/attachment/file/681172/PECC-2021-2024.pdf>

²⁶ <https://leafcoalition.org/>. The “Update” section of the website reports as of December 8, 2021 that the following jurisdictions have submitted proposals to LEAF and have successfully completed an initial technical screening process led by a panel of technical experts: Acre (Brazil); Amapá (Brazil); Amazonas (Brazil); Burkina Faso; Costa Rica; Ecuador; Ghana; Guyana; Jalisco (Mexico); Kenya; Maranhão (Brazil); Mato Grosso (Brazil); Nepal; Nigeria; Papua New Guinea; Para (Brazil); Province of Tshuapa (DRC); Quintana Roo (Mexico); Roraima (Brazil); Tocantins (Brazil); Uganda; Vietnam, and Zambia. Of those jurisdictions, Costa Rica, Ecuador, Ghana, Nepal and Vietnam will be in the first wave of jurisdictions entering purchase agreement discussions with LEAF Coalition corporate participants and have signed Letters of Intent with Emergent, LEAF program administrator.

²⁷ <https://www.biodiversidad.gob.mx/monitoreo/smmm/extensionDist>

There is evidence that mangroves in Mexico are being lost and degraded in different regions of the country, such as Baja California Sur and Sinaloa, and these forests not only have higher carbon sequestration potential than regular forests, but they also house immense biodiversity and provide a wide range of ecosystem services to communities. LEAF's objective is to end tropical and subtropical forest loss by 2030 to meet global climate, biodiversity, and sustainable development goals. Tapping this initiative in order to fund government-led projects to protect blue carbon ecosystems is definitely a strong opportunity for Mexico.

Article 6 of the Paris Agreement

Carbon pricing mechanisms can provide countries access to climate finance to further their own international climate commitments. Just as emission trading systems and voluntary carbon markets can help channel resources into low-carbon technologies and projects, as well as help uncover the most cost-efficient strategies for emission abatement, carbon pricing mechanisms have the potential to mobilize and channel both private and public resources into developing countries and assist them in meeting their climate targets through voluntary international cooperation. Through Article 6, the Paris Agreement will offer actors at sub-national levels and the private sector an opportunity to contribute directly to countries' NDCs so long they increase overall mitigation and climate ambition. Article 6 also enables countries to exchange carbon reduction units between them to make overall mitigation more efficient.

The rulebook for Article 6 was unfinished during COP21 in Paris, and was only finalized in Glasgow after six years of difficult negotiations, marking a major win for COP26. Article 6 will not only ensure quality and permanence of reductions sought after the international carbon markets, but it will also dynamize the international carbon markets in two ways. First, through Article 6.2, it enables international transfers of carbon market units amongst signatory countries, it "provides an accounting framework for bilateral and multilateral transfers, including programs that link the emissions-trading schemes of two or more countries".²⁸ Second, through Article 6.4, this rulebook allows countries to authorize carbon credits to be used for other non-Paris reduction programs, such as CORSIA and other voluntary markets.

Per Lambert Schneider, carbon market expert at the Öko-Institut in Germany, these new rules agreed upon "include important requirements and safeguards for engaging in international carbon markets but also create loopholes that could considerably undermine climate mitigation efforts... The most important achievement from Glasgow is the adoption of comprehensive accounting rules for the international transfer of carbon market units."²⁹

For any of this "authorized carbon credits", the host country must apply corresponding adjustments thus taking those reductions off from country-wide NDC mitigation accounting to

²⁸ <https://www.ecosystemmarketplace.com/articles/article-6-and-its-glasgow-rulebook-the-basics/>

²⁹ <https://blog.oeko.de/glasgow-delivered-rules-for-international-carbon-markets-how-good-or-bad-are-they-cop26/>

avoid double-counting. This requirement “enables the voluntary carbon market to generate and use carbon units that are backed by corresponding adjustments,” giving projects a high degree of credibility, and investors certainty, as these are backed by host-countries.

