



CrossBoundary
Group

Carbon Markets 101

March 2024



Carbon credits are used by companies and countries to quantify and price the avoidance and removal of greenhouse gas emissions

What are carbon markets?

- Carbon markets are used to **price and trade greenhouse gases**, in the form of carbon credits or emissions allowances
- Carbon markets **support climate transition** in hard-to-abate sectors and where emissions reductions remain costly

What is a carbon credit?







- A carbon credit represents the avoidance or removal of **one metric ton of carbon dioxide** or its equivalent (CO₂e)
- Carbon credits must demonstrate...
 - **Permanence**: assurance of long-term storage of sequestered carbon
 - **Non-Leakage**: emissions reduction achieved by the project is not simply shifted to another geography or activity
 - **Additionality**: mitigations achieved by a project must be additional to what would have happened if the project, and its financially supportive credits, had not been realized

Why do companies and countries use carbon credits?







- Carbon credits can be used by **companies** to...
 - Make offsetting claims against hard-to-abate emissions or historical emissions
 - Make contributions to global climate change mitigation efforts through results-based payments
 - Reduce liabilities in a regulated market that allows the use of qualifying offsets
- Carbon credits can be used by **countries** to...
 - Meet Nationally Determined Contributions under the Paris Agreement
 - Make contributions to global climate change mitigation efforts through results-based payments

