

GLOBAL CARBON MARKETS

DRIVING THE WORLD TO A
LOWER-CARBON ECONOMY

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Contents

- Executive Summary2
- Introduction.....3
- Emission Trading Systems4
 - How does it work?.....4
 - Mechanisms – Price Floors, Ceilings and Penalties.....5
 - Challenges – Measurements, Leakages and Offsets.....5
- The Three Major ETS Markets6
 - European Union ETS (EUA).....7
 - California/Quebec Cap-and-Trade (CCA).....7
 - Regional Greenhouse Gas Initiative (RGGI)8
- Global Carbon Markets – A Look Forward.....8

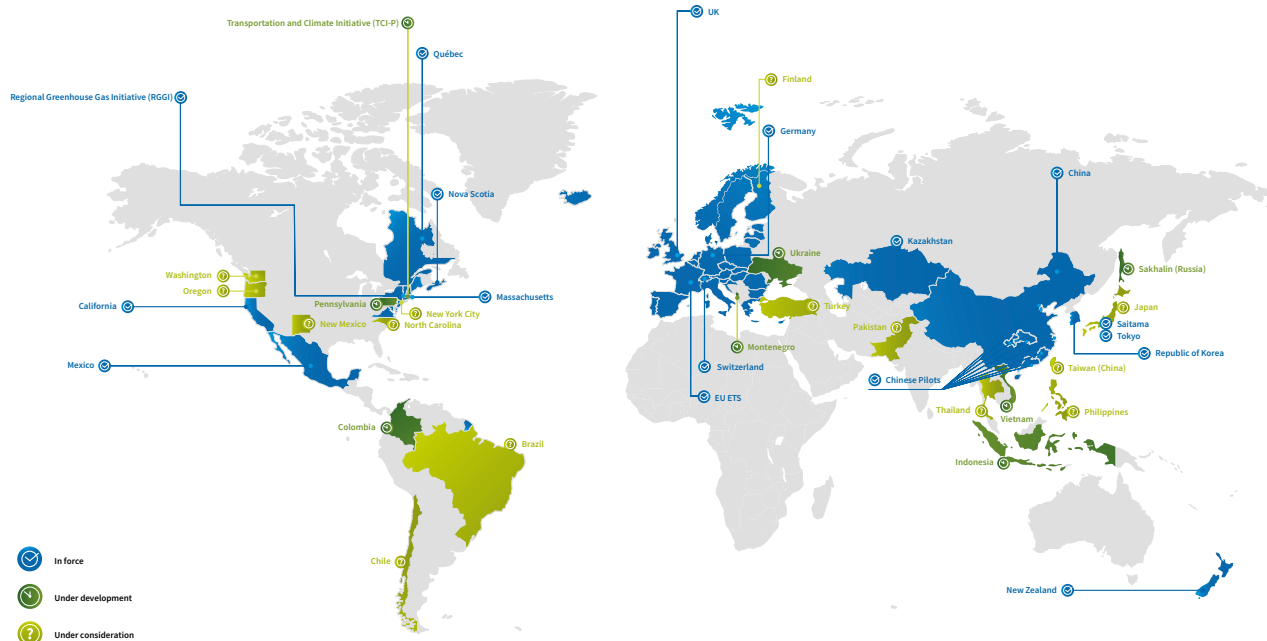
Executive Summary

Climate Change threatens prosperity – the world must transition to a lower-carbon global economy. Trillions of dollars are required, estimated by the Intergovernmental Panel on Climate Change (IPCC) in 2018 to be \$2.4T per annum until 2035.¹ Governments have responded with regulation and placed a price on carbon to compensate for the externalities of industrial pollution. Emissions Trading Systems (ETS) established in Europe and North America require major emitters to reduce their carbon footprints. And through these new ETSs, a new investible asset class and market-based source for accurate, transparent price discovery have been created.

Carbon credits is an emerging asset class. Over its 15-year history, it has shown consistent contango and low correlation with other commodities and equities – thus sometimes being referred as the “Ultimate Un-Correlated Asset.” The world’s three major ETS markets for carbon credit are the European Union (EU ETS), Quebec/California (CCA), and The Regional Greenhouse Gas Initiative (RGGI), which is a collaboration of 11 North Eastern Atlantic Seaboard States. These three ETSs cover 9% of global greenhouse gas emissions² and represent a burgeoning new asset class.