In addition, this mechanism will provide developing and least developed countries with even more resources for climate adaptation, as five percent of proceeds from offset trades will be channeled into the Adaptation Fund (although this fee will not apply to the bilateral reduction trades between countries). Furthermore, the integrity of the mechanism for trading offset and mitigation credits will be strengthened by an independent *complaints procedure mechanism*³⁰ that will be established, to which NGO’s, indigenous groups, and others can recur to would they wish to report a deficiency in an authorized carbon credit generation-project.

According to the UNFCCC, before COP26, around two thirds of the 2015 Paris Agreement signatories had already included some sort of carbon pricing mechanism in their NDCs, and the World Bank estimated that, “using carbon pricing approaches on a large scale to meet the emission reduction targets set in NDCs could reduce the cost of climate change mitigation by 32% by 2030.”³¹ Now, having a finalized rulebook means that international carbon markets—including voluntary ones—will likely gain momentum.

A word of caution is due, as there has been ample criticism to carbon offsets, mainly because without stringent oversight, regulations and protocols, offsets could induce no additional emission reductions, or could lead to leakage of emissions from one place to another. They too can deter companies, industries and state actors from pursuing deeper decarbonization of their own, when in principle, offsets are meant to be used when their own carbon footprint has been reduced to the limit of their possibilities.

Besides, to date, there is no global regulatory framework, or verification and compliance mechanism. This creates credits of varying quality, and it then becomes complicated for investors and companies to differentiate and evaluate. It is also to date an important challenge to verify the permanence and quality of the emissions reductions. Technology here has the potential to greatly mitigate that challenge.

In that sense, the rulebook achieved in Glasgow in COP26 aims to tackle integrity issues by helping to avoid double-counting of emissions reductions—requiring countries transferring carbon credits abroad to make the corresponding adjustment in their own mitigation accounting. Furthermore, companies and investors wishing to buy carbon credits in the voluntary market can then buy credits linked to country’s corresponding adjustments. The presence of such standards is key to creating a viable international emissions trading scheme. According to Chirag Gajjar,

³⁰ <https://www.cleanenergywire.org/news/carbon-markets-cop26-closes-biggest-loopholes-lacks-clarity-voluntary-trade>

³¹ <https://unfccc.int/about-us/regional-collaboration-centres/the-ci-aca-initiative/about-carbon-pricing#eq-6>

head of subnational climate action within the climate program at the World Resources Institute, “the rules agreed to in Glasgow will make offsetting programs stricter”.³²

Furthermore, the Taskforce on Scaling Voluntary Carbon Markets released a Phase II Summary Report in July of 2021, proposing new and rigorous quality standards called Core Carbon Principles. These are meant to make sure that they have a measurable, meaningful impact on emissions and to establish a strong Measuring, Reporting and Verification (MRV) process that is consistent across both voluntary and mandatory markets. The TSVCM also announced it is working to establish a global governance body, which will finalize the standards and oversee voluntary carbon markets globally. Before such guidelines, creating, accounting and verifying carbon credits came down basically to the private sector and verification organizations.

All these efforts will contribute towards building higher quality, permanent, and additional emissions reductions, and will also provide the higher degree of confidence and credibility in the markets needed for them to scale up and bring the carbon price to a point that more truly reflects the negative externalities global warming pollutants bare. This will all allow these pricing mechanisms to play a more meaningful role in the fight against the climate crisis.

Conclusions and Recommendations

Mexico’s blue carbon ecosystems face land-use pressures that lead to their degradation or destruction. This, taking into account variability in carbon density across different types of mangrove forests, means Mexico has the second largest mangrove restorable area after Indonesia, even though it is the country with the fourth largest mangrove extension, according to the Earth Security study mentioned previously.³³ The study also mentions that the financial return of mangrove restoration in Mexico, at a carbon price of US\$60/tCO₂, would be of around US\$1.2 billion. In that sense, the non-profit community and the government need to promote projects that internalize the full range of ecosystem services provided—not only the price of carbon—in order to ensure these ecosystems are properly conserved. This would provide the necessary incentives for the communities to protect them and avoid land-use changes.

