

# Understanding Carbon Markets

December 2024



This is an **interactive guide**



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What's next

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Essential terms

# Navigating carbon markets

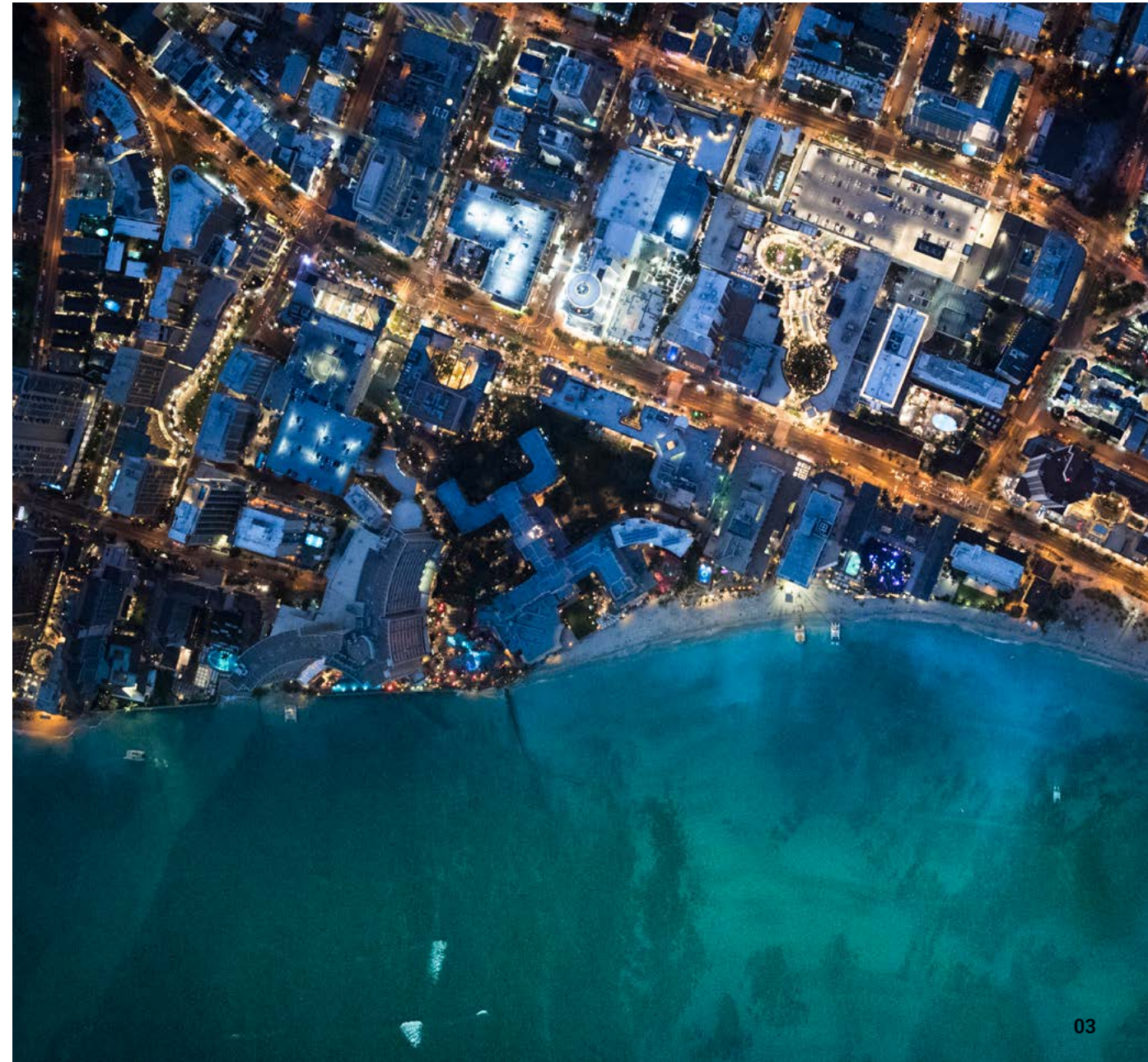
Voluntary purchases of carbon credits can play an essential role in helping companies and investors reduce greenhouse gas emissions (GHG) in line with climate commitments and serve as a key mechanism for funding decarbonization globally.<sup>1</sup>

Carbon markets have reached a critical point. Work is underway to safeguard that credits meet criteria designed to ensure they represent real reductions in emissions and that companies and investors can use them as part of a credible climate strategy.

The convergence of these two trends – the need for carbon credits that support net-zero pathways and the rigor that reliance on carbon credits demands – underscores why carbon markets matter for everyone who aims to mitigate the risks and impacts of climate change.

This guide is designed to equip readers with a thorough understanding of carbon markets, their operation and governance, and recent developments. We hope this resource helps you navigate this critical dimension of the climate-finance landscape.

<sup>1</sup> This information is provided "as is" and does not constitute legal advice or any binding interpretation. Any approach to comply with regulatory or policy initiatives should be discussed with your own legal counsel and/or the relevant competent authority, as needed.



# Carbon markets 101

Before we dive into the details of carbon markets, here are a few basics to help explain this corner of climate finance.

## Carbon emissions are fungible

Greenhouse gas emissions trap heat in the atmosphere wherever (and by whomever) they are emitted. Actions to reduce and remove emissions slow global warming no matter where they take place. This forms the key principle behind the ability to trade emissions (or reductions in emissions): Their environmental impact is independent of their source, while the ability of different actors to reduce those emissions varies.

## Economics apply

Carbon trading is a market-based approach to tackle climate change and accelerate the transition to a low-carbon economy. Companies or countries that face a comparatively high cost to reduce their emissions can pay another company or country that can reduce emissions more efficiently to do so instead. Hence, carbon trading can minimize the collective cost of reducing emissions.

## Two types of markets

There are two types of carbon markets: those that trade emissions allowances and those that trade carbon credits. The former are often called “compliance” markets because participants are required to do so by regulation. The latter are often called “voluntary” markets because most entities that purchase carbon credits do so voluntarily, usually in support of a climate commitment or claim.

## Net-zero ambitions drive anticipated growth

The “net” in net-zero implies the use of carbon credits to neutralize emissions that cannot (easily) be reduced. The ongoing, and rapid, rise in the number of companies pledging to reach net-zero by 2050 could fuel substantial growth in the carbon credit market over the next two decades, assuming at least some of the companies stick to their climate commitments.

## Use of carbon credits is not a substitute

Nearly every corporate climate initiative — from the Science Based Targets initiative (SBTi) to net-zero frameworks developed by the United Nations “Race to Zero” alliances — envisions a mitigation hierarchy in which companies prioritize deep reductions of emissions within their value chain before looking to reduce emissions outside of it.

# Compliance carbon markets



# Compliance carbon markets

Compliance carbon markets are established and run by governments, which set standards for their operation and mandate which firms must participate. They function on the principle that firms that put greenhouse gases into the atmosphere must limit, and pay for, their emissions.

The most common form of compliance market is an emissions trading scheme (ETS).<sup>2</sup> Companies in industries covered by an ETS can buy and sell allowances in line with national or subnational targets designed to reduce market-wide emissions over time.

Like a tax on emissions, an ETS injects the cost of emitting greenhouse gases into business decision-making. Unlike taxes, which control the price of emissions but not the quantity, an ETS controls the quantity of emissions but leaves the price to vary based on the supply and demand of allowances, subject to a limit on their total amount.<sup>3</sup> While the design and regulation of an ETS can vary considerably across jurisdictions, these schemes can broadly be classified into two types: cap-and-trade and baseline.

<sup>2</sup> Confusingly, some commentators include carbon taxes within their definition of compliance markets. Carbon taxes are beyond the scope of this guide except where governments allow firms subject to a carbon tax to offset some or all of their tax liability with carbon credits, as explained in the next section.

<sup>3</sup> And, in some compliance markets, other stabilization measures that effectively impose a cap and/or floor on the carbon price within an ETS.



## Types of emissions trading schemes

Most ETS markets use a cap-and-trade model that requires participants to purchase allowances authorizing the holders to put carbon dioxide equivalent (CO<sub>2</sub>e) emissions into the atmosphere, subject to a set limit. Think of an allowance as an emissions permit.

Cap-and-trade markets typically require participants to surrender allowances equivalent to their emissions in each compliance period (usually annually). The quantity of allowances issued by the government in each compliance period becomes, in effect, a cap on legally permitted emissions market-wide.

Note the difference between emissions allowances and carbon credits. A carbon credit is a registered claim on reducing or removing one metric tonne of CO<sub>2</sub>e (tCO<sub>2</sub>e) emissions from the atmosphere. An allowance is an ETS-specific permit granting its holder the right to emit one tCO<sub>2</sub>e.

Allowances can be issued freely or through an auction. A common approach is for an ETS to start with free allocations of allowances that are phased out over time. The EU ETS, for example, primarily distributes allowances via auction.<sup>4</sup> It provides free allowances for sectors that are either new to the ETS or subject to more significant economic risks because of the ETS.<sup>5</sup>

The cap on total emissions allowed within an ETS typically decreases over time. Hence, unless covered entities take steps to lower their emissions, higher demand for allowances runs into decreasing supply. As demand exceeds supply, the price of allowances rises, eventually making it cheaper for companies to reduce their emissions directly than to purchase allowances.

Some ETS markets use a so-called baseline and credit model, which requires participants to meet an emissions-reduction target for each compliance period. If a company reduces emissions more successfully than this baseline, it receives tradeable allowance credits equal to the excess reduction.

Comparing different types of emissions trading schemes		
	Cap-and-trade ETS	Baseline ETS
Mechanism to set emissions limit	Cap set for scheme in aggregate	Baseline emissions and credit system (reduction) set for each individual entity
Allowances initially allocated either freely or by auction	✓	✓
Allowances can be traded between entities	✓	✓
Entities must purchase allowances	Equal to their emissions	If emissions are more than baseline
Entities can sell allowances	If they hold more allowances than emissions (by reducing their emissions)	If emissions are lower than baseline
Typical cost of compliance	Higher	Lower
Emissions limits typically decrease over time	✓	✓
Example markets	EU, UK, China*	Indonesia

<sup>4</sup> "Auctioning," EU Emissions Trading System, European Commission, available at [climate.ec.europa.eu/eu-auction](https://climate.ec.europa.eu/eu-auction).

<sup>5</sup> See "Free allocation," EU Emissions Trading System, European Commission, available at [climate.ec.europa.eu/eu-auction](https://climate.ec.europa.eu/eu-auction).

\* The pilot phase of China ETS was a baseline scheme, but it has since transitioned to a cap-and-trade model. Source: MSCI Carbon Markets

	ETS types						

## Types of emissions trading schemes

If the company lowers its emissions by less than targeted, it must purchase credits (from firms that have exceeded their reduction target) or pay a financial penalty.

Unlike the cap-and-trade model, a baseline and credit system doesn't require participants to compensate all of their emissions with allowances – just the portion that exceeds their baseline. This can lower compliance costs, making it a popular structure for emerging economies. Indonesia, for example, uses a baseline approach for its national ETS.<sup>6</sup>

Some compliance markets start with a baseline model and eventually transition into a cap-and-trade system. China, for example, used a baseline approach in the pilot phase of its ETS but has since shifted to a cap-and-trade scheme.<sup>7</sup>










<sup>6</sup> Indonesia's carbon market does not impose an overall limit on emissions. The scheme is designed to be a "cap-tax-and-trade system" that will impose a carbon tax on participants who fail to meet their obligations under the scheme. See "Indonesian Economic Value of Carbon (Nilai Ekonomi Karbon) Trading Scheme," International Carbon Action Partnership.

<sup>7</sup> Hongqiao Liu, "China ETS," International Carbon Action Partnership. See also "In-depth Q&A: Will China's emissions trading scheme help tackle climate change?" Carbon Brief, June 24, 2021.

## The number of emissions trading schemes

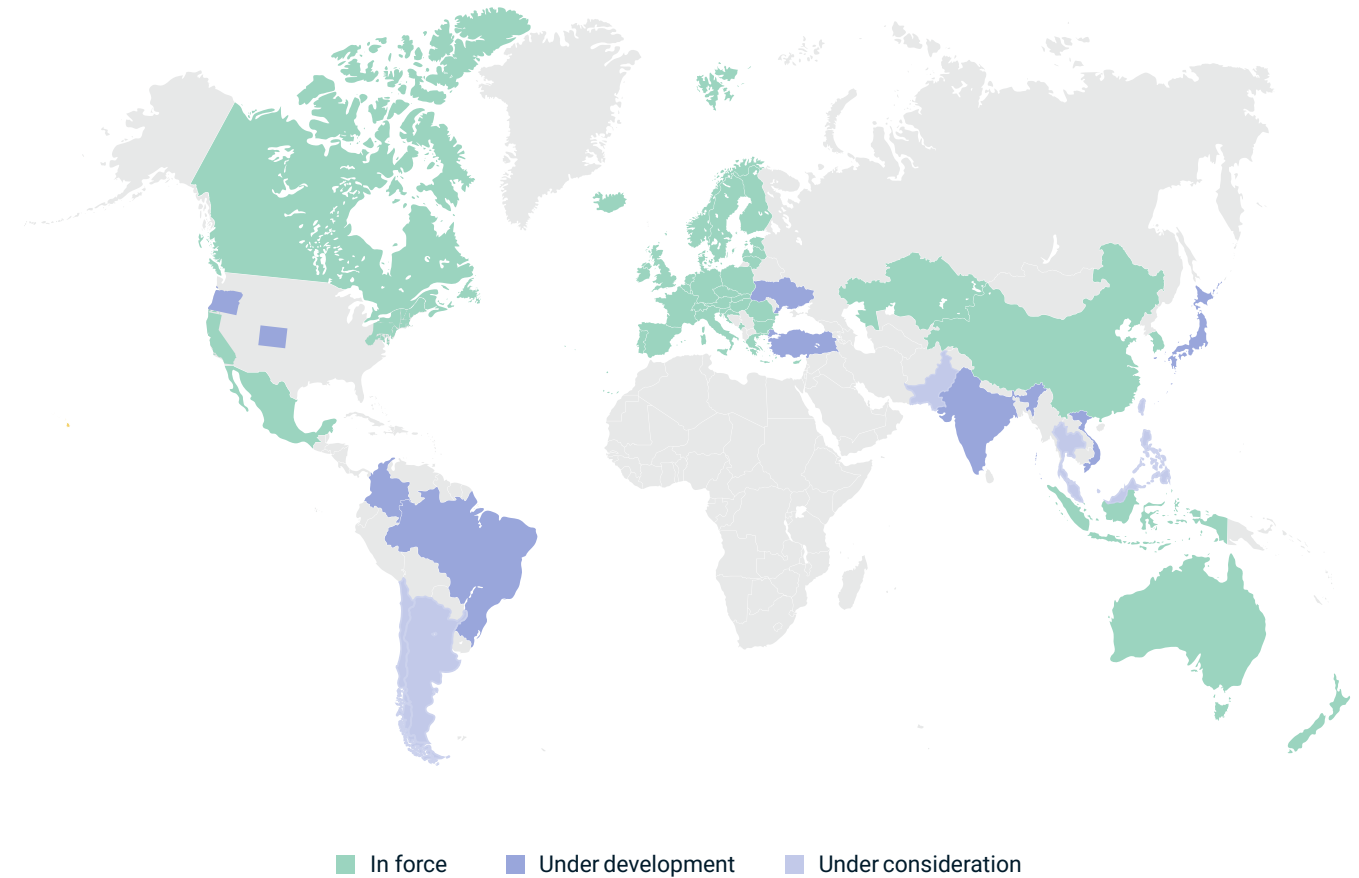
There are more than 36 emissions trading schemes in operation around the world that collectively cover about 18% of global GHG emissions.<sup>8</sup> China has the largest ETS in the world by emissions; the EU has the largest ETS by market value. The schemes in South Korea, California and the U.K. are among the other largest currently in operation.

Roughly 22 more schemes are in the planning stages, with a significant expansion expected before 2030. Much of this growth will come from developing countries, with Brazil, India, Pakistan and Vietnam among those currently setting up domestic markets.

Region	Launched	Emissions cap (MtCO <sub>2</sub> /yr)	Sector coverage includes	Avg price in 2023 (USD/tCO <sub>2</sub> )
 China	2021	4,500	Power generation	10
 EU	2005	1,557	Power generation, oil refining, cement & lime, steel, pulp & paper, chemicals, aviation	85
 South Korea	2015	589	Power generation, industry, buildings, transport, waste, public sector	8
 California	2012	294	Power, industry, fuel distribution	33
 UK	2021	147	Power generation, industry, domestic aviation	50
 New Zealand	2008	51	Forestry, stationary energy, industry, liquid fossil fuels	38
 RGGI (9 US states)	2009	88	Power generation	13

Source: International Carbon Action Partnership

Emissions trading schemes worldwide



<sup>8</sup> "Emissions Trading Worldwide, Status Report 2024," International Carbon Action Partnership, April 2024. Collectively, ETS and carbon taxes cover around 24% of global GHG emissions. See also, "State and Trends of Carbon Pricing," World Bank Group, 2024.

## Prices in emissions trading schemes

Though allowances in every ETS represent one tonne of CO<sub>2</sub>e, allowances in one jurisdiction cannot be used to satisfy a compliance obligation in another jurisdiction unless governments have agreed to link their systems.<sup>9</sup> Thus, prices reflect idiosyncratic drivers of supply and demand as well as the different rules governing each ETS and, consequently, vary widely among schemes.

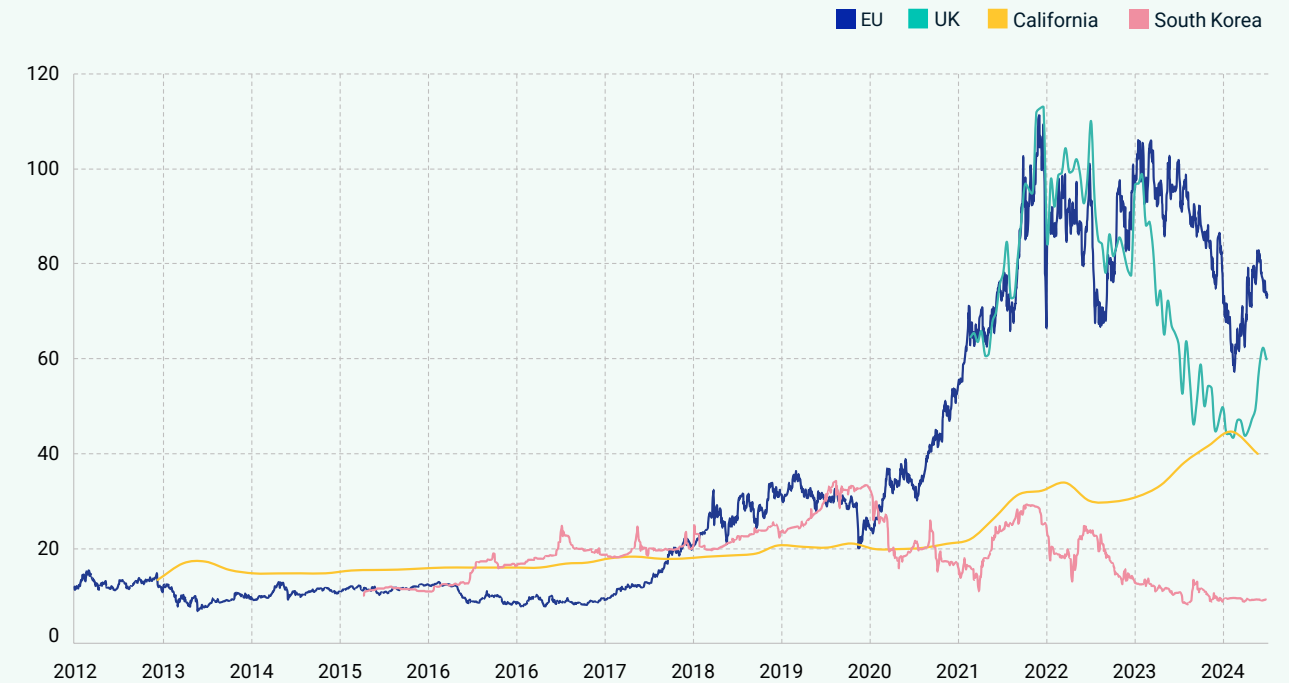
Governments have historically oversupplied the number of allowances relative to demand, causing prices to languish in single digits for many years.<sup>10</sup> In recent years, however, the two largest emissions trading schemes, the EU and California, have made efforts to tighten the supply of allowances through varied measures, including by reducing caps more aggressively and decreasing the supply of allowances already available in the market.<sup>11</sup>

This dynamic can be observed in prices for EU allowances. From 2012 through 2017, the price of EU ETS allowances remained within a range of EUR 4 to 8 because of excess supply in the market. In 2015, the EU passed legislation, known as the Market Stability Reserve (MSR), to better balance supply and demand. The MSR essentially removes allowances each year if total supply is above a threshold and adds allowances if below.

Although the MSR only became operational in 2019, the market began a sustained rally in early 2018 in anticipation of the launch and the removal of allowances from the market. EU ETS prices began another rally in 2020 in anticipation of the EU's Fit for 55 plan (which proposed more aggressive emissions reduction targets and a corresponding tightening in the supply of allowances) that peaked in early 2023, when prices topped EUR 100 for the first time. Prices have since retreated to the EUR 60 to 80 range, the result of both added supply of allowances as part of the EU's REPowerEU initiative (which aimed to reduce reliance on Russian gas) and a drop in demand following a spike in energy prices that reduced emissions from the industrial and power sectors.