Emissions Trading Worldwide

As of 2021, ETS systems are operating in **38** countries covering over **40%** of global GDP



Data Source: Partnership for Market Readiness; International Carbon Action Partnership. 2021. Emissions Trading in Practice, Second Edition: A Handbook on Design and Implementation. World Bank, Washington, DC. © World Bank.

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Image Source: The World Bank, Adapted from International Carbon Action Partnership (ICAP) 2021.

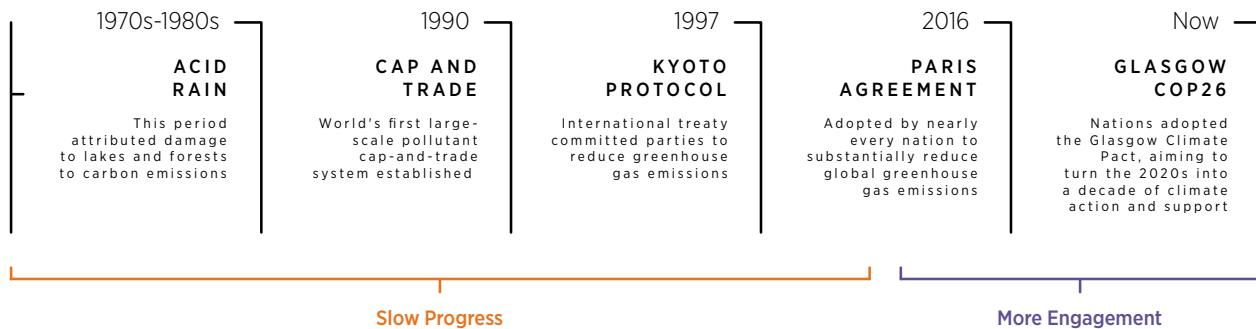
Introduction

“The Earth is 4.5 billion years old. Its history is written in the rocks. Modern Human Civilization has developed within just 10,000 years, yet the success of the species has tipped the planet’s systems outside their natural limits. We are all implicated, some far more profoundly than others, but the tenacity and ingenuity that helped us thrive can also help us to pull these systems back to a safe place for all life on earth. Recognizing and reimagining our dominant skill is the beginning of change.”

-The Anthropocene Project 2021³

Climate Change threatens global prosperity. Since the beginning of the Industrial Revolution, unabated Greenhouse Gas (GHG) emissions have caused surface temperatures to warm by between 0.91° and 1.09° C. Without urgent action to return to circa 1900 levels, the planet’s temperature could rise beyond 2.5° C by 2050.⁴ Already we see extreme weather patterns, including increases in the frequency and intensity of temperature extremes, heavy precipitation, agricultural and ecological drought, and increases in the proportion of intense tropical cyclones or hurricanes. Deep ocean warming and ice-sheet melting will contribute to rising sea levels, rendering many islands and coastal areas uninhabitable. Under the direst predictions, the heat and drought in tropical regions will not sustain agriculture causing mass populations to migrate.⁵ The unmanaged release of CO₂ and other GHG gases will be at a great cost to global stability.

