An Update on Carbon Markets

Spotlight Review

July 2025

Foreword

Since FMSB's first publication on carbon markets, much has changed.

From a peak in early 2022, the average price of voluntary carbon credits has dropped dramatically.

Growing anti-ESG sentiment, especially in the U.S. where some state governments have blacklisted certain funds, has led to numerous firms withdrawing from net-zero commitments, at least publicly. Recent months have seen the Interagency Working Group on the Social Cost of Greenhouse Gases disbanded and many of its recommendations nullified, effectively making U.S. government decisions independent of the costs of carbon.

But despite this backdrop, we should continue to care about the carbon markets.

Firstly, it is worth noting that the U.S.' first withdrawal from the Paris Climate Accord in 2020 did not significantly hinder the voluntary carbon markets. Digging beneath the headlines shows that compliance markets are managed at the state level in the U.S. and they have survived numerous legal challenges in the past. New York, New Jersey, and Oregon are among the states still contemplating new compliance markets, in addition to the well-established California Cap and Trade and RGGI programmes.

Secondly, the rest of the world has diverged less from their climate paths.

COP29 saw progress on Article 6, and while the design of a fully integrated state and private level market still needs negotiation, Art 6.2 has already seen the completion of trades of Internationally Transferred Mitigation Outcomes (ITMOs) between nations.

Of the larger emitters, the EU Emissions Trading Scheme shows few signs of lowered ambitions, with the previously-planned introduction of the Carbon Border Adjustment Mechanism and the inclusion of shipping in the scheme progressing as planned. And EU carbon prices have mostly recovered from an initial slump in response to the Russian invasion of Ukraine and another low in February 2024, when the strategic decision to release new permits to fund energy independence led to a temporary oversupply.

Similarly, China's inclusion from 2025 of cement, iron, steel, and aluminium to its national ETS, in addition to the existing power companies, adds approximately 3 billion tonnes of CO_2 per year to its coverage; this one scheme now covers about 5% of total global emissions.

More so than many other markets, the carbon markets combine business with a moral imperative. Global temperatures shattered records in 2023 and then again in 2024, and we have increasingly seen the catastrophic impact that climate change can have through more powerful, and more frequent, extreme weather events.

And those to whom it ultimately matters – the people – remain in support of governments taking action for climate initiatives. Four out of five polled across 77 countries in the UN-backed People's Climate Vote 2024 backed such measures - with the population of even the four largest emitters at a national level, while lower than the global average, still showing healthy support (China 73%, U.S. 66%, India 77%, Russia 66%).

With such attitudes on the ground, and evidence of major governments continuing on their energy transition paths, the reports of the death of carbon markets may just be a temporary exaggeration.

About us

Financial Markets Standards Board

Financial Markets Standards Board Limited (FMSB) is a private sector, market-led organisation created in light of the recommendations in the Fair and Effective Markets Review (FEMR) Final Report in 2015.

One of the central recommendations of FEMR was that participants in the wholesale markets should take more responsibility for raising standards of behaviour and improving the quality, clarity and market-wide understanding of trading practices. Producing guidelines, practical case studies and other materials that promote the delivery of transparent, fair and effective trading practices will help increase trust in wholesale markets.

FMSB brings together people at senior levels from a broad cross-section of global and domestic market participants and end-users.

In committees and working groups, industry experts debate issues and develop FMSB Standards and Statements of Good Practice and undertake Spotlight Reviews - like this one - that are made available to the global community of financial market participants and regulatory authorities.

Spotlight Reviews

Spotlight Reviews encompass a broad range of publications used by FMSB to illuminate important emerging issues in financial markets. Drawing on the insight of Members and industry experts, they provide a way for FMSB to surface challenges market participants face and may inform topics for future work.

Spotlight Reviews will often include references to existing law, regulation and business practices. However, they are not intended to set or define any new precedents or standards of business practice applicable to market participants.

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I. Why is carbon difficult to price?

An economic good is something that participants in the market are generally willing to pay to have or to consume. Buyers have a "utility value" they assign: the maximum they are willing to pay.[1] Sellers have a minimum value they want to achieve to part with the good, often tied to production costs. While not all markets are deep and liquid, the drivers for price discovery are straight forward.

Carbon (dioxide)[2] is, however, significantly more complex. Rather than a good, when added to the earth's atmosphere, it becomes an economic *bad* with negative utility – something we would pay to not have. Even where it has utility in pharmaceutical or culinary applications, due to its gaseous properties, it is highly difficult and expensive to extract – effectively a stranded asset.

Given this, economists consider carbon to be a negative externality, which becomes very difficult to price when the broad scope and complex nature of its effects are considered.[3] The issue remains, however, that to extract, offset or reduce carbon dioxide is vital for mitigating climate change. As discussed in more detail in our 2022 publication: *Voluntary Carbon Markets: An Overview*, the route that has emerged to incentivise this is to create carbon credits and allowances in the form of tradable assets.[3] In compliance markets, where emitters are legally bound to keep their output below a certain value, these allowances represent "permits to pollute", while in voluntary markets, credits represent a unit of reduction or elimination (usually a metric tonne) that is assigned away from the project creating the reduction or elimination, and to the holder of the credit.

Using the theory of efficient markets, we would imagine the price of a carbon credit to align with its intrinsic value: the cost of the harm caused by the emissions, or the cost of preventing that harm. However, when comparing credit prices to the range of values that result from well-designed models, this alignment has not been observed in practice.

In the absence of a central authority to set a global or regional value for carbon credits, the market has struggled to achieve a clear and efficient pricing mechanism. Diversity in the structures of a range of different markets has further complicated matters. In compliance markets like the EU's Emissions Trading System (ETS), companies are required to buy carbon allowances, while in voluntary markets, companies buy carbon credits, typically generated by carbon reduction or avoidance projects, using a baseline and credit approach. Increasingly projects involving carbon dioxide removal are sought after, creating a fragmented market with prices ranging from mere pennies per ton to over $1000, depending on the region, project, or methodology, and the participant.[4]

Carbon dioxide might be fungible – but these carbon credits are not.

