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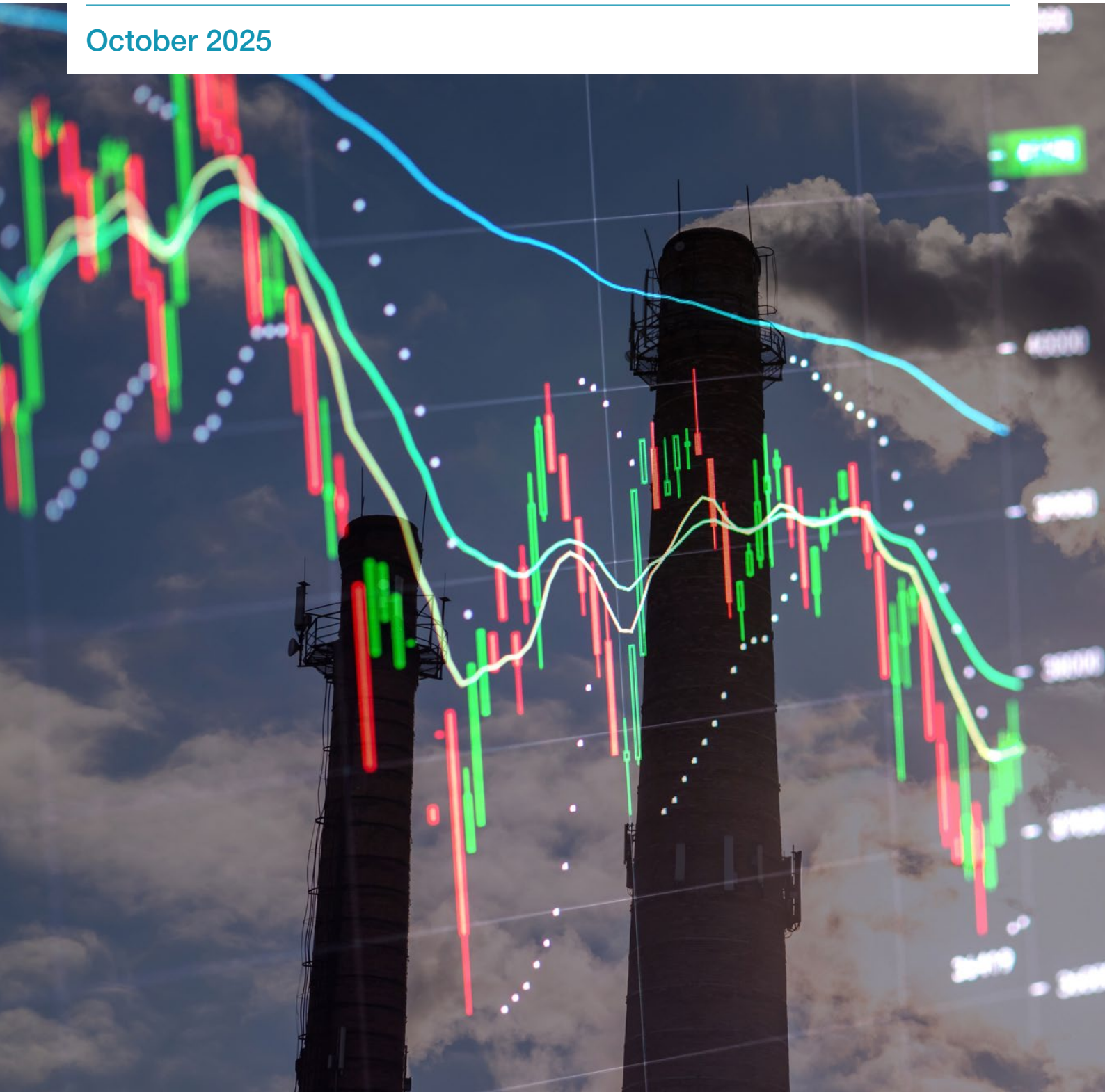
Understanding the opportunity from carbon markets for sustainable finance and the wider market

October 2025



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Executive Summary

Carbon markets contribute significantly to the reduction of global greenhouse gas emissions. These markets incorporate regulatory-driven national and regional compliance markets which trade carbon allowances alongside international voluntary markets that involve carbon offsets. Both have created opportunities for the financial markets in trading and risk management, and represent a nascent opportunity for sustainable finance, particularly in the sustainable bond market.

