

# Understanding carbon markets



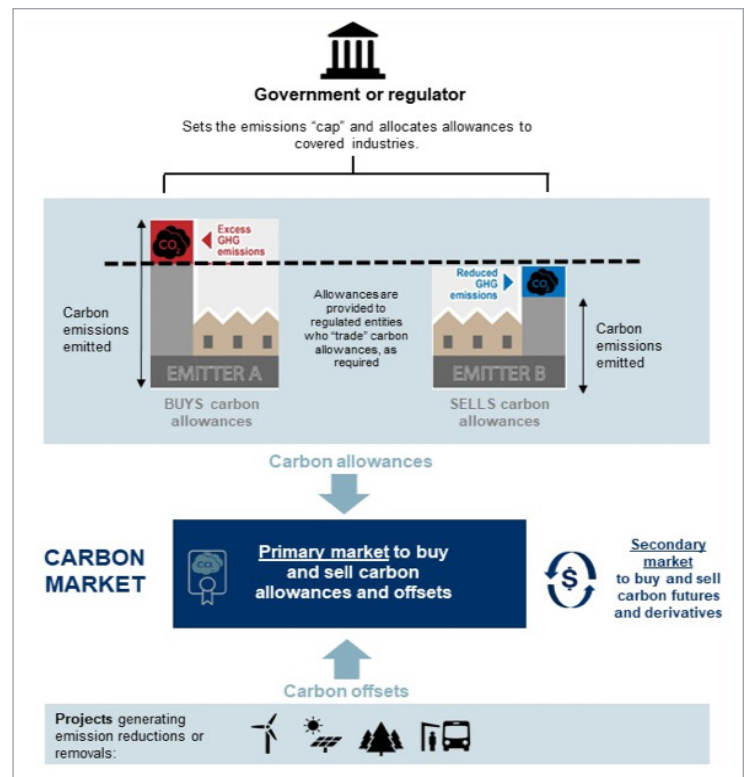
Climate change is a pressing issue that has the potential to impact the economy, markets, and society. To mitigate climate change will require significant reductions in global greenhouse gas (GHG) emissions.<sup>1</sup> One of the most cost-effective ways of incentivizing these reductions is to put a price on carbon, which can be accomplished through either a carbon tax or cap-and-trade program.

Putting a price on emissions shifts the economic incentives by making it more expensive to pollute. This article will focus on the establishment of carbon pricing through government and regulatory cap-and-trade programs. These emissions-trading schemes (ETS) establish a “cap” on the amount of emissions that regulated companies can produce, and allow them to then “trade” these allowances between companies that have exceeded their allowed cap and those that have reduced emissions below it. In this way, a cap-and-trade program provides incentives for emissions reductions to occur at the lowest possible cost.

The very first ETS was established by the European Union (EU) in 2005; presently, there are 45 national and 35 sub-national jurisdictions that have implemented some form of ETS, covering 21% of global annual emissions and over 50% of global GDP.<sup>2</sup> These emissions trading schemes form the foundation of carbon markets.

## How do carbon markets work?

Carbon markets exist under both mandatory (compliance) programs and voluntary programs. Compliance programs are created and regulated by national, regional, or sub-regional governments and laws. Voluntary markets operate outside compliance markets and enable companies to buy and sell carbon offsets to meet their own objectives. The rules for how voluntary carbon markets operate were established at the 2021 UN Climate Change Conference (COP26) and will guide their implementation moving forward.



<sup>1</sup>Intergovernmental Panel on Climate Change, Special Report, Global Warming of 1.5oC ([Link](#))

<sup>2</sup>Carbon Pricing Dashboard, The World Bank, accessed July 30, 2021 ([Link](#))

Compliance carbon markets operate as cap-and-trade programs (see diagram below<sup>3</sup>), with rules and requirements established by emissions trading schemes, which are in turn regulated by government entities and laws.