In this paper, we first consider how an intrinsic value of carbon can be calculated. Then, from most to least robust, we consider the features of different compliance and voluntary schemes which result in a misalignment of price. Developing from our previous paper, which focused on the voluntary markets, we will examine in greater depth the frictions still existing in both the voluntary and compliance markets, and a potential path to a future integrated carbon market.

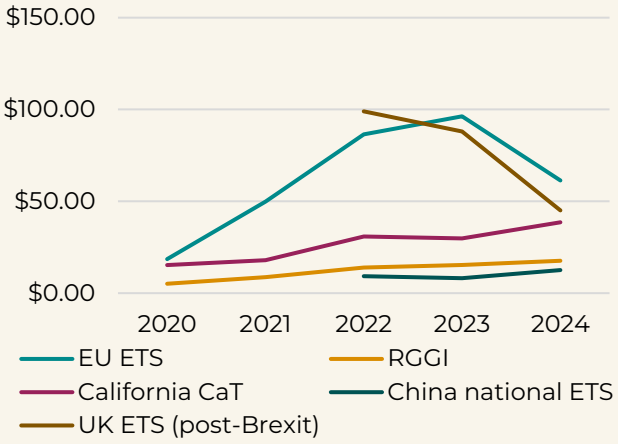
1. In this paper, "Carbon" refers to the ability to emit carbon dioxide, unless specifically stated or context requires.
2. Externalities occur when the costs or benefits of an economic activity are not fully borne by the individuals or firms involved in the transaction but instead affect others in society.
3. Overview of Voluntary Carbon Markets published | Financial Markets Standards Board
4. The Cost-Effectiveness of Carbon Dioxide Removal Methods | MAHB

II. Modelling the intrinsic value of carbon

A range of factors can impact carbon prices, while the need for stability, predictability, consistency, and alignment with intrinsic value remains essential.

Trend in Carbon Prices Across Select Compliance Schemes (2020-2024)

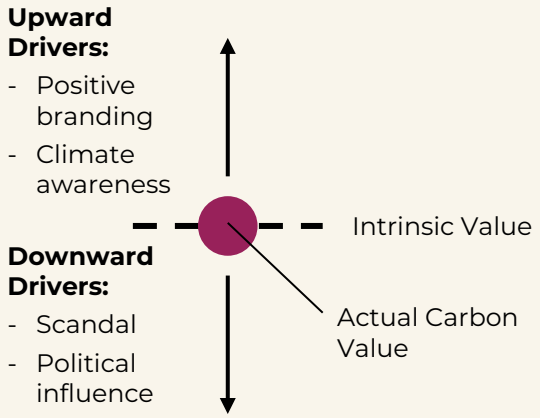
- In compliance carbon markets like the EU ETS, prices are influenced by breadth of coverage, and the stringency of emissions caps.
- The stricter the cap, the lower the supply of credits, resulting in higher prices. This dynamic can vary significantly across schemes.



Source: World Bank

Carbon Prices in Voluntary Markets

- In voluntary carbon markets, the price of credits is largely influenced by sentiment.
- Carbon credit sentiment can fluctuate based on global attitudes toward climate change, politics, and the perceived credibility of the schemes.



Methods of Intrinsic Valuation of Carbon

Social Cost of Carbon

Cost of the economic damages created per tonne of CO_2 released into the atmosphere

Marginal Abatement Cost

Average cost of reducing an additional tonne of CO_2 emissions into the atmosphere

Social Value of Offset

The economic value of temporarily reducing CO_2 emissions through offsetting

Why is assigning a carbon value so important?

In global compliance markets, intrinsic carbon values underpin the calibration of mechanisms including:

- Setting of Carbon Taxes
- Issuance of Permits
- Determining Offset Viability

Models must be regularly updated to reflect changes in climate targets, regulations, and technology. However, they are sensitive to shifts in assumptions – and political climate.

II. Modelling the intrinsic value of carbon continued

The efficient market theory states that prices should fully reflect all available information and accurately represent the intrinsic value of a good. But what is carbon's intrinsic value? If we take as a comparable cash securities of going-concern companies, they represent present and future flows of value to the holders and both shares and bonds are valued using models which consider expected cash flows to the holder, discounted by time, and any risk of non-receipt.

Hence, carbon values should represent the monetary estimate of the economic and/or social value associated with a change in a single tonne of carbon dioxide emissions. To calculate carbon values, there are multiple approaches, including the Social Cost of Carbon (SCC) and Marginal Abatement Cost (MAC), which are most used at governmental levels for policy.

- **SCC:** Cost of the economic damages created per tonne of CO2 released into the atmosphere. SCC is usually calculated using Integrated Assessment Models (IAMs), which model long term emissions trajectories, providing insights into how additional CO2 emissions impact the climate, the economic costs of those impacts, and the societal harm they cause.[1]

- **MAC:** Marginal cost to prevent an additional tonne of CO2 emissions into the atmosphere.[2]

This measure evaluates the cost effectiveness of various methods for reducing carbon emissions, including abatement technologies (e.g., carbon capture) and reforestation (e.g., planting trees to absorb CO2). A MAC curve can be created that will stack the cheapest form of abatement to the highest, and the point where demands cross supply sets the price of carbon.

The Social Value of Offset (SVO) is also increasingly believed by economists to be an important metric for overcoming the challenges associated with offset markets, especially in relation to the difficulty in ensuring that offset projects result in permanent emissions reductions. SVO measures the economic value of temporarily reducing CO2 emissions through offsetting.[3] This is measured in terms of economic damages avoided, which involves calculating how much damage is prevented by temporarily reducing emissions. It is expressed as a proportion of the SCC. The SVO enables the calculation of the amount of carbon to be stored in temporary offsets to make it equivalent to a permanent CO2 emission. This is important since even postponing emissions, in lieu of reducing, has environmental and economic value. For example, technological advancements could occur while emissions are temporarily offset, enabling cheaper carbon removal of those emissions when they are released back into the atmosphere in the future.