Compliance carbon markets (CCMs) are the dominant force with near USD 950 billion of traded allowances in 2024, covering over a quarter of global emissions. These regulated systems—primarily structured around cap-and-trade—are expanding globally, led by the European Union Emissions Trading System (EU ETS), North American systems, and China's ETS, with additional markets under development notably in India, Japan and Turkey. The EU's Carbon Border Adjustment Mechanism (CBAM) is expected to accelerate international adoption of compliance systems by incentivising EU trading partners to introduce them.

Voluntary carbon markets (VCMs), though much smaller (USD 535 million of traded carbon offsets in 2024), offer global reach and flexibility but face persistent credibility challenges. Initiatives such as the Integrity Council for the Voluntary Carbon Market (ICVCM), the Voluntary Carbon Markets Integrity Initiative (VCMI), and IOSCO's Good Practices are working to strengthen integrity and standardisation. It is, however, hybrid markets, mainly the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) implemented by the International Civil Aviation Organisation (ICAO), a United Nations agency, that largely provide the demand for carbon offsets.

For sustainable finance, the recognition and role of carbon offsets remain limited. International standards such as the Science Based Targets initiative (SBTi), as well as ICMA's Climate Transition Finance Handbook, restrict offsets primarily to residual emissions, limiting their use in transition targets. Nonetheless, innovative structures are emerging, such as World Bank "outcome bonds" that link returns to the value of generated carbon credits.

The most significant near-term financial opportunity lies in risk management and secondary trading within compliance markets. The EU ETS alone generated EUR 648 billion in secondary trading in 2023, largely through derivatives. As more jurisdictions establish compliance markets, carbon derivatives and trading platforms are poised for substantial growth, attracting banks, investors, and other financial institutions.

In conclusion, voluntary markets may benefit from further progress on integrity and recognition to grow, but in the near to medium term they will remain dependent on whether CORSIA moves to its planned second and mandatory phase. The intersection with sustainable finance represented by outcome bonds is innovative but may not be scalable. From a financial market perspective, it is therefore compliance markets and their international expansion that represent the real opportunity centred on risk management and derivatives trading of carbon allowances.

Introduction

ICMA recognises that carbon markets have significant potential to reduce global carbon emissions. At the same time, the structure and interplay of compliance markets, carbon tax regimes, and voluntary markets have become increasingly complex and continue to evolve. While the carbon markets support an active trading and risk management market, they have for the most part operated independently from the debt capital market, although there are nascent connections with the sustainable bond markets.

This study is not intended to be a comprehensive overview of carbon markets, but rather an introduction to aspects of the carbon markets which may be relevant to sustainable finance and the wider market. We first review some of the basic concepts, structural features, and dynamics of the compliance and voluntary carbon markets. We then consider the potential impact of the application of the Paris Agreement, the EU's Carbon Border Adjustment Mechanism and possible greater recognition of carbon offsets.

We highlight the wider opportunity represented by carbon markets especially the expected international development of compliance markets. We then focus on sustainable bond guidance relating to carbon credits, where it exists, and the scope for innovation resulting from the generation of carbon credits by projects financed by use-of-proceeds instruments.

1 What are Carbon Markets?

Carbon credits are an umbrella term covering both “carbon allowances” and “carbon offsets”. Each credit typically represents one tonne of carbon dioxide equivalent (CO_2e).

Carbon allowances are permits that authorise the emission of a specific amount of carbon dioxide and trade in official compliance markets. These markets are driven by regulatory frameworks that set mandatory emissions limits for certain industries and allow the purchase of carbon allowances to reduce effective emissions for those who may have exceeded these limits.

Carbon offsets are created as a result of a carbon reduction or sequestration project. They are governed by voluntary rules and trade in international markets. These markets are mainly driven by corporates and financial institutions who wish to reduce their emissions as much as possible voluntarily, to meet targets under their own internal environmental policies and climate transition plans.

It is important to underline that “hybrid” markets have also emerged. These are known as “compliance offset (or credit) markets” which include elements of both compliance and voluntary markets as these are legally binding but involve the use of carbon offsets rather than allowances.