The Carbon Pricing Policy Journey



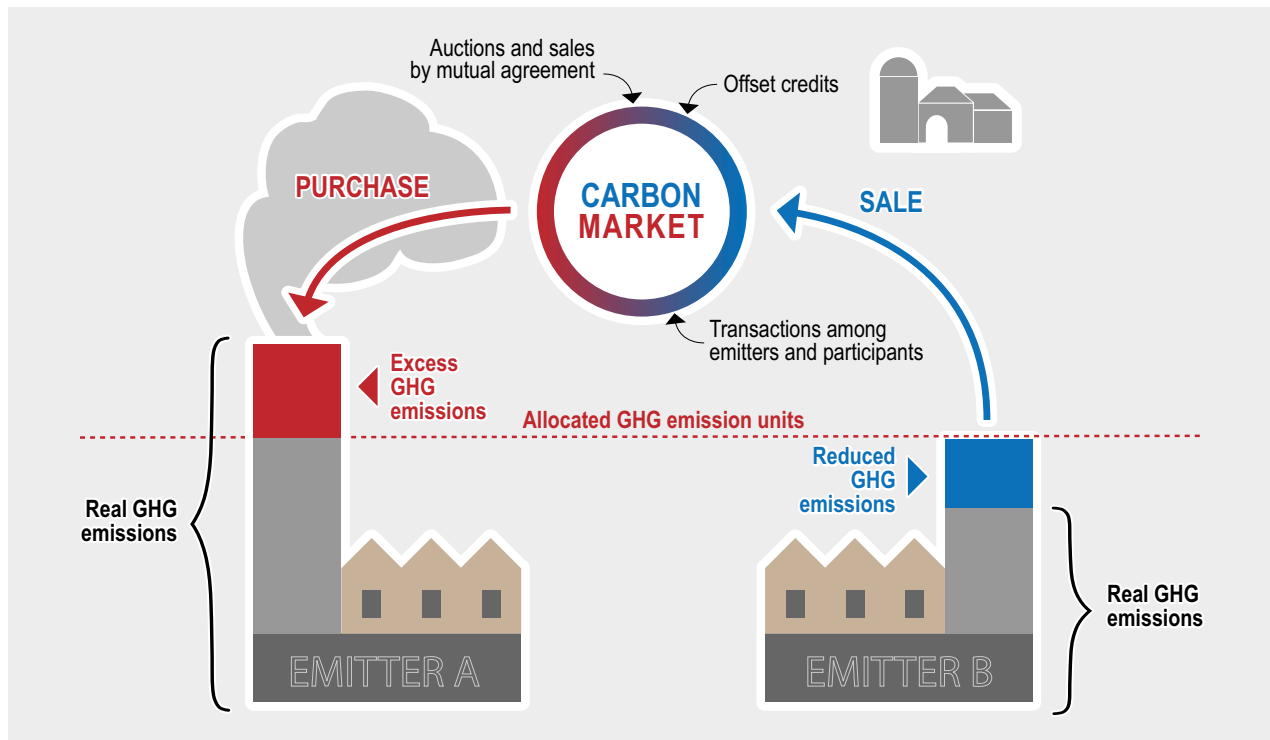
To continue on a path of limiting warming to 1.5° C, the world must transition to a lower carbon economy. Under the 2005 Paris Agreement, participating countries have agreed to set goals to diminish emissions. Both national and regional governments have begun by placing a price on carbon which is a clear disincentive to pollute. A carbon tax is levied on major emitters to bring about change in their operational practices and shift consumer behaviors towards sustainability. For example, in Canada, carbon tax is applied in every province where the federal regulator determines an effective carbon mitigation and reduction policy is absent. The tax penalizes significant emitters with the money rebated to consumers. Some other nations and regions have established Cap-and-Trade, i.e. Emissions Trading Systems (ETS), regulating emission levels within economic sectors. The European Union’s ETS was the first Cap-and-Trade program in 2005. There are now ETS markets in North America, Japan, Korea, China, and New Zealand. **Effectively, by regulation, establishing a price for a permit to emit a metric tonne of carbon has created a new commodity and world market for carbon.**

Emission Trading Systems

How does it work?

Emissions trading is a regulated market-based approach to reducing pollution by providing economic incentives to bring about adoption of carbon abatement practices. In an Emissions Trading System, a governmental entity sets a policy objective to reduce emissions in their jurisdiction by establishing a regulatory authority which sets targets for major emitters. The regulatory authority sets a cap on total emissions within the Emissions Trading System and splits the cap into carbon allowances or credits. One carbon credit represents the right to emit one ton of carbon dioxide (CO₂) or carbon dioxide equivalent gases. On average, people emit one ton of CO₂ when driving approximately 2,500 miles⁶ – roughly the distance between Toronto and Vancouver.