Carbon values are used by policymakers to evaluate policy decisions as they enable a cost-benefit analysis that assesses whether the implementation of different policies will improve or undermine social welfare. This is relevant in global compliance carbon markets, where carbon values underpin the calibration of mechanisms including setting of carbon taxes, issuance of permits under emissions trading schemes (ETS) and determining the viability of offset programmes.[4] These markets rely on robust carbon evaluation to set appropriate carbon prices that incentivise emissions reductions.

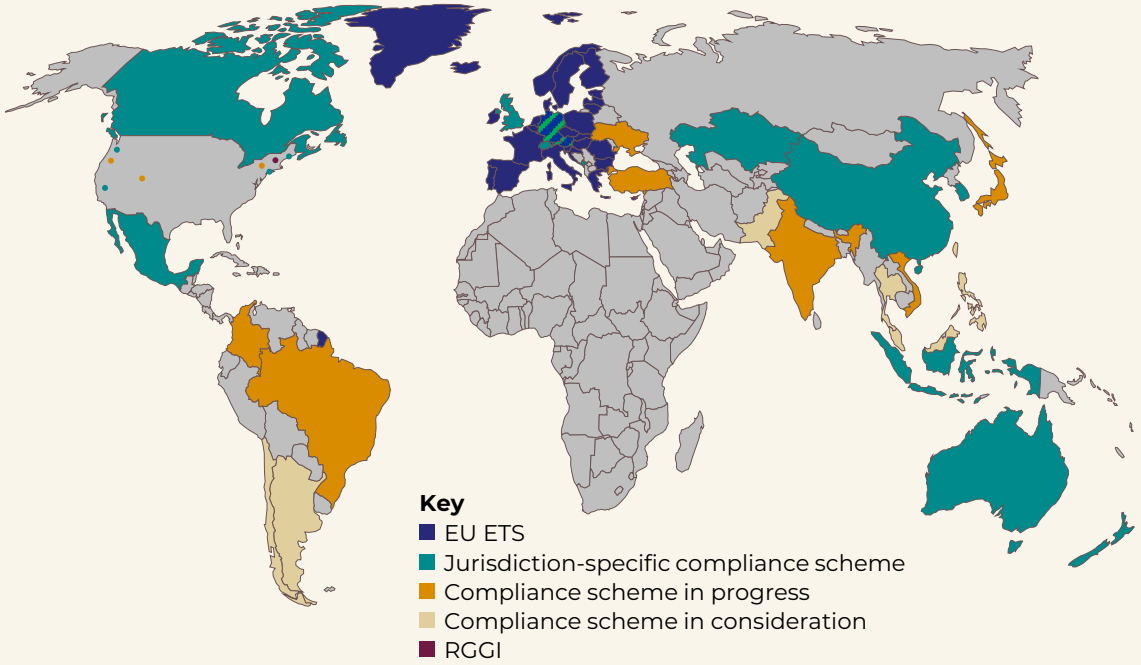
To make these measures robust amid changing conditions, the models, and inputs should be reviewed and updated to account for developments in international and domestic climate targets, changes in environmental regulations and technological advancements. However, as with all models projecting into the medium and distant future, they are highly sensitive to changes in assumptions. For example, the U.S. Social Cost of Carbon dropped from c. $45/tonne in between 2012-2016, to below $6/tonne in the 2016-2020 administration[5], largely driven by a decision to limit economic harm to persons within the U.S., and not worldwide.

1. Professors explain the social cost of carbon | Stanford News
2. What is the marginal abatement cost of carbon (MACC) curve? | Homaio
3. The social value of offsets | Nature
4. Trump vs. Obama on the Social Cost of Carbon–and Why It Matters - Center on Global Energy Policy at Columbia University SIPA | CGEP

III. The strengths and limitations of compliance markets

Recent and promising developments in carbon markets suggest a potential resurgence after a turbulent several months

Compliance Markets as at 2024 YE



Region-Specific Focus

Political headwinds in the U.S. have led to firms withdrawing net-zero commitments, but legally-resilient state-level markets like California's Cap and Trade and RGGI continue, with others still planned.

China will expand its national ETS in 2025 to cover cement, iron, steel, and aluminium, adding approximately 3 billion tonnes of CO2 annually. This single ETS will cover 5% of global emissions.

The EU's Emissions Trading Scheme remains robust, with the inclusion of shipping and the introduction of a Carbon Border Adjustment Mechanism (CBAM) proceeding as planned.

The Present Situation

Carbon markets carry business and moral imperatives, as record-breaking temperatures in 2023 and 2024 highlight the devastating impacts of climate change.

Despite challenges, public support remains strong, with 80% backing government action on climate in the UN People's Climate Vote 2024.

Negotiations around Article 6 have made significant progress, with frameworks largely established, though some practical and operational details remain to be finalised.

Ghana and Singapore, along with Switzerland and Peru and several others, are advancing Article 6.2 collaborations to facilitate the transfer of Internationally Transferred Mitigation Outcomes (ITMOs).

III. The strengths and limitations of compliance markets continued

Carbon is often considered an externality, meaning the environmental costs associated with its emissions, such as the impacts of climate change, are not typically reflected in the price of goods and services. To address this market failure, many governments have introduced carbon pricing policies aiming to internalise the cost of carbon emissions on a global scale (see page 6), thereby encouraging businesses to adopt decarbonisation strategies.

Compliance carbon markets operate under regulations that require certain sectors, typically high-emission industries, to measure, report, and reduce their greenhouse gas (GHG) emissions. These markets function through issuing a limited supply of tradable permits (also known as allowances). Each allowance grants the right to emit one tonne of carbon dioxide equivalent (tCO_2e), and companies must hold enough allowances to cover their emissions or face penalties. In Cap-and-Trade schemes, every year the supply of credits is cut leading to scarcity and forcing emitters to find the cheapest way of reducing emissions. Trading allows companies with lower abatement costs to sell to those with higher costs or who are unable to reduce their emissions.