Jurisdictions that host regulated emissions trading schemes and carbon markets include the EU, China (launched July 2021), South Korea, Kazakhstan, New Zealand, the EU, 10 U.S. states (including California and New York), Québec, and Tokyo. There are also systems being developed or considered in Mexico, Turkey, Ukraine, Brazil, Taiwan, and Thailand, among others.<sup>4</sup> In May 2021, Canada announced efforts to create a national carbon trading marketplace. While rules vary by jurisdiction, the sectors or groups typically regulated under an ETS include power generation, oil and gas refining, chemical manufacturing, mining and steel production, pulp and paper processing, cement, and transportation.

Carbon markets consist of both primary and secondary markets, and carbon trades now represent approximately USD\$1 billion per day inclusive of carbon allowances, futures, and options.<sup>5</sup>

- In the primary market, carbon allowances are bought and sold by regulated companies. Governments or regulators establish emissions “caps” for sectors and allocate allowances for participating companies to produce a certain volume of emissions. Each carbon allowance provides a company the legal ability to emit one ton of CO<sub>2</sub> equivalent. Companies that exceed their allowances, and those that have surplus allowances, can trade these in the carbon market. In some regions, such as East Asia and North America, regulated entities may buy carbon offsets (or credits) to meet their obligations (see box).
- In the secondary market, market participants (banks, trading companies, others) are able to provide liquidity to companies regulated by cap-and-trade programs. Regulated companies can also hedge their exposure to future price increases. All long-established emissions trading schemes have exchange-listed futures markets to enhance liquidity and price discovery, which facilitates both greater market efficiency and increased demand within the market.<sup>6</sup>

### What drives the carbon price?

The price of carbon is determined by both the supply and demand of carbon allowances and offsets, as well as expectations by market participants of future price direction. The supply and demand of carbon allowances is determined based on the number of allowances provided under each ETS and the cost of reducing emissions for regulated entities, which will vary by company, sector, and geography. Over time, governments typically reduce the cap on emissions, which means companies must reduce emissions even more, which in turn increases the cost (and price) of carbon allowances.

### What are carbon offsets?

Carbon offsets are credits provided to a project or entity for their removal or reduction of emissions. Offsets can be verified under both regulated and voluntary schemes, with varying levels of rigour and quality depending on the program. The offset program, as well as other factors such as project geography, focus, and scale contribute to the price differential between carbon offsets bought and sold in the carbon market (e.g., higher-quality offsets qualified to be sold in the regulated market are worth more).

Examples of projects that may generate offsets include renewable energy, forestry, carbon capture and sequestration, energy-efficient improvements, landfill gas capture, ozone depleting substance removal, and animal waste methane capture, among others. The following project criteria are typically used to determine eligibility for a carbon offset: (Source: IETA Emissions Trading 101).

- **Real:** Demonstrate real emissions reductions that have already occurred (i.e., are not projected to occur in the future).
- **Additional:** Emissions reductions must be in addition to what would have occurred otherwise.
- **Permanent:** Emissions reductions must be non-reversible, or be sequestered for a set number of years.
- **Verifiable:** Emissions reductions must be supported by sufficient data quantity and quality so that they can be verified by an independent auditor.
- **Quantifiable:** Emissions reductions must be capable of being reliably quantified.
- **Enforceable:** Offset ownership must be clear and undisputed, with enforcement mechanisms to ensure program rules are followed.