1.1 Compliance Markets

1.1.1 Cap-and-trade

Compliance carbon markets (CCMs) are regulated trading systems. Companies from specified sectors, usually those with high carbon emissions, are legally obligated to offset their greenhouse gas (GHG) emissions by acquiring carbon allowances or credits.

Most compliance markets operate under a cap-and-trade framework, in which regulators impose a maximum limit, or cap, on the total carbon allowed to be emitted within a specific jurisdiction or sector. This cap is ideally reduced over time.

In cap-and-trade systems, carbon allowances are distributed through either auctions or free allocations. In auction systems, businesses must buy allowances directly. In contrast, free allocations provide no-cost emissions permits to emission-intensive industries, and entities emitting less than their allocated allowances may sell their surplus allowances to those exceeding their limits.

Both mechanisms create financial incentives for businesses to reduce emissions. Firms that emit less either reduce the required purchases of allowances or are able to sell surplus allowances. Those exceeding limits must buy additional allowances or face penalties.

The supply of allowances tradable in the market, and the demand for additional allowance, will be directly related to the cap on emissions set by the relevant rules. Therefore, careful calibration of the emissions thresholds is essential to create a well-functioning market. A threshold that is too high will result in a market with no carbon credit buyers and little incentive to reduce emissions. A threshold that is too low will result in a scarcity of credits and potentially inhibit production and investment.

1.1.2 Main markets

The global compliance markets are fragmented, each with their own range of industries covered and their own operational mechanisms. Perhaps most fundamentally, as a general matter a carbon credit created in one market cannot be used to offset emissions in another market (though there are some exceptions, as noted below).

The total value of traded CO_2 permits in compliance markets internationally reached an estimated USD 947 billion in 2024[1], covering over a quarter of global GHG emissions[2]. There are currently over 30 compliance carbon markets[3] operating globally. The most significant markets are outlined below.

- **European Union Emissions Trading System (EU ETS)**

  The EU ETS is the world's largest compliance carbon market, accounting for 85% of the global value[4]. It covers the power, industrial, and aviation sectors. The EU ETS is based on a "cap and trade" principle. The cap refers to the limit set on the total amount of GHG that can be emitted by installations and operators covered under the scope of the system. This cap is reduced annually in line with the EU's climate target, ensuring that overall EU emissions decrease over time. Since its launch in 2005, the system has contributed to a 43% reduction in emissions from power generation and energy-intensive industries, which together account for around 40% of the EU's total GHG emissions. From 2025, planned reforms are expected to significantly tighten the emissions caps under the EU ETS.

- **North America**

  The California Cap-and-Trade Program establishes a statewide cap and a system for trading allowances. It includes major sectors such as heavy industry, electricity generation, and fuel distribution. Since 2014, California and Quebec allow mutual recognition of carbon credits, which effectively enables companies in one market to purchase and use credits from another, helping to unify standards and pricing and create a larger, more liquid market. In 2024, Washington state also announced a plan to join the California and Quebec linkup in carbon markets. Collectively these North American emissions trading systems represents 11% of the global market in terms of traded value[5].

- **China's National ETS**

  Launched in 2021, China's National ETS is expected to now cover around 3,700 covered entities, equivalent to approximately 15% of global emissions[6]. Carbon credits trading in China represented however less than 1% of the global market. China's ETS does not set absolute emissions limits like most cap-and-trade systems. Rather, China's ETS follows an intensity-based approach whereby allowances are allocated based on emissions per unit of output.

1.2 Voluntary Carbon Markets

While voluntary carbon markets – and the challenges around them – have captured much public attention and industry-led development effort in recent years, it is important to note that they remain very small compared to compliance markets. The total value of traded credits in the voluntary carbon markets in 2024 was USD 535 million[7], a fraction of the USD 947 billion traded in the compliance markets.

1.2.1 Voluntary and international

In voluntary carbon markets (VCMs), carbon offsets, often referred to as carbon credits, are created directly from projects that reduce or remove emissions. These projects include, for example, reforestation, renewable energy development, and

1 See Annex 1
2 World Bank. 2024. State and Trends of Carbon Pricing 2024
3 Carbon Knowledge Hub
4 See Annex 1
5 See Annex 1
6 The International Carbon Action Partnership (ICAP)
7 See Annex 1

methane capture. Carbon credits in VCMs are typically supplied by project developers, aggregators, and brokers who either generate or distribute verified emission reductions.