The European Union Emissions Trading System (EU ETS), operational since 2005, is the most prominent example of a compliance carbon market.[1] Widely regarded as the gold standard for carbon pricing, the EU ETS is praised for its robust governance, wide coverage, stringent monitoring, reporting, and verification (MRV) processes, and relatively stable market prices which approach modelled intrinsic values. Wider coverage ensures that more emitters, and therefore emissions, are subject to a scheme. Coverage is currently estimated at around 45% for the EU ETS[2] , while the introduction of ETS2, expected to be fully operational by 2027[3], will for the first time include certain Scope 3 emissions (those indirectly attributed to an emitter through their up- or downstream suppliers and consumers).

Since participants are legally obligated to comply, the demand for allowances is more predictable and less subject to market fluctuations compared to voluntary markets, resulting in higher and more stable prices.

One significant challenge in compliance carbon markets is carbon leakage, where companies circumvent emissions regulations by offshoring emissions-intensive activities instead of reducing them. As cheaper sources of on-shore abatement get used up, allowance prices rise, incentivising emitting activities abroad where they are no longer in scope. To tackle this, the EU ETS introduced the Carbon Border Adjustment Mechanism (CBAM), which imposes a carbon price on imported goods based on the emissions generated during their production. While this approach addresses leakage, it complicates the MRV process, as accurately assessing the carbon footprint of products across multiple jurisdictions can be challenging. Moreover, the CBAM could potentially spark trade disputes, as carbon pricing effectively functions as a tariff.

1. About the EU ETS | European Commission
2. EU Emissions Trading System | Environmental Protection Agency
3. ETS2: buildings, road transport and additional sectors | European Commission

III. The strengths and limitations of compliance markets continued

Another limitation of compliance carbon markets lies in their reliance on government policy to allocate emissions permits. The total amount of CO2 emissions allowed is subject to shifting political priorities, which can change depending on the prevailing attitudes towards climate change and emissions reductions. These priorities can be influenced by external events, such as geopolitical crises. For example, the Russia-Ukraine war caused an energy crisis in Europe, elevating the cost of living, particularly for heating and electricity. This led to a temporary shift in focus away from clean energy investment towards addressing immediate energy security needs. Furthermore, changes in government leadership can exacerbate this issue, as administrations with differing views on climate policy may prioritise short-term economic concerns, such as cheaper energy from non-renewable sources, over long-term emissions reductions. Such shifts can destabilise the consistency and predictability of compliance carbon markets, creating uncertainty that undermines both industry participation and the effectiveness of emissions reduction strategies.

Further, not all compliance markets are created equal. Global differences in attitudes towards emissions reduction targets have significantly influenced the scope and pricing of carbon credits across various schemes. For example, the Regional Greenhouse Gas Initiative (RGGI) has historically struggled with oversupply.[1] This absence of strict supply constraints, in addition to RGGI's coverage being limited only to fossil fuel power plants, has kept the value of RGGI credits lower than the EU ETS, reducing the financial pressure on companies to curb emissions. The Chinese ETS is an intensity-based scheme, with no absolute cap on emissions for the time being, which prevents direct linking with a cap-and-trade scheme like the EU ETS.

Carbon credit prices in schemes that focus on offsetting activities, often viewed as more cost-effective but less reliable for achieving genuine emissions reductions, tend to remain lower. While these offsets can be cheaper than allowances, they are sometimes criticised for not delivering long-term, verifiable emissions reductions. In contrast, the EU ETS, by phasing out offsetting and enforcing a stricter emissions cap, has created scarcity in the market, leading to higher prices for allowances which encourage companies to take more direct action to reduce emissions. The downside is that this has increased costs for European industry, making the scheme unpopular in some circles. The answer might be to allow companies to use carbon credits once again is some limited way. If other countries were to do likewise it could create a globally linked carbon market.

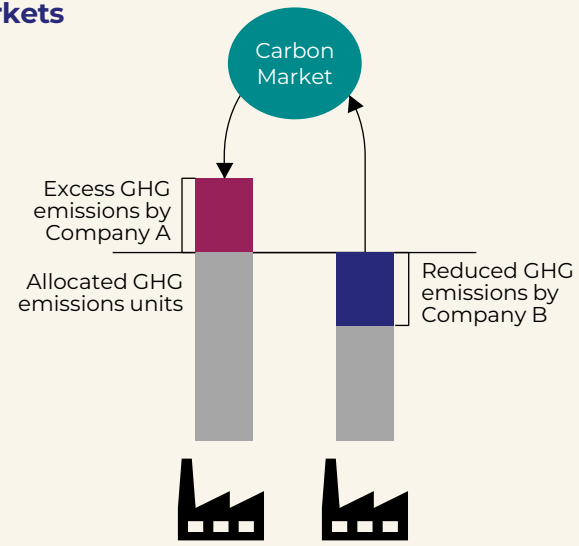
1. Declining Emissions and Allowance Oversupply Keep RGGI Prices Low | Acadia Center

IV. Additional challenges for voluntary markets

As of current, there are strengths and limitations of both compliance and voluntary markets that we will need to put into consideration.

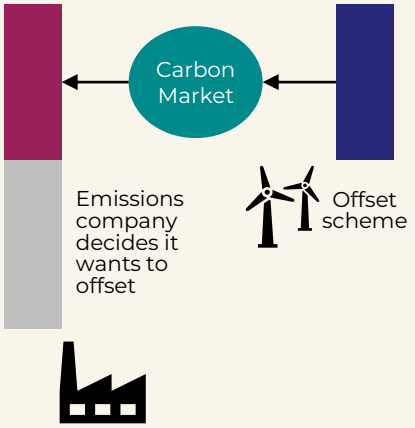
Structure of Compliance Markets

- Compliance carbon markets regulate high-emission industries by requiring them to measure, report, and reduce emissions.
- They operate through a limited number of allowances, each permitting one tonne of CO_2e emissions.
- Companies must hold enough allowances to cover their emissions or face penalties, while the ability to trade allowances creates a financial incentive for efficient emission reductions.