The fall in the price of European Union Allowances (EUAs), which really started in 2023 from the EUR 100 peak, was not only due to the prospect of increased supply from the front-loading of auction supply as part of the Repower policy, but also resulted from the demand destruction following the spike in energy prices, which reduced industrial and power sector emissions and thus demand for EUAs.

Compliance market prices (USD)



As of June 30, 2024. ICE Source: ICE Refinitiv

<sup>9</sup> A trade agreement between the EU and U.K., for example, calls for consideration of linking their respective carbon-pricing systems, though the systems are not currently linked. See "The EU-UK Trade and Cooperation Agreement," European Commission, April 30, 2021. See also "UK and EU Emissions Trading Schemes – drifting in different directions?" UK in a Changing Europe, Sept. 11, 2023.  
<sup>10</sup> Prices in the EU ETS stayed at around EUR 10 per tCO<sub>2</sub>e throughout much of the last decade. See "Large Surplus Remains in EU Emissions Allowances," Colorado School of Mines, May 12, 2022.  
<sup>11</sup> "Decision (EU) 2015/1814 of the European Parliament and of the Council of 6 October 2015 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading scheme and amending Directive 2003/87/EC," EUR-Lex, Oct. 6, 2015. See also "Are there too many allowances?" FAQ Cap-and-Trade Program, California Air Resources Board.



## Effectiveness of compliance markets

Compliance markets have a track record of helping to reduce emissions.<sup>12</sup> A recent survey of academic studies on global carbon pricing (including both cap-and-trade schemes and carbon taxes) found that such policies have reduced global GHG emissions between 4% and 15% as of March 2022. In some instances, the carbon prices drive direct changes in emissions, such as in the EU ETS, where power stations factor in the prevailing carbon prices into their operating regimes, reducing the load on high-carbon units (e.g., coal) in favor of lower-emitting plants, such as those that run on natural gas. The sheer presence of a compliance market may also signal the longer-term direction of regulations, and coupled with complementary policies, is likely to have supported a shift in investment toward cleaner technologies.

## Considerations for investors

The primary considerations for investments in compliance markets are availability and liquidity. Not all compliance markets allow participation by entities that are not subject to compliance obligations. Even in California, which is one of the few cap-and-trade markets open to investors and financial institutions, there is a relatively long approval process to hold allowances and participate in auctions.

For now, the main vehicles for investing in compliance allowances are futures markets and ETFs (that mainly comprise futures contracts). The total size of global environmental markets was estimated at USD

1.1 trillion as of 2023. Much of the liquidity comes from futures contracts traded on the Intercontinental Exchange (ICE), mainly in EU allowances. While investor participation in carbon allowances has been limited to date, the market itself may eventually develop as a more investable asset class thanks to several potentially attractive risk and return characteristics.

**Returns.** In theory, there is a compelling narrative for robust returns over a medium- to long-term holding period as demand for allowances meets declining supply, particularly absent dramatic improvements in industrial decarbonization. The current average price for a large globally diversified set of ETS allowances is only around USD 30 per tonne, far below estimates of what carbon prices need to rise to deliver a net-zero transition.

**Risk.** Differences among the structures and rules governing compliance markets create idiosyncratic drivers for allowance prices that correlate weakly with conventional asset classes and among compliance markets themselves. Based on daily data over three years ended in June 2024, we observed correlations ranging from negative 0.07 to plus 0.09 between the primary traded allowance markets in the U.K., EU and California and major asset classes, including global equities, high-yield credit, investment-grade credit and commodities.

**Hedging.** Investments in allowances (through futures, ETFs and, in limited cases, physical allowances) may enable investors to limit their exposure to the risk of compliance costs for portfolio companies. Such costs are expected to rise in line with the price of allowances as compliance markets in the EU and elsewhere begin to reduce the availability of free allowances for industries.

<sup>12</sup> Niklas Döbbling-Hildebrandt et al., "Systematic review and meta-analysis of ex-post evaluations on the effectiveness of carbon pricing," *Nature Communications*, May 16, 2024.

# Carbon credits



# Carbon credit basics

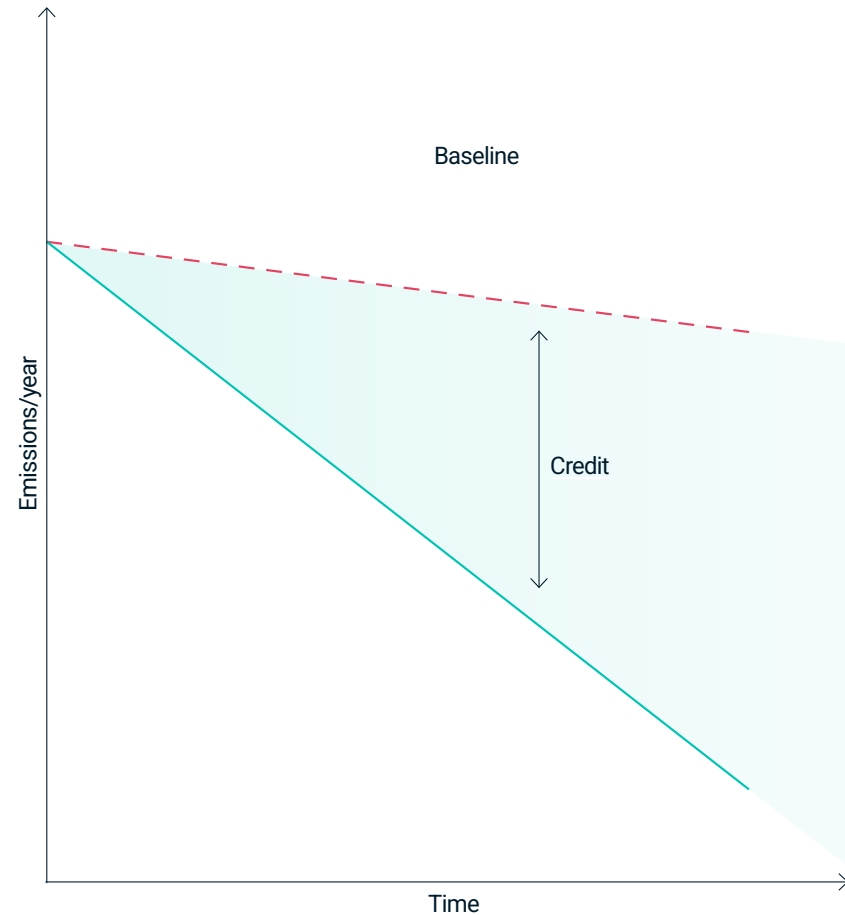
The same economics that governs emissions trading schemes applies to the carbon credit market. Expanding the range of abatement opportunities beyond their business's own value chain allows companies with high abatement costs to lower the cost of reducing and eliminating their net emissions, provided their carbon credits genuinely have the emissions impact they claim to have.

A carbon credit represents a reduction in emissions relative to what would have happened without the project. The validity of a carbon credit project depends on four essential criteria:

- The project that gave rise to the carbon credit needs to be **additional**; that is, the reductions in emissions would not have occurred without the incentive created by credit revenues.
- The difference between the reductions in emissions the credit represents and the baseline needs to be **quantified** accurately, or if perfect accuracy is not possible, then conservatively.
- The emissions reduced or removed by the credit must not later re-enter the atmosphere (i.e., the reduction or removal must be **permanent**).
- The credit project needs to be independently validated with its credits verified and operated in a **socially and environmentally responsible** manner.

Opportunities for reducing emissions through carbon credits can be as diverse as controlling methane emissions from landfills or pipelines, deploying clean cookstoves in rural Africa, developing low-carbon agricultural practices, reforesting degraded land or removing carbon permanently from the atmosphere through underground storage. In all, more than 250 different project types are currently eligible for carbon credits under various standards bodies.

**Carbon credit is a reduction in, or removal of, emissions relative to what would have otherwise happened**



## Carbon credit:

A verified and tradeable certificate representing the reduction (avoidance) of one metric tonne of tCO<sub>2</sub>e from being put into the atmosphere, or the removal of one tCO<sub>2</sub>e from the atmosphere.



## Types of carbon credits

The most important categorization of carbon credits addresses how they reduce greenhouse gases in the atmosphere. Carbon credits can either avoid (reduce) the release of emissions into the atmosphere or remove greenhouse gases that are in the atmosphere already.

Overall, both reduction and removal credits will likely be needed at scale in the coming years if companies are to decarbonize at the pace and breadth that reaching net-zero in line with global goals demands.

A second dimension for categorizing carbon credits examines whether the emissions impact of the credit is achieved via nature-based processes (such as carbon soil sequestration or reforestation) or technology-based ones (such as through direct air capture) and, for removals credits, whether GHG emissions removed are stored biologically or geologically. Both types of processes and storage have merit; both will likely be needed at scale to meet global climate goals.

A third dimension used to categorize carbon credits focuses on the level at which implementation occurs. Traditionally, carbon credits have been issued by activities happening at a project level. There is increasing interest, however, in jurisdictional-level credits — i.e., those from activities implemented at a national scale. The first credits from jurisdictional REDD+ activities, which aim to provide financing for developing countries that aspire to protect and restore forests, were issued in late 2022.<sup>13</sup>

### Type of mitigation

#### Reduction

Projects that reduce/avoid emissions being released into the atmosphere

- **For example:** reduced deforestation (REDD+), renewable energy, cookstove distribution
- **To date:** ~90% of issued credits
- **Use case:** can be used in most non-net-zero claims (such as carbon neutral), plus some compliance schemes

#### Removal

Projects that directly remove emissions from the atmosphere

- **For example:** nature restoration, direct air capture, biochar
- **To date:** <10% of issued credits
- **Use case:** most net-zero standards (e.g., SBTi) only permit removal credits to neutralize emissions in net-zero year

### Type of process/storage

#### Nature-based

Projects that achieve emissions impact via nature-based processes

- **For example:** REDD+, carbon soil sequestration, afforestation
- **To date:** ~40% of issued carbon credits

#### Technology-based

Projects that achieve emissions impact via tech-based processes

- **For example:** renewable energy, cookstove distribution, restoration, direct air capture
- **To date:** ~60% of issued carbon credits

In addition, for removals, projects can either store their captured emissions biologically (e.g., in trees) or geologically.

### Level of implementation

#### Project-based

Activities occur at project level

- **For example:** REDD+, cookstove distribution, renewable energy
- **To date:** ~99% of issued credits

#### Jurisdictional

Activities at regional or national level

- **For example:** Jurisdictional REDD+, Energy Transition Accelerator
- **Volume:** ~1% of issued credits, but seen as an area of growth in coming years

<sup>13</sup> "ART Issues World's First Jurisdictional Forestry TREES Carbon Credits to Guyana," Architecture for REDD+ Transactions, December 2022.

## Types of carbon credits

MSCI Carbon Markets has developed its own carbon industry classification to categorize the hundreds of different project methodologies in the carbon credit market. This system provides a comprehensive (and detailed) view of the entire market by classifying around 30,000 projects across major crediting registries.

### Nature-based

Nature Restoration		REDD+
<p><b>Reduction</b></p> <ul style="list-style-type: none"> <li>• Avoided Conversion of Grasslands and Shrublands (ACoGS)</li> </ul>	<p><b>Removal</b></p> <ul style="list-style-type: none"> <li>• Blue &amp; Coastal Carbon</li> <li>• Peatlands</li> </ul>	<p><b>Reduction</b></p> <ul style="list-style-type: none"> <li>• General Deforestation</li> <li>• High Forest, Low Deforestation (HFLD) Jurisdictional REDD+</li> <li>• Jurisdictional REDD+</li> <li>• Planned Deforestation (APD)</li> <li>• Unplanned Deforestation (AUDD)</li> </ul>
<ul style="list-style-type: none"> <li>• Agricultural Land Management (ALM)</li> <li>• Improved Forest Management (IFM)</li> </ul>		

**More information**

Learn more about MSCI's Carbon Industry Classification [here](#).

### Tech-based

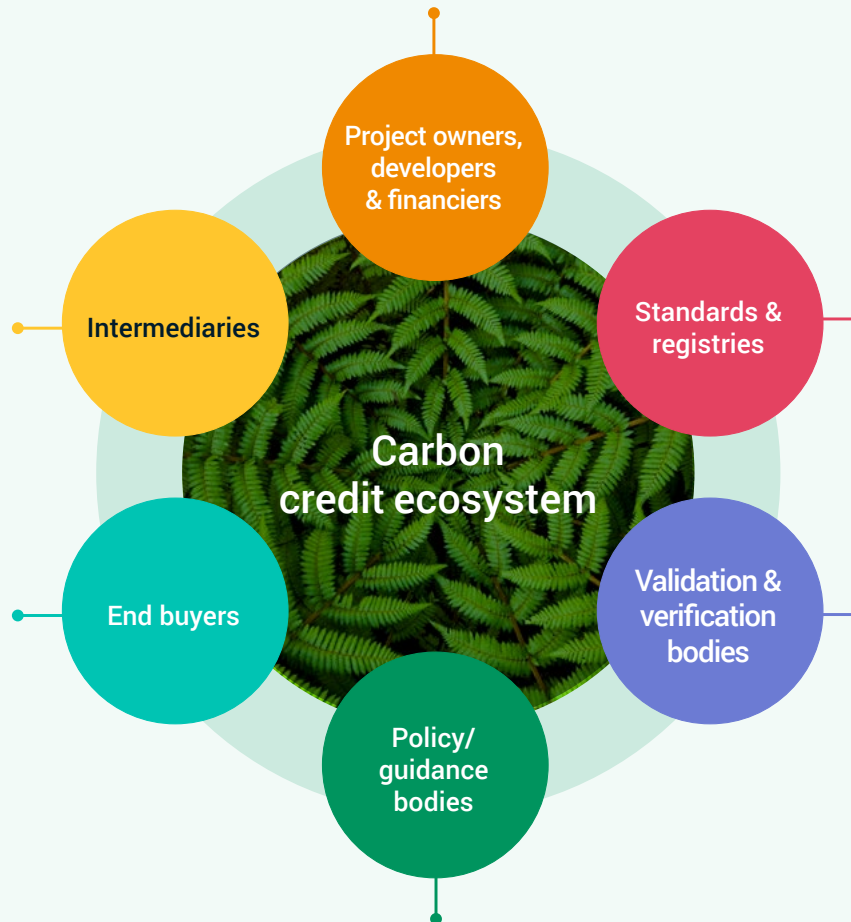
Non-CO <sub>2</sub> Gases	Energy Efficiency	Fuel Switch
<p><b>Reduction</b></p> <ul style="list-style-type: none"> <li>• Chemical</li> <li>• Fugitive Emissions (CH<sub>4</sub>)</li> <li>• Landfill Gas (CH<sub>4</sub>)</li> <li>• Ozone Depleting Substance (CFCs, HFCS &amp; PFCS)</li> <li>• Waste Management (CH<sub>4</sub>)</li> </ul>	<p><b>Reduction</b></p> <ul style="list-style-type: none"> <li>• Clean Cooking</li> <li>• Efficient Distribution</li> <li>• Efficient Transport Systems</li> <li>• Energy Demand Reduction</li> </ul>	<p><b>Reduction</b></p> <ul style="list-style-type: none"> <li>• Biofuel</li> <li>• Hydrogen and Hybrid</li> <li>• Fuel Switch</li> <li>• Other</li> </ul>
Renewable Energy	Carbon Engineering	
<p><b>Reduction</b></p> <ul style="list-style-type: none"> <li>• Geothermal</li> <li>• Hydro</li> <li>• Organic Waste</li> <li>• Solar</li> <li>• Storage</li> <li>• Wind</li> <li>• Renewable Energy - Mixed &amp; Other</li> </ul>	<p><b>Reduction</b></p> <ul style="list-style-type: none"> <li>• Carbon Capture and Storage (CCS)</li> </ul>	<p><b>Removal</b></p> <ul style="list-style-type: none"> <li>• BioEnergy Carbon Capture &amp; Storage (BECCS)</li> <li>• Biochar</li> <li>• Direct Air Capture (DAC)</li> <li>• Marine Carbon Capture</li> </ul>

## The carbon credit ecosystem

Own, develop and finance the projects that produce carbon credits by reducing or removing emissions from the atmosphere.

Like in any market, intermediaries connect producers or sellers with buyers of carbon credits.

End buyers of carbon credits are typically companies that retire credits to compensate for (or offset) their emissions or make a climate-related claim. Registries retire credits used by a company to ensure that the emissions reduction/removal the credit represents is not claimed more than once.



Produce methodologies that set out how carbon credit projects should be run, and how tonnes of CO<sub>2</sub>e of reductions/removals are calculated based on the activities on the ground. They also maintain registry infrastructure that tracks carbon credits as they are issued, traded and retired.

Review carbon credit projects to ensure they genuinely take place, and that the carbon credits produced follow approved methodologies.

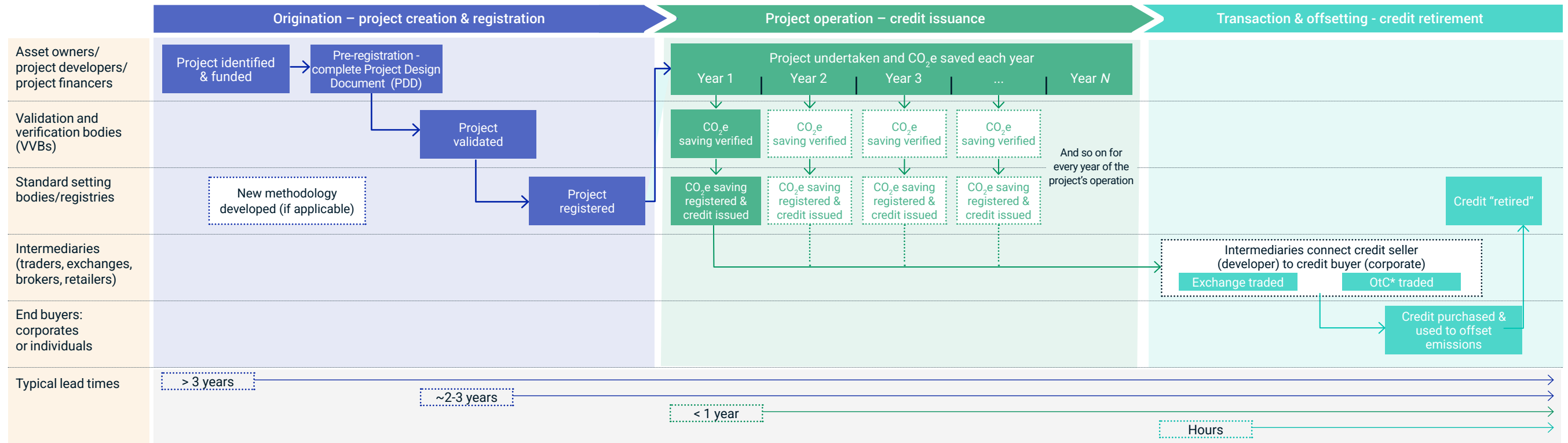
Hundreds of organizations, ranging from investor groups and industry initiatives to governments and nongovernmental organizations, are trying to shape the carbon credit market.

## How carbon crediting works in practice

Creating a carbon credit comprises three stages: 1) The creation and registration of a carbon crediting project; 2) the operation of that project that leads to the issuance of credits, which can then be sold; and 3) the retirement of the credit by a buyer who uses the credit to compensate for its emissions.

Creating and registering a new carbon project can often take several years and can involve extensive documentation. The operation of a project includes ongoing monitoring and verification, typically on an annual basis. The number of credits issued in a year is determined by the amount of verified emission reductions or removals that have occurred.

Note that carbon credits are traditionally sold or traded only once an emissions saving has occurred and been verified – that is, on an ex-post basis. Selling credits on an ex-ante basis, however, is also becoming increasingly common. The year that emissions were reduced or removed is known as a carbon credit's vintage.