To achieve compliance, a regulated company under the emission trading system can acquire carbon allowances from the regulator for free or through an auction, purchase through secondary markets, or reduce its emissions. After each compliance period, regulated companies must surrender enough carbon credits to cover its emissions, or they will be liable to heavy fines. In some Emissions Trading Systems, companies may use offset credits generated from regional or international projects towards a small percentage of their compliance requirements. Each year the regulatory authority reduces the total number of allowances available, thereby achieving lower emissions targets. Below is an illustration of an Emissions Trading System:

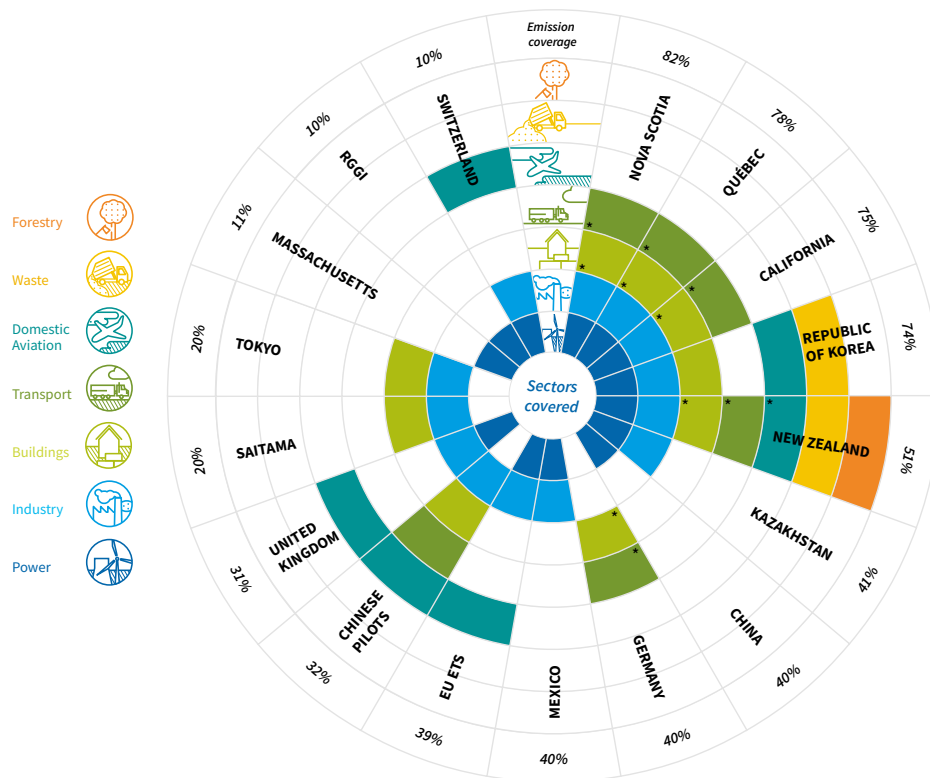


Source: Ministère de l'Environnement et de la Lutte contre les changements climatiques.

Emission Trading Systems generally target the top end of emitters within sectors. Leading this group are Power Generation Companies and Utilities, Traditional Energy, i.e., Coal, Oil and Natural Gas companies, Iron and Steel Manufacturing, Cement, Food Processing, Glass, Bricks, Pulp and Paper, Petrochemicals, Telecommunications and Aviation.

Greenhouse Gases measured and monitored include Carbon Dioxide, Methane, Nitrous Oxide, Sulfur Hexafluoride, Hydrofluorocarbons, Per-fluorinated Chemicals, Nitrogen Trifluorides, and other fluorinated GHGs.

Sectors covered by emissions trading across systems



Source: ICAP. (2021). Emissions Trading Worldwide: Status Report 2021. Berlin: International Carbon Action Partnership.

Mechanisms – Price Floors, Ceilings and Penalties

Cap-and-Trade is a supply-side platform. The regulatory authority controls the quantity of allowances issued and price discovery happens in trading activity in the market. A Cap-and-Trade program is successful when the regulator’s policy objectives are achieved i.e. the benefit curve of abatement is steeper than the cost curve. All Emission Trading Systems, by design, have controls to manage supply and allocate allowances to achieve their emission targets. Additionally, all ETSs have mechanisms to manage supply and volatility. These consist of reserve pools of allowances, establishing floor and ceiling prices, and price-setting of penalties.

Undervaluing pollution’s externalities has accelerated the climate crisis. To contain volatility, regulators have worked to impose a “*price corridor*” so that participants can form clearer expectations between emission reduction strategies and a “positive” optimal price of carbon.