Structure of Voluntary Markets

- Voluntary carbon markets enable companies and individuals to purchase carbon credits to offset their emissions.
- Each credit represents one tonne of CO_2e reduced or removed from the atmosphere.
- Companies participate to meet net-zero goals, enhance their reputation, or show corporate responsibility, while independent registries certify projects to ensure emission reductions are credible, though verification standards can vary.



Key Considerations in Compliance Markets

- Carbon-leakage risk: Moving of emissions-intensive operations to regions with weaker regulations to avoid carbon costs.
- Compliance markets are influenced by government policies, which can shift due to political changes or external events.
- The extent of coverage and management of emissions caps are crucial. The greater the coverage, and the tighter the caps, the more efficient the scheme at carbon abatement.

Key Considerations in Voluntary Markets

- Credit quality is a major concern in VCMs, as credits vary in reliability and additionality.
- Oversupply, low liquidity, and scepticism about certain projects have made credit valuation unpredictable.
- Fragmented frameworks and inconsistent certification practices have made it difficult to ensure credits are credible, increasing the risk of greenwashing and market inefficiency.

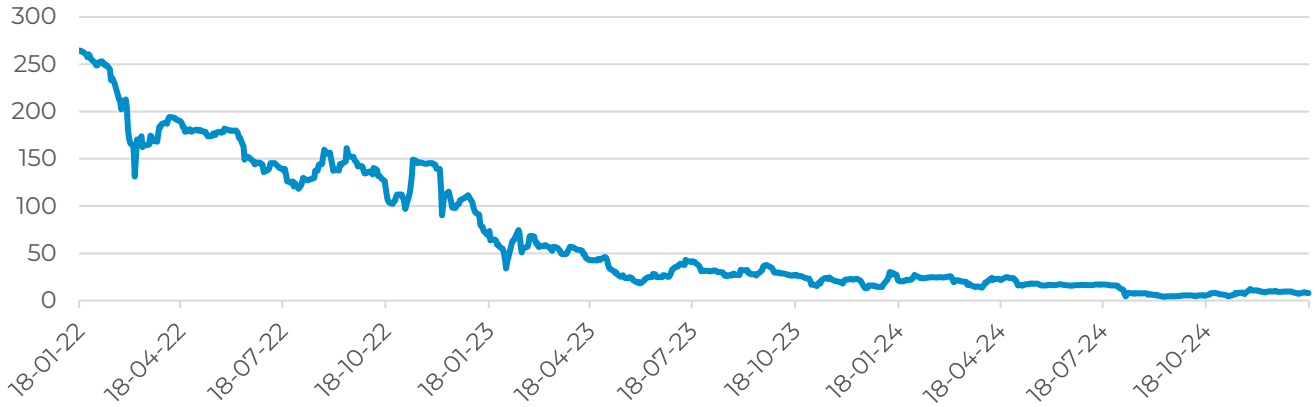
Currently, no fungibility between Compliance and Voluntary Schemes

IV. Additional challenges for voluntary markets continued

While the issue of allowance quality is not a concern for compliance markets, it becomes particularly relevant in voluntary carbon markets, which are based on credits. As credits can vary significantly in terms of their reliability and additionality, key criteria are needed to ensure reductions are real, measurable, and long-lasting. This challenge, particularly in voluntary schemes, which by definition lack regulation, highlights the importance of robust verification processes. These variations in quality have a substantial impact on the market price of credits. Inaccurate or unreliable offsets may fail to deliver the promised environmental benefits, undermining the integrity of the carbon market. We explored these themes in 2022; a brief summary and update follows.

Whilst in compliance carbon markets, prices are driven by scarcity, potential supply of carbon credits in voluntary markets is much greater, with demand driven primarily by the extent of corporate ambitions to reduce emissions, and the trust in the quality and integrity of credits as a credible means to do so. As of January 2025, nature-based offsets were trading at around $7.70 per tCO_2e, a three-year decline since when they traded above $250 at the start of 2022.[1] These low prices are attributed to factors such as oversupply, lack of market liquidity, and growing scepticism about the quality of certain offset projects. This is even though annual carbon credit retirements amount to no more than 200m tonnes of CO2, roughly the

S&P GSCI Nature-Based Global Emissions Offsets (USD)



equivalent of 2 days' worth of global emissions. While carbon credits in VCMs are traded much like commodities, they differ significantly from typical commodities such as wheat or oil. Unlike physical goods, consumers do not receive anything tangible in return for their investment, and their decision to purchase depends largely on trust. VCM credit schemes cover a wide range of methods, requiring substantial organisation, expertise and time-commitment to monitor and evaluate. Transparency is crucial: corporate buyers need to verify that their money is being used as promised, to avoid accusations of greenwashing or false emissions reductions. With methods for verifying scheme reliability still in their development, the pricing of many credits in VCMs remains largely speculative. Scandals or reports of fraud under such schemes can dramatically sway credit prices, resulting in a market which is particularly inefficient in assigning a price. But putting all the risks of project quality and delivery on the buyer is not sustainable and is one of the reasons the market fails to scale.

Some believe that the way that carbon credits will scale is through the homogenisation of demand not supply. If companies need to buy carbon credits that meet a narrow delivery requirement, then they will seek only those credits that meet that requirement, at the cheapest possible price. This does not mean that those credits will be low quality as the minimum acceptable quality of those credits can be set at a high-quality benchmark, which means buyers will need to source credits from high quality projects that meet those criteria.

1. S&P GSCI Nature-Based Global Emissions Offsets | S&P Dow Jones Indices

IV. Additional challenges for voluntary markets continued

The rules for those carbon credit quality standards could be set by a quasi-regulatory body such as CORSIA or by a compliance mechanism, such as for a carbon tax or a compliance scheme. While standardisation may seem to encourage a lowest common denominator approach, there will continue to be demand for different types of carbon credits based on the different requirements of buyers, be they voluntary corporates or regulated compliance buyers. Different benchmarks will develop, as seen in other commodities, with specific credits or projects trading at a discount or premium to that benchmark. It has indeed been the case historically that carbon credits have been marketed according to the direct impact of their project, leading to a perception of carbon credits being unique, rather than a commodity. This has led to the co-benefits generated by a project headlining a credit, rather than the climate impact being emphasised.