VCMs allow businesses and other entities to purchase carbon credits to offset their GHG emissions. Organisations participate in voluntary markets to meet corporate sustainability targets, enhance brand reputation, or prepare for potential future regulatory requirements. As indicated above, the voluntary carbon market represents a fraction of the size of compliance markets in terms of trading volumes.

However, unlike the jurisdiction-specific compliance markets, the voluntary carbon market is truly global. Because the overall market structure is not governed by law or regulation, credits may be traded freely cross-border. A significant portion of trading in carbon credits is done bilaterally through private commercial relationships; at the same time, several carbon exchanges have been established around the world to function in a similar way as traditional securities exchanges. These carbon exchanges not only connect buyers and sellers but play an important role to enable price discovery for the wider market and maintain standards for quality and disclosure to help improve the credibility of the market.

1.2.2 Standards and integrity

Concerns voiced about credit integrity have eroded confidence in VCMs. The International Organization of Securities Commissions (IOSCO) issued in December 2023 a report outlining a set of Good Practices to promote the integrity and orderly functioning of the Voluntary Carbon Markets (VCMs). In this report IOSCO proposed a set of 21 Good Practices relating to regulatory frameworks, primary market issuance, secondary market trading, and the use and disclosure of carbon credits.

New initiatives have emerged to rebuild trust and improve standards. The Integrity Council for the Voluntary Carbon Market (ICVCM) and the Voluntary Carbon Markets Integrity Initiative (VCMI) have introduced frameworks designed to strengthen the quality and transparency of VCMs. The ICVCM's Core Carbon Principles aim to ensure the environmental integrity of credits, while the VCMI's Claims Code of Practice provides guidance on credible corporate use of carbon credits.

The Integrity Council for the Voluntary Carbon Market (ICVCM) is a non-profit, independent governance body that aims to set and maintain a global standard for high integrity in the voluntary carbon market. It was set up in 2021 in response to the final recommendations of the Taskforce on Scaling the Voluntary Carbon Markets (TSVCM), an initiative backed by more than 250 organisations.

The Voluntary Carbon Markets Integrity Initiative (VCMI) is an international non-profit organisation with a mission to enable high-integrity voluntary carbon markets (VCMs) that deliver real and additional benefits to the atmosphere, help protect nature, and accelerate the transition to ambitious, economy-wide climate policies and regulation. VCMI was launched at COP26 on 31 March 2021 with government support.

2 Interaction between compliance and voluntary markets

Compliance and voluntary markets, while separate, can overlap to a limited degree. Some compliance markets accept conditional and limited amounts of carbon offsets, while more significantly, a hybrid market in the form of compliance offset markets has developed notably under the supervision of the United Nations.

2.1.1 Carbon offsets acceptance in national and regional compliance markets

It is important to note that from 2013 to 2020, the EU emissions trading system (EU ETS) allowed the international offsetting of emissions with EU ETS operators to account for 4.5 % of their verified emissions with international carbon offsets. From 2021 onwards, the EU decided not to allow international carbon offsets under the EU ETS amidst arguments over lack of integrity, greenwashing, over-crediting and environmental concerns[8].

Nonetheless, when the European Commission introduced on 2 July 2025 its 2040 climate target of reducing greenhouse gas (GHG) emissions by 90% compared to 1990 levels, it included the possibility to reintroduce international carbon credits. If this is adopted, from 2036 onward, international carbon credits may contribute up to 3% toward the EU's overall emission reductions[9].

Currently, some emissions trading systems allow a small proportion of credits sourced from voluntary markets to be used to meet compliance emissions targets. These include:

- China's ETS allows the use of credits from the national voluntary market to offset up to 5% of emissions.
- Singapore, which has a carbon tax regime for major industries rather than a formal emissions trading system, allows the use of eligible international carbon credits[10] to offset up to 5% of taxable emissions.