Challenges – Measurements, Leakages and Offsets

All ETSs establish a verification program to support mandatory reporting by their compliant participants. Protocols for measurement, accuracy, monitoring, and verification are implemented using methods and technologies set by International Standards Organizations. An accreditation program is established for independent verifiers and an oversight body evaluating those services governs reporting and compliance. The success of an ETS program is equal to the quality of measurement of GHGs and verification of reductions.

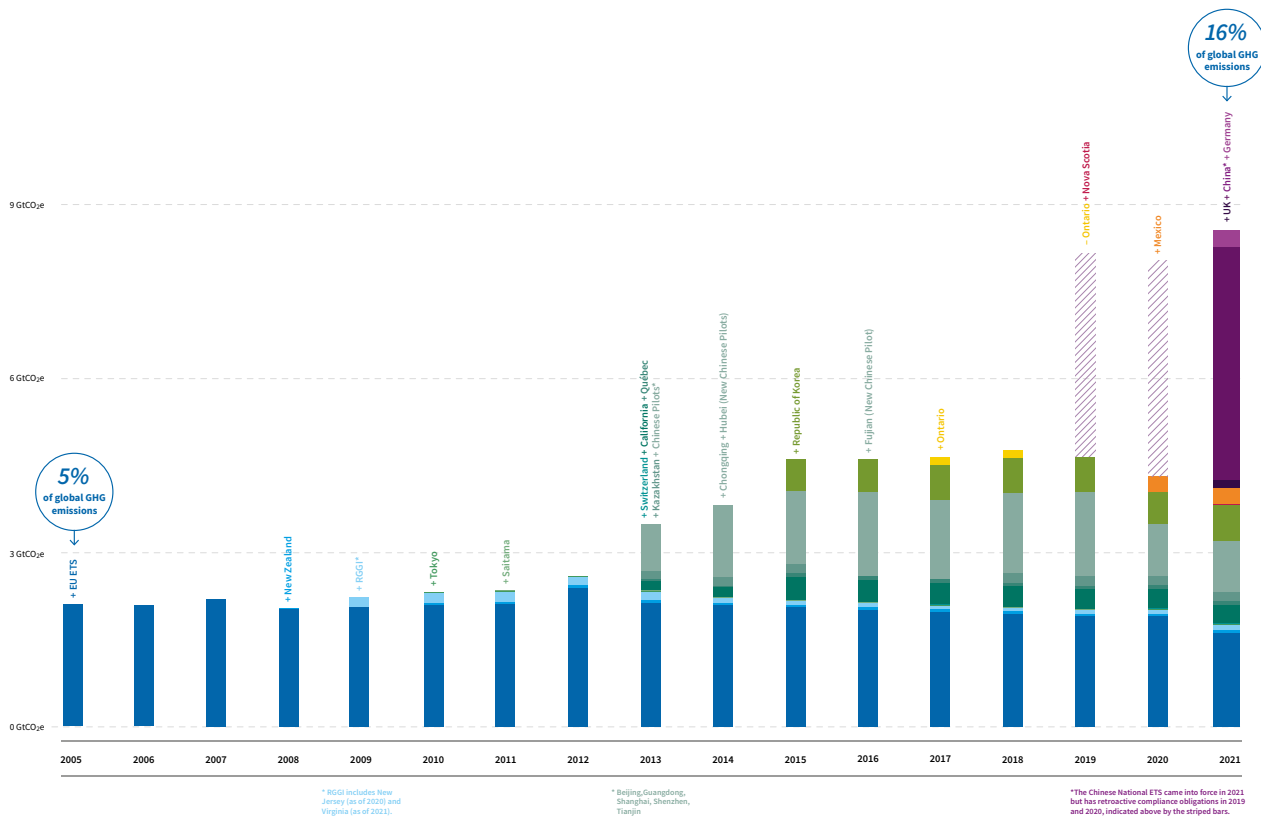
A challenge for all systems is leakage, which happens when emission-intensive and trade-exposed industries—facing costly climate policies – relocate to jurisdictions with less-stringent environmental policies. Leakage undermines the global benefits of all carbon reduction programs. The utility of Canada’s carbon tax program for example, is jeopardized by the fact the United States, its major trading partner, has much less stringent environmental policies. The solution is to implement a cross border tax on all goods and services from countries with lower environmental standards. To apply fairly will challenge the accuracy of measurement and verification systems.