Mexico’s SEMARNAT is currently analyzing the country’s climate policy framework’s suitability to engage in international cooperation through Article 6. It is in this context that blue carbon projects can take center-stage in Mexico’s environmental policy and in its strategy to achieve its NDCs (both adaptation and mitigation targets)—as blue carbon assets were already explicitly mentioned on the 2020 update³⁴ of the NDCs delivered to the UNFCCC.

³² <https://www.greenbiz.com/article/what-passage-article-6-means-carbon-markets>

³³ Financing the Earth’s Assets: The Case for Mangroves as a Nature-based Climate Solution, 2020.

³⁴ <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Mexico%20First/NDC-Esp-30Dic.pdf>

This would be achieved through one, directly counting the blue carbon projects' emission reductions towards Mexico's NDC mitigation targets, and two, through the issuance and selling of carbon offsets in the international carbon markets as "authorized carbon credits,". The revenues of these credits could – and should – be used to encourage coastal communities to further conserve and restore mangrove and generally blue carbon ecosystems through, for instance, a payment for ecosystem services program like the one implemented successfully in Costa Rica and Ecuador.

It is important to highlight that Mexico's NDC and its General Law on Climate Change (LGCC, in Spanish) recognize the forestry sector as key to achieve the national mitigation objectives (through emissions reductions from deforestation and forest degradation), as, according to the government's analysis, REDD+ strategies have the potential to deliver up to 22% of the unconditional mitigation target by 2030—the third most important sector after power generation and transport. Mangroves, in the end, are part of Mexico's forests.

In addition, until the time of writing, none of the top ten countries in terms of restorable mangrove area, except Mexico, has included specifically blue carbon ecosystems as part of their NDCs. This gives Mexico a golden opportunity to attract sustainable financing in the near-term, and, as investors get into this space and these projects become more profitable with higher carbon prices, this could prove a relevant source of climate finance for the country.

Furthermore, these projects could too, in fact, be financed domestically by private actors in the future, if SEMARNAT is to include them as allowable offsets in the compensation protocols for the ETS that Mexico is in the midst of implementing.

It is important that Mexican authorities include a relevant section on applicable protocols for blue carbon in the country's upcoming national emissions trading scheme, and authorize appropriate international crediting methodologies specifically for blue carbon offsets, as these projects have their nuances in regard to all other sectors—including regular tropical forests.

As the world advances the low-carbon revolution, government and regulators' policies become stricter and companies' climate targets more ambitious. This means entire new sectors of the global economy—such as aviation and shipping—will seek to lower their own supply chains' carbon footprint, but it also means they will create demand for climate mitigation projects elsewhere for those emissions they cannot directly abate.