<sup>3</sup>The Carbon Market, a Green Economy Growth Tool, Ministère de l'Environnement et de la Lutte contre les changements climatique. Diagram adapted by RBC GAM ([Link](#))

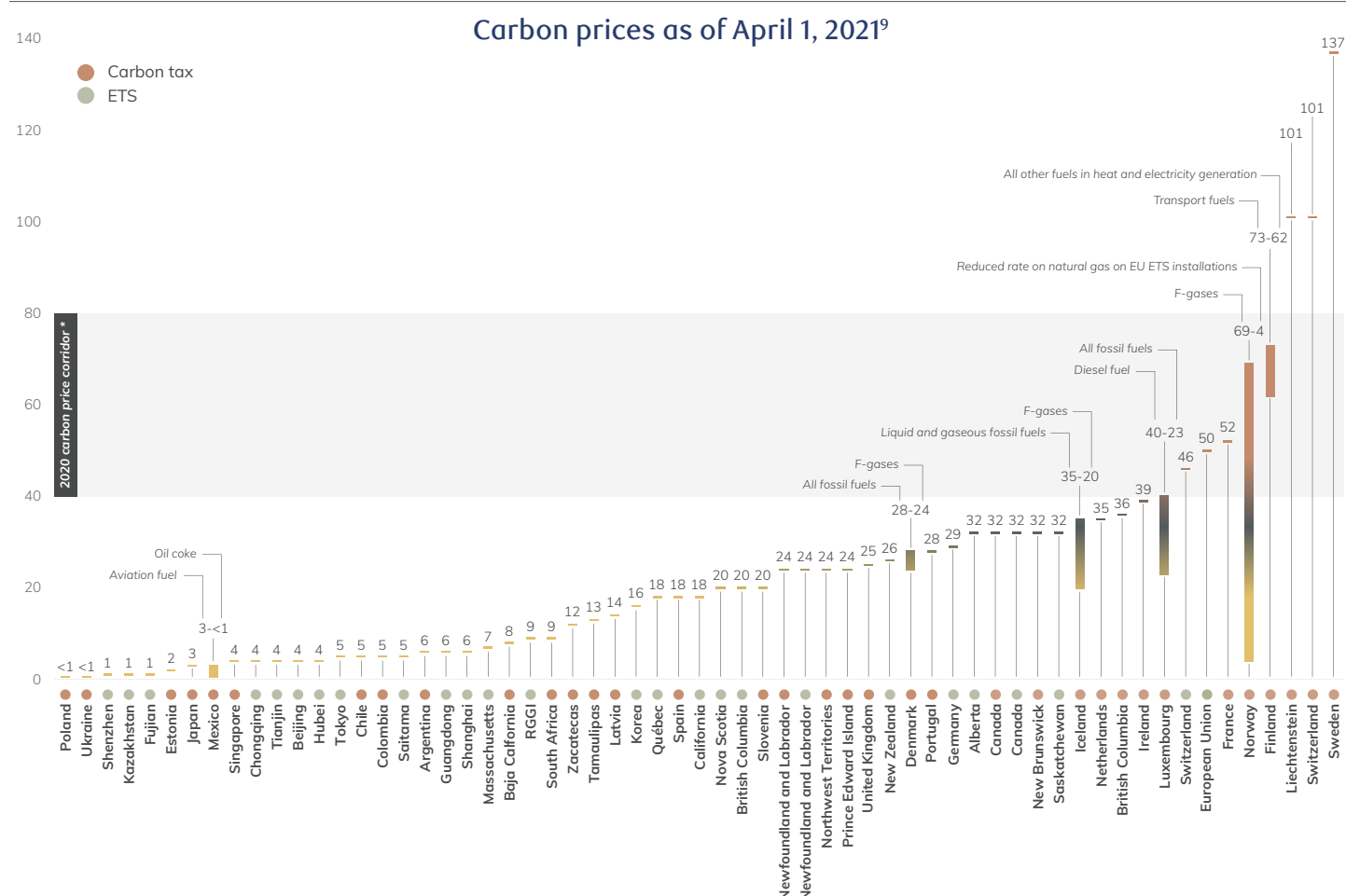
<sup>4</sup>Emissions trading worldwide: Status Report 2021, International Carbon Action Partnership ([Link](#))

<sup>5</sup>Carbon as an emerging asset class, CFA Institute Case Study: Carbon Cap Management LLP, October 5, 2020 ([Link](#))