Lastly, Emissions Trading Systems have historically accepted a small percentage of emissions reductions from carbon offset projects. To qualify, offsets must be real, quantifiable, enforceable, permanent, additional, and verified reductions of GHGs and from economic sectors outside the Cap-and-Trade program. As offset projects are generally less expensive to develop, companies under ETS will allocate resources to develop them creating much needed capital investment for carbon mitigation. In addition to carbon reduction, these projects often provide a social benefit. The United Nations has established requirements for 17 “Sustainable Development Goals” (SDGs)⁷ which includes combating poverty, providing clean water and creating high quality employment opportunities. In North America, these projects can often be found on First Nations lands and contribute to saving natural wildlife habitats. The carbon offsets are generally created and monitored using stricter engineering protocols and measurement than others in the voluntary carbon markets. And the regulator can use capital raised through the ETS as subsidies to industry to develop new lower emissions and carbon reduction technologies. Offset projects are consistent and complimentary to the policy objectives of Cap-and-Trade systems.

The Three Major ETS Markets

The global asset value for regulated carbon in 2020 was €230B.⁸ Under the three ETS discussed in this whitepaper, approximately 9% of the planet’s emissions are regulated. This coverage grows to 16% when China’s national ETS and Germany’s national ETS are added.²

The share of global GHG emissions under an ETS tripled since 2005



Source: ICAP. (2021). Emissions Trading Worldwide: Status Report 2021. Berlin: International Carbon Action Partnership.

European Union ETS (EUA)

The EU ETS is by far the largest market for regulated carbon representing 88% of global value.⁸ Approximately 11,000 installations are covered across the EU plus Norway, Iceland and Liechtenstein and recently the Swiss ETS has harmonized pricing.⁹ Currently, in its fourth phase, the system has had significant measurable success in lowering emissions. By 2018, total EU GHG emissions have fallen by 23% since 1990.¹⁰ A recent study by Bayer and Aklin (2020) estimates that 1.2B tonnes of CO₂ were saved between 2008 and 2016.¹¹

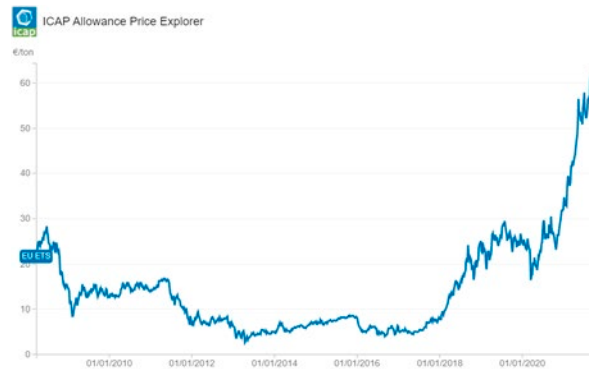
In 2019, a Market Stability Reserve (MSR) was established to respond to overall economic conditions and supply/demand dynamics from world events such as the pandemic.

In July 2021, a new “Fit for 55” policy was tabled for EU ETS members to ratify. It targets reducing emissions by 55% by 2030.¹² New proposals to extend and accelerate the system and targets include:

- Addition of maritime shipping, road transportation, and building sectors;
- A sharp reduction in Cap targeted for 2024 followed by a steeper linear reduction rate in subsequent years;
- Introduction of Cross Border Carbon Adjustment Mechanism to capture revenue on goods imported from outside the EU;
- Elimination of applying for International Credits from the Clean Development Mechanism, and,
- Phasing out free allowances.

Since 2017, the price of EU ETS carbon allowances has increased dramatically. The 2020 pandemic further demonstrated that the underlying structure of carbon market is sound. In facing the pandemic, the price reacted rationally as prices and auction volumes initially dropped, then stabilized and later recovered to pre-pandemic price and volume levels. The chart above shows prices recovered rapidly and reached new highs in the 4th quarter of 2021. Recent highs are partly attributable to supply limits of natural gas in Europe. This shortage caused greater use of coal by power generation companies. Also, in part, long-term investors see more aggressive climate action policies world-wide. They have increased their holdings as a hedge to potentially offset declines in the value of carbon-intensive assets. Increasingly EU allowances are seen not just as an energy-related commodity but as a financial asset.