While there can be significant additional benefits from implementing carbon projects, such as cleaner water, reduced poverty, increased biodiversity, or access to clean energy, many of the co-benefits of these projects are difficult to measure in an objective way. Co-benefits are important and may have appeal to different buyers depending on their own use case, but they have no bearing on the amount of CO2 reduced, avoided or removed. Maintaining this distinction is important to avoid buyers start to confuse or prioritise the co-benefits of these projects above their verified climate impact, undermining the environmental integrity of the market.

To measure the true environmental impact of a carbon project is challenging, though the development of robust MRV tools has enabled a more accurate determination of whether a tonne of carbon emissions has genuinely been avoided, reduced or removed. These tools are essential for restoring trust in the voluntary carbon market and ensuring that credits represent real and quantifiable mitigation outcomes, as opposed to relying on hard-to-verify co-benefits as proxies for quality.

The credibility of carbon credits also depends heavily on the integrity of the registries that issue and certify them. While registries have taken steps to stabilise demand in the voluntary carbon market, the landscape remains fragmented, with multiple standards, frameworks, and inconsistent levels of oversight. Some have faced criticism for lenient certification practices, which has led to instances where buyers overpaid for low-quality credits or failed to channel sufficient investment into projects with genuine climate impact. Initiatives like the ICVCM's Carbon Credit Program (CCP) Assessment aim to address this by evaluating registries against the Core Carbon Principles. In response, leading bodies such as Verra and Gold Standard have updated their methodologies, and as of early 2025, are among six registries deemed CCP-Eligible . If regulators and major buyers endorse the ICVCM framework, it could steer demand toward higher-quality credits and drive greater standardisation across the market.

V. Recent developments

There are a range of issues, stretching from the regulation of carbon markets to the future usage of the credits.

The Present

The landscape for carbon credits is fragmented, with various financial and non-financial regulatory bodies being potential stakeholders. There is uncertainty around their creation and use, limiting fungibility.

- Strengthening and harmonising frameworks is key to scaling the market.
- Agreements like Article 6 of the Paris Agreement aim to standardise frameworks and support cross-border trade.
- Initiatives like ICVCM's registry certification improve fungibility.[1]

Updates from COP29

COP29 Baku Azerbaijan

Article 6.2 allows countries to trade carbon credits (ITMOs) through bilateral and multilateral agreements, though participation is limited by approval processes and infrastructure challenges.

Article 6.4 would establish a UN-governed carbon market, requiring projects to be approved by both the host country and a UN supervisory body before credits (A6.4ERs) can be issued and traded, but it is not yet finalised.

Progress under Article 6.4 is advancing, with key standards approved at COP29. Final technical details are pending, however.

While these developments are positive, a few concerns remain:

- Article 6.2's **self-regulation system** raises transparency concerns, risking credibility and market effectiveness.
- **Double counting** remains a problem, especially with voluntary credits, requiring stronger rules to prevent emissions reductions from being counted twice.
- **Transitioning legacy CDM projects** under Article 6.4 risks flooding the market with low-quality credits due to outdated methodologies.

The Future

Regulatory Developments

- Regulators should define carbon credits' legal status, as Abu Dhabi's FSRA has done.
- Effective oversight of VCMs is essential, aligning with international standards like IOSCO's, to ensure transparency and credibility.
- Accurate registries and independent audits prevent double counting, exemplified by Egypt's FRA protocols.
- Robust KYC and due diligence measures are needed.

Transparency and Disclosure

- Detailed disclosures on project development, verification, and auditing ensure transparency in creation.
- Clear disclosures on primary issuance are key to managing risks. Low-quality credits can harm liquidity, so programmes should publish standards, methodologies, and verification.
- Regulators could work with organisations like the IASB to set accounting standards.

Governance/Risk Management

- Purchasers of carbon credits should establish strong governance frameworks to manage risks, ensure compliance, and maintain market integrity.
- This includes thorough due diligence and robust controls, at all stages of credits' lifecycle, including retirements.

Fundamental Market Structure

- Estimates suggest that by 2030, the combined market for carbon credits could be worth between $5 billion and $30 billion.[2]
- Even mature markets face supply and demand mismatches, potentially requiring structuring solutions to align; care is needed to manage the additional complexity this may create and ensure quality.

1. The Core Carbon Principles | ICVCM
2. Carbon credits: Scaling voluntary markets | McKinsey

V. Recent developments continued

Currently, the regulatory landscape for carbon credits is varied and driven by legal and regulatory uncertainty surrounding the creation and use of carbon credits, and the regulatory frameworks that should govern them. This confusion stems from a lack of common understanding of the nature of carbon credits as traded instruments. As a result, different jurisdictions have developed their own interpretations, leading to a patchwork of regulatory approaches. The outcome is a lack of fungibility and transferability of carbon credits between frameworks and across borders, with varying treatments of credits creating ambiguity and hampering liquidity and trade.

To address this, strengthening and harmonising regulatory frameworks is important for scaling up an integrated carbon market. The aforementioned initiative from the ICVCM, to certify registries, goes some way towards creating fungibility. Furthermore, international agreements could support with standardising legal frameworks. Article 6 of the Paris Agreement, which was approved during COP29, is expected to play a pivotal role by ensuring voluntary carbon markets align with the rules set out by the agreement.

The Paris Agreement's Article 6 introduces a framework for global carbon market cooperation. Within this, there are two sections of particular significance: 6.2 and 6.4. Article 6.2 allows countries to directly trade carbon credits, known as Internationally Transferred Mitigation Outcomes (ITMOs), through bilateral and multilateral agreements.[1] Countries including Japan and Switzerland have begun early trades, though broader participation is hampered by lengthy approval processes and limited infrastructure for implementation.