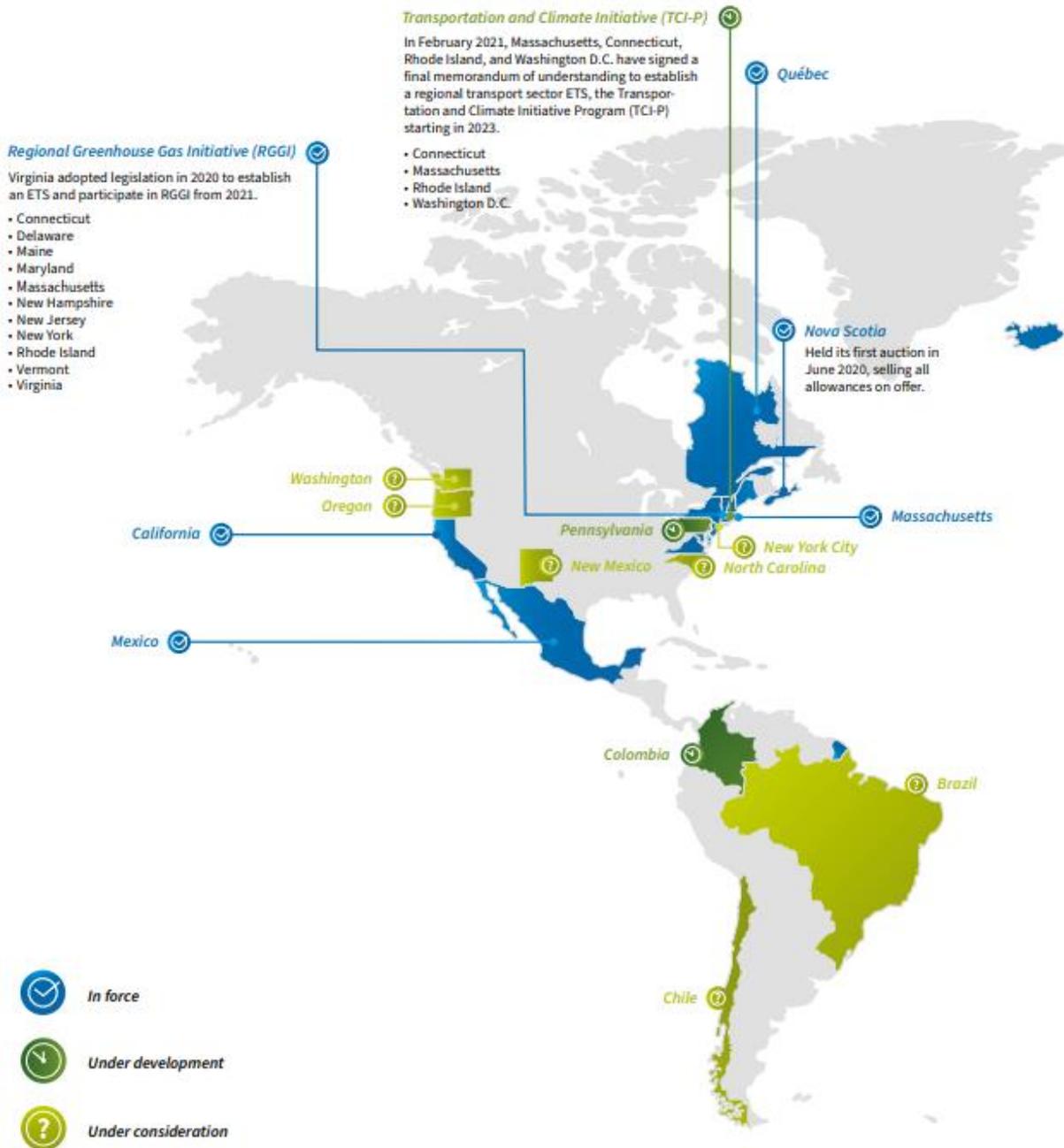
This will help marshal resources into low-cost mitigation projects, and given rising emissions in the developing world and vast natural resources, countries such as Mexico will stand to gain from global climate finance flows. Furthermore, as carbon market mechanisms scale, and prices rise, blue carbon projects will become more profitable and attract investors' attention.

It is important to ensure Mexico analyzes the role carbon markets—compliance trading systems, the Paris Agreement's Article 6 mechanism, and voluntary markets—can and will play in the future to fund nature-based projects.

This requires establishing the right set of regulations and protections for its ecosystems at the federal and local levels, so that these projects truly benefit not only the country's overall climate policy interests, but its communities and its biodiversity at large. Through the country's framework of its Nationally Determined Contribution, its Emission Trading System's compensation mechanism, and ENAREDD+ strategy, Mexico is ripe to leverage carbon market-based mechanisms as a source of funding to protect its blue carbon coastal ecosystems.