\* OtC = Over-the-Counter

## Carbon credit issuances to date

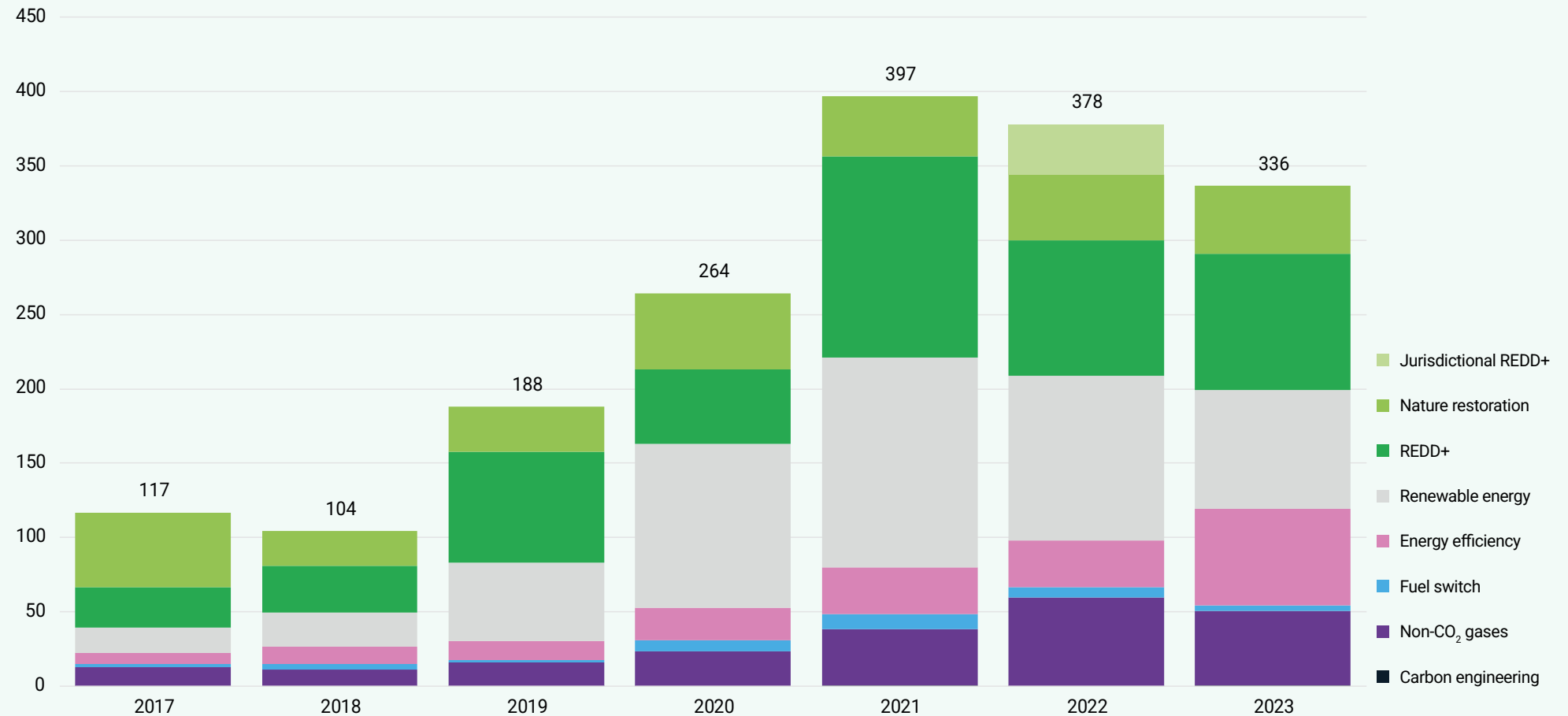
Across all project types, 336 million tonnes (MtCO<sub>2</sub>e) of carbon credits were issued in 2023. That means 336 Mt of GHG emissions were independently verified as being prevented from entering the atmosphere (90% of the 336 Mt) or removed from it (10%) due (and only due) to the financing provided by the carbon credit market.

Roughly 42% of those reductions or removals were achieved via nature-based methods, while 58% were achieved through technology-based methods.<sup>14</sup> The total volume of issued credits was equivalent to less than 1% of global greenhouse gas emissions in 2023, reflecting the current market’s relatively small size.

**More information**

➤ To view MSCI’s daily dashboard of latest issuances click [here](#).

Annual issuances by project type (MtCO<sub>2</sub>e)



Includes credit transactions from ACR, ART TREES, BioCarbon, CAR, CDM (NDC-eligible credits only), EcoRegistry, GCC, Gold Standard, Plan Vivo, Puro Earth and Verra. These registries represent the vast majority of credits in the market today. Additional, smaller, registries are available on the Carbon Markets platform to subscribers. Source: MSCI Carbon Markets

## Governance of voluntary carbon credits

A number of registries, NGOs and private-sector firms have established standards for creating and using carbon credits and, of particular focus currently, standards for quality. In addition, governments are increasingly regulating certain pockets of the market for carbon credits, including development and certification of credits, trading, and claims and disclosures that a company should make when using them.

Registries are the market’s main standard-setting bodies. While registries, in theory, ensure that all credits are of high integrity, that hasn’t always been the case. Some methodologies and approaches historically granted project developers considerable leeway, resulting in the issuance of some low-quality credits.

More recently, however, the largest registries have made concerted efforts to improve their methodologies with the aim of promoting integrity. In December 2023, for example, Verra, the largest registry, unveiled a major overhaul of its methodologies for quantifying carbon credits from forest conservation projects.<sup>15</sup> The initiative included a decision by Verra to, for the first time, apply one of its updated methodologies retroactively to previously issued carbon credits under an older methodology.

The Integrity Council for the Voluntary Carbon Market (ICVCM), a cross-industry body established in 2021, aims to establish and maintain the highest standards of ethics, sustainability and transparency in the global voluntary carbon market. The ICVCM has created a set of Core Carbon Principles (CCPs) designed to improve the practices of the registries and ensure that the methodologies they produce result in high-quality carbon credits.<sup>16</sup> The first CCP-labeled credits were announced in mid-2024. Market participants have expressed high hopes that the CCPs will have a major impact in raising standards and, consequently, confidence in the quality of carbon credits.<sup>17</sup> We anticipate that at least 15% to 20% of issued credits will eventually achieve CCP labels.

### More information

➤ Learn more about the first Core Carbon Principles qualifying projects [here](#).

Private-sector firms are also increasingly offering solutions designed to help raise and/or assess the quality of carbon credits. Such companies, for example, use satellite imagery, location-specific data and remote sensing to monitor rates of deforestation within (and quantify the carbon sequestration of) forests protected or replanted by carbon projects. Insurance companies are creating new products that insure buyers of carbon credits against certain types of quality risks. Most prominently, several analytics firms, including MSCI Carbon Markets, have created solutions that assess, or rate, the integrity of carbon credits.

ICVCM's Core Carbon Principles		Requirements	
Governance	1	Effective governance	Effective program governance to ensure transparency, accountability and overall quality of carbon credits.
	2	Tracking	A registry to uniquely identify, record and track mitigation activities and credits issued.
	3	Transparency	Comprehensive and transparent information publicly available and accessible to non-specialized audiences.
	4	Third-party validation/verification	Program-level requirements for robust independent third-party validation and verification of mitigation activities.
Emissions impact	5	Additionality	Reductions/removals shall be additional: they would not have occurred without incentive created by credit.
	6	Permanence	Reductions/removals shall be permanent and if there is a risk of reversal, there must be compensation.
	7	Quantification	Robust quantification of reductions/removal which are conservative and complete and based on sound scientific methods.
	8	No double counting	Reductions/removals shall only be counted once towards achieving mitigation targets/goals.
Sustainable development	9	Benefits & safeguards	Clear guidance, tools and compliance procedures to ensure mitigation activities conform or go beyond best industry practices.
	10	Contribution to net-zero transition	Avoid locking in levels of emissions, technologies or carbon intensive practices incompatible with achieving net-zero emissions by 2050.

Source: ICVCM website

<sup>15</sup> "Verra Launches New Era of Forest Protection with Transformative REDD Methodology," news release, Nov. 27, 2023, and "Verra's New Methodology for Unplanned Deforestation Aims to Silence the Critics," MSCI Carbon Markets, Dec. 1, 2023.

<sup>16</sup> "The Core Carbon Principles, Plus the Program-Level Assessment Framework and Assessment Procedure" and "The Core Carbon Principles Assessment Framework," both available at [icvcm.org](http://icvcm.org).

<sup>17</sup> See, generally, "Potential Impact of the Core Carbon Principles on the Global Carbon Credit Market," MSCI Carbon Markets (previously Trove Research), Sept. 20, 2023.

## Carbon credit registries

Registries perform two important functions in the voluntary carbon market. They oversee standards for generating carbon offsets and record their issuance and retirement. They also track the buying and selling of carbon credits. The largest registries by volume are run by Verra, Gold Standard, Climate Action Reserve (CAR) and American Carbon Registry (ACR). Together they accounted for 77% of all credits issued in the credit market in 2023.

	Verra	Gold Standard	EcoRegistry	American Carbon Registry (ACR)	Climate Action Reserve (CAR)	Clean Development Mechanism (CDM)	BioCarbon	Global Carbon Council (GCC)	Plan Vivo	Puro Earth	ART TREES
Start year	2005	2003	2018	1996	2001	2006	2022	2016	1997	2019	2020
Geographic focus	Global	Global	Global	North America	North America	Global	Global	Global	Global	Global	Global
Organization type	NGO	NGO	For profit	NGO	NGO	Governmental	NGO	For profit	NGO	For profit	NGO
Issuances (MtCO <sub>2</sub> e, 2023)	148	61	58	36	13	13*	5	3	1	< 1	0
ICROA-endorsed	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ICVCM-eligible	✓	✓	Has not applied	✓	✓	Has not applied	Has not applied	Has not applied	Has not applied	Has not applied	✓
CORSIA-eligible (Phase 1)	Conditional eligible	Conditional eligible	Conditional eligible	✓	Conditional eligible	✗	✗	Conditional eligible	✗	✗	✓

\*CDM issuances shown for NDC-eligible credits only. Data as of Sept. 1, 2024. Source: MSCI Carbon Markets

## What makes a high-quality carbon credit

**Carbon credits, and the projects that generate them, can vary in quality or integrity — terms that most market participants use interchangeably.**

This variation in quality is not by design. Standard-setting and governance bodies have attempted to create a system in which all carbon credits had an equivalent climate benefit (representing a tonne of CO<sub>2</sub>e emissions) and could be traded and used interchangeably.

Differences in quality can stem from differences in project types, the methodologies used to define the project (and create its credits) and the rigor with which developers have adhered to them. Projects can also differ by the co-benefits they deliver or their social, ethical and legal risks and safeguards.

Ensuring carbon credits are of high quality is critical for several reasons. First, buyers of credits want to know that the money they are spending is genuinely having a positive impact on emissions and couldn't be better spent elsewhere. Second, companies that make climate claims based on their use of carbon credits (such as to claim they have offset their emissions with credits) risk understating their net climate impact if the credits they use overstate their actual climate impact. Third, buyers of credits want to ensure the money they are spending (often voluntarily) on credits neither impacts society or the environment negatively nor contravenes any legal or ethical standards.

Debates over the integrity of carbon credits typically focus on three main issues:

- **Emissions impact:** How much CO<sub>2</sub>e has been reduced or removed?
- **Implementation:** How did the project reduce or remove that CO<sub>2</sub>e?
- **Usage:** How are the credits then reviewed and used?

Perhaps the key challenge lies in quantifying the emissions impact of a carbon project, that is, whether the credits calculated are genuinely equivalent to mitigating or removing one tonne of CO<sub>2</sub>e from the atmosphere. The challenge stems primarily from the calculation method, which needs to quantify what would have happened in the absence of the project, in other words, the baseline or counterfactual.

While often difficult to calculate, a broad consensus exists that three factors should be considered when measuring **emissions-impact integrity: additionality**, which determines whether the carbon credits play a decisive role in the mitigation activity going forward; **quantification**, which refers to how accurately and consistently the CO<sub>2</sub>e impact of a project is measured;<sup>18</sup> and **permanence**, which aims to ensure that emissions reduced or removed by the credit are not later released back into the atmosphere, for example, by a wildfire burning down a newly forested area.<sup>19</sup>

**Implementation integrity** turns primarily on three factors: **co-benefits**, which assess how likely is it that the project generated net positive sustainable development benefits beyond the CO<sub>2</sub>e it reduced or removed; **legal and ethical concerns**, which assess the likelihood that the project has been delivered by parties that have taken a legal and ethical approach to implementation; and **delivery risk**, which assesses the likelihood that carbon credits will be issued in line with expectations. Because issuance of a carbon credit eliminates the risk of delivery, the last factor only applies to carbon credits being traded on an ex-ante basis (i.e., before they are issued).

**Usage integrity** includes the need to: 1) avoid double counting/double claiming (either between a country and company, or between two different companies), and 2) provide sufficient levels of transparency and disclosure.

Because these quality criteria are broad ranging and demanding, in practice, they can be difficult to implement perfectly (particularly when operating in less-developed economies) and, in some cases, can even conflict with one another. Few if any projects are considered perfect, and most are associated with at least some degree of integrity risk. Moreover, the weighting put on a particular quality dimension can make a significant difference to which projects are considered highest or lowest quality.

### More information

➤ Learn more about how MSCI assesses and rates the integrity of carbon projects [here](#).

<sup>18</sup> A fourth factor known as leakage is sometimes separately highlighted, but we consider this as subcriteria within quantification. Leakage refers to when the location of emissions simply shifts from the project area to another (nearby) area, and hence, at a global level, there is no net emissions saving.

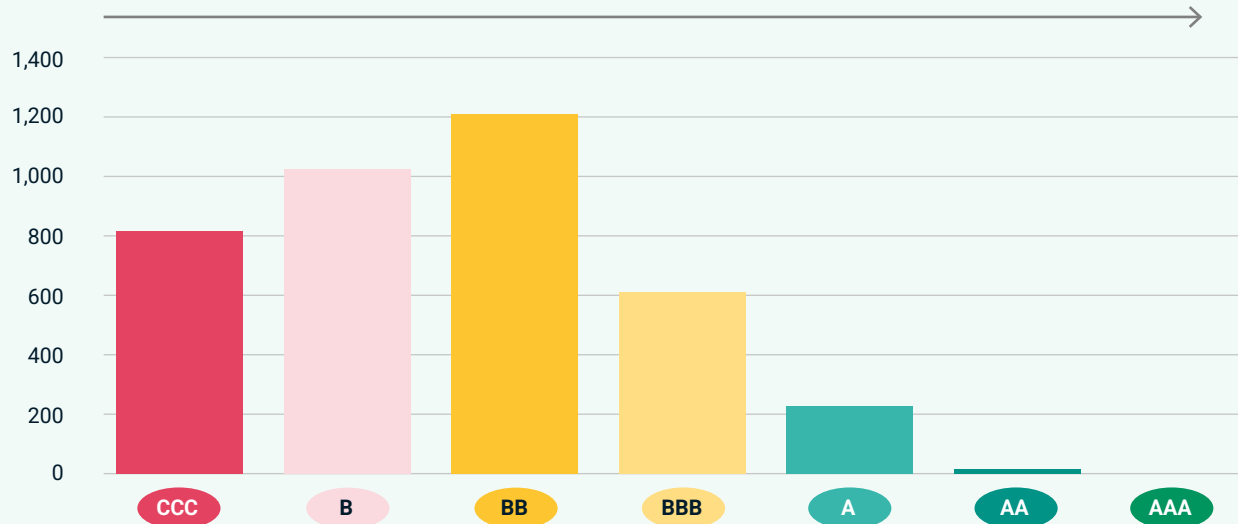
<sup>19</sup> Note that permanence, an essential attribute of carbon credit quality, can vary. Carbon emissions injected into rock, for example, may remain there for thousands of years, whereas emissions stored in a forest may remain there for much shorter periods of time.

## The state of integrity in today's market

MSCI independently rates the integrity and risks of carbon projects across multiple criteria, including their impacts on climate, the environment and society. As of September 2024, MSCI had rated over 4,000 projects and conducted a preliminary integrity assessment on a further 1,500 projects.

### Number of registered projects by MSCI Carbon Project Rating

Higher integrity / lower risk →



	CCC	B	BB	BBB	A	AA	AAA
1H 2022	29%	32%	21%	13%	4%	2%	0%
1H 2024	15%	28%	23%	23%	8%	4%	0%
% change	-14%	-4%	+2%	+10%	+4%	+2%	-

Overall, no project currently receives an AAA rating, which reflects the challenges of developing a project on-the-ground and the inherent trade-offs that exist when both developing and evaluating carbon projects. Some 7% of the projects analyzed are rated in the A-AAA band. At the other end of the scale, 47% of projects are rated in the lowest two bands (B and CCC), demonstrating that many low-integrity projects do remain in the market.

There are, however, some early signs of a trend to increasing integrity. First, there has been a gradual shift in retired credits moving toward higher-integrity projects. Second, new projects being developed also appear to be, on average, of higher integrity. This is especially the case for projects, both engineered and nature-based, that remove carbon dioxide from the atmosphere.

Integrity considerations of a carbon project extend beyond its emissions impact. In particular, its co-benefits are increasingly being seen as core benefits for stakeholders. The contribution of a project to sustainable development varies by the nature of each project type, but also by how an individual project has been designed and implemented. Projects that have been assessed to deliver strong co-benefits, and operate with low legal and ethical risks, have commanded a premium price over the last two years.

More generally, over the same period, higher-integrity projects (A - AAA) have traded at a clear, and statistically significant, premium to lower-integrity credits. After controlling for other factors such as project type and location, a one-point improvement in a project's overall integrity score (1 to 5) has been associated with an 8% increase in the spot price of a project's credits. There also appears to be an emerging trend toward higher-priced, higher-quality projects in the offtake market, particularly for nature-restoration projects. While this relationship holds across the overall market, at the individual project level the relationship between integrity and price remains variable. This relationship may strengthen over time as tools to easily assess integrity across the whole market, such as the ICVCM's CCPs and MSCI Carbon Project Ratings, become more widely available.

#### More information

➤ For more insights on the current state of integrity, please read our seminal report [here](#).

# The carbon credit market



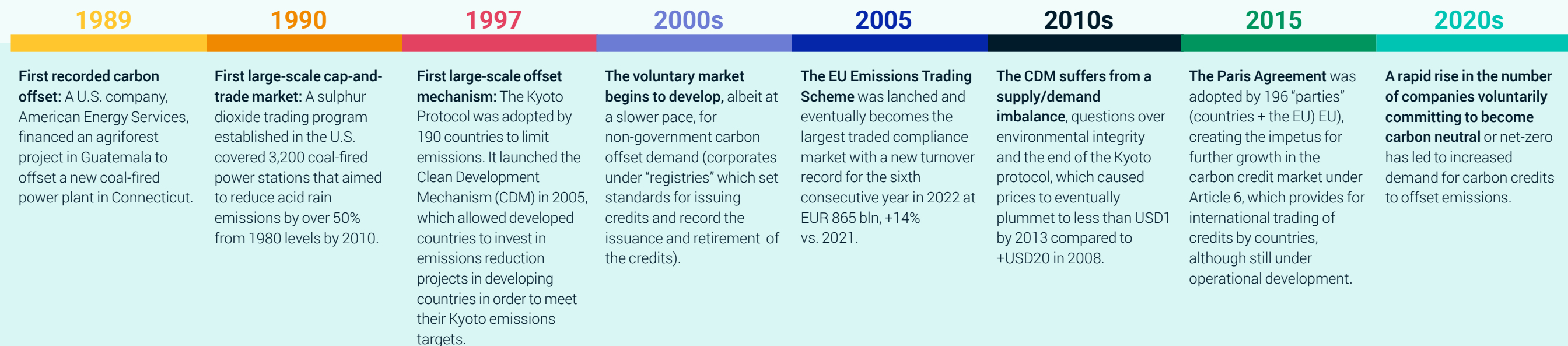
# The market for carbon credits

The projects that underpin carbon credits either reduce or remove emissions that would not have been reduced or removed in the absence of carbon credit financing.

So, who provides this financing? The main source of demand today is the voluntary purchase of carbon credits by companies that want to make a positive claim about their net climate impact. In addition to voluntary corporate demand, some corporate demand is also driven by the need to meet a compliance commitment, and some governments are also looking to use carbon credits as a means of enhancing their own climate impact.

The number of companies and governments that have made long-term climate commitments far exceeds those who are making climate claims about their actions today. In particular, any entity that has committed to eventually be net-zero has effectively committed to use carbon credits in the future (thanks to the “net” in net-zero). Hence, demand for (high-quality) carbon credits is expected to grow significantly in the coming decades as companies and governments follow through on their various climate commitments.

## The market for carbon credits has gradually developed over the last 30+ years



## Voluntary corporate demand for credits

### Why companies use carbon credits

Nearly 3,600 listed companies have pledged to reduce their GHG emissions to net-zero.<sup>20</sup> More than 2,100 of them have set (or committed to set) a target validated by the SBTi, a key arbiter of corporate climate pledges.

These 3,600 companies have an estimated GHG footprint (Scopes 1 and 2) of roughly 9.3 gigatons of CO<sub>2</sub>e emissions per year.<sup>21</sup> Hence, a meaningful proportion of the world's emissions are now covered by corporate net-zero targets.<sup>22</sup> Collectively these targets are, on paper at least, ambitious. Achieving them will also be costly: reducing emissions often requires companies to undertake upfront investments. The cost of abating residual emissions can be as high as USD 500/tCO<sub>2</sub>e in some industries.<sup>23</sup>

The cost to companies of reducing GHG emissions rises as they reduce their overall emissions (as remaining emissions become increasingly more difficult to abate). This is where the argument for the economic efficiency of carbon credit trading comes in. Expanding the range of abatement opportunities beyond their business allows companies with high abatement costs to lower the cost of reducing and eliminating their net emissions without, in theory, any trade-off for the environment, provided their carbon credits meet specific criteria for quality and credibility. In short, carbon credit trading may offer companies more abatement for a similar level of investment.

Industries	Estimated average cost of abatement to achieve 40% emissions reduction by 2030 (USD/CO <sub>2</sub> e)	
	Range	Average
Aviation	200-600	400
Chemicals and chemical processes*	250-650	450
Electricity generation	50-300	175
Non-ferrous metals and processes**	450-660	555
Non-metallic minerals and processes	100-580	340
Other energy transformation (fossil fuels)	440-600	520
Rail transport	200-300	250
Residential	180-400	290
Road transport	200-800	500
Services	180-460	320
Shipping	130-200	165
Iron & steel and processes	350-640	495

\*Including ammonia

\*\*Including aluminum

Source: MSCI Carbon Markets, based on the average cost of each sector reducing its emissions 40% from 2019 levels by 2030 in line with science-based 2050 net-zero scenarios. See "Using Carbon Credits to Meet Corporate Climate Targets," MSCI Carbon Markets (previously, Trove Research), Nov. 24, 2023, and "Synthesis Report of the IPCC Sixth Assessment Report (AR6)," Intergovernmental Panel on Climate Change, March 20, 2023. Read full report [here](#).

<sup>20</sup> "The MSCI Net-Zero Tracker," MSCI Sustainability Institute, November 2024.

<sup>21</sup> MSCI ESG Research, as of March 31, 2024.

<sup>22</sup> To be sure, companies' carbon footprints overlap; the Scope 3 emissions for one company are the direct emissions of its suppliers or customers. Similarly, companies' Scope 2 emissions can be electric utilities' Scope 1 emissions. For discussion of double counting in emissions scopes, see "Scope 3 Frequently Asked Questions," Greenhouse Gas Protocol, June 2022.