Conversely, Vietnam's recently established ETS, which is currently focused on the coal sector, allows companies with reduced emissions to create carbon credits that can be sold in the international voluntary markets, and not only to other domestic companies in the same sector.

2.1.2 Compliance Offset Markets

The largest and most significant hybrid market where carbon offsets can serve to meet regulatory or legal targets, also referred to as a "compliance offset market", is the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). CORSIA is implemented by the International Civil Aviation Organisation (ICAO) – a United Nations body. It is a global sector-wide system for offsetting greenhouse gas (GHG) emissions. CORSIA is being implemented with an initial voluntary phase to be followed by a future mandatory one.

The pilot phase started in 2021 and involves airlines operating international flights buying and surrendering carbon credits to offset any emissions over and above their total annual emissions in 2019. Until 2026, only flights between countries that volunteer to participate in CORSIA are required to surrender offset credits. Europe, North America, some parts of the Middle East, South-East Asia, Australasia and Africa were part of the scheme.

8 See International carbon credits and EU climate targets, 2025
9 Questions and answers on the 2040 EU climate target proposal, July 2025
10 Singapore's International Carbon Credit (ICC) Framework, 2023

From 2027, all international flights are expected to be subject to the system, and participation will become mandatory at this time. Exemptions are, however, provided for the Least Developed Countries[11]. It is important to note, however, that the stated objective of the United States to leave the Paris Agreement may also impact the participation of US airlines.

ICAO also sets standards for carbon credit standards for eligibility with CORSIA which determine which carbon offsets in the voluntary market may quality. The standards set out detailed methodologies specifying the requirements for a carbon project, including monitoring, reporting and independent verification to ensure environmental integrity. Carbon offset qualifying for CORSIA include those from the American Carbon Registry, Architecture for REDD+ Transactions (forest-based credits), the China GHG Voluntary Emission Reduction Program, the UN Clean Development Mechanism, Climate Action Reserve, the Forest Carbon Partnership Facility, The Gold Standard, Verra's Verified Carbon Standard and others.

In addition to ICAO's process, governments of host countries must agree "a corresponding adjustment" to prevent double counting, so that credits supporting projects under CORSIA are not also used to meet national obligations under the Paris Agreement on climate change. As of the date of publication, only Guyana has agreed a corresponding adjustment[12].

11 https://unctad.org/topic/least-developed-countries/list
12 https://www.icao.int/news/guyana-sets-global-example-quality-carbon-offset-achievement

3 Growth and internationalisation drivers

There are several potential developments which could lead to significant growth and development of both compliance and voluntary carbon markets.

3.1.1 Article 6 of the Paris Agreement

Article 6 of the Paris Agreement establishes two important frameworks that potentially allow for international cooperation among compliance carbon markets in various jurisdictions and could also facilitate the recognition of carbon offsets in compliance and hybrid markets. These frameworks remain however voluntary and contingent on the success of international negotiations and complex implementation.

Specifically, Article 6.2 facilitates the trading of emission reduction units among countries through bilateral or multilateral agreements through Internationally Transferred Mitigation Outcomes (ITMOs). Switzerland and Thailand concluded the first Article 6.2 deal in 2024 by transferring ITMOs from Bangkok's e-bus programme into Switzerland's carbon registry. While developed economies like Singapore and Norway are actively negotiating cooperation to purchase ITMOs from African and Asian jurisdictions, no new deals have actually been executed to date.

Article 6.4 – The Paris Agreement Crediting Mechanism (PACM) offers a centralised carbon market under supervision of the United Nations as the standard-setting body (with the role of ICAO with CORSIA in the airline industry providing a precedent). The mechanism involves host firms/countries implementing climate mitigation projects such as renewable energy or carbon removal activities and generating carbon offsets that meet specific standards, which are then sold to a purchasing firm/country to support its climate targets. The mechanism is expected to become operational in late 2025 or early 2026, with the first projects transitioning from the Clean Development Mechanism (CDM) established by the Kyoto Protocol.

3.1.2 The EU CBAM

The Carbon Border Adjustment Mechanism (CBAM) is a policy introduced by the EU to ensure that imported goods, particularly those associated with high carbon emissions, are subject to a carbon price comparable to that applied to domestically produced goods. The primary objective is to prevent carbon leakage, which occurs when companies shift production to countries with weaker climate regulations in order to avoid higher carbon costs, then import those goods into the EU.