Article 6.4 – the Paris Agreement Crediting Mechanism (PACM) - goes a step further by creating a centralised, UN-governed carbon market.[2] Unlike Article 6.2, where countries can trade freely, Article 6.4 requires projects to be approved by the host country and a UN supervisory body before credits, called A6.4ERs, can be issued and traded. However, the rollout has been slow, with A6.4ERs unlikely to be issued before 2026, as critical infrastructure, such as a centralised registry, is still under development. As the quality of carbon credits generated by the independent project-based market continues to improve and the CCP labelled credits become more widely available, it will be necessary to ensure that PACM and the ICVCM work together to ensure standards are aligned and credits generated under either mechanism are interchangeable.

In parallel with these international efforts, regional approaches are also evolving. In July 2024, the European Commission proposed allowing up to 3% of the EU's 2040 emissions reduction target to be met using international carbon credits.[3] This marks a notable shift from the EU's previous preference for relying primarily on domestic emissions reductions. While this move could enhance market demand and foster greater global cooperation, critics have warned that without strict environmental and integrity standards, it could risk slowing the EU's clean-energy transition. To address these concerns, the Commission aims to introduce specific rules governing the use of such credits by 2026.

This reflects a wider dilemma facing carbon markets globally: how to expand market participation while maintaining environmental integrity, transparency, and public trust.

Article 6.2 allows countries to trade carbon credits to meet climate goals, though oversight operates on a "trust-without-verification" system, where countries are responsible for managing their own trades. Countries can classify key details like credit volumes and prices as confidential, limiting public scrutiny. While this offers flexibility, it raises concerns about transparency and accountability, making it difficult to verify whether countries are adhering to the rules or inflating their emissions reductions. This lack of transparency may undermine the credibility of carbon markets and their effectiveness in tackling climate change. Again, the use of the CCPs should reduce these risks.

1. How Article 6 & the CCPs Work Together for Climate Action | ICVCM
2. Paris Agreement Crediting Mechanism | UNFCCC
3. Q&A: European Commission's proposal to cut EU emissions 90% by 2040 | Carbon Brief

V. Recent developments continued

Double counting is another issue, particularly with voluntary carbon credits bought by private companies. While Corresponding Adjustments(CAs) are meant to prevent credits from being counted twice by countries in their national inventories, these adjustments don't need to apply to voluntary purchases. Emissions reductions can be claimed by both the corporation and the nation, but to safeguard the system's integrity, rules are needed to ensure that a carbon credit is unique and that any double claims are accounted for effectively.

Alongside this, the transition of legacy Clean Development Mechanism (CDM) projects into the Article 6.4 framework creates fresh complications. In theory, the plan appears relatively sound: existing projects get a second life under the new rules. However, in practice, many of these projects will be able to use outdated methodologies until 2025. Critics fear this will enable an influx of low-quality credits, with up to 900 million old CDM credits potentially rebranded as Article 6.4 units.[1] This is not just a bookkeeping issue and raises significant questions about the environmental integrity of the entire market. Compounding the problem, countries can still use up to 300 million CDM credits to meet their 2030 climate goals, even as doubts remain around their quality.

From a more positive standpoint, Article 6 introduced some important accountability measures into carbon markets. Corresponding Adjustments do ensure that host countries properly account for transfers of emissions reductions from their own national inventory to another country's, supporting the other country's Nationally Determined Contribution (NDC).[2] Host country governments need to understand there is a cost for this and should set the amount of CAs they are willing to issue based on their carbon budget. They can then auction the credits to whoever needs them. Credits now come with expiration dates tied to specific NDC periods. This helps prevent "banking" old credits for future use, a tactic that has undermined previous market systems. The system also channels 5% of A6.4 credits toward the Adaptation Fund, providing crucial support for climate adaptation in vulnerable countries.[3] Additional safeguards are in place, including grievance mechanisms and appeal processes for communities affected by carbon projects.

Still, unresolved issues remain significant. Article 6.2's reliance on self-regulation leaves room for abuse, and the lack of mandatory cancellation for overall mitigation dilutes its climate impact. Then there is the problem of temporary storage. Nature-based carbon removal projects, like reforestation, are inherently risky because trees can burn, rot, or be cut down. If those credits have already been sold, it is challenging to confirm what will happen next. Buffer pools, insurance and other mitigation tools could be considered, to reduce these risks of reversal. Lastly, letting CDM projects continue under outdated methodologies for another few years risks flooding the market with subpar credits, potentially undercutting the credibility of the entire system. For Article 6 to achieve its goal of robust, transparent carbon markets, these cracks will need to be addressed beyond COP29.

1. FAQ: Fixing Article 6 carbon markets at COP29 | Carbon Market Watch
2. Article 6.2 Reference Manual | UNFCCC
3. Alternative and Private Sector Sources | Adaptation Fund

VI. The Future

In addition to challenges drawn from Article 6, there are a range of issues, stretching from the regulation of carbon markets to the future usage of the credits. These challenges and opportunities can be broken into several sub-categories: regulatory treatment, market oversight, transparency and disclosure, governance and risk management, expansion of coverage, and market structure.

Regulatory treatment

How carbon credits are treated are vital to market development – for example, their legal form, how they are reported, and the economic cost of carry.

To scale, regulators will need to define the legal status of carbon credits within their jurisdictions, specifying whether they are treated as financial instruments, commodities, or something else. For instance, Abu Dhabi's FSRA has classified carbon credits as financial instruments subject to commodity regulations. Global efforts, like the UNIDROIT/UNCITRAL Joint Study, are also working toward harmonising international legal frameworks for carbon credits. These efforts aim to reduce regulatory discrepancies between jurisdictions, facilitating cross-border trade by ensuring that regulatory differences do not interrupt the seamless flow of credits.

Legislation could also help clarify ownership rights to the underlying emission reductions, how carbon credits are generated and how title to those credits is transferred. Any domestic registries should ideally be integrated with independent registries, such as Verra and Gold Standard, so that changes to credits issued in one are reflected in the other.