<sup>23</sup> Estimate by MSCI Carbon Markets, based on the average cost of each sector reducing its emissions 40% from 2019 levels by 2030 in line with SBTi 2050 net-zero scenarios. See "Using Carbon Credits to Meet Corporate Climate Targets," MSCI Carbon Markets (previously, Trove Research), Nov. 24, 2023, and "Synthesis Report of the IPCC Sixth Assessment Report (AR6)," Intergovernmental Panel on Climate Change, March 20, 2023.

## When and how credits are used

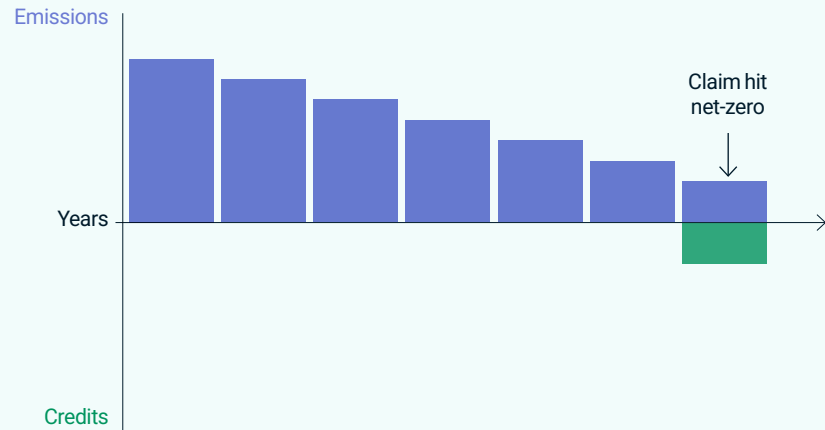
Nearly every corporate climate initiative envisions a mitigation hierarchy in which companies prioritize deep reductions of emissions across their value chain before looking to reduce emissions outside of it.<sup>24</sup> Carbon credits play two roles within such corporate climate standards.

The first, for which relatively strong consensus exists, is for use by companies to offset residual hard-to-abate emissions once a company has reduced its emissions as much as possible (by 90% for most sectors under the SBTi) in order to claim net-zero alignment.<sup>25</sup> Most net-zero standards, including the SBTi, permit only removal credits to be used in support of a net-zero claim.<sup>26</sup> This has led to a recent focus

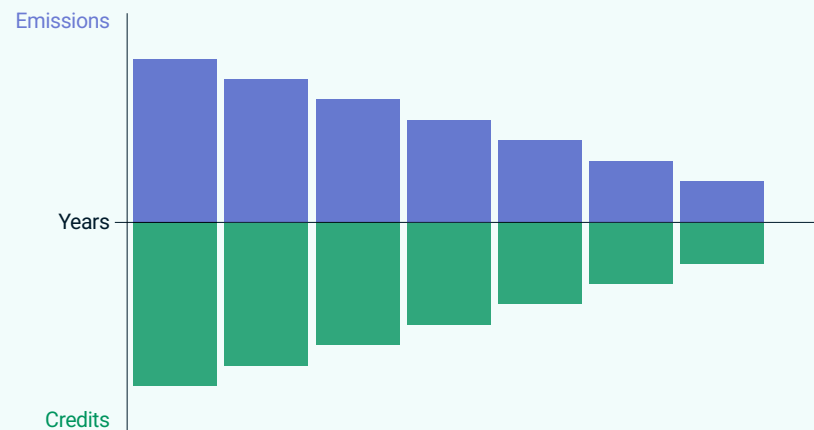
within carbon markets on the scaling of engineered carbon dioxide removal (CDR) technologies, with companies such as JPMorgan Chase & Co., Airbus, Microsoft and Swiss Re Group making purchases of credits for direct air capture.<sup>27</sup>

The second, and more debated role, for carbon credits within corporate standards is their use by companies in the shorter term as they transition to net-zero.<sup>28</sup> Most stakeholders recommend that companies, once they have done all they reasonably can at present to reduce their own emissions, should consider using carbon credits as a way to further compensate for their emissions impact and to effectively buy the world more time for its transition to net-zero.

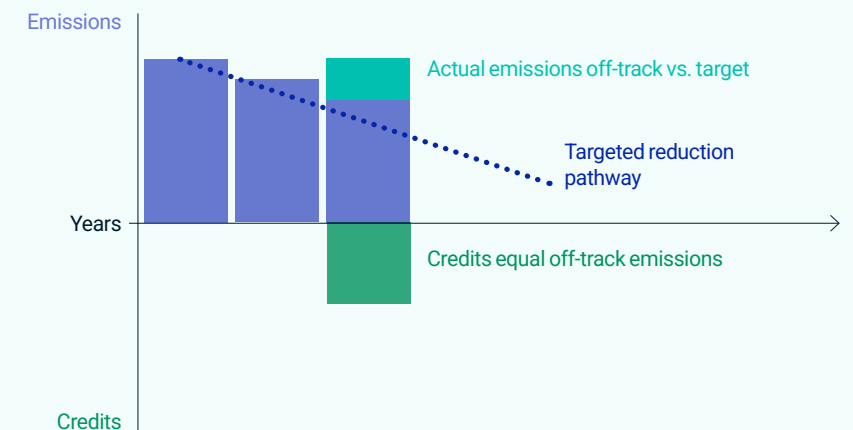
### 1. Neutralizing residual emissions in net-zero year



### 2. Compensating for emissions each year



### 3. Using credits to cover shortfall in emissions reduction target



<sup>24</sup> "Net-Zero: Urgent Beyond Value Chain Mitigation Is Essential," SBTi, Sept. 13, 2022: "The principle at the heart of the SBTi's Net-Zero Standard is the mitigation hierarchy."  
<sup>25</sup> "The Corporate Net-Zero Standard," SBTi, April 2023.  
<sup>26</sup> "Above and Beyond: An SBTi report on the Design and Implementation of Beyond Value Chain Mitigation (BVCM)," Version 1.0, SBTi, February 2024.  
<sup>27</sup> See, for example, "Unlocking the potential of direct air capture: Is scaling up through carbon markets possible?" International Energy Agency, May 11, 2023.  
<sup>28</sup> See, for example, "Target Setting Protocol. Third edition," UN-convened Net-Zero Asset Owner Alliance (NZAOA), January 2023, and "Implementation Guide," Net-Zero Investment Framework, Paris Aligned Investment Initiative, Version 1.0, March 2021.

The latest guidance from the SBTi, for example, recommends that companies set near- and long-term targets to reduce their own emissions as well as to help reduce emissions beyond their value chain.<sup>29</sup> Companies can accomplish the latter by purchasing high-quality carbon credits or by investing directly in carbon credit projects. Though the Net-Zero Asset Owner Alliance, a U.N.-convened investor group, encourages members to prioritize abatement of emissions, the alliance also encourages members to contribute to a liquid and well-regulated voluntary carbon market this decade, noting the importance of such a market for speeding decarbonization.<sup>30</sup>

Historically, companies have quantified the amount of credits they should buy based on their current emissions with the aim of using those credits to offset those emissions and claim carbon neutrality. Such claims, particularly in Europe, are now viewed by many as misleading, given the problems with guaranteeing the integrity and permanence of many carbon credits, as well as the absence, in some earlier carbon-neutrality standards, of a requirement for companies to first reduce their emissions before resorting to credits.

To address such concerns, the Voluntary Carbon Markets Integrity Initiative (VCMI) has developed a claims code composed of tiers (silver, gold and platinum) based on the proportion of emissions being offset.<sup>31</sup> The VCMI requires that companies use only high-quality carbon credits and must also be on track to reduce their own emissions in line with the goal of limiting warming to 1.5°C. Such an approach is increasingly considered best practice compared with claims of carbon neutrality.



<sup>29</sup> Kate Abnett, "EU considers bringing emissions removal credits into carbon market," Reuters, April 17, 2024  
<sup>30</sup> "Target Setting Protocol, Fourth edition NZAOA", April 2024.  
<sup>31</sup> "Claims Code of Practice: Building integrity in voluntary carbon markets," v. 2, November 2023, VCMI.

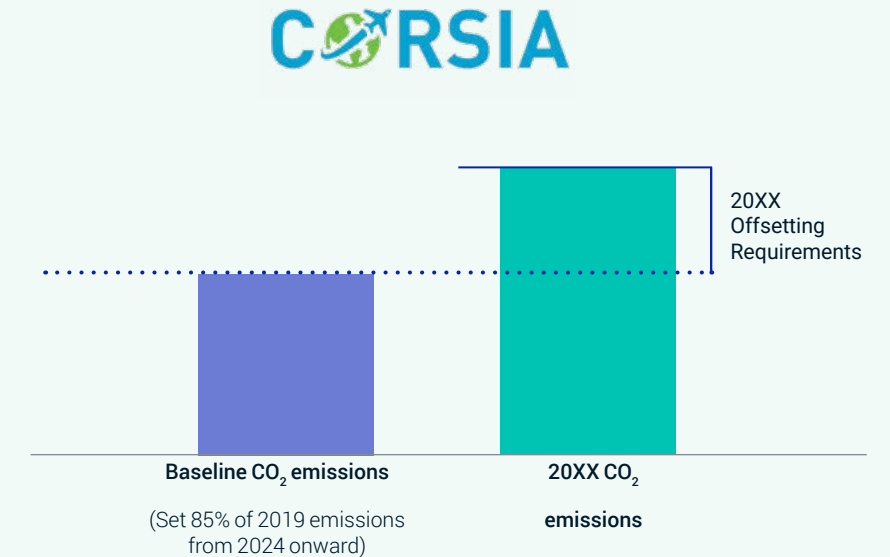
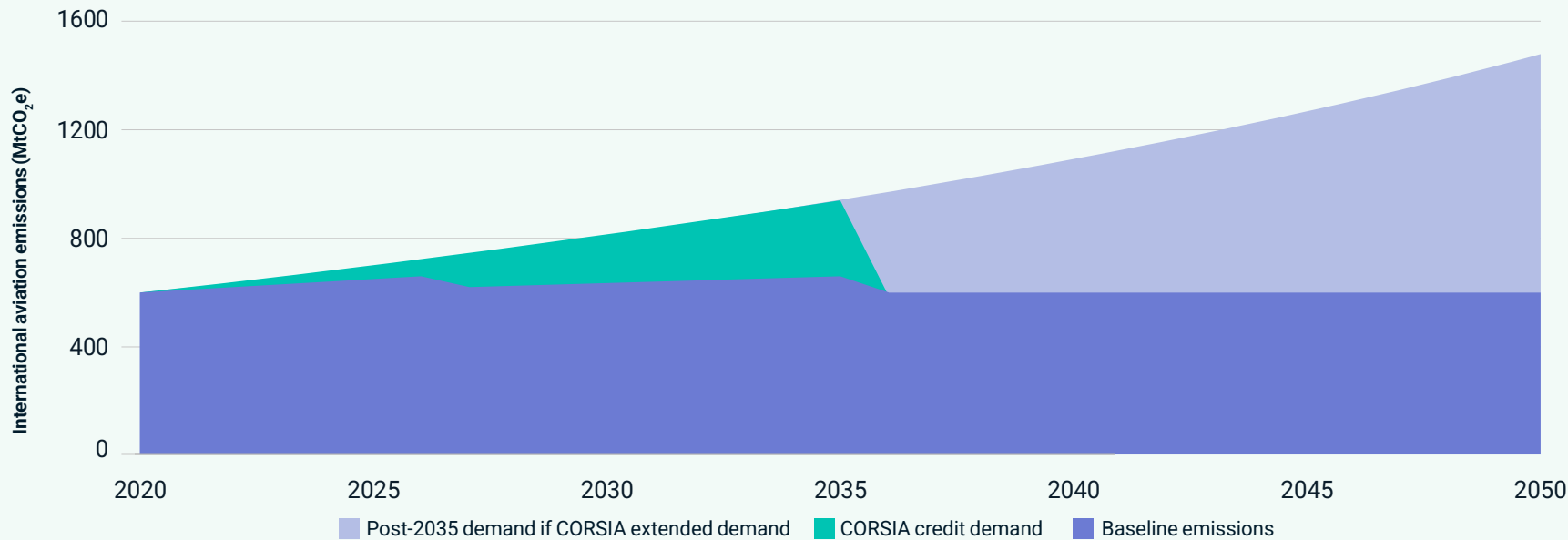
## Demand from international aviation

The International Civil Aviation Organization (ICAO), a U.N. agency that helps align air regulations worldwide, developed the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), a quasi-compliance scheme designed to cap emissions from international aviation at 85% of their 2019 levels.<sup>32</sup>

Airlines that fly routes between countries participating in CORSIA will now have to buy carbon credits to cover emissions that exceed the agreed-upon baseline.<sup>33</sup>

CORSIA fills a gap created by the Paris Agreement, which left international aviation out of its emissions target (international aviation accounts for about 2% of global CO<sub>2</sub> emissions but is among the most difficult sectors to decarbonize).<sup>34</sup> Participation in Phase I of CORSIA, covering 126 countries from 2024 to 2026, is voluntary.<sup>35</sup> The second phase, from 2027 to 2035, will be mandatory for all international airlines (with a limited number of exceptions such as those traveling from/to small island nations). CORSIA has developed a specific set of rules for credit eligibility, so not all credits available in the broader carbon credit market may be used.<sup>36</sup>

**CORSIA aims to offset growth in international aviation emissions above 85% of 2019 levels**



<sup>32</sup> "Generating lift for low-carbon aviation," The MSCI Sustainability Institute, March 4, 2024.

<sup>33</sup> "Handbook," CORSIA, January 2024.

<sup>34</sup> "Tracking Clean Energy Progress 2023," IEA, 2023.

<sup>35</sup> "Frequently Asked Questions," CORSIA, December 2022. A pilot phase of CORSIA ran from 2021 to 2023. Prior to Phase I, due to the fall in airline emissions as a result of the COVID-19 pandemic, no CORSIA credits were purchased during the pilot.

<sup>36</sup> "CORSIA Eligible Emissions Units," International Civil Aviation Organization, March 2024.

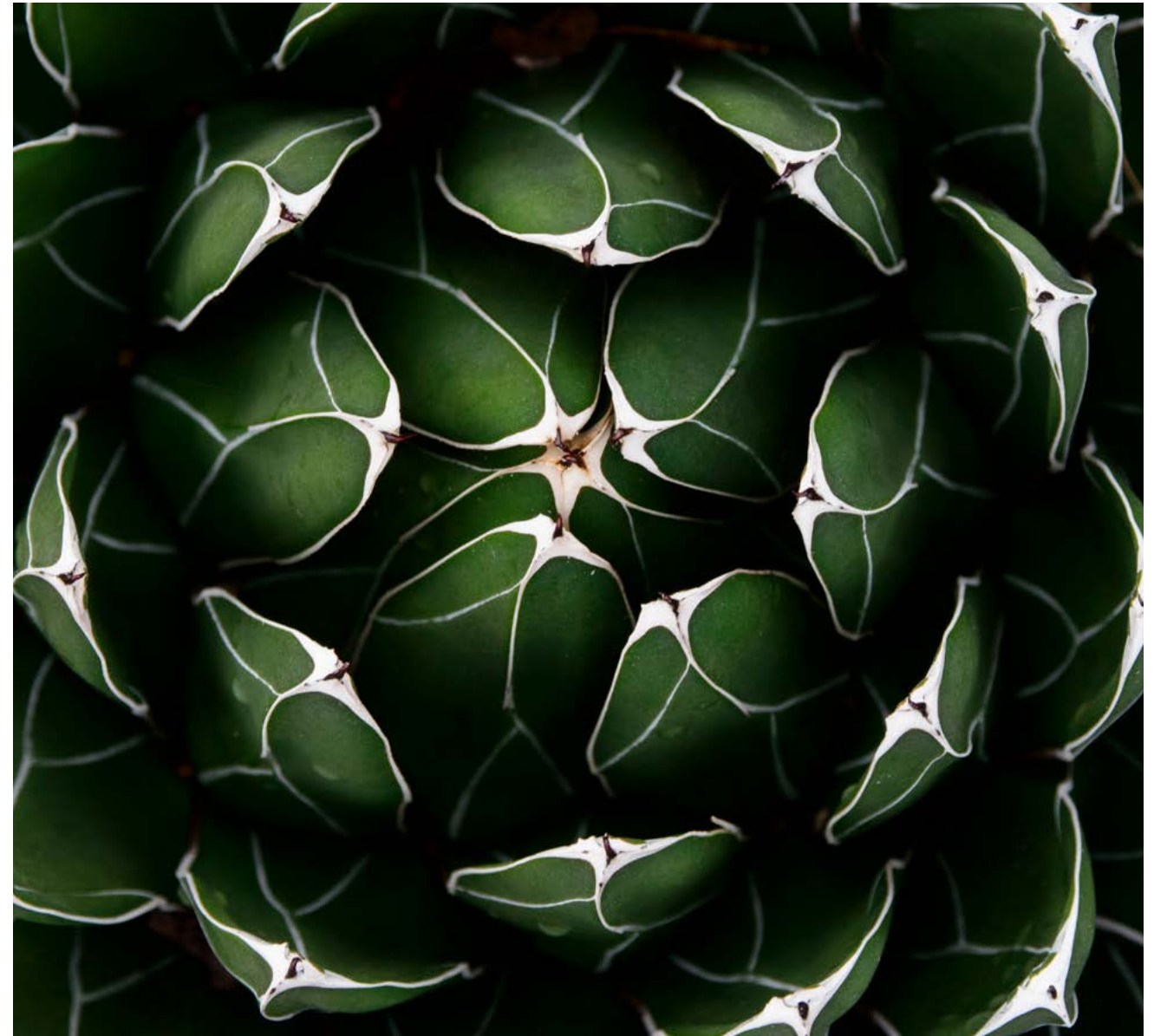
## Compliance-related corporate demand

An ETS can also permit participating corporations to use carbon credits to offset a portion of their emissions in lieu of holding an allowance.

Restrictions usually apply to the maximum share of obligations that can be met with credits and the types of credits that can be used (often only permitting the use of domestically generated credits). California's cap-and-trade program, for example, allows companies covered by the ETS to invest in carbon credit projects and use the reductions in emissions to be applied toward a portion (currently 4%, rising to 6% in 2026) of their annual compliance obligation.<sup>37</sup>

Few of the large emissions trading schemes currently permit the use of carbon credits purchased in the voluntary market. The EU ETS allowed the use of carbon credits until 2012 but discontinued the practice after low-quality carbon credits developed under the Clean Development Mechanism (CDM) flooded the market, undermining the price of EU allowances and reducing the incentive for participating companies to reduce their own emissions.<sup>38</sup> More recently, the European Commission has discussed the possibility of once again allowing the use of some high-integrity, high-performance carbon-removal credits to be used within the EU ETS, although the prospect seems unlikely before 2040.<sup>39</sup>

In addition, governments in some countries that have a carbon tax, including Colombia, South Africa and Singapore, allow companies to use carbon credits to reduce a portion of their liability.<sup>40</sup> Though demand for credits in such schemes remains relatively small, it could grow significantly over time if more governments adopt similar approaches.



<sup>37</sup> "FAQ Cap-and-Trade Program," California Air Resources Board.

<sup>38</sup> "Use of international credits," EU Emissions Trading System, European Commission.

<sup>39</sup> Kate Abnett, "EU considers bringing emissions removal credits into carbon market," Reuters, April 17, 2024.

<sup>40</sup> See "Colombia Drives Innovation and Carbon Markets: Updated," Verra, Sept. 5, 2017; "Carbon Offset Administration System," Republic of South Africa and "Singapore Sets Out Eligibility Criteria For International Carbon Credits Under The Carbon Tax Regime," Ministry of Sustainability and Environment, Singapore, Oct. 4, 2023.

## Demand from governments

**Article 6 of the Paris Agreement included two trading mechanisms designed to encourage voluntary cooperation between countries in implementing their national climate targets.**

Article 6.2 sets the basis for country-to-country emissions trading, while Article 6.4 establishes an international mechanism for trading of carbon credits by countries or companies to meet their climate goals. After several years of negotiations, in November 2024, countries meeting at the United National climate conference in Baku, Azerbaijan (COP29), approved high-level rules for both bilateral trading under Article 6.2 and an international market under Article 6.4.

### Article 6.2

Article 6.2 creates a decentralized mechanism in which countries can negotiate the bilateral transfer of carbon credits. Carbon credits are known as internationally transferred mitigation outcomes (ITMOs) in the Article 6.2 framework. ITMOs can count toward another country's national climate plans or other international climate targets (such as those for international aviation) or can be used in the voluntary carbon market if authorized by the host country.

Countries began trading emissions, even before the policy framework for Article 6.2 was finalized. Switzerland, Japan, Singapore, South Korea and Norway have all either negotiated agreements or frameworks that will allow them to buy carbon reductions from developing countries.<sup>41</sup>

### Article 6.4

Article 6.4 creates a centralized mechanism for issuing and trading carbon credits, monitored by the UNFCCC, and set to be called the Paris Agreement Crediting Mechanism (PACM). PACM allows for the trading of carbon credits between companies and governments, for use toward either countries' national climate plans or corporate climate targets, respectively. Its concept resembles the Clean Development Mechanism a U.N. mechanism, created in 1997 to authorize developed countries to meet their climate targets by purchasing carbon credits tied to emission reductions in developing countries. The agreement reached at COP29 sets high-level standards for carbon credit methodologies and specific projects in the new global market. Though many details remain to be finalized, the first PACM credits may be available by the end of 2025.