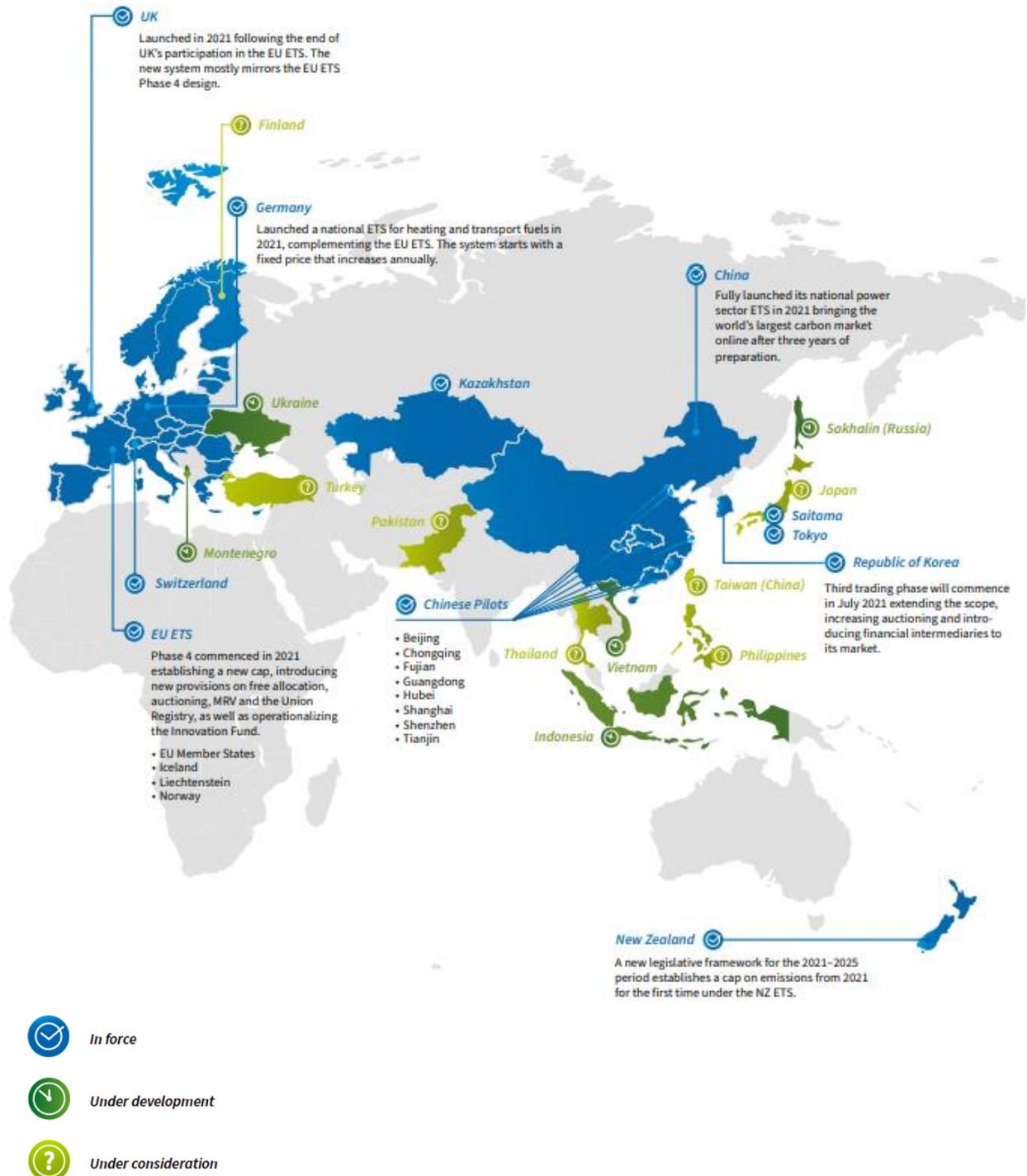
Appendix

World map of emissions trading systems currently in force, under development or under consideration.



Source: EMISSIONS TRADING WORLDWIDE, The state of play of cap-and-trade in 2021, ICAP.

World map of emissions trading systems currently in force, under development or under consideration.



Source: EMISSIONS TRADING WORLDWIDE, The state of play of cap-and-trade in 2021, ICAP.