Price of EU ETS Carbon Allowance



California/Quebec Cap-and-Trade (CCA)

The California Air Resources Board (CARB) and the Ministry of Environment and Fight Against Climate Change of the Canadian province of Quebec have collaborated to create a single Cap-and-Trade market. In California, the original compliance period began in 2013. It applies to Power Generation (including imports) and organizations emitting more than 25MTs CO₂e/annum. As with Europe, these major emitters include refineries, oil and gas production facilities, food processing plants, cement production operations, and glass manufacturers. However, the CARB system does not cover aviation or marine operations. Approximately 400 institutions from this group have compliance obligations, while an additional 200 that fall just below the 25MTs threshold are required to report their emissions. California has a series of longer-term climate targets, including a 2030 state reduction target of 40% below 1990 levels and an objective of carbon neutrality by 2045.⁹

Price of CCA Carbon Allowance



California has instituted price controls to support demand. An Auction Price Reserve was established in 2012, setting a floor price of \$10/tCO₂e, which increases annually by 5% plus inflation. The 2021 floor is set at \$17.71. Finally, a ceiling has been set beginning in 2021 at \$65/t.⁹

Quebec's plan targets a 2030 greenhouse gas emissions reduction of 37.5% compared to 1990 levels and aspires to carbon neutrality by 2050. Québec directs all revenues generated to the Electrification and Climate Change Fund. The fund invests and supports companies, municipalities, and private citizens in reducing GHG emissions while helping them transition to a robust, innovative, and increasingly lower-carbon economy.

Regional Greenhouse Gas Initiative (RGGI)

The Regional Greenhouse Gas Initiative (RGGI) is a cooperative, market-based effort by the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, Vermont, and Virginia, to cap and reduce CO₂ emissions from the power generation sector. Every year regulated power plants must surrender allowances equal to one-half of that year's CO₂ emissions. Every three years, called a control period, each plant must surrender allowances for all emissions from year three, plus all remaining emissions from years one and two. Additionally, participants can access the RGGI futures market to manage their compliance obligations.

Price of RGGI Carbon Allowance



The RGGI uses internal mechanisms to smooth volatility and control supply, including a Cost Containment Reserve (CCR) price ceiling, and an Emission Containment Reserve (ECR) price floor. The original floor established in 2018 is mandated to rise 2.5%/annum and 3% in 2020 as an inflation buffer. The CCR mechanism releases allowances when ceiling prices are triggered – in 2017, this price was \$10; in 2021, \$13; and future increases are governed at 7%/annum 2022. A top price of \$24 is in place for 2030. Similarly, the ECR mechanism provides a floor price of withdrawing allowances. The floor in 2021 is set at \$6, which will rise by 7%/annum beyond. The RGGI system has achieved its goals and dropped emissions in the energy generation sector in these States by 50%. Over \$3B in revenues has been returned to RGGI states for energy-efficient and renewable projects, and other consumer GHG reduction programs.⁹

Global Carbon Markets – A Look Forward

We are entering the age of Carbonomics – carbon pricing driving the world to a lower-carbon global economy. The simple truth is that dramatic reductions of emissions need to be achieved beginning now.¹³ Under-valuing the true cost of pollution has accelerated the crisis we face today. International efforts are fragmented, and all carbon pricing mechanisms are estimated to cover only 21% of global emissions.¹⁴ However, at COP 26 in Glasgow, the international community's acceptance of Article 6 of the Paris Agreement created an international carbon market. All countries participating have agreed to submit Nationally Determined Contributions (NDCs) which are essentially emission thresholds or Caps under National Carbon Accounts. In this agreement, the carbon credits called "Internationally Transferable Mitigation Outcomes" (ITMOS) will be tradeable for countries to make "corresponding adjustments" to comply with their National Carbon Accounts. While all carbon pricing regulates approximately 21% of global emissions, the Article 6 mechanism aims to cover 90%.¹⁵

The bottom line is increased regulation within countries and regions, more emission trading systems, and a stronger carbon price. ■

“What’s important is that the price on carbon pollution provides an incentive for everyone, from industry to households, to be part of the solution. Ultimately, the critical factor in reducing heat-trapping emissions is the strength of the economic signal. A stronger carbon price will kick-start more growth in clean, renewable energy and will encourage adoption of greener practices.”

FOOTNOTES

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