Carbon projects create credits either through emissions removal or avoidance

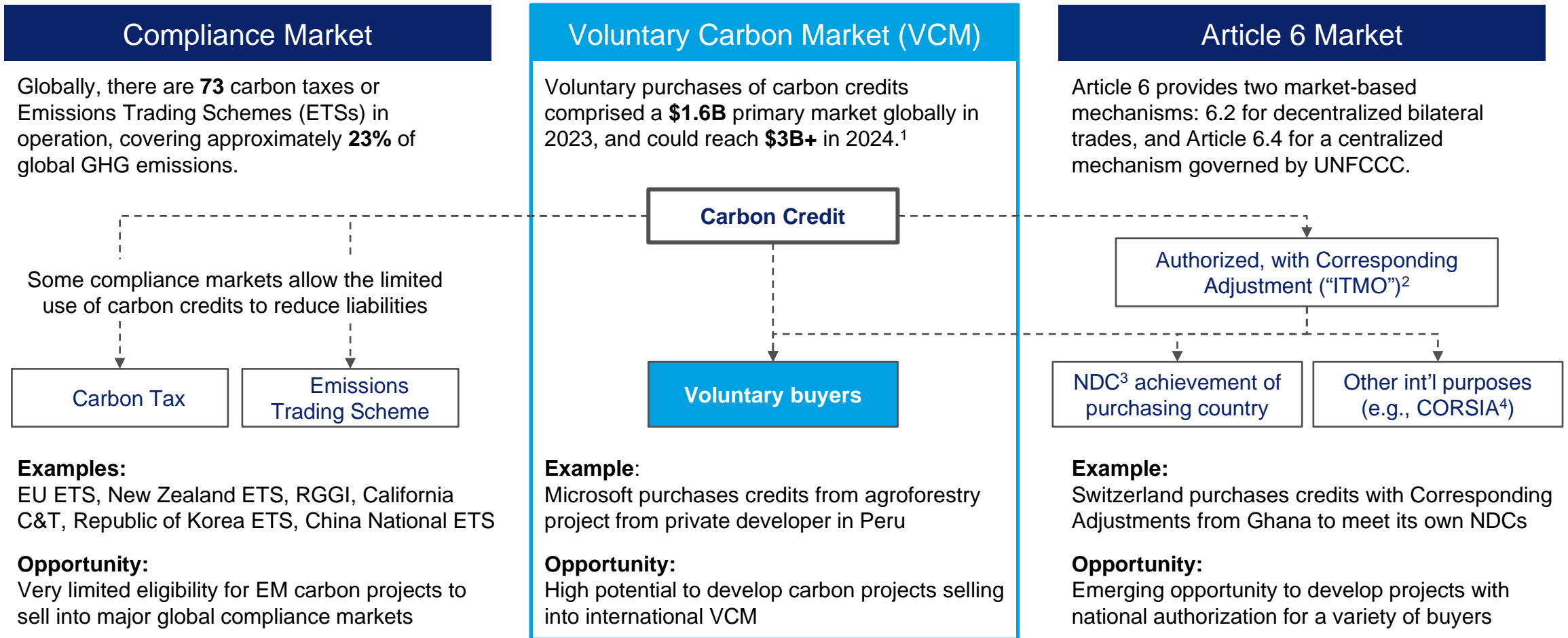
Emissions removal

	Afforestation, Reforestation and Revegetation (ARR)	Restoration of terrestrial forest ecosystems
	Enhanced rock weathering	Accelerating the naturally occurring process through which certain minerals react with CO ₂ for long-term storage
	Biochar	Avoiding emissions from biomass burning and permanently storing carbon
	Blue carbon	Protecting or restoring coastal and marine ecosystems including mangroves, seagrass meadows, and tidal marshes
	Net farm emissions reductions	Basket of activities that can reduce net farm emissions (e.g. no till, reduced fertilizer use)
	Direct Air Capture (DAC)	Using chemical reactions to pull carbon dioxide out of the air

Emissions avoidance

	Improved Forest Management (IFM)	Avoiding emission or enhancing sequestration in commercial forestry
	Reducing Emissions from Deforestation and Forest Degradation (REDD+)	Forest protection by enhancing enforcement capacity and/or incentivizing land steward behavior
	Improved cookstoves	Distribution and use of more efficient and/or alternative fuel cookstoves
	Solar irrigation	Use of solar irrigation system to avoid emissions from use of diesel pumps
	Renewable energy	Renewable energy generation and energy efficiency, where costs remain prohibitive
	Carbon Capture and Storage (CCS)	Capturing CO ₂ at a concentrated source and typically storing it underground

There are three types of carbon markets today – Compliance, Voluntary, and Article 6. We will focus on the Voluntary Carbon Market opportunity



Notes: 1) Source: BeZero; 2) Internationally Transferred Mitigation Outcomes; 3) Nationally Determined Contribution; 4) Carbon Offsetting and Reduction Scheme for International Aviation, UN scheme to offset any rise in international aviation emissions above 2020 levels

Credits are issued following third party verification, and they can be bought and sold until retired by the end buyer to make a claim



Implementation of carbon credit project to sequester carbon or avoid emissions

Credit does not exist until it is verified



Issuance of carbon credit following third-party ex-post verification of climate impact

Credit is issued to project and appears in registry of the chosen standard



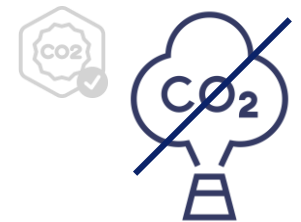
Purchase and delivery of carbon credit; new owner holds carbon credit as an asset on its balance sheet

Credit in registry is transferred to buyer



(Optional) Trade of carbon credit to another party, who then holds the credit on its balance sheet