CBAM aims to ensure a level playing field by applying a carbon price to imports that reflects the costs EU producers face under the EU ETS. CBAM, however, also incentivises other countries to develop their own compliance carbon pricing systems. If the exporting country has a domestic carbon price that is compatible with the EU's system, the CBAM charge is reduced or eliminated. This structure creates a strong economic incentive for non-EU countries that export to the EU to adopt their own compliance carbon pricing frameworks. This may create a powerful incentive for the development of national compliance markets by the EU's most active trading partners.

3.1.3 Carbon offset recognition

A clear obstacle to the developments of voluntary carbon markets is that carbon offsets receive very limited recognition within corporate sustainability and transition plans. This is illustrated by the position taken by both the Science Based Targets initiative (SBTI) and the Greenhouse Gas Protocol (GHGP).

> *"The Science Based Targets initiative requires that companies set targets based on emission reductions through direct action within their own boundaries or their value chains. The use of carbon credits must not be counted as emission reductions toward the progress of companies' near- or long-term science-based targets. This means that companies cannot purchase carbon credits as a substitute for emission reductions."*

SBTi is however currently developing a new version of its standard. While this updated standard does not propose the use of carbon credits as a substitute for decarbonising operations, supply chain activities, or products, it outlines three use cases where high-quality carbon offsets may be used to supplement value-chain decarbonisation efforts. These three cases are:

1. Use of carbon credits from removal activities to counterbalance the impact of residual emissions.
2. Contribution to mitigation activities outside of a company's value chain as a way to take responsibility for the emissions that they continue to release every year on the way to net-zero.
3. Removal of carbon to take accountability for underperformance against targets. This use does not imply that targets have been achieved, nor does it negate the need to abate emissions that could not be reduced during the target period.

4 The opportunity for sustainable finance and the wider market

Carbon offsets play a limited role in the sustainable bond market but there are recent innovative transactions incorporating them. Conversely, carbon compliance markets represent a significant existing opportunity in derivatives trading and risk management which may be poised to develop significantly.

4.1.1 Limited recognition of carbon offsets for transition targets

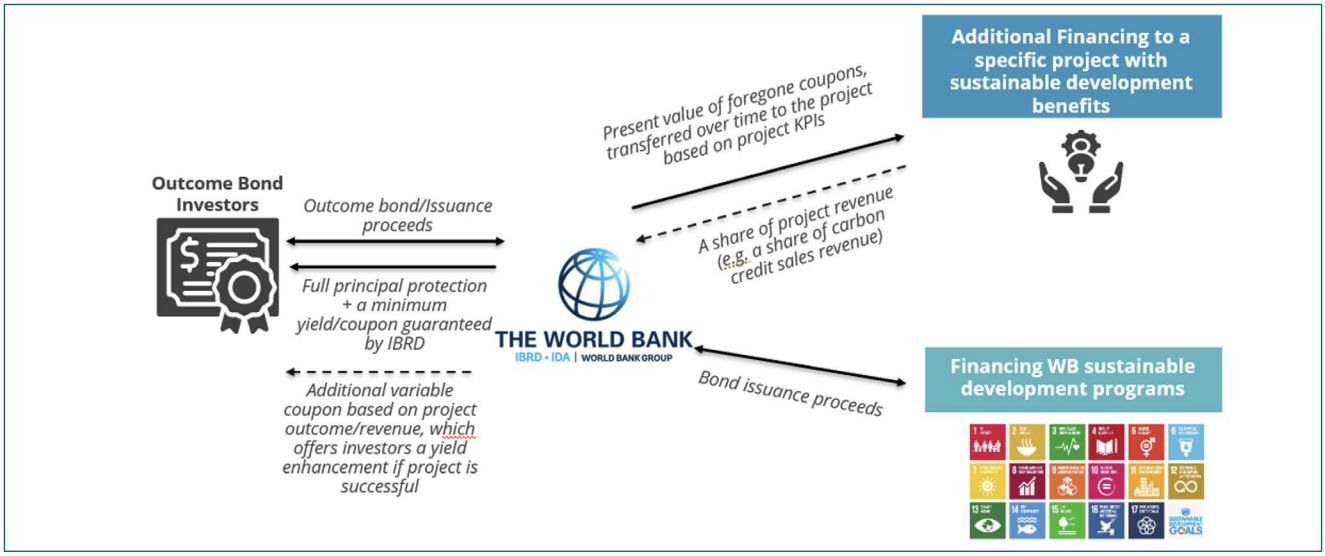
The Green, Social, Sustainability and Sustainability-Linked Bond Principles (the "Principles") provide extensive guidance for climate transition targets both at the issuer and at the financial instrument level. The recognition of carbon offsets in the sustainable bond market for this purpose has been limited to date reflecting the priority given on emission reductions through direct action by recognised international standards such as SBTi.