<sup>6</sup>Carbon as an emerging asset class, CFA Institute Case Study: Carbon Cap Management LLP, October 5, 2020 ([Link](#))

Key design features in carbon markets have been established more recently to reduce the impact of an economic downturn on carbon prices and support the robust functioning of these market. These features include: introducing carbon price floors below which trading is not permitted, cutting auction volumes when allowances exceed a certain limit, and the free allocation of allowances to companies based on benchmarks that reward the most efficient installations in each sector. For example, the EU's Market Stability Reserve (MSR) was introduced in 2019 to address an excess supply of carbon allowances that had accumulated following the economic crisis of 2008–2012 and resulted in excessively low carbon prices. The MSR automatically moves allowances to the reserve whenever there are too many allowances in the market, and releases allowances when there are too few. In both cases, decisions are based on predefined thresholds, with no discretion afforded to regulators.

Rapidly accelerating government ambitions to reduce GHG emissions, including those made under the Paris Agreement and through more recent commitments to achieve net-zero emissions by 2050, will continue to put upward pressure on carbon prices as carbon allowances become increasingly valuable. According to the Net Zero Tracker,<sup>7</sup> as of 2021, 55 countries have made net-zero commitments, including the European Union, China, Japan, Canada, and the United States. China's national ETS launched in February 2021, becoming the world's largest carbon market.<sup>8</sup> For these countries and others, carbon pricing will be an important and cost-effective policy tool for governments to use to meet their climate ambitions.



NOTE: Nominal prices on April 1, 2021, shown for illustrative purpose only. China national ETS, Mexico pilot ETS and UK ETS are not shown in this graph as price information is not available for those initiatives. Prices are not necessarily comparable between carbon pricing initiatives because of differences in the sectors covered and allocation methods applied, specific exemptions, and different compensation methods. The 2020 carbon price corridor is the recommendation of the World Bank's 2017 High-Level Commission on Carbon Prices Report.

<sup>7</sup>Net Zero Tracker, Energy and Climate Intelligence Unit, Accessed August 3, 2021. ([Link](#))

<sup>8</sup>China National ETS, International carbon Action Partnership, August 9, 2021 ([Link](#))

<sup>9</sup>State and Trends of Carbon Pricing 2021, The World Bank Group ([Link](#))

The number of jurisdictions applying carbon pricing and the volume of emissions covered continues to increase year over year. And while carbon pricing is becoming increasingly widespread, it is anticipated that prices will need to rise significantly over the next decade in order to stimulate the emissions reductions required to meet the Paris Agreement's goal of limiting warming to well below 2°C (see chart). Various research studies have shown that carbon allowance prices need to be at least US\$40 to \$80 per ton of CO<sub>2</sub> by 2020 and US\$50 to \$100 by 2030 to reach the goal of the Paris Agreement.<sup>10</sup> According to the State and Trends of Carbon Pricing 2021 only 3.76% of global emissions were covered by a carbon price above US\$40/tCO<sub>2</sub> eq., which is the bottom end of carbon prices recommended for meeting Paris. The average global price of carbon was \$24.05/tCO<sub>2</sub> eq. (equivalent) as of December 31, 2020).<sup>11</sup> A meaningful rise in carbon prices will be required over the next decade for governments to reach their commitments to achieve net-zero emissions and limit global warming in line with the Paris Agreement.

### What's next for carbon markets?

Effective carbon pricing signals are needed to incentivize emissions reductions and to meet net-zero emissions goals. Carbon emissions trading schemes are an effective policy tool for establishing a price on carbon and well-functioning carbon markets can contribute to emission reductions. As carbon markets continue to develop, so too will investible opportunities.