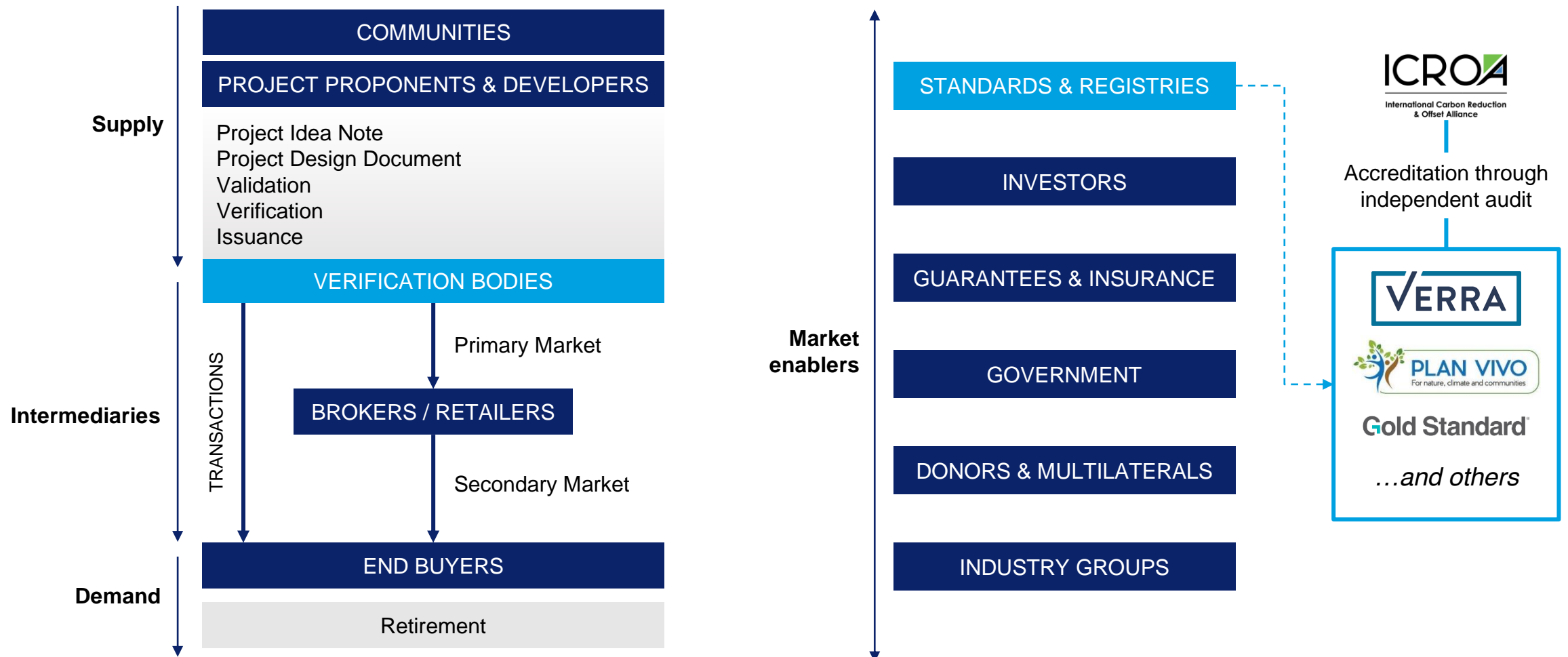
Credit in registry is transferred to buyer



Retirement of carbon credit by end user to make a valid claim of offsetting one tCO2

Credit in registry is retired and permanently taken out of circulation

Carbon standards bodies develop and manage methodologies and centralize data related to project validation and verification



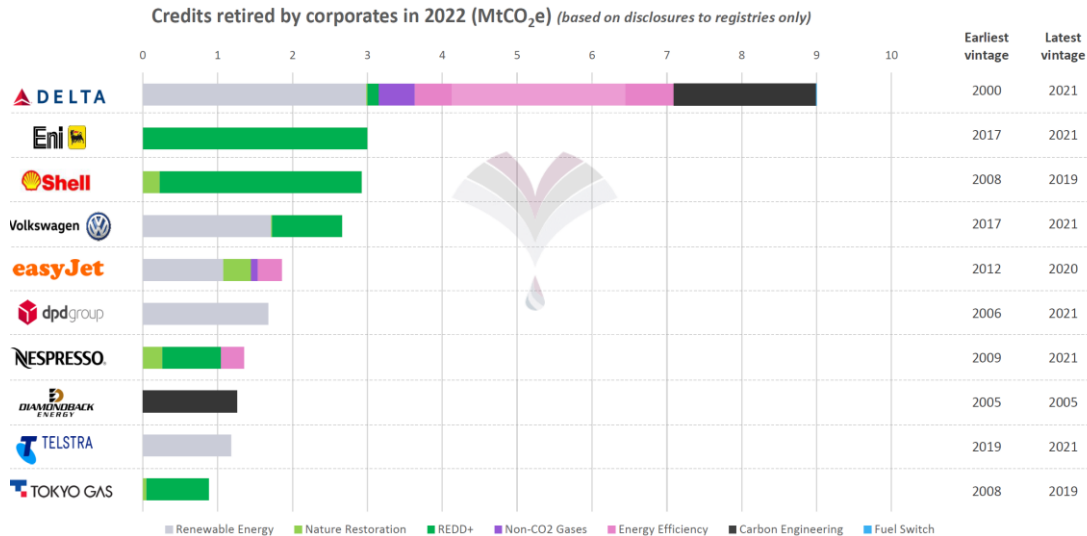
Source: CrossBoundary, COP27 Guidebook for Just Financing; graphic is adapted from Ecosystem Marketplace

Carbon credits are purchased both by corporate end buyers and a growing universe of intermediaries

Corporate Buyers

Corporates buy carbon credits to to make an emissions-related claim, or for broader contribution to climate impact.