Specifically, the Climate Transition Finance Handbook (CTFH) which focuses on issuer level guidance states that the "*use of carbon credits for offsetting purposes towards achievement of GHG emission reduction strategies should be kept to a minimum and used to abate residual emissions only*." Focusing on Sustainability-linked bonds, the Guidance Handbook states that "*issuers are encouraged to set targets without considering offsetting efforts*". It also confirms that "*Carbon offsetting has not been envisaged within the Green Bond Principles list of eligible projects, only carbon reduction*."

4.1.2 Innovation in sustainable bonds

Carbon offsets have nonetheless the potential to play a role in the structuring of sustainable bonds. Although their use is not widespread, the market has seen a small number of high-profile transactions in which the bond proceeds are used to finance projects that ultimately generate carbon offsets, which in turn generate revenues that can be passed back to the investor.

The World Bank has issued three separate sustainable bonds structured as "outcome bonds" – the Amazon Reforestation-Linked Bond, the Plastic Waste Reduction-Linked Bond, and the Emission Reduction-Linked Notes – that apply this concept. Although each of these has different environmental objectives, counterparties, and structural details, they all incorporate carbon offsets in a similar way.



Source: World Bank

Investors receive through these outcome bonds a guaranteed return that is lower than the ordinary return paid to investors for regular World Bank issuances of similar maturity. An amount equal to the foregone coupon payments (the differential between the World Bank ordinary return and the fixed return) are used to support sustainable projects. In compensation for receiving a smaller guaranteed return at issuance, investors may receive amounts from the World Bank linked to the value of the generated carbon offsets – assuming these projects perform as expected. The bond can in this way offer investors a potential enhancement over the yield of regular World Bank issuances of similar maturity.

4.1.3 Risk management and secondary trading in carbon markets

The wider market opportunity from carbon markets resides primarily in trading and risk management revenues linked to compliance markets. CCM secondary trading occurs largely through futures and options reflecting a sizeable carbon derivative market. Companies subject to carbon compliance programs can use carbon derivatives to meet their obligations and manage risks. Banks buy allowances at auctions and sell forwards or futures to compliance entities that use allowance derivatives to hedge power forward sales. These compliance entities acquire derivatives rather than allowances in auctions or via the spot market due to higher capital costs and financial liquidity restrictions associated with allowances.

The opportunity is illustrated by the numbers available for the EU ETS, the largest CCM market globally. In 2023, secondary trading in the EU ETS[13] totalled €648 billion, almost entirely (99%) in futures with the rest in options and some residual spot activity. A further EUR 72.5 billion of trading took place off exchange. 73% of all trading was from financial and investment firms.

Secondary trading in CCMs is a significant growth opportunity with the multiplication of initiatives in key jurisdictions aiming to establish national compliance markets. These include in 2026 both Japan, Brazil and India, with other countries such as Turkey, Indonesia, Vietnam and Thailand also developing their own initiatives.

Although VCMs do not offer comparable trading volumes (limited to USD 535 million in 2024), there is an active market largely focused on the airline offset market framed by CORSIA. There are several leading trading platforms in Europe, Asia and the USA offering both spot and derivative trading. It is important to note that some analysts[14] project significant expansion of the VCM market with demand increasing from USD 7 to 35 billion by 2030 depending on the scenarios.