RBC Global Asset Management (RBC GAM) supports the global goal of achieving net zero emissions by 2050 or sooner and we continue to implement our commitments and actions as described in [our net zero ambition](#). This includes integrating financially material climate factors in our investment approach, measuring and monitoring the alignment of issuers to net zero, and actively engaging with issuers for whom climate change is a material financial risk if they don't have net zero targets and action plans. When it comes to our own operations, we are committed to maintaining net zero emissions in our operations, which we have done every year since 2017. As a formal supporter of the *Task Force on Climate-Related Financial Disclosures* (TCFD), we believe that transparent disclosure of climate risks and opportunities is important, and provide detailed climate reporting in our [TCFD 2020 Report](#).

<sup>10</sup>State and Trends of Carbon Pricing 2021, The World Bank Group ([Link](#))

<sup>11</sup>A Global Price for Carbon Emissions, IHS Markit Climate Finance Partners (CLIFI), August 2019 ([Link](#))

This document is provided by RBC Global Asset Management (RBC GAM) for informational purposes only and may not be reproduced, distributed or published without the written consent of RBC GAM or its affiliated entities listed herein. This document does not constitute an offer or a solicitation to buy or to sell any security, product or service in any jurisdiction; nor is it intended to provide investment, financial, legal, accounting, tax, or other advice and such information should not be relied or acted upon for providing such advice. This document is not available for distribution to investors in jurisdictions where such distribution would be prohibited.

RBC GAM is the asset management division of Royal Bank of Canada (RBC) which includes RBC Global Asset Management Inc., RBC Global Asset Management (U.S.) Inc., RBC Global Asset Management (UK) Limited, RBC Global Asset Management (Asia) Limited, and BlueBay Asset Management LLP, which are separate, but affiliated subsidiaries of RBC.

In Canada, this document is provided by RBC Global Asset Management Inc. (including PH&N Institutional) which is regulated by each provincial and territorial securities commission with which it is registered. In the United States, this document is provided by RBC Global Asset Management (U.S.) Inc., a federally registered investment adviser. In Europe this document is provided by RBC Global Asset Management (UK) Limited, which is authorised and regulated by the UK Financial Conduct Authority. In Asia, this document is provided by RBC Global Asset Management (Asia) Limited, which is registered with the Securities and Futures Commission (SFC) in Hong Kong.

---

Additional information about RBC GAM may be found at [www.rbcgam.com](http://www.rbcgam.com).

This document has not been reviewed by, and is not registered with any securities or other regulatory authority, and may, where appropriate and permissible, be distributed by the above-listed entities in their respective jurisdictions.

Any investment and economic outlook information contained in this document has been compiled by RBC GAM from various sources. Information obtained from third parties is believed to be reliable, but no representation or warranty, express or implied, is made by RBC GAM, its affiliates or any other person as to its accuracy, completeness or correctness. RBC GAM and its affiliates assume no responsibility for any errors or omissions.

Opinions contained herein reflect the judgment and thought leadership of RBC GAM and are subject to change at any time. Such opinions are for informational purposes only and are **not intended to be investment or financial advice and should not be relied or acted upon for providing such advice**. RBC GAM does not undertake any obligation or responsibility to update such opinions.

RBC GAM reserves the right at any time and without notice to change, amend or cease publication of this information.

Past performance is not indicative of future results. With all investments there is a risk of loss of all or a portion of the amount invested. Where return estimates are shown, these are provided for illustrative purposes only and should not be construed as a prediction of returns; actual returns may be higher or lower than those shown and may vary substantially, especially over shorter time periods. It is not possible to invest directly in an index.

Some of the statements contained in this document may be considered forward-looking statements which provide current expectations or forecasts of future results or events. Forward-looking statements are not guarantees of future performance or events and involve risks and uncertainties. Do not place undue reliance on these statements because actual results or events may differ materially from those described in such forward-looking statements as a result of various factors. Before making any investment decisions, we encourage you to consider all relevant factors carefully.

® / TM Trademark(s) of Royal Bank of Canada. Used under licence.

© RBC Global Asset Management Inc. 2021

Publication date: December 15, 2021