### Corresponding adjustments

To prevent emissions reductions being claimed more than once, Article 6 introduces an accounting mechanism called a corresponding adjustment (CA). By design, a CA aims to ensure that the same tonne of CO<sub>2</sub>e cannot be counted by more than one country toward its national climate target.

CAs represent a key element of authorization in the Article 6 framework. For example, if a carbon credit project in Rwanda sells credits with CA authorization, it means the Rwandan government cannot claim the emissions that project reduces against their own national climate target.<sup>42</sup> At the same time, a CA enables another country to use Rwanda's emission outcomes toward its target.

Credits used by airlines under CORSIA must have a CA.<sup>43</sup> However, CAs are not required for corporate use of carbon credits more generally (i.e., toward voluntary climate claims), albeit some stakeholders in the NGO community argue that the voluntary use of a CA by a corporation represents best practice.<sup>44</sup>

<sup>41</sup> Data from International Emissions Trading Association. See also, "Norway Launches Initiative to Cut Emissions in Developing Countries," Norwegian Ministry of Climate and Environment, Nov. 19, 2024.

<sup>42</sup> Craig Ebert, "Corresponding Adjustments: Bad Idea at the Wrong Time," Climate Action Reserve, Jan. 10, 2022.

<sup>43</sup> "CORSIA: What eligibility decisions mean for carbon markets," Gold Standard, July 5, 2023.

<sup>44</sup> See, for example, Kelley Hamrick and Beatriz Granziera, "To trade or not to trade," The Nature Conservancy, 2021.

## The quantity of credits used

Demand for carbon credits is measured by the number of retirements; a retirement occurs when companies use a credit in support of a climate claim. The number of retirements has hovered around 180 MtCO<sub>2</sub>e for the last three years. As the comparison of retirements and issuances suggests, supply has outstripped demand for a number of years, creating a surplus. The total surplus of unused credits in the market rose above 1 Gt of CO<sub>2</sub>e, more than five times annual demand, earlier this year.

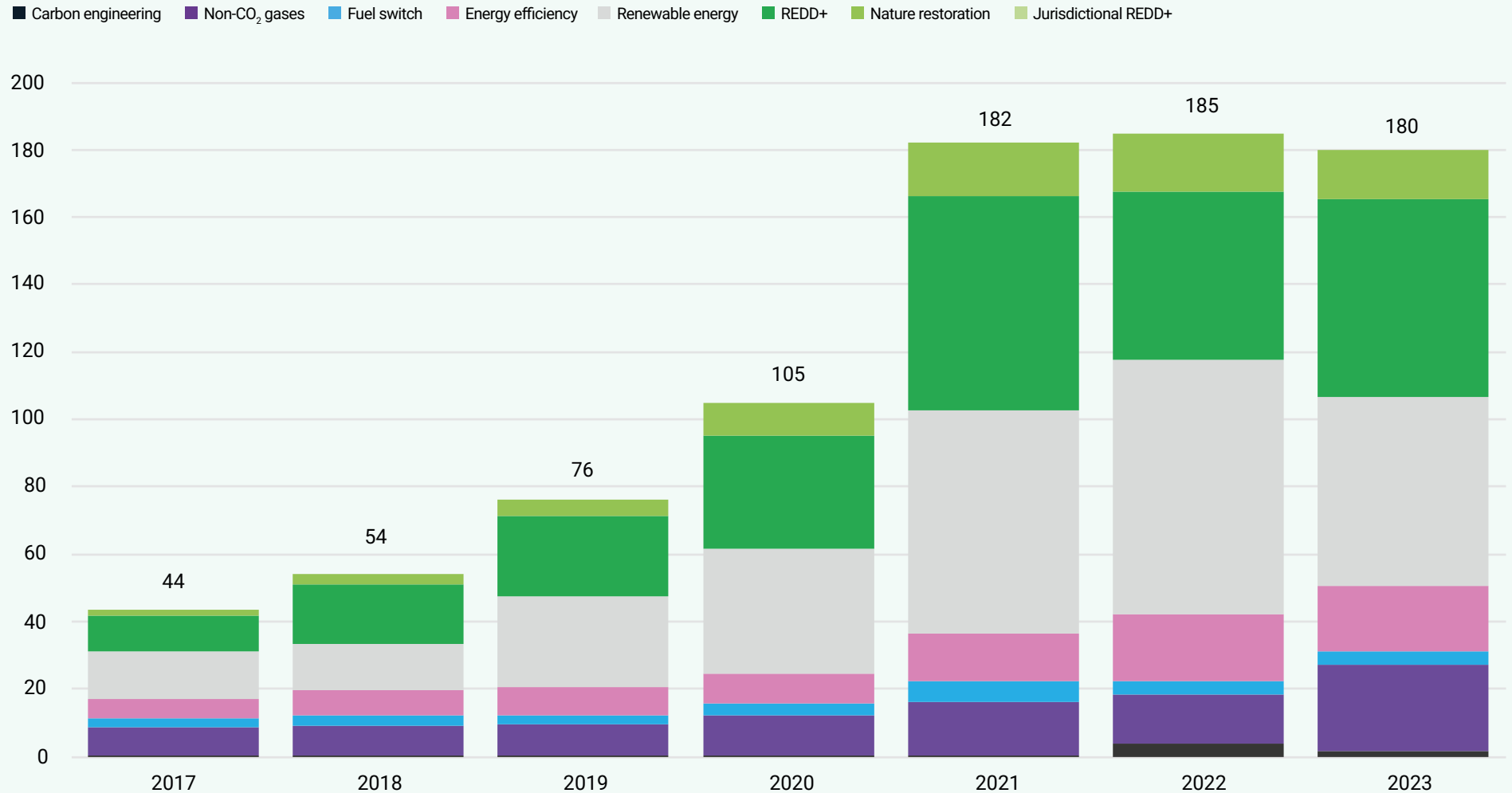
Of the 180 MtCO<sub>2</sub>e of credits retired in 2023, 93% came from reduction projects and 7% from removal projects. Different corporate retirees favor different types of credits, but across the market 41% of retired credits last year were nature-based and 59% technology-based.

The biggest voluntary users of carbon credits currently are companies in the fossil-fuels industry. The use of carbon credits by oil and gas companies fulfills a range of needs, mainly to demonstrate progress against their climate commitments and to reduce their net carbon intensity.

**More information**

➤ To view our dashboard of the latest issuances click [here](#).

**Annual retirements by project type (MtCO<sub>2</sub>e)**



Includes credit transactions from ACR, ART TREES, BioCarbon, CAR, CDM (NDC-eligible credits only), EcoRegistry, GCC, Gold Standard, Plan Vivo, Puro Earth and Verra. These registries represent the vast majority of credits in the market today. Additional, smaller, registries are available on the Carbon Markets platform to subscribers. Source: MSCI Carbon Markets

Oil and gas companies that use carbon credits are not restricted to a single region and include Shell and Eni (Europe), Diamondback Energy and Civitas (U.S.), Ecopetrol (Colombia) and PetroChina (China).<sup>45</sup> Most of these purchases are voluntary, though in Colombia companies use carbon credits to offset the country's carbon tax. The average integrity of the carbon credits being used by these companies is higher than the market average, in part reflecting the relatively large budgets of companies in the oil and gas industry, but also the level of diligence they now apply to their purchase of and investment in carbon credit projects.

Certain airlines have been historically large buyers of carbon credits, which they purchased to make carbon-neutrality claims. Delta Airlines, for example, was the largest user of credits in the world between 2020 and 2022.<sup>46</sup> Demand from the aviation industry (part of the transportation sector), however, has dropped significantly over the last two years as governments and NGOs have objected to airlines using carbon-neutrality language in their marketing.<sup>47</sup>

Companies in the services, financial, health and retail sectors have driven demand for carbon credits in recent quarters. These firms tend to have low emissions per dollar of profit relative to many other sectors, facilitating their investments in carbon credits, including higher-cost engineered CDR credits.

Sector	% share of 2021-23 credit retirements	Average integrity of retired credits (out of 5)
Fossil fuels	31%	3.1
Transportation	18%	3.0
Services	15%	3.0
Manufacturing	13%	2.8
Retail	5%	2.9
Financial services	4%	3.1
Food, beverage & agriculture	3%	3.0
Power generation & utilities	3%	2.8
Materials	2%	2.9
Infrastructure	2%	3.4
Real estate	2%	3.2
International bodies	1%	3.0
Biotech, health & pharma	1%	3.1

The table considers retirements from registries matched to a specific retiree from the disclosed details. Many transactions do not disclose the beneficiary. Average integrity is a weighted average by volume, using MSCI Carbon Project Rating's balanced weighting, across credits where an integrity rating is available only. Registries included are ACR, BioCarbon, CAR, CDM (NDC-eligible credits only), EcoRegistry, GCC, Gold Standard, Pacific Carbon Standard, Plan Vivo, Puro Earth, UK Woodland Carbon Code, Verra

45 MSCI Carbon Markets data.  
 46 MSCI Carbon Markets data.  
 47 Ibid.

## Trading in carbon credits

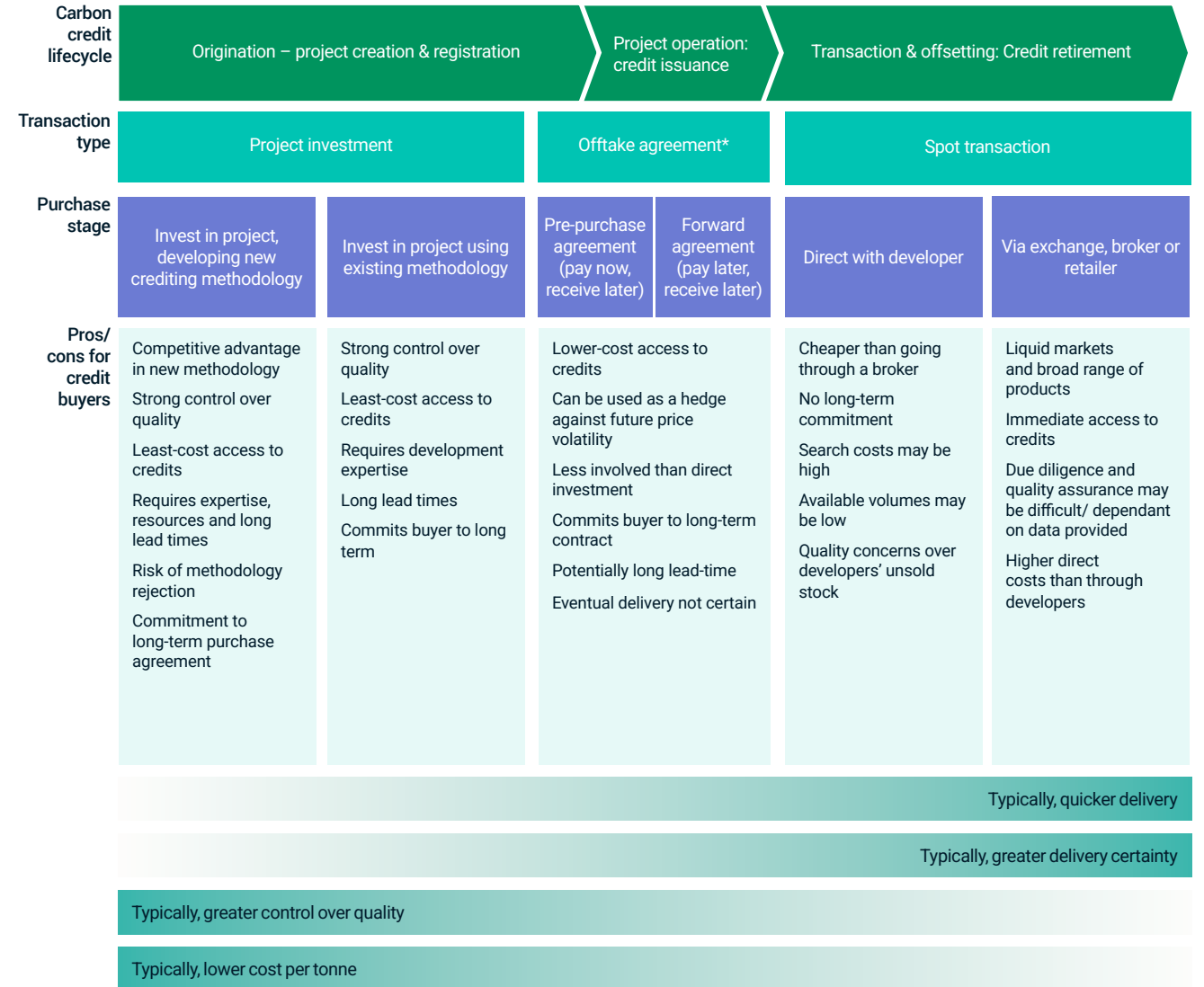
An active secondary market in trading carbon credits facilitates the flow of financing from end buyers to project developers.

But the market remains relatively illiquid and opaque. It also remains relatively small, with credits changing hands just a couple of times, on average, prior to their purchase by an end user. The volume contrasts with more-mature markets, such as the market for trading EU ETS allowances (which change hands 10 to 15 times) or the market for trading oil, where a barrel may change hands 30 times.<sup>48</sup>

Several new exchanges dedicated to trading carbon credits (or environmental certificates more generally) have come online in recent years; the largest (on a traded-volume basis) is currently CBL Markets. The market trades mainly on an over-the-counter basis (often via brokers and other intermediaries) although an increasing number of developers seek to sell their credits directly to end buyers.

Most transactions are executed on a spot basis for ex-post issued credits. Many buyers, however, are increasingly looking to invest earlier in the crediting process, either via long-term offtake agreements or direct project investment. This gives buyers access to cheaper credits and greater control over their quality, but it also introduces delivery uncertainty, longer lead times and the potential need for project development expertise.

There is currently a very limited derivatives market for carbon credits. Several environmental-focused exchanges have established standardized contracts, under which a seller must deliver carbon credits that meet a set number of criteria (for example, nature-based credits from three registries with vintage greater than 2016). These rose in popularity between 2021 and 2022 but interest in them has since collapsed as buyers have been concerned about the low quality of credits that can be delivered through them.<sup>49</sup> In addition, two major commodity exchanges, ICE and Chicago Mercantile Exchange, have launched futures contracts, although again these have not yet traded in any material volume<sup>50</sup>



48 Estimates by MSCI Carbon Markets, as of June 2023.

49 MSCI Carbon Markets data.

50 See "Carbon Emissions Solutions," available at cmegroup.com, and "ICE Carbon Futures Index Family," available at ice.com.

## The price of carbon credits

Individual carbon credits can trade at very different prices that reflect, in part, illiquidity and opacity that have impeded development of an overarching valuation paradigm. A number of factors, however, can have a major impact on the price of a carbon credit, including:

Project type	Region	Vintage	Integrity	Co-benefits	Corresponding adjustment
<p>Nature-based projects have generally tended to trade at a premium, although this narrowed significantly in 2023, particularly for nature-based reduction credits (known as REDD+) following news reports that questioned their underlying quality. Renewable energy credits typically trade at the lowest price point among major project types, reflecting integrity concerns around their additionality. Engineered removal credits with a high permanence trade at a significant premium to the rest of the market, reflecting the nascent stage, and high cost, of their technology development.</p>	<p>The location of a carbon credit project can influence its price, although the impact of geography on credit prices is much less pronounced than project type. For example, among nature restoration credits, North American credits tend to trade at a clear premium versus those originating from Asia or South America. However, among REDD+ credits, there is no consistent trend of South American, Asian or African credits commanding a premium.</p>	<p>More-recent vintages of credits tend to trade at a premium to older vintages. This reflects the perception among market participants that some older vintages were registered under methodologies that lack sufficiently rigorous standards for quality. A lack of demand, based on the length of time the credits have remained in a registry's inventory, may also suggest similar concerns. In addition, under some compliance schemes, such as CORSIA, or exchange-traded products, only more-recent credits are eligible for use.</p>	<p>Credits with the highest integrity, as measured by MSCI's assessments of carbon credit integrity, have historically traded at a significant premium to those that have received the lowest integrity scores. Still, credit quality does not yet correlate strongly with price, given the absence of any widely accepted quality standard. There is a widespread expectation that CCP-labeled credits, once they come to market in sufficient volume, will trade at a premium to non-CCP credits.<sup>51</sup></p>	<p>Projects with more certified co-benefits, such as helping to achieve one or more of the U.N.'s Sustainable Development Goals, tend to generate a premium over the market average. For example, credits that meet standards set by the Climate, Community &amp; Biodiversity (CCB) Alliance have attracted a statistically significant 25-35% premium over similar credits that are not CCB certified.<sup>52</sup></p>	<p>Few carbon credits have traded with a CA, but those that have, have commanded a premium.<sup>53</sup> Prices for credits traded under Article 6 of the Paris Agreement could range from USD 36 to 45 per tCO<sub>2</sub>e in 2030, if all countries seek to reduce their total mitigation costs and are willing to trade with one another.<sup>54</sup></p>

<sup>51</sup> More than 90% of market participants surveyed by MSCI Carbon Markets in April 2023 predicted that CCP-labeled credits would trade at a premium, with half of those surveyed saying the premium would exceed USD 2 per credit. Source: "Voluntary Carbon Market 1Q23 in Review – the State of Integrity," MSCI Carbon Markets (previously, Trove Research), April 18, 2023.

<sup>52</sup> "Impact of project co-benefits on carbon credit pricing," MSCI Carbon Markets (previously, Trove Research), Sept. 29, 2023. This report is available to subscribers only.

<sup>53</sup> MSCI Carbon Markets data.

<sup>54</sup> "Price outlook for Article 6 credits and corresponding adjustments," MSCI Carbon Markets, March 26, 2024.

## The price of carbon credits

While price discovery and transparency remain a challenge in the carbon credit market, MSCI Carbon Markets has, via its extensive partnership network of market participants, built a database since 2021 that currently includes more than 25,000 prices.<sup>55</sup>

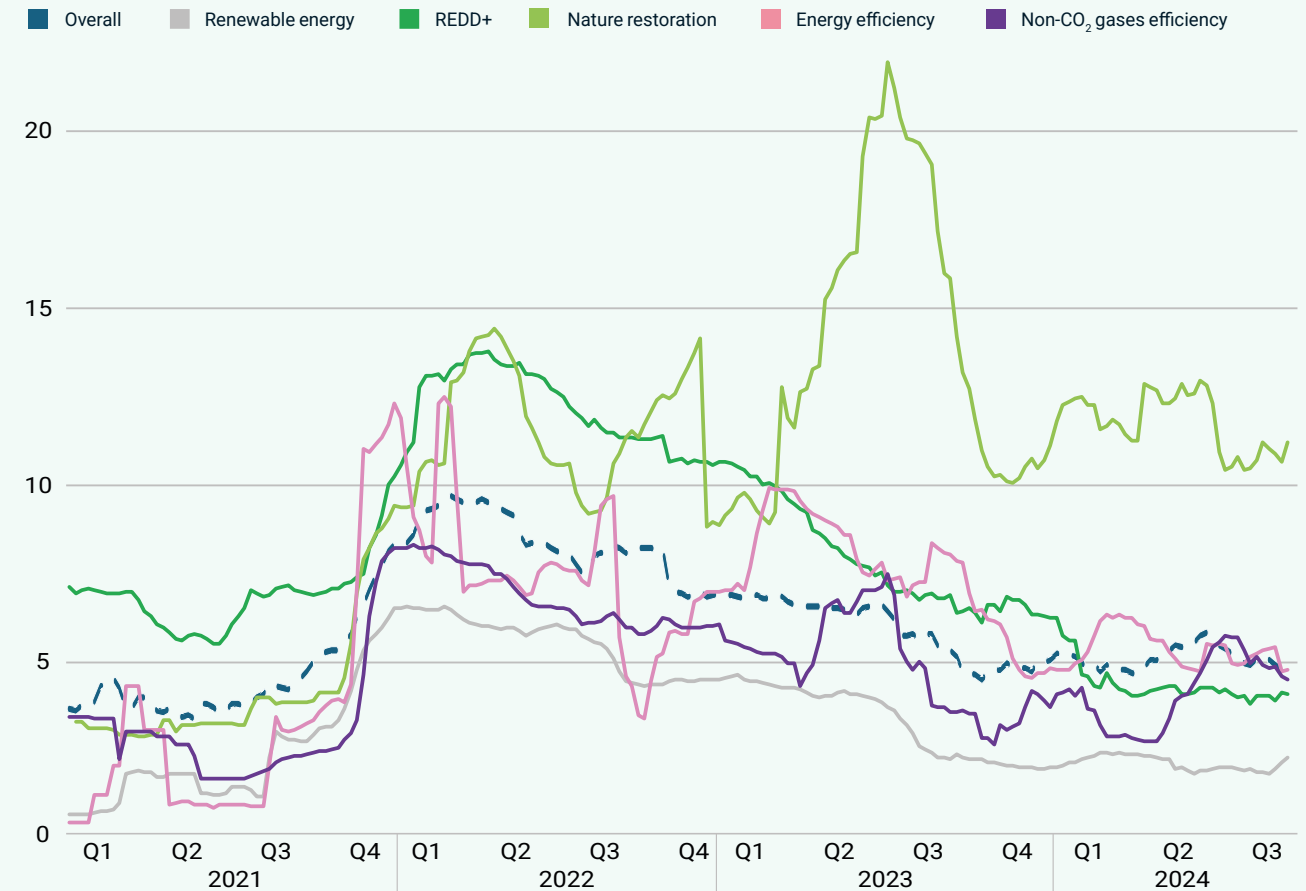
The monthly volume-weighted average spot price for carbon credits was USD 4.8 per tCO<sub>2</sub>e in the three months ended Sept. 30, 2024, an 18% decrease from the previous quarter but roughly level with the same period a year earlier. Prices fell by similar percentages across most project types with the exception of renewable energy credits, which actually increased by 25% last quarter, albeit from a very low base. There continues to be a significant premium placed on nature-restoration credits, particularly those that are traded on a forward basis.