They have very different purchasing preferences and price sensitivity, and demand is increasingly fragmented as more buyers enter the market.



Source: Trove

Traders, Brokers, and Funds

Retail traders purchase large amounts of credits directly from the supplier and sell to end buyers, typically with some commission while brokers facilitate purchase transactions of carbon credits.

Traditional commodity houses and investment banks are building out VCM trading desks as the market grows.

Funds are emerging that return carbon credits to corporate LPs.



There are several ways that carbon credits can be bought and sold, including both before and after issuance

Spot market

Sold at issuance at **prevailing market price** on an exchange, through a broker/trader, or RFP process

Offtake agreement

Payment on delivery at issuance of credit, at **price and volume agreed in advance** through offtake contract

Pre-purchase or Stream

Payment in advance to fund the project, in return for delivery of **discounted credits** at issuance – either a set volume or percent of credits

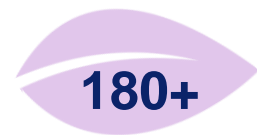
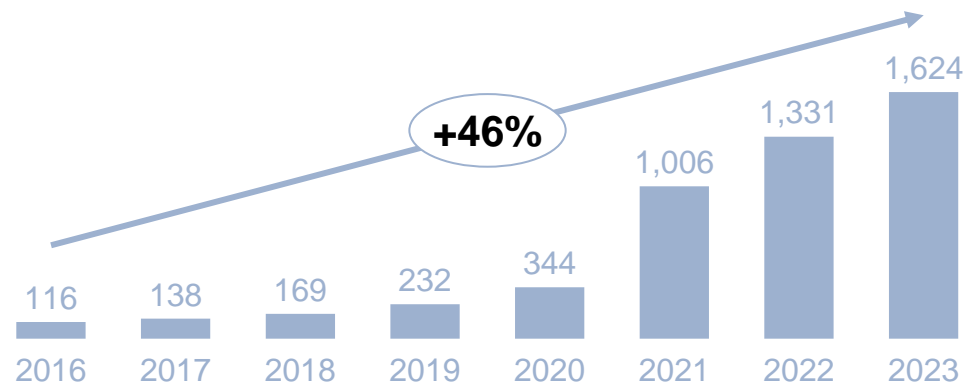


An estimated 80-90% of sales today take place over the counter rather than on an exchange or marketplace. This limits transparency and can make price discovery more challenging.

There is growing structural demand for high-quality carbon credits from corporates with ambitious climate targets

The VCM has grown at 46% CAGR since 2016 and is expected to 20x by 2030...

Primary voluntary carbon market size (US\$M)²



new developers in 2022³



projects from new developers in 2022³



est. 2030 market size (US\$)⁴

...and record retirements over the last three months setting the pace for ~233M retirements in 2024, up 45% from the previous record year⁵...

- November 2023, December 2023, and January 2024 each set **monthly records** for most credits retired
- Retirements in January 2024 were **223%** higher than 2023