Market oversight

Policymakers will also need to establish effective oversight of Voluntary Carbon Markets, covering the lifecycle from issuance to trading and retirement of carbon credits. Regulatory frameworks used for financial markets can be adapted for carbon markets, ensuring alignment with international standards such as those proposed by IOSCO. This oversight is key to maintaining market transparency, protecting investors, and ensuring the credibility of carbon credits. For VCMs to thrive, carbon credits must meet rigorous standards—being real, measurable, additional, unique, and verified. The EU's Carbon Removal Certification Framework exemplifies an approach to fostering transparency and trust.

To prevent double counting, which compromises market integrity and exposes investors to financial risk, regulators should ensure that carbon credit registries keep accurate, up-to-date records. Independent audits and third-party verifications can help guarantee the accuracy of these registries. Egypt's FRA, for example, has established clear guidelines for both domestic and international registries, including governance and cybersecurity audits.

Policymakers should also consider extending robust "know-your-customer" (KYC) and due diligence protocols to carbon credit programs, to prevent money laundering and other illicit activities. These standards should be based on best practices from established financial markets, and regulators can leverage the expertise of independent bodies to ensure compliance, safeguarding the integrity of carbon credits in the process.

VI. The Future continued

Transparency and disclosure

On the issuance / project side, rules are necessary to foster transparency in carbon credit creation by requiring detailed disclosures on various aspects, including the project development process, verification of emissions reductions, auditing methodologies, and the entities responsible for measurement, monitoring, reporting, and verification. In addition, transparency in pricing and contracts in the primary market should be promoted. For example, Egypt's FRA mandates that issuers disclose comprehensive data on carbon credits and associated projects, including validation and verification reports. This transparency helps maintain market integrity and fosters trust in carbon credit transactions.

Regulators should encourage complete, accurate, and understandable disclosures of information related to the primary issuance of carbon credits, particularly regarding the associated risks.

Poor-quality carbon credits that fail to deliver promised emissions reductions can harm market liquidity and hinder the achievement of carbon reduction goals. New regulations can encourage carbon crediting programmes to disclose clear standards, methodologies for measuring reductions, and the verification process. This could also include making project-level documentation publicly available, consistent and accessible.

On the demand side, public bodies could collaborate with organisations like the International Accounting Standards Board (IASB) to establish accounting requirements that enhance disclosure in the carbon market.

Governance and risk management

Similar to other market activities, regulations are needed to require all VCM participants, such as developers, registries, auditors, brokers, traders, exchanges, and rating agencies, to implement a comprehensive governance framework with clearly defined roles and responsibilities. A robust governance structure ensures effective oversight and accountability, promoting transparency in the carbon credit market. This framework helps maintain high standards of compliance and fosters trust among market participants.

Market participants, including intermediaries, marketplaces, and exchanges, should adopt effective enterprise risk management systems to address operational and technological risks. This includes implementing cybersecurity protections, fraud prevention measures, and business continuity plans to ensure the resilience of carbon credit trading systems. Effective risk management practices are essential for preventing disruptions in trading and maintaining the market's stability.

VCM participants should be required to adhere to clear rules that address potential conflicts of interest, especially those arising from the issuance, verification, certification, and transfer of carbon credits. They should also establish processes for identifying and managing conflicts within trading venues. This is essential to maintaining the integrity and fairness of the market, preventing undue influence or manipulation that could undermine trust in the carbon credit system.

These measures support the stability and fairness of carbon credit markets by fostering transparency, accountability, and adherence to best practices.

VI. The Future continued

VCMI Scope 3 Action Code of Practice

The VCMI Scope 3 Action Code of Practice provides a credible framework for addressing Scope 3 emissions. These emissions typically arise from activities not directly controlled by the company, including the transportation, use and disposal of goods the company produces and sells, and which are difficult to address at that level. Since Scope 3 emissions often represent c.70% of a company's total emissions, the Code is essential to ensuring completeness and transparency in publicly reported emissions.

The Code enables companies to integrate high-quality carbon credits into their emissions reports, to complement direct emissions reduction efforts. By supporting the scaling of carbon credits to address emissions that are otherwise difficult to eliminate, the VCMI demonstrates potential to expand and enhance the scope and impact of carbon markets.

Market structure

Even considering an idealised market with global harmonised rules on carbon credits, standardised protocols for ensuring the integrity of credits, and a stable price reflecting the true, intrinsic value of carbon, the size of a market also depends on the number of participants, and their ability to meet in the middle.

On the one hand, at an aggregate level, it is positive that demand is still predicted to grow substantially over the coming years. For example, based on analysis by McKinsey, credit demand in the market for Carbon Dioxide Removal (CDR), the highest quality and most expensive type of credit to date, could rise to 100 million metric tons of CO2 (MtCO2) by 2030.[1] This is approximately twice the announced supply of such credits at this date.

But there is no guarantee that such capital will make its way towards funding these vital projects. The fragmentation of markets means markets with credits in surplus supply face significant obstacles in moving to regions or sectors where they are in greater demand. The result is a series of isolated credit markets, each driven by a range of jurisdiction or region-specific market factors, and inefficient resource allocation. These challenges highlight the need to accelerate the cohesion of markets, reduce fragmentation and improve liquidity to ensure the effectiveness of carbon markets in the future.

Secondly, even in mature markets, a deeper dive will reveal that any market for an asset class is, in fact, composed of participants with their own characteristics and risk and reward tolerances. For example, the issuers of, and investors in, vanilla bonds of different credit ratings are quite distinct, with demand for investment grade debt far exceeding that of riskier capital. Structuring methods to enhance credit quality, such as securitisation and covered bonds, have developed to fill the gap in the supply of highly rated bonds, but at the price of increased complexity and reduced transparency. Whether similar solutions may develop to address the structural mismatches in supply and demand emerge for carbon, remain to be seen over time.

1. Matching durable carbon removal supply and demand by 2030 | McKinsey Sustainability