Credit prices, however, vary significantly, and some credits have changed hands at much-higher price points, particularly for engineered CDR. The chart shows the range of carbon credit spot prices observed by MSCI in the third quarter of 2024. Prices by project type cover a relatively large range given the number of factors that influence price. Nature Restoration credits tend to trade at a clear premium, particularly if traded on a forward basis. In contrast, the price of renewable energy credits is much lower and contained within a narrower range, typically averaging around USD 2 per tCO<sub>2</sub>e.

**More information**

↘ We publish the average price of carbon credits trading in the market each week [here](#).

**Carbon credit spot prices monthly weighted average (USD/tCO<sub>2</sub>e)**



Prices represent a mix of settled transactions and asks, although a greater weighting is given to settled transactions. Source: MSCI Carbon Markets

55 \*Carbon Credit Prices,\* MSCI Carbon Markets.

## The outlook for carbon credit prices

Both supply of, and demand for, carbon credits are projected to rise materially in the coming years, assuming that projects currently in the registration pipeline are successfully registered, and that companies with set climate commitments follow through on them.

Most market commentators expect carbon credit prices to rise in the long run given the huge number of companies that have committed themselves to net-zero, although estimates of how much prices will rise varies considerably. The market value of the primary credit market, that is, the annual retirement volume excluding secondary market trading, was about USD 1.1 billion in 2023, down from roughly USD 1.4 billion a year earlier.

In October 2021, MSCI Carbon Markets forecast that the carbon credit market could grow to between USD 10 and 40 billion by 2030.<sup>56</sup> The forecast was based on a [landmark study](#), conducted in collaboration with University College London, and marked the first analysis of long-term demand, supply and prices of carbon credits in the voluntary carbon market.<sup>57</sup>

More recently, in late 2024, MSCI Carbon Markets also published the world's first public [CORSIA price forecast](#), which was based on analysis of the individual airline emissions of over 300 airlines.

Based on review of publicly available carbon credit research and ratings providers, as of Nov. 1, 2024

### More information

➤ MSCI Carbon Markets subscribers receive forecasts of supply, demand and prices of carbon credits out to 2050. Forecasts cover the market as a whole, as well as specific market segments including nature-based credits, engineered CDR credits, CORSIA-eligible credits and Article 6 credits. [Learn more here.](#)



56 "Future Size of the Voluntary Carbon Market," MSCI Carbon Markets (previously, Trove Research), Oct. 29, 2021.

57 "Carbon Credit Demand, Supply and Prices," MSCI Carbon Markets (previously, Trove Research) and University College London, June 1, 2021.

# Criticisms of carbon credits

(and the path forward)



# Criticisms of carbon credits

While the underlying economic rationale for the use of carbon credits is relatively compelling, corporate use of credits has suffered from a series of criticisms, which include:

- Some credits not having had as positive an impact as they claim
- Discomfort with corporate claims of carbon neutrality and offsetting claims
- Concern that the use of carbon credits delays corporate decarbonization
- The continuing absence of a strong incentive for companies to act in the short term

Such criticisms may have slowed the corporate use of credits and the growth of the voluntary carbon market. Hence, a number of initiatives are now trying to tackle these concerns, which are impeding the market from reaching its full potential.



## Questions about carbon credit integrity

Carbon credits have long been troubled by questions, many of them valid, about their integrity.

Some carbon credits have overstated, for example, the quantity of emissions they have reduced or removed from the atmosphere (a problem seen mainly with nature-based and clean-cooking projects), or understated the likelihood that those emissions reductions would have happened in the absence of the carbon credit (an additionality problem most associated with renewable energy and projects intended to reduce deforestation).<sup>58</sup>

Some projects have had the permanence of their emissions impact questioned (particularly among North American nature-based projects) or their impacts on local communities or biodiversity criticized.<sup>59</sup> These shortcomings have generated news coverage and charges of greenwashing against carbon-market participants.<sup>60</sup>

There is now, however, there is now a clear consensus on what constitutes a high-quality credit and how credit quality can be assessed. A number of important initiatives, including improvements by the registries themselves, introduction of a new CCP-label by the ICVCM and new product offerings from private-sector firms (including MSCI), are focused on raising (and better assessing) underlying credit quality.<sup>61</sup> Such initiatives have raised hopes among many stakeholders that the market is now turning a corner on the serious quality issues that have held it back.

## Questions about carbon-credit-related claims

Carbon credits have traditionally been used by corporations to offset their emissions and claim carbon neutrality at a product or company level.

Some stakeholders, however, particularly from environmental groups, have charged that the use of such language represents a form of corporate greenwashing.<sup>62</sup>

In particular, they argue that corporations might be creating the impression there is no net impact from a company's emitting tonnes of GHG pollution and then purchasing an equivalent amount of carbon credits. Critics charge that because of problems with carbon credit quality — and, for many credit types, the shorter duration of their positive emissions impact compared to the negative emissions impact of burning fossil fuels, which remain in the atmosphere for thousands of years — the use of carbon credits can still have a net negative impact. Consequently, a company's emissions, they assert, are not actually fully offset and its carbon impact is not truly neutral.

Such arguments have resonated with consumers and regulators. Consumers have charged both Delta Air Lines and Etihad Airways, for example, with billing themselves inaccurately as carbon-neutral based in part on their use of carbon credits.<sup>63</sup> Regulators in the European Union, meanwhile, have banned the use of terms such as “offset” and “carbon neutrality” in connection with the marketing of products starting in 2026.<sup>64</sup>

While regulators are taking steps to limit offsetting and carbon-neutral claims, they are currently less clear on what climate claims companies can make based on the use of carbon credits. Voluntary standards, which set out a range of new proposals and claim types, aim to fill the gap. The most prominent of these is the VCMI, which has launched a claims code. Other bodies have made (or are preparing) alternative suggestions, including Gold Standard, Verra, the International Emissions Trading Association and the International Standards Organization.<sup>65</sup>

<sup>58</sup> Barbara Haya et al., “Comprehensive review of carbon quantification by improved forest management offset protocols,” *Frontiers in Forests and Global Change* 6, March 21, 2023.

<sup>59</sup> Alex Fredman and Todd Phillips, “The CFTC Should Raise Standards and Mitigate Fraud in the Carbon Offsets Market,” Center for American Progress, Oct. 7, 2022.

<sup>60</sup> Nina Lakhani, “Revealed: top carbon offset projects may not cut planet-heating emissions,” *The Guardian*, Sept. 19, 2023, and Gautam Naik and Natasha White, “Junk Offsets Are Feeding Wave of Greenwashing, Study Shows,” Bloomberg, Aug. 24, 2023.

<sup>61</sup> Tristan Loffer, Konstantina Stamouli and Jamie Saunders, “The First Core Carbon Principles-Qualifying Projects — the VCM Steps on the Gas,” MSCI Research Insight, June 6, 2024.

<sup>62</sup> Stefano Gelmini, “We’re living in a golden age of greenwash,” *Greenpeace*, June 29, 2021.

<sup>63</sup> Ed Davey, “Delta Air Lines hit with lawsuit over claims of carbon neutrality,” *Associated Press*, May 31, 2023, and Elias Visontay, “Etihad accused of misleading customers with greenwashing in ‘Net-Zero’ ads,” *The Guardian*, March 22, 2023.

<sup>64</sup> “EU to ban greenwashing and improve consumer information on product durability,” European Parliament, press release, Sept. 19, 2023.

<sup>65</sup> “Fairly contributing to global Net-Zero - Framework for organizational climate mitigation strategies,” Gold Standard, Sept. 4, 2024.

## Questions about impact of carbon credit use on corporate decarbonization

**Some critics charge that the use of carbon credits allows companies to buy their way out of the need to decarbonize their business.<sup>66</sup>**

This criticism, however, overlooks the widely accepted mitigation hierarchy embedded in prominent corporate climate standards such as the one promulgated by the SBTi, which prioritizes the reduction of emissions by companies within their value chain before use of credits to reduce emissions outside of it.

As it happens, listed companies that have used at least 1,000 tonnes of CO<sub>2</sub>e of carbon credits (classified as material, or major, users) have performed, on average, better on a range of climate-performance metrics than those that have used fewer carbon credits, an analysis by MSCI finds.

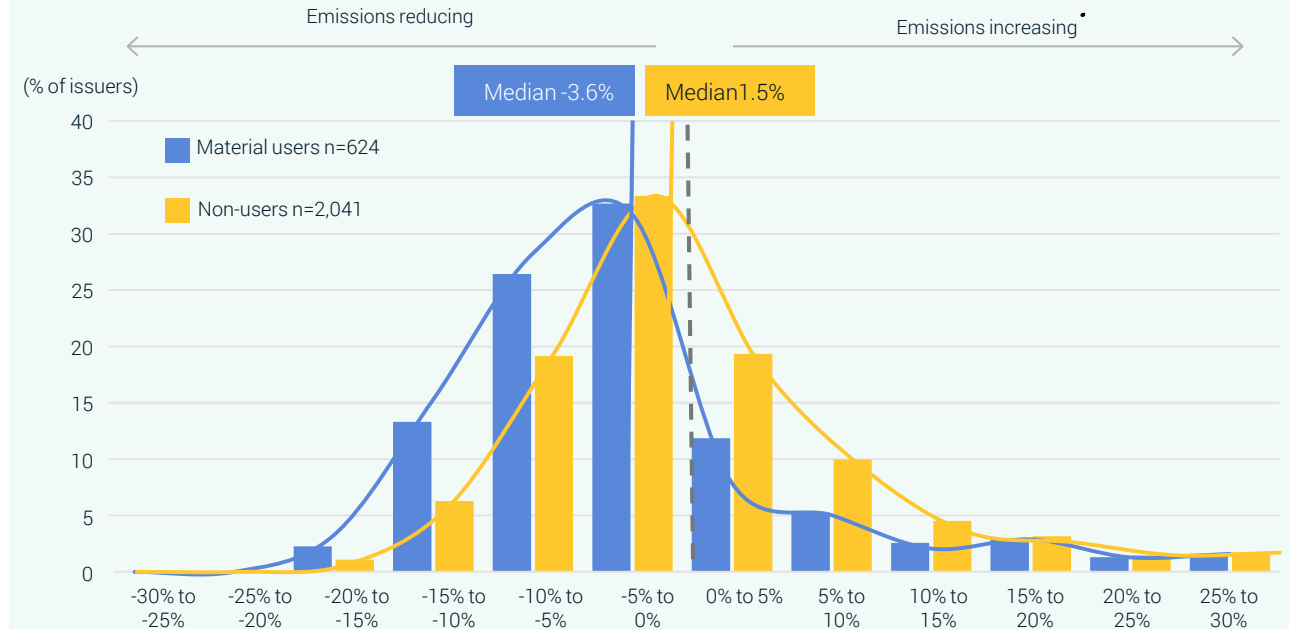
According to the analysis, these companies:

- Reduced their absolute Scope 1 and 2 emissions more than twice as fast as non-users – at a median rate of 3.6% per annum (p.a.) compared with 1.5% p.a. Among material carbon-credit users, 75% reduced their emissions in absolute terms between 2017 and 2022, compared with only 60% of non-users.
- Reduced their Scope 1 and 2 emissions intensity faster than non-users (at a median rate of 5.6% p.a. for material credit users vs. 4.4% p.a. for non-users), with 82% showing a reduction in their Scope 1 and 2 emissions intensity, compared with 72% of non-users.
- Were more likely to have set a climate target than non-users (92% vs. 52%), and those targets were more likely to meet commonly accepted target-credibility criteria such as external validation by a third party, existence of short-term or interim targets and a demonstrated track record of achieving past targets.
- Generated a greater share of revenue from low-carbon activities than non-users across most sectors.

The evidence refutes the assertion that companies are trading off reducing emissions when they buy carbon credits. If anything, it suggests the opposite – that the voluntary purchases of carbon credits can provide companies an incentive to accelerate their emissions reductions.

By purchasing carbon credits, companies voluntarily attach a price to their emissions. This results in an annual budgeted cash expenditure that companies then have an incentive to reduce. The opportunity to reduce costs strengthens the business case for reducing emissions. Firms that purchase carbon credits, the evidence suggests, are also likely to take their climate impact seriously and have well-developed mitigation and carbon credit strategies.

**Distribution of annualized change in company-reported gross Scope 1+2 emissions for material carbon-credit users and non-users, 2017-2022**



Data as of July 1, 2024. Only includes firms within the MSCI ACWI Investable Market Index that reported their Scope 1 and 2 emissions for every year between 2017 and 2022. Source: MSCI Carbon Markets, MSCI ESG Research

66 Varsha Ramesh Walsh and Michael W. Toffel, "What Every Leader Needs to Know about Carbon Credits," *Harvard Business Review*, Dec. 15, 2023.

## Questions around the incentive to act now

Relative to the number of firms that have committed to reach net-zero over the next 25 years, few are currently using carbon credits at scale. The world's carbon budget, meanwhile, continues to rapidly decrease. Listed companies are likely to burn through their share of the global carbon budget for limiting the rise in average global temperatures to 1.5°C by November 2026.<sup>67</sup>

A number of voluntary standards seek to spur corporate use of carbon credits, in addition to reducing corporate emissions as quickly as possible, to speed decarbonization. Even the SBTi, which traditionally has opposed use of carbon credits by companies before they have significantly reduced emissions within their value chain, has started to stress that best practice calls for the use of removal-based carbon credits beyond their value chain in parallel with reducing their own emissions.<sup>68</sup>



<sup>67</sup> [The MSCI Net-Zero Tracker](#), MSCI Sustainability Institute, November 2024

<sup>68</sup> "The SBTi releases new reports to help accelerate corporate climate action beyond the value chain," Science Based Targets initiative, Feb. 28, 2024.

# Corporate use of carbon credits



# Use of carbon credits by companies

Companies considering how and when to engage with the carbon credit market face a number of important questions, including:

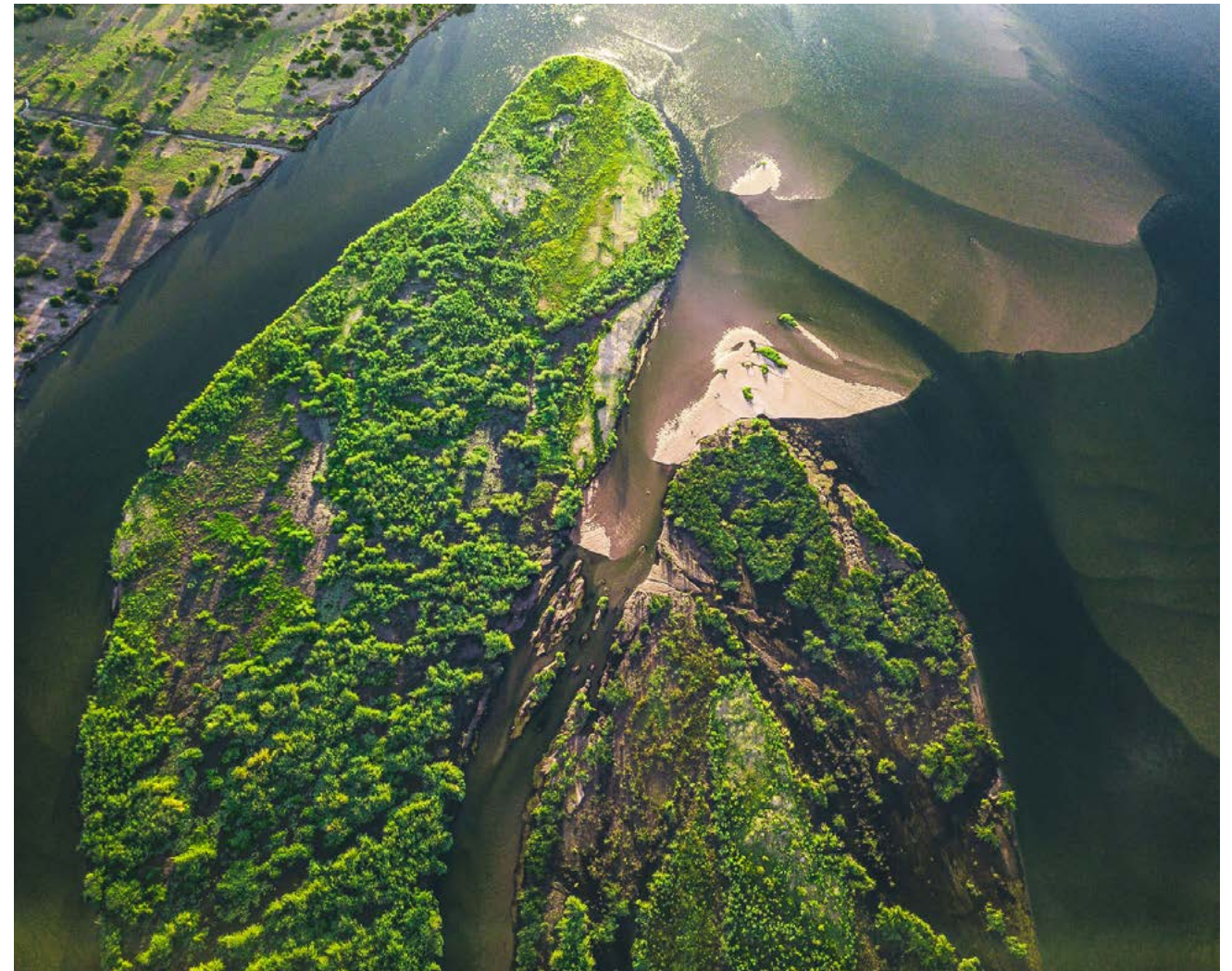
→ When to use credits?

→ What types of credits to use?

→ When, and how, to buy credits?

→ What claim(s) can be made?

→ What needs to then be disclosed?



## When to use credits?

**Consensus among standard-setting bodies suggests that companies should, where feasible, prioritize the reduction of their own emissions as fast as possible.**

Beyond such in-value-chain emissions reductions, there are three potential corporate uses for carbon credits, with the first two widely supported and the third still the subject of considerable debate:

- To neutralize residual hard-to-abate emissions once a corporation's own emissions have been reduced as much as possible in order to achieve net-zero status;
- To compensate for emissions released during a company's transition to net-zero as part of mitigation efforts beyond its value chain; and
- To support an interim emissions-reduction target, on at least a temporary basis, while any shortfall in in-value-chain emissions reductions is achieved.

As the second of these uses suggests, companies are increasingly expected to invest in so-called beyond value chain mitigation (BVCM), which refers to any mitigation actions and outcomes that take place outside their value chain. The SBTi has published comprehensive guidance on designing and implementing corporate BVCM strategies.<sup>69</sup> The Oxford Principles for Net-Zero Aligned Carbon Offsetting also recognize the use of carbon credits for mitigation efforts beyond a company's own climate targets.<sup>70</sup>

BVCM includes both carbon crediting projects and noncrediting approaches. For example, a corporate BVCM portfolio could include:

- Climate policy advocacy
- High-integrity carbon credits
- Investment in early-stage climate or carbon removal technologies
- Landscape-level biodiversity initiatives that do not generate credits
- Contributions to loss and damage following natural disasters
- Retraining for energy-sector employees impacted by the renewable transition

The emergence of BVCM as a key alternative or complement to offsetting reflects both growing regulatory scrutiny of compensation claims and the urgency of closing a global gap in financing the net-zero transition. While investments in BVCM do not help achieve corporate decarbonization targets, they can deliver business benefits by improving supply-chain resilience, contributing to a favorable policy environment and supporting development of technologies that companies may adopt at a later stage.<sup>71</sup>

Companies have traditionally calculated the volume of credits they should purchase using a **"tonne-for-tonne"** calculation method, in which the tonnes of carbon credits they purchase equal the tonnes of emissions they emit. While that remains the most-common calculation method, the SBTi's guidance for BVCM considers alternatives, including **"money-for-tonne"** (where a company's spending on BVCM, including carbon credits, is based on its emissions multiplied by an internally set carbon price) and **"money-for-money"** (where a company's spending on BVCM represents a fixed proportion of profits or revenues). Several NGOs, including the WWF and Gold Standard, support the money-for-tonne approach, which has been adopted by several firms, including Boston Consulting Group (BCG) and the financial firm Klarna.<sup>72</sup>



<sup>69</sup> "Above and Beyond: An SBTi Report on the Design and Implementation of Beyond Value Chain Mitigation (BVCM)," version 1.0, SBTi, February 2024.

<sup>70</sup> "Oxford launches revised offsetting principles," Net-Zero Climate, Feb. 27, 2024.

<sup>71</sup> "Above and Beyond: An SBTi Report on the Design and Implementation of Beyond Value Chain Mitigation (BVCM)," version 1.0, SBTi, February 2024.

<sup>72</sup> See, for example, "Fit for Paris Replacing Kyoto-style CO<sub>2</sub> offsetting: How companies should finance additional climate action," WWF, Nov. 16, 2022, and "Gold Standard Unveils Comprehensive Guide for Effective Beyond Value Chain Mitigation," Gold Standard, media release, March 18, 2024.

## Case study

### How JPMorgan Chase & Co. is harnessing the voluntary carbon market for climate innovation

The voluntary carbon market can play an important role in accelerating the transition to a low-carbon economy by lowering the cost of decarbonization, driving capital toward climate solutions and creating benefits for communities and the environment.