...and new demand drivers in 2024

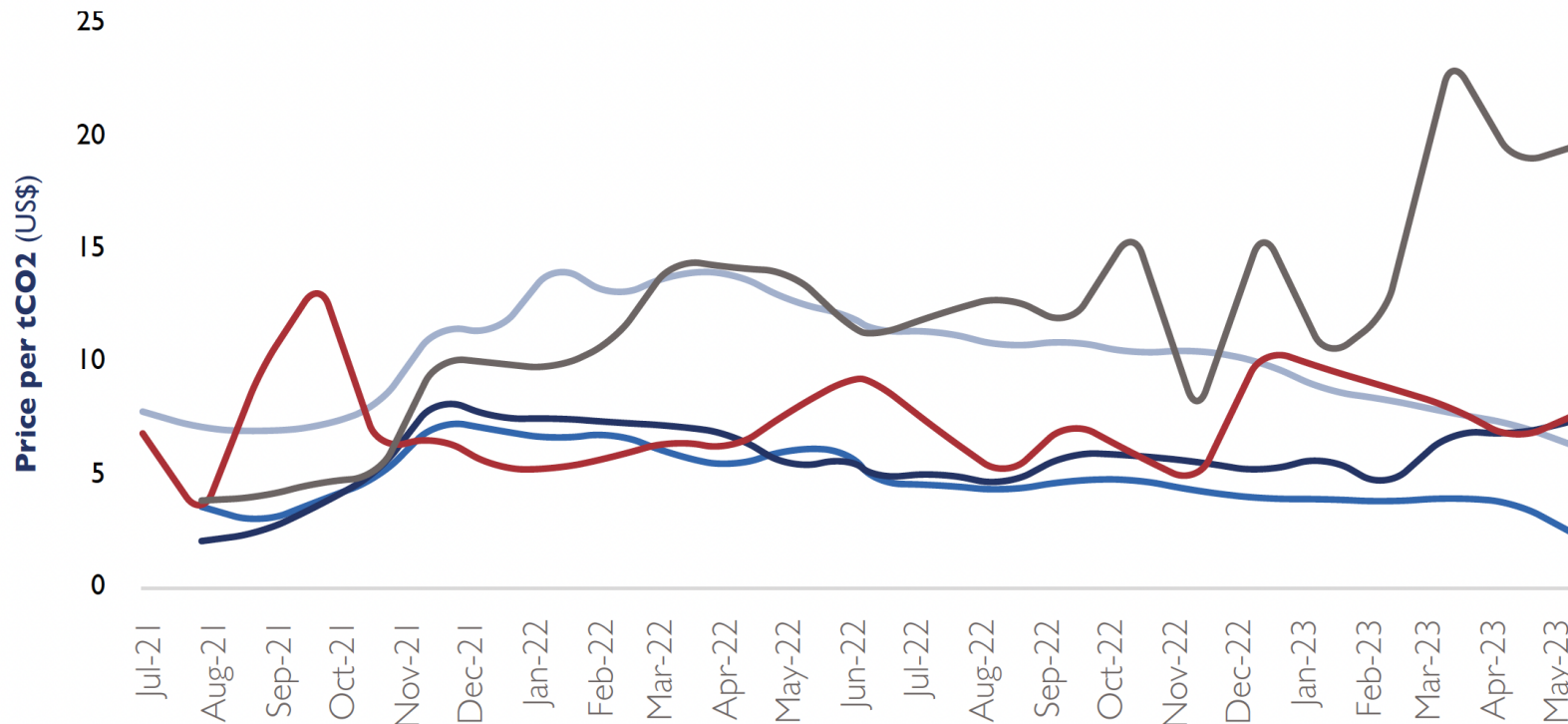
- CORSIA Phase I launch requiring offsetting by airlines in participating countries
- First credits stamped with the Integrity Council for Voluntary Carbon Markets (ICVCM)'s Core Carbon Principles (CCPs) label



Carbon is not a commodity; prices vary by type, with nature restoration generally highest, and renewable energy lowest

Figure 10. Monthly weighted average Voluntary Emission Reduction (VER) price (US\$/tCO₂e)¹³

Legend ● Nature Restoration ● Energy Efficiency ● Renewable energy ● Non-CO₂ Gases ● REDD+








Key characteristics affecting pricing

- ✓ Project type
- ✓ Methodology
- ✓ Vintage
- ✓ Co-benefits
- ✓ Third-party credit rating
- ✓ Geography

Source: Carbon Finance Playbook; data from Trove

New regulations and industry-led initiatives are solidifying future demand for high-quality carbon credits globally