13 See ESMA Market Report - EU carbon markets 2024
14 See Frozen Carbon Credit Market May Thaw as 2030 Gets Closer, January 2025, MSCI

Conclusion

While much attention has been given to the perceived potential of voluntary carbon markets, it is in the compliance markets that there is the greatest momentum. Historically, it is the EU ETS, followed by North American systems, that have dominated this segment. The footprint of China's ETS is developing rapidly since 2021. Spurred, among other things, by the forthcoming implementation of the EU's CBAM, many other major jurisdictions, notably India, Japan and Turkey, are also launching domestic compliance markets.

The voluntary carbon markets require a significant alignment of planets to become mainstream. In the near term, these markets are largely dependent on the future of CORSIA and offsetting in the airline industry. Their outlook remains also tied to the resolution of quality and integrity issues, which several credible international initiatives aim to address. Carbon offsets need in parallel to achieve greater recognition of their potential contribution to emissions reduction especially by international standards such as SBTi. Other factors that could increase demand are the implementation of Article 6 of the Paris Agreement and renewed partial acceptance in compliance markets.

The constraints on the recognition of carbon offsets for transition targets in the sustainable bond market reflect those in international standards. There is however innovation relating to the generation of carbon offsets in underlying projects and their integration in transaction structures. This is illustrated by new products such as outcome bonds for which the challenge is scalability in the mainstream sustainable bond market.

The wider market opportunity represented by carbon markets, looking to the precedent of the EU ETS, is essentially in derivatives trading and risk management in line with the multiplication of national compliance markets. This may be especially attractive and relevant to platform providers and financial institutions active in these markets.

Annex 1

Comparison of Key National Emissions Trading System (ETS) by Traded Volume and Amount (2022-2024)

	2022		2023		2024	
	Millions of tonnes (Mt)	USD (in millions)	Millions of tonnes (Mt)	USD (in millions)	Millions of tonnes (Mt)	USD (in millions)
Europe*	9,277	879,207	8,260	818,151	10,467	801,085
UK ETS	512	54,552	607	42,533	676	30,619
North America**	2,505	73,332	2,481	79,121	3,010	108,340
China***	112	883	294	2,649	275	3,074
South Korea (K-ETS)	39	723	89	748	111	814
New Zealand ETS	60	3,329	17	697	75	2,969
Japan****	0.6	14.4	0.5	10.2	0.8	13.3
Total	**12,506**	**1,012,041**	**11,749**	**943,909**	**14,615**	**946,914**

Source: Table compiled by ICMA using data from LSEG

* Covering (aviation) EU allowances (EUAs)

** Covering Western Climate Initiative, Regional Greenhouse Gas Initiative and Washington State ETS

*** Covering Carbon Emissions Allowances (CEAs), regional pilots and the China Certified Emissions Reduction (CCER) programme

**** Covering J-credits traded through auction and Tokyo Stock Exchange pilot programmes

Comparison of Key National ETS by Trading Price (in USD/tonne)

	2022	2023	2024
Europe ETS	85.56	92.33	71.81
UK ETS	97.62	68.53	49.32
North America			
- Regional Greenhouse Gas Initiative	14.80	15.17	23.32
- California Cap-and-Trade Programme	29.46	34.06	37.89
- Washington Cap-and-Invest Programme	-	59.42	40.89
China National ETS	8.63	8.99	12.75
South Korea (K-ETS)	18.53	8.75	6.94
New Zealand ETS	50.03	37.91	36.28

Source: ICMA estimates based on data from ICAP

Global Voluntary Carbon Market (VCM)* by Traded Volume, Amount and Average Price** per Tonne (2022-2024)

	2022	2023	2024
GHG Emissions ($MtCO_2e$)	254	112	84
Trading Volume (USD millions)	1,900	755	535
Average Price (USD/tonne)	7.48	6.71	6.34

Source: Table compiled by ICMA using data from Ecosystem Marketplace

* Including data from the American Carbon Registry (ACR), Architecture for REDD+ Transactions (ART), BioCarbon, Climate Action Reserve (CAR), Clean Development Mechanism (CDM), Cercarbono, Global Carbon Council (GCC), Gold Standard, Plan Vivo, and Verified Carbon Standard (VCS) registries.
** As explained by Ecosystem Marketplace, average carbon credit prices are calculated on a volume-weighted basis mostly from transactions reported to Ecosystem Marketplace.

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