That's according to JPMorgan Chase & CO (JPM), which participates in the carbon credit market both as part of its own carbon management strategy and in support of clients' decarbonization plans.<sup>73</sup> The biggest U.S. bank by assets retired 269,000 carbon credits in 2023, up nearly 8% from a year earlier.<sup>74</sup>

JPM has defined a set of eight principles that guide its engagement with the carbon credit market. They include ensuring that carbon projects deliver decarbonization that is real, measurable, additional, permanent and independently verifiable. Projects should also avoid leakage, generate credits that are unique and support front-line communities. The bank references these principles when assessing carbon credits to support its own sustainability efforts or advising clients on carbon credit transactions.

The lion's share of JPM's carbon credit retirement portfolio comprises credits from nature-based projects, including improved forest management, afforestation and projects that conserve mangroves.<sup>75</sup> The bank has said it intends to progressively increase purchases of long-term or permanent engineered CDRs over time with the aim of helping to accelerate and scale the development of related technologies.

In keeping with this strategy, JPM has retired 20,000 biochar CDR credits to date.<sup>76</sup> While this accounts for a small proportion of its current retirements, it appears set to increase. JPM announced last year that it would purchase high-quality CDR credits that represent the removal and durable storage of 800,000 tCO<sub>2</sub>e at a value of over USD 200 million.<sup>77</sup> This included a commitment of USD 75 million to the advance-market-commitment group Frontier, which also includes Stripe, Alphabet, Meta and McKinsey, among others.<sup>78</sup>

"These agreements reflect our ambition to support scale, innovation and evolution in these technologies," Ashley Bacon, JPM's chief risk officer, said in a statement.<sup>79</sup> "Alongside reducing emissions, the world needs significant investment in durable carbon removal solutions with gigaton-scale potential."

JPM's investments in CDR are an important component to fulfilling its own climate target, which aims to reduce its Scope 1 and 2 emissions by 40% from 2017 levels by 2030. That includes the aim of fully offsetting the bank's Scope 1 emissions with durable CDR this decade.

Despite this sizeable investment in engineered CDR, JPM has stated it is dedicated to supporting a diverse range of project types, noting that it would continue to use nature-based credits as part of efforts to neutralize Scope 3 emissions such as those from business travel.

The bank also stresses the importance of carbon credit integrity. That includes its support for transparency efforts such as the ICVCM and its Core Carbon Principles. "There is a clear need for the voluntary market to achieve greater scale, credibility and functionality," JPM writes in its own Carbon Market Principles, "in order to deliver the scope of emission reductions and removals that will ultimately be required."

<sup>73</sup> "Carbon Market Principles," JPMorgan Chase & Co., 2023.

<sup>74</sup> MSCI Carbon Markets data.

<sup>75</sup> "Environmental Social Governance Report," JPMorgan Chase & Co., 2023.

<sup>76</sup> MSCI Carbon Markets, as of Aug. 21, 2024.

<sup>77</sup> "JPMorgan Chase seeks to scale investment in emerging carbon removal technologies, announces agreements intended to durably remove and store 800,000 tons of carbon," JPMorgan Chase & Co., May 23, 2023.

<sup>78</sup> "Frontier carbon removal commitment tops \$1B with four new members: Autodesk, H&M Group, JPMorgan Chase, and Workday," Frontier, April 12, 2023.

<sup>79</sup> "Oxford Principles for Net-Zero Aligned Carbon Offsetting (revised 2024)," University of Oxford, February 2024.

## What type of credits to use?

Fragmentation of the carbon credit market and a multitude of standards and guidance bodies can make it difficult for companies to know exactly which carbon credits they should use.

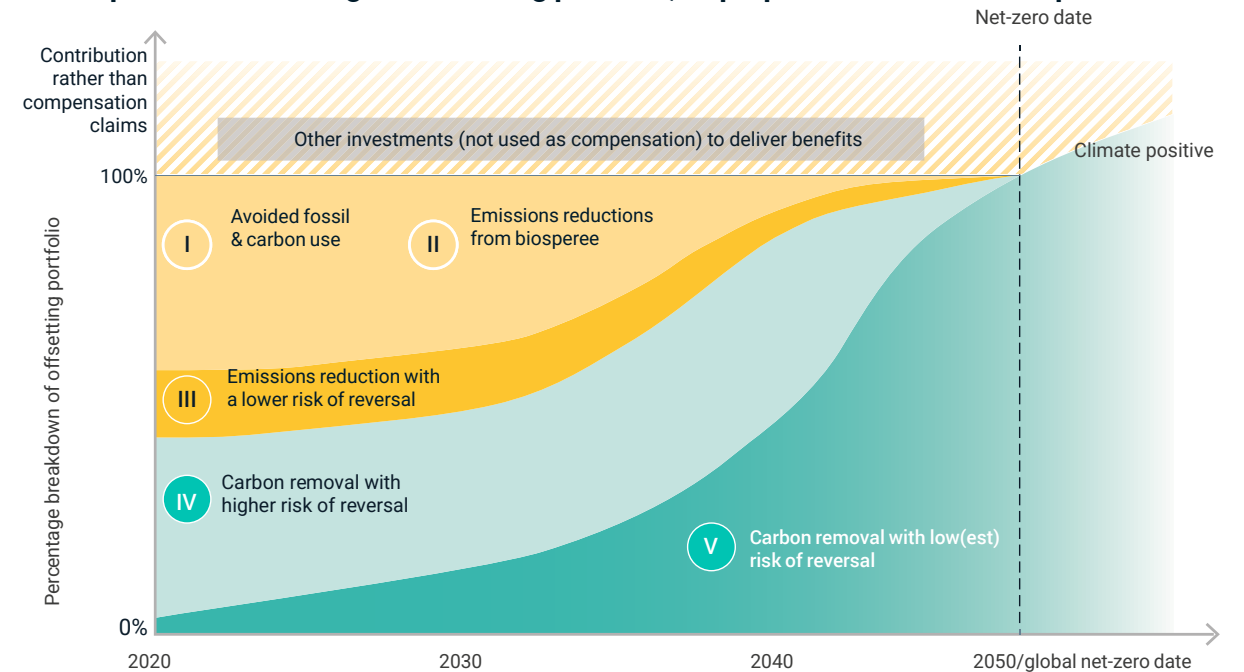
While there is a clear consensus that companies should use high-quality carbon credits, definitions and standards can differ significantly. The SBTi, for example, defers this question to the VCMi.<sup>80</sup> The VCMi explicitly endorses the use of the ICVCM's CCP label as a quality benchmark.<sup>81</sup> Other standards will likely reference the ICVCM but have yet to do so given the newness of the ICVCM's CCP-labels.<sup>82</sup>

Some regulators, most noticeably in the EU, have also started to set their own standards for carbon credit quality.<sup>83</sup> For airlines participating in CORSIA, the question of what credits are acceptable is a bit more straightforward, as CORSIA itself has set detailed guidelines on exactly what credits are permissible.<sup>84</sup>

Beyond quality benchmarks, companies must also consider whether they use reduction or removal (nature-based or technology-based) and project-based or jurisdictional-based credits. There is widespread agreement that only removal credits should be used in support of a net-zero claim. Aside from that, however, a clear consensus has yet to emerge on what types of credits should otherwise be used. While some stakeholder groups can vocally advocate for one or the other, it is likely all credit types will be needed at scale in a successful global transition.

The Oxford Principles for Net-Zero Aligned Offsetting represent one well-regarded standard.<sup>85</sup> They suggest that a portfolio of credits for a company on the path to net-zero could shift over time from credits that reduce emissions, largely through nature-based projects. The share of removals would increase over time as removal technologies develop and scale.

### Example of net-zero-aligned offsetting portfolio, as proposed in Oxford Principles



Companies may also want to consider whether to use carbon credits that have a CA. CAs are a requirement for carbon credits approved for use within CORSIA and are likely to also be so for companies looking to use international credits within a compliance scheme. While a CA is generally not required for corporate use of voluntary carbon credits, some NGOs, including Gold Standard and Carbon Market Watch, recommend their use because a CA, in theory, helps to stretch governmental climate ambitions.<sup>86</sup>

<sup>80</sup> "SBTi does not have plans to validate BVCM claims, particularly given that others are already working to define BVCM-related claims, including the Voluntary Carbon Market Integrity Initiative (VCMi)." Source: "Above and Beyond: An SBTi report on the Design and Implementation of Beyond Value Chain Mitigation (BVCM)," Version 1.0, SBTi, February 2024.  
<sup>81</sup> "Claims Code of Practice," Voluntary Carbon Markets Initiative, June 27, 2023.  
<sup>82</sup> "Integrity Council announces first high-integrity CCP-labelled carbon credits, as assessments continue," The Integrity Council for the Voluntary Carbon Market, June 6, 2024.  
<sup>83</sup> "EU Carbon Removals and Carbon Farming Certification Regulation," European Commission, April 10, 2024.  
<sup>84</sup> "CORSIA Emissions Unit Eligibility Criteria," International Civil Aviation Organization, March 2019.  
<sup>85</sup> "Oxford Principles for Net-Zero Aligned Carbon Offsetting (revised 2024)," University of Oxford, February 2024.  
<sup>86</sup> "CORSIA Eligible Emissions Unite Programme Change Notification Form," Version 2.0, International Civil Aviation Organization, Jan. 10, 2022. See also "A practitioner's guide: Aligning the Voluntary Carbon Market with the Paris Agreement test," Gold Standard, June 21, 2024.

## When, and how, to buy credits?

Companies have traditionally purchased carbon credits on the spot market, often over the counter, via an intermediary such as a broker. This remains the most common means for corporations to buy credits.

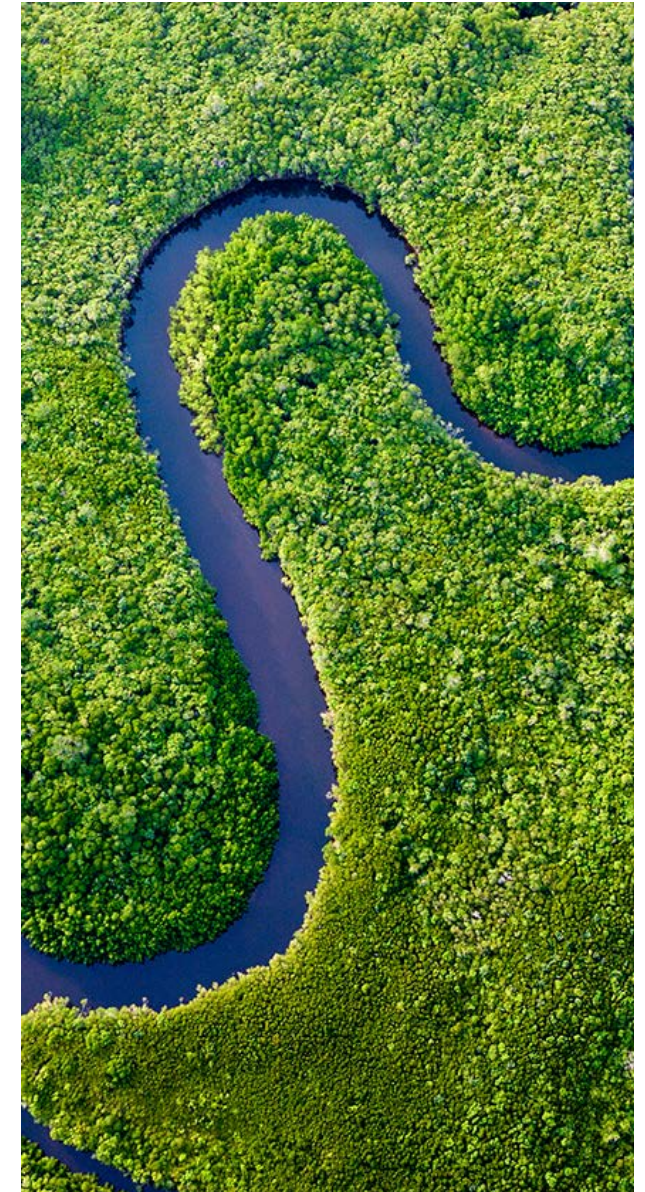
At the same time, companies increasingly have more options. Some companies, for example, are now looking to invest directly in developing carbon credit projects or to purchase credits that are issued for anticipated reductions via long-term offtake agreements.<sup>87</sup> While such investments give companies greater control over quality standards, and potentially access to a lower price point, they also raise delivery risk and increase transaction complexity. Other companies are using the large number of marketplaces and/or carbon credit exchanges that have emerged in recent years. A number are also further simplifying their purchases of carbon credits by using standardized contracts, although the use of such instruments remains limited.<sup>88</sup>

## What claim(s) can be made?

Exactly what claims a company can make when using carbon credits is an area of continuing uncertainty.

Traditionally, companies using carbon credits have claimed they offset their own emissions and hence are having a carbon-neutral impact. As detailed earlier, however, such claims are now the subject of substantial scrutiny and are falling out of use. Though the term net-zero remains widely supported, its use would require a company to first make a scientifically valid claim of net-zero, which appears to be unlikely for many years.

As an alternative, the VCMi has introduced its own Claims Code of Practice, and within that has proposed three claims tiers (platinum, gold, silver) depending on the volume of credits retired.<sup>89</sup> The SBTi has focused on supporting companies in making BVCM claims, within which it endorses the VCMi as a possible claim type.<sup>90</sup> Various alternatives have been put forward by other stakeholder groups, including claims of “climate contribution,” “carbon compensation” and “funding climate action.”<sup>91</sup> The EU has taken steps to ban companies from claiming that the purchase of carbon credits makes their products carbon neutral.<sup>92</sup>



<sup>87</sup> “New Research Finds Investment into Carbon Projects Totals More than \$36 billion since 2012 with another \$3 billion in Future Investment Already Committed,” International Emissions Trading Association, Sept. 14, 2023.

<sup>88</sup> “IETA Publishes Trading Documents for Carbon Reductions and Removals,” International Emissions Trading Association, July 2, 2023.

<sup>89</sup> “Claims Code of Practice,” Voluntary Carbon Markets Integrity Initiative, v. 2, November 2023.

<sup>90</sup> “Above and Beyond: An SBTi Report on the Design and Implementation of Beyond Value Chain Mitigation,” Version 1.0, SBTi, February 2024.

<sup>91</sup> “A Guide to Climate Contributions: Taking Responsibility for Emissions without Offsetting,” New Climate Institute, July 5, 2023.


<sup>92</sup> “Green claims’ directive: Protecting consumers from greenwashing,” Think Tank, European Parliament, May 3, 2024.

## What needs to be disclosed?

Historically, disclosure of carbon credit use has not been mandatory, although most companies have, in practice, disclosed at least some details.

Nearly all new voluntary standards and government regulations, however, require companies that are using or planning to use carbon credits to disclose the details.

At a high level, countries that are mandating disclosure are asking companies to provide information that focuses on the quantity of credits used, their type and location, and information about their standards, accreditation and/or integrity. Details, however, differ. Adding to the complexity, many regulations use terminology unfamiliar to carbon-market participants or create ambiguity when referring to registries and integrity criteria.<sup>93</sup>

		Disclosure standard			Emissions & targets	Retirement quantity		Financials	Project details			Standards and integrity		
Standard setter (link)		Scope	Effective	Historic		Planned	Cost	ID	Type	Location	Registry	Accreditation	Integrity	
EMEA		EU	Large entities (investors, listed companies & SMEs)	From 2024	●	●	●		●	●	●	●	●	
		UK	TBD	TBD	●	●	●		●		●	●	●	
Americas		Canada	TBD	From 2025	●		●		●		●		●	
		California	Entities doing business in California	From 2025	●			●	●	●	●	●		
		USA	Listed companies	From 2026	●	●		●	●	●	●	●		
		Brazil	Listed companies & investment funds	From 2026	●		●		●		●		●	
APAC		Hong Kong	Listed entities	From 2025	●		●		●		●		●	
		Australia	Large entities	TBD	●		●		●		●		●	
		Singapore	TBD	TBD	●		●		●		●		●	
		Japan	TBD	TBD	●		●		●		●		●	
		Korea	TBD	TBD	●		●		●		●		●	
Voluntary		ISSB	Guidance for national regulators	From 2023	●		●		●		●		●	
		TPT	Guidance for national regulators	From 2023	●	●	●		●		●		●	
		VCM	Voluntary standard for credit-related claims	From 2024	●	●	●		●		●		●	
		SBTi	Voluntary guidance for using credits in BVCM	From 2024	●	●	●		●		●		●	
MSCI Carbon Markets					●	●	●	●	●	●	●	●	●	

## What needs to be disclosed?

Disclosing the quantity of retired credits allows stakeholders to assess the extent to which credits are used within a company's climate claim or targets and form part of its expenditure on climate mitigation. Rules finalized by the U.S. Securities and Exchange Commission, for example, require companies to disclose the value of credits expensed and capitalized, where financially material.<sup>94</sup>

Different regulations have taken diverse approaches on even simple-sounding requirements such as the volume of credits retired. Some require companies to disclose current credit use while others ask for planned use of credits. The challenge with the latter is that few companies will be able to say with confidence what credits they plan to retire over long time horizons — at best they might know a target volume and be able to make a high-level commitment to quality and certain credit types.

Beyond credit quantities, disclosure of the project type is often requested because it can be seen as a good indicator of its expected permanence and co-benefits. Similarly, disclosure of a project's location is an important factor in considering its contribution to the host country's national ambition, national accounting and inherent political risk. Disclosure of the certification and integrity of the credits helps in assessing the environmental credibility of the activity and other factors, such as human-rights impacts and legal and ethical safeguards.

**More information**

➤ Read more about carbon credit disclosures [here](#).



<sup>94</sup> "The Enhancement and Standardization of Climate-Related Disclosures for Investors," U.S. Securities and Exchange Commission, March 6, 2024.

## How MSCI Carbon Markets supports companies

Our data and analytical tools help leading companies navigate the carbon credit market successfully. In particular, we help carbon-credit buyers:

- Determine what role carbon credits should play in climate strategy.
- Benchmark climate and carbon-credit strategies against peers.
- Monitor carbon-credit supply, demand and pricing market dynamics.
- Identify the types of carbon credits to purchase today or invest in for the future.
- Reduce reputational risks and enhance the positive impact of credit purchases.
- Ensure value-for-money for credit purchases today and estimate likely future costs.
- Simplify efforts to complete carbon-credit disclosure requirements.
- Adapt to evolving carbon-market policies, regulations and standards.

### More information

➤ See how we can support your climate strategy. [Book a demo.](#)



# Investor use of carbon credits



# Use of carbon credits by investors

Owners and managers of assets are increasingly integrating data from carbon markets into their climate analysis. Their participation in the market can take several forms.

## Assessing climate progress by portfolio companies

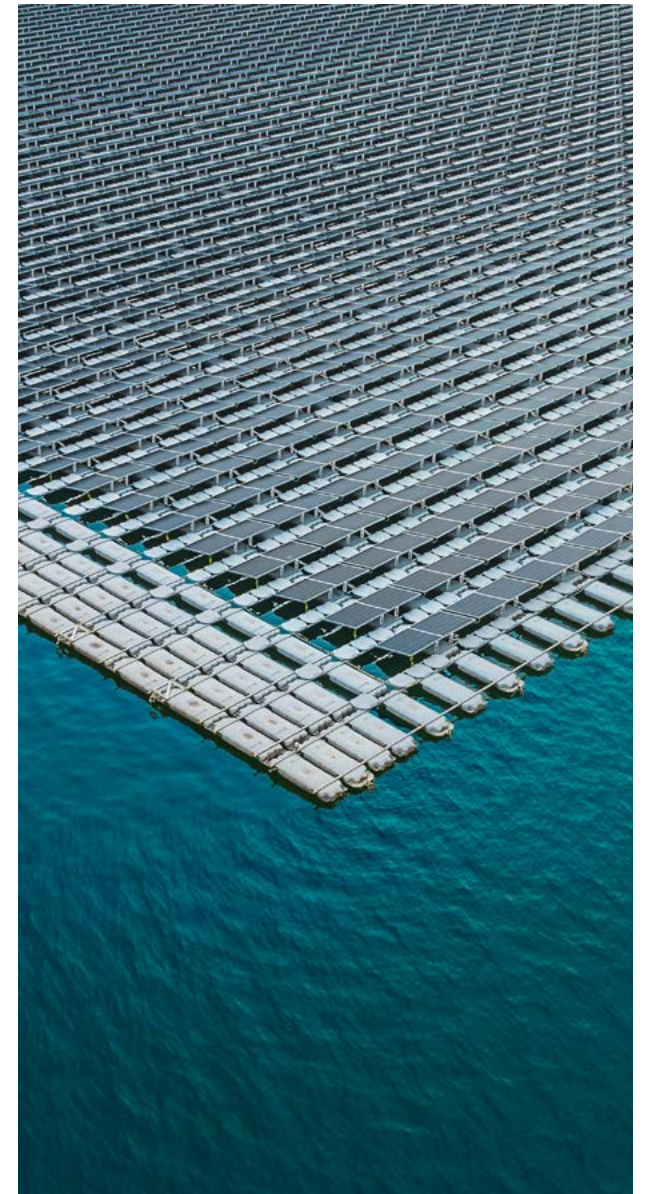
Evaluating the use of carbon credits by portfolio companies can equip investors with a clearer view of a company's climate progress and ambition. That includes examining purchases of carbon credits by portfolio companies to understand their net impact on emissions and assessing risks based on the quality of credits that companies purchase.

Some investors are also starting to quantify the potential impact of future changes in the supply or price of carbon credits on portfolio companies and, in turn, their portfolio as a whole. This information can help investors assess their vulnerability to such changes and the potential to mitigate the risk through hedging.