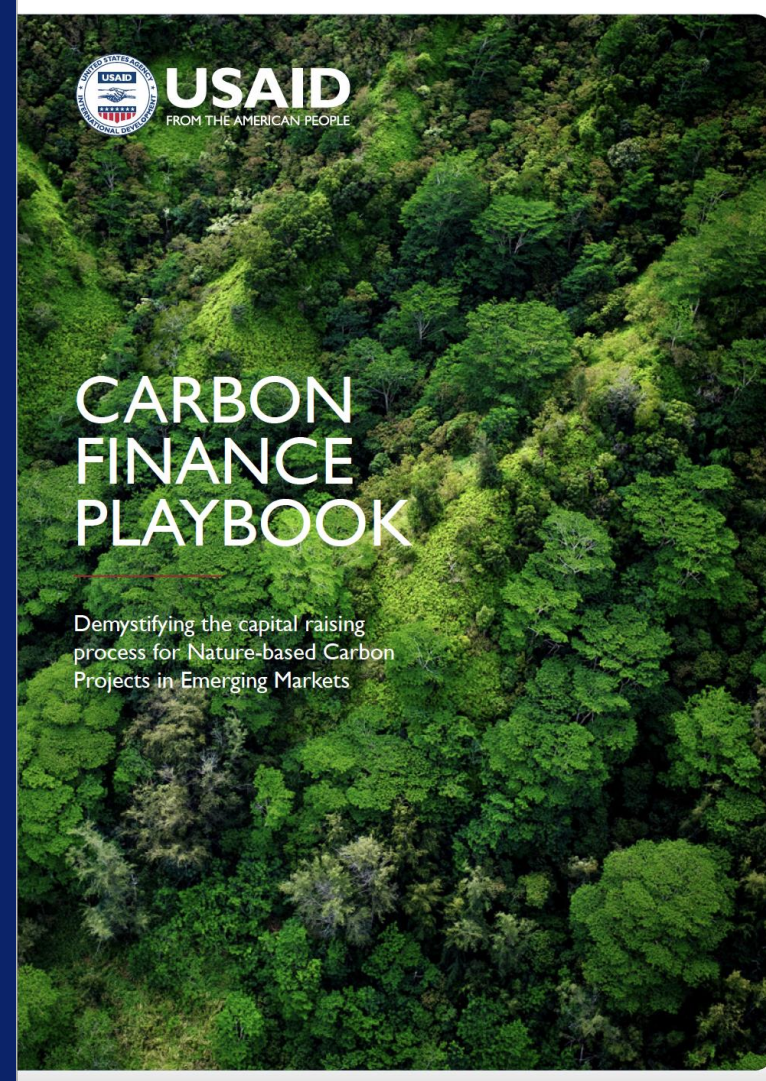
	<p>The Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)¹</p>	<p>CORSIA is the first industry-led international compliance market, for aviation. The Pilot phase ran from 2021-2023, and the First Phase began this year. At the end of the First Phase (2026), operators in the 126 participating countries will need to offset any emissions over the baseline of 85% of 2019 emissions. In 2027, CORSIA will become mandatory for all ICAO members, covering 90% of global airline emissions.</p>
	<p>The Voluntary Carbon Markets Initiative (VCM)</p>	<p>VCM developed high integrity guidance, the Claims Code of Practice, for buyers of carbon credits, including on climate claims by businesses. To showcase increasing levels of climate achievement, companies and non-state actors can make three distinct Carbon Integrity Claims – Silver, Gold, and Platinum – to demonstrate they are going above and beyond their science-aligned emissions cuts. The Claims Code was launched in November 2023, and the first corporate Platinum Claim was made in February 2024.</p>
	<p>The Integrity Council for the Voluntary Carbon Market (ICVCM)</p>	<p>ICVCM developed the Core Carbon Principles (CCPs) and Assessment Framework (AF) that sets new threshold standards for high-quality carbon credits, provide guidance on how to apply the CCPs, and defines which carbon-crediting programs and methodology types are CCP-eligible. The first CCP label approved programs are expected to be announced in April 2024.</p>
	<p>Bilateral Article 6 agreements²</p>	<p>There are currently 80 Bilateral Agreements under Article 6.2 as of March 2024. Four pilot projects have Authorization Statements. In December 2023, the first ever issuance of Internationally Traded Mitigation Outcomes (ITMOs) happened between Thailand and Switzerland for an e-bus program.</p>
	<p>Singapore tax scheme</p>	<p>Singapore implemented the first carbon pricing scheme in Southeast Asia in 2019 through a carbon tax. From 2019-2023, the tax was set at S\$5 per ton, but it will rise to S\$25 in 2024-2025, and reach S\$50-80 per ton by 2030. Singaporean companies can offset up to 5% of their taxable emissions with eligible credits from the VCM. Credits must be correspondingly adjusted, and Singapore is signing Bilateral Agreements to facilitate this. As the carbon tax rises beginning in 2024, demand for carbon credits from eligible countries is expected to rise considerably.</p>

Sources: 1) <https://bezerocarbon.com/insights/corsia-impacts-on-the-vcm-and-demand-dynamics> 2) <https://unepccc.org/article-6-pipeline/>

Kate.Wharton@crossboundary.com

NaturalCapital@crossboundary.com

Climate@crossboundary.com





CrossBoundary
Group



Unlocking capital for
sustainable growth in
underserved markets.

crossboundary.com

For more information please contact
naturalcapital@crossboundary.com