## Investing directly in carbon-credit-producing companies

The anticipated rise in demand for high-quality credits may present investment opportunities. Investors often consider using investments in carbon-credit-producing assets for diversification purposes, given that, in theory, many of the return drivers from carbon credits differ from other more-traditional asset classes.<sup>95</sup>

The market is of particular interest to investors in natural capital. Investors in land such as timber or forests, for example, may find that the capacity to generate carbon credits from those assets has the potential to improve risk-adjusted returns. An estimate by Nuveen based on carbon credit prices at the end of 2022, for example, found that incremental returns from the sale of carbon credits from U.S. timberland ranged by up to about 250 basis points, on average.<sup>96</sup> The analysis notes that managing for carbon does not necessarily diminish the value of commercial timber or farmland.



<sup>95</sup> MSCI Carbon Markets  
<sup>96</sup> Gwen Busby and Skye Macpherson, "An introduction to carbon markets for land-based investments," Nuveen Natural Capital, June 2022.

## Case study

### How AXA IM Alts is financing ecosystem conservation via the carbon credit market

AXA IM Alts launched a Natural Capital impact investment strategy in 2022.<sup>97</sup> The fund finances development of carbon-credit-generating projects that aim to protect and restore natural capital such as forests, mangroves and peatlands.

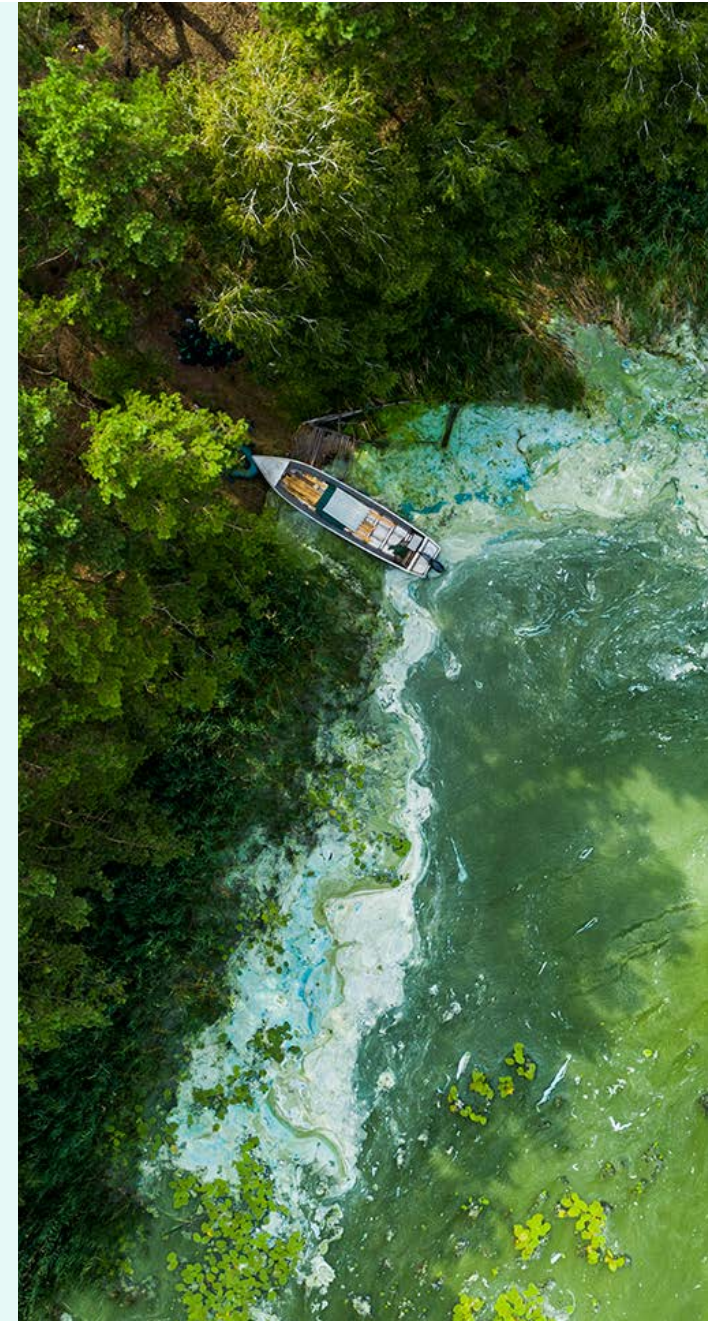
With USD 500 million of committed capital, as of Dec. 31, 2023, AXA IM Alts' natural capital investment fund aims to ensure the conservation, protection and restoration of natural capital and biodiversity.<sup>98</sup> The investment includes initiatives such as afforestation, restoration and avoided deforestation that can be measured through the production of carbon credits, with the aim of sequestering or avoiding 25 million tonnes of CO<sub>2</sub> annually.

"Our strategy is to take stakes in developers and projects that create emissions reductions and environmental benefits," Adam Gibbon, natural capital investment lead at AXA IM Alts, told MSCI's "Perspectives" podcast (listen [here](#)). "We're working with developers that we hope will become the next big companies in landscape restoration and sustainable management."

Gibbon cites the fund's investment in Mombak, a nature-based carbon removals startup focused on restoring deforested areas in the Brazilian Amazon, as an example.<sup>99</sup> Mombak buys or leases degraded pastureland, which it converts to conservation forests that are managed for 50 years before being legally converted to protection forests.

Mombak's first project, Turmalina, launched in April 2023, comprises the reforestation of a nearly 2,900-hectare farm forecasted to remove up to 1.5 million tonnes of CO<sub>2</sub> from the atmosphere while contributing to the protection of endangered species and generating jobs for the local population. Both Microsoft and McLaren Racing have agreed to purchase carbon removal credits from the project.<sup>100</sup>

Gibbon says he's bullish about the growth of the voluntary carbon market, citing scenario analysis from MSCI Carbon Markets showing that the market could grow by up to 38 times by 2050. "We're still very much in the foothills of where this is going," he suggests, noting both the role of carbon markets in meeting global climate targets and the importance of industry-wide initiatives to improve carbon credit quality. One of the most powerful tools for changing the way the economy works is a price on carbon," he adds. "We're really just at the beginning."



<sup>97</sup> "AXA IM Alts expands Natural Capital platform with the launch of a €500m strategy and strategic appointments," AXA Investment Managers, Sept. 21, 2022.

<sup>98</sup> "Investing for People and Planet, Impact Investing – Private Markets 2023 Annual Review," AXA Group, June 6, 2024.

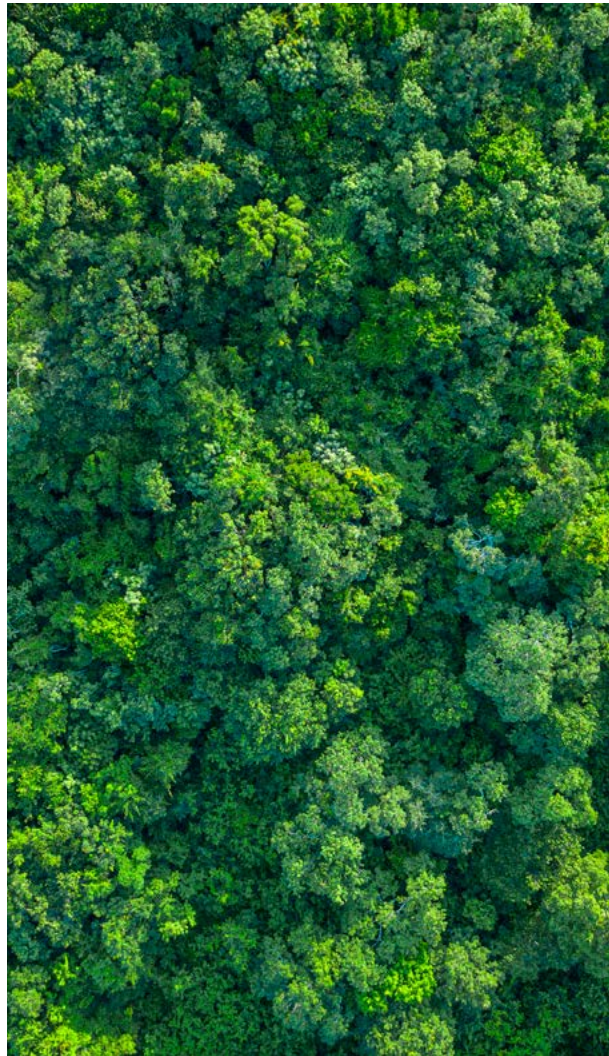
<sup>99</sup> Gabriel Araujo, "AXA fund to invest \$49 million in Brazil reforestation projects," Reuters, July 18, 2023.

<sup>100</sup> See Peter Millard, "Microsoft Goes Big In Brazil's Voluntary Carbon Credit Market," Bloomberg, Dec. 5, 2023, and Gabriel Araujo and Alan Baldwin, "McLaren buys carbon credits in quest for Net-Zero," Reuters, Nov. 30, 2023.

## Trading carbon credits

A growing number of financial institutions support the trading of carbon credits.<sup>101</sup> Such activities can open the market to participation by a broader cross-section of participants and help to channel capital toward decarbonization. Banks' commodities-trading businesses are also increasingly active in the voluntary carbon market.<sup>102</sup>

Banks and other financial intermediaries are increasingly seeking to provide advice that supports their clients' strategies for transitioning to a greener global economy, which can include buying or creating carbon credits.<sup>103</sup> Banks also facilitate transactions between developers of carbon projects and clients who are looking to finance such projects.<sup>104</sup>



## Using carbon credits in a fund's or investor's own climate strategy

Some investors are creating new climate-oriented funds that use carbon credits in innovative ways. Uses range from credits being purchased alongside a fund to offset the fund's financed emissions, to providing a fund's investors with carbon credits in lieu of a financial dividend, to forming part of the asset base of a fund that is subject to an explicit emissions reduction or removal target.

More generally, many investment managers use carbon credits as part of their corporate climate strategy. The SBTi's Financial Institutions Net-Zero Standard, which the initiative has said it anticipates finalizing this year, is expected to include criteria against which the SBTi will validate the climate commitments, including the use of carbon credits, of asset owners and managers, banks, insurers and other institutional investors.<sup>105</sup>

Like the SBTi's corporate net-zero standard, a draft of its standard for financial institutions proposes that institutions reduce financed emissions by approximately 90% in their long-term target before neutralizing any residual emissions at the target year. The draft standard would prevent financial institutions from including in their emissions inventories carbon credits purchased by portfolio companies.

The SBTi has proposed two methods for use by financial institutions in neutralizing residual portfolio emissions at the net-zero target year. One would require them to invest in carbon-negative companies that generate verified carbon removal credits and retire the credits they issue on behalf of the portfolio emissions rather than sell the credits. The second method would authorize financial institutions or their portfolio companies to use verified carbon removal credits outside of their portfolio to neutralize residual emissions. The SBTi is seeking feedback on whether financial institutions should be given the second option.

<sup>101</sup> "Carbon Market Principles," JPMorgan Chase & Co., 2023.

<sup>102</sup> "Managing our Transition to a Sustainable Future," 2023 Task Force on Climate-related Financial Disclosures Report, Bank of America, November 2023.

<sup>103</sup> "Approach to Zero: Our commitment to helping finance the transition to Net-Zero before 2050," Bank of America, April 2022.

<sup>104</sup> "Leveraging markets for the green push," Standard Chartered, June 17, 2022.

<sup>105</sup> "The SBTi Financial Institutions Net-Zero Standard, Conceptual Framework and Initial Criteria," Consultation Draft V0.1, SBTi, June 2023. See also "Financial Institutions Net-Zero Standard, Consultation Draft V0.1," July 2024.

## Fulfilling reporting requirements

Like companies, investors increasingly face new climate-related disclosure requirements. Investors located or operating in the EU will need to comply with the Corporate Sustainability Reporting Directive (CSRD), which asks companies and investors to undertake best efforts to disclose carbon credits used across their supply chain and portfolios, where material.<sup>106</sup>

The same may be the case with planned updates to the 2019 EU Sustainable Finance Disclosure Regulation (SFDR). A draft update could introduce provisions for some funds that promote social or environmental characteristics or have sustainable investments as their objective to report the volume and other details of credits retired in relation to a financial product, including those used by investee companies.<sup>107</sup>

Aggregating this information portfolio-wide may present challenges, such as data availability and standardization, but also can deepen insight into an investor's exposure to carbon markets and certain transition risks. In considering such provisions, EU regulators have advised investors to seek support from third-party data providers.

### More information

- MSCI has launched a CSRD-aligned solution (see [here](#)) that can help investors address the complexities of CSRD reporting, including the use of carbon credits.



<sup>106</sup> "European Sustainability Reporting Standards," Commission Delegated Regulation (EU) 2023/2772, Official Journal of the European Union, Dec. 22, 2023.  
<sup>107</sup> "Final Report on draft Regulatory Technical Standards," Joint Committee of the European Supervisory Authorities, Dec. 4, 2023.

## How MSCI Carbon Markets supports investors

We've developed a full suite of so investor-grade data and analytics to help investors and financial institutions navigate the carbon credit market.

Forward-looking owners and managers of assets, banks and insurers use our data and analytics to deepen insight into use of carbon credits by companies across their portfolios and loan books, to determine how carbon credits can be incorporated into their strategies and to evaluate investment opportunities. We also help clients optimize their own use of carbon credits as part of their fund or corporate climate strategy.

Our data and analytics can help you...

- Understand and track portfolio and company use of carbon credits.
- Obtain a more complete picture of corporate climate performance and ambition.
- Analyze potential reputational risks faced by investible companies in their use of credits.
- Quantify carbon-credit liabilities at the company and portfolio level.
- Support disclosures for the reporting on portfolio-company use of carbon credits.
- Assess new market opportunities arising from growth in the carbon market.
- Determine how carbon credits could support the fund's and/or investor's own climate strategy.
- Identify and purchase high-integrity, cost-effective carbon credits to fulfill fund's or investor's own climate claims.

### More information

➤ To learn more about investor-grade carbon market data and analytics available from MSCI Carbon Markets. [Contact us.](#)



# What's next



# What's next

To resolve the climate crisis, we'll need all the tools we can get. Reaching net-zero in line with science-based pathways for preventing the worst impacts of global warming will demand that society accelerates efforts to prevent greenhouse gases from going into the atmosphere while removing emissions that are in it already. Trading of carbon is poised to play an increasingly pivotal role in speeding up net reductions of global emissions at the lowest cost, helping to spur economic development and conserve land, natural resources and biodiversity.

Carbon markets can help to drive decarbonization, provided that participants come to know them as a wellspring of credible climate action. A series of industry-wide initiatives spearheaded by independent groups and designed to strengthen standards and improve accountability are underway, fueled by demand for credibility from stakeholders and a ratcheting up of climate ambition. Thanks to such efforts, conditions for carbon markets grounded in integrity and designed to meet objectives are now coming into view.

## More information

➤ Want to learn more about how MSCI can help you navigate today's carbon markets? [Contact us.](#)



# Essential terms

Carbon markets have their own lexicon. We've set out below a few of the most commonly used terms.

Markets	
<b>Voluntary carbon market (VCM)</b>	A mechanism that provides a means for companies to voluntarily meet their own climate commitments by purchasing carbon credits to offset all or part of their emissions. Credits are generated by projects that take place outside a regulated market.
<b>Compliance carbon market</b>	A jurisdictional carbon-pricing system, carbon pricing systems, including emissions trading schemes and carbon taxes. Participation is mandatory for covered entities, and failure to comply results in penalties.
<b>Emissions trading scheme (ETS)</b>	A form of compliance market. Most ETS are so-called cap-and-trade, meaning they require participants to surrender carbon allowances equivalent to their emissions. There is also a so-called baseline ETS, where participants are required to meet emissions-reduction targets that they can earn tradeable credits for outperforming.
<b>CORSIA</b>	A forthcoming global compliance market for the aviation sector, currently in its voluntary pilot phase. The mandatory second phase is scheduled to begin in 2027, requiring airlines to submit carbon accounting and compensate emissions increases with CORSIA-eligible carbon credits.

Article 6	
<b>Article 6</b>	A section of the Paris Agreement that enables countries to use carbon trading as part of their achieving their national climate targets (known in the agreement as nationally determined contributions, or NDCs). It establishes two mechanisms for this purpose: Articles 6.2 and 6.4.
<b>Article 6.2</b>	Allows countries to trade mitigation outcomes bilaterally, using existing domestic and international carbon standards. The first transaction was completed in December 2023, when Switzerland purchased carbon credits from Thailand.
<b>Article 6.4</b>	Establishes a new international carbon crediting mechanism governed by the United Nations Framework Convention on Climate Change (UNFCCC).
<b>Internationally Transferred Mitigation Outcome (ITMO)</b>	The equivalent of a carbon credit under Article 6.2. ITMOs can be transferred from one national carbon registry to another, allowing the recipient to use them toward their NDC target.
<b>Corresponding adjustment (CA)</b>	An accounting measure to prevent double counting. When a country transfers an ITMO into another country's registry under Article 6.2, it must add a corresponding amount of emissions in its own carbon accounting. CAs could also be applied to credits that will be used for voluntary purposes.
<b>Authorization</b>	A prerequisite to using credits toward NDC targets by which participating, participating governments must authorize transactions under Article 6. In practice, this means applying corresponding adjustments, and ensuring that the transfer and use of credits is registered and reported appropriately.

## Carbon credit basics

<b>Carbon credit</b>	A tradeable certificate representing the prevention or removal of one metric tonne of carbon dioxide-equivalent emissions from being put into the atmosphere.
<b>Credit issuance</b>	The process of creating a carbon credit based on a verified emissions reduction activity over a period of time. Issued carbon credits are recorded in registries run by third-party certification bodies.
<b>Credit cancellation</b>	The removal of carbon credits from circulation within a compliance carbon market, such as in the European Union, California or South Korea.
<b>Credit retirement</b>	The removal of issued carbon credits from circulation so that they are unable to be used again. Retired carbon credits are mostly used against voluntary corporate climate claims.
<b>Credit surplus</b>	The cumulative total of issued credits less retirements and cancellations.
<b>Credit vintage</b>	The year in which the verified emissions that a carbon credit represents occurred.

## Projects

<b>Project</b>	An activity designed to generate carbon credits by avoiding or removing emissions. To issue credits, a project must be registered under a carbon standard. MSCI Carbon Markets classifies projects by eight types, ranging from nature restoration to renewable energy.
<b>Developer</b>	An individual, organization or government that develops carbon-credit projects and supplies the credits associated with them to the marketplace.
<b>Carbon Industry Classification System (CICS)</b>	A framework for categorizing types of carbon crediting projects, developed by Trove Research (now MSCI Carbon Markets).
<b>Registries</b>	Bodies that register projects, issue credits and record transactions. The largest registries in the voluntary carbon market are Verra, Gold Standard, Climate Action Reserve (CAR) and American Carbon Registry (ACR). Carbon standards establish their own methodological and integrity requirements.
<b>Methodology</b>	Establishes the implementation conditions for a certain type of carbon project, such as REDD+. A methodology document defines the parameters for quantifying emissions outcomes, as well as other conditions, such as social safeguards that must be in place.
<b>Validation</b>	Carbon projects must undergo validation as a prerequisite for registering under a carbon standard. Validation entails an assessment of the proposed project's compliance with the relevant methodological and integrity requirements for that project type.
<b>Verification</b>	Carbon projects must undergo verification, which assesses emissions outcomes achieved in the crediting period, as a prerequisite for issuing credits.
<b>Validation and verification bodies (VVBs)</b>	Many carbon standards outsource the validation and verification processes to certified third-party auditors. These auditors are commonly known as VVBs.

Integrity	
<b>Additionality</b>	A determination of whether carbon credits represent the prevention or removal of emissions that would not have occurred without the carbon project they represent.
<b>Core Carbon Principles (CCPs)</b>	Ten principles for high-integrity carbon credits created in 2023 by the Integrity Council for the Voluntary Carbon Market .
<b>Co-benefit</b>	A determination that a carbon credit project has a positive impact beyond emissions outcomes. Projects are increasingly expected to deliver community and biodiversity co-benefits and prevent any harms thereof, as demonstrated by the inclusion of social and environmental safeguards in the CCPs
<b>Leakage</b>	The risk that emissions avoided by a carbon-credit project simply shift to another location.
<b>Permanence</b>	The mitigation activity covered by the carbon credit cannot be reversed, or where there is a risk of reversal (such as, for example, a forest covered by credits burning down), the project developer has measures in place to address the risk or compensate the buyer accordingly.

Credit use and related claims	
<b>Remaining emissions</b>	Value chain emissions that are either currently unabated or projected future emissions.
<b>Residual emissions</b>	The portion of remaining emissions that is hard to abate for financial or technical reasons and that may be addressed through offsetting.
<b>Mitigation hierarchy</b>	The principle that direct decarbonization should take precedence over the use of carbon credits; that is, credits should be used to compensate a small portion of remaining emissions or residual emissions only. Accepted as consensus in the VCM, but interpretations of credit-use thresholds vary.
<b>Offsetting</b>	The use of carbon credits to compensate, tonne-for-tonne, for emissions within a company's value chain.
<b>Insetting</b>	The use of carbon credits generated within a company's value chain to compensate emissions in another part of its value chain.
<b>Neutralization</b>	The use of removal-based carbon credits to counterbalance residual emissions and reach net-zero at the end of a corporate decarbonization pathway.
<b>Beyond value chain mitigation (BVCM)</b>	Actions or investments by a company to reduce emissions outside of its value chain. The actions can include the purchase of carbon credits.
<b>Compensation claims</b>	A statement by a company that it has retired carbon credits to compensate for some or all of its emissions, typically done on a tonne-for-tonne basis.
<b>Contribution claims</b>	A statement by a company that it has retired carbon credits in contribution to mitigating climate change. Typically a claim made without reference to a company's own value chain emissions.



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