STEPSTONE

An introduction to carbon credits and offsetting

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Introduction

Mitigating and adapting to climate change is going to require a fundamental redesign of traditional economic models. As countries, companies, consumers and investors strive to make the net-zero economy a reality, science-based targets make it evident that:

- It's going to take time to decarbonize supply chains because of the technological and business model limitations faced by different industries; and
- There will likely be hard-to-abate residual emissions in many supply chains; localizing production, improving energy efficiency or using alternative energy sources, new technology or industrial processes may only get you so far.

Carbon markets can solve for both, serving as an interim solution provided offsetting is used alongside supply chain mitigation, consistent with the guidelines established by the Voluntary Carbon Markets Integrity Initiative (VCMI), which seeks to support credible net-zero-aligned participation in voluntary carbon markets, and a long term solution for residual emissions which cannot be mitigated by alternative means. Consequently, if utilized appropriately, we believe carbon markets can play a vital role and form part of a comprehensive response in limiting climate change, and at the same time offer institutions a compelling investment opportunity.

Carbon markets, as the name implies, offer an arena to trade in the reduction, avoidance or removal of CO_2 and other greenhouse gases (GHGs), collectively measured in tons of CO_2 equivalent (tCO_2e). In compliance carbon markets participants that emit less than their allowance can sell their surplus to counterparties that weren't able to meet their emission reduction obligations. Alternatively, parties can establish carbon projects that generate credits commensurate with the resulting GHG reduction, avoidance or removal from the atmosphere, which can be purchased by emitters to satisfy their emission reduction obligations in compliance markets or targets in voluntary markets, a process known as "offsetting."

The practice of purchasing credits to "offset" one's emissions has attracted positive and negative attention from the media, academia and the investment community owing to the perceived financial opportunity and criticisms regarding environmental efficacy and integrity.

While we agree with some of the criticisms, the desire to construct a perfect offset market should not be an obstacle to the development of a good one. While there are shortcomings that need to be, and are being, addressed by the industry, overall, offsetting can be a net positive for Earth's climate, the environment more generally, and local communities. This is sometimes lost in what can be an ideologically charged debate when it comes to climate change.

This primer seeks to provide an objective assessment of carbon markets, their merits and shortcomings, and the factors that investors should consider when contemplating whether to participate in this fast-growing, but complex market.

A brief history of carbon markets

KYOTO PROTOCOL

The concept of carbon markets was originally established in 1997 under the Kyoto Protocol (or Kyoto), an agreement among industrialized (or developed) countries to reduce emissions relative to 1990 levels.[1] To help signatories (otherwise known as Annex B countries) meet their emission reduction targets, Kyoto created several market-based mechanisms:

- **The Clean Development Mechanism (CDM)** allowed signatories to establish emission-reduction projects in developing countries that generated Carbon Emission-Reduction (CER) credits that could be utilized in meeting their emission targets. **The Joint Implementation (JI) Mechanism** was similar but allowed Annex B parties to earn credits from projects in other developed countries.
- **The Emissions Trading (ET) Mechanism** introduced the concept of carbon trading and granted Annex B parties a

[1] The Kyoto Protocol established two commitment periods. The first sought to reduce emissions by 5% by 2012; the second, by at least 18% by 2020.

set number of units that they could trade with one another. Countries that exceeded their allowance could buy units from countries that remained below their allowances.

While these inaugural carbon market mechanisms were well-intentioned, critics were quick to point out that there were too many allowances under the ET Mechanism such that no one was incentivized to decarbonize. Other detractors focused on the environmental integrity of the credits, questioning whether the emission reductions would have been achieved without a carbon market incentive—a concept known as **additionality**.[2]

PARIS AGREEMENT

Ratified in 2015, the Paris Agreement (Paris) followed the Kyoto Protocol. Though there are some major differences between the two, the basic idea remained the same: Countries that exceeded their carbon reduction targets would be able to sell credits to countries that failed to meet their targets, which were based on strengthening the global response to the threat of climate change by keeping a global temperature rise this century to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase even further to 1.5°C.[3] Paris also introduced to the world the concept of carbon neutrality, which stipulates that every ton of GHG emitted must be offset.

Since the Kyoto Protocol, distinct carbon markets have evolved. Broadly speaking, there are two types: compliance markets and voluntary markets.

COMPLIANCE MARKETS

Compliance markets can exist at any level—state, national, regional or international. As the name implies, participating in these markets is compulsory to meet legally mandated emissions limits. These markets are administered by regulatory bodies that determine the total GHG emission allowances and the protocols for issuing (i.e., generating), trading and retiring (i.e., using) credits.[4]

Today, the most common type of compliance market is an emissions trading system (ETS). Similar to the ET mechanism introduced under the Kyoto Protocol, ETSs typically operate as a cap-and-trade program. Because one of the primary criticisms of Kyoto was that too many credits were issued, most modern cap-and-trade regimes reduce the number of allowances from one year to the next, which drives up prices and encourages companies to invest in more efficient business models and technologies to reduce emissions. As a result, companies that are covered by an ETS incorporate a carbon cost into all investment decisions, irrespective of whether the investment aims to reduce emissions. Put differently, failing to cut one's emissions only gets more expensive as the supply of allowances is reduced. ETSs may also allow companies to purchase credits to offset some or all of their emission obligations provided the credits are issued under an approved protocol.

According to a 2022 report by the International Carbon Action Partnership (ICAP), a club for ETS users, there are 25 ETSs in place around the world, covering 17% of global GHG emissions and 37% of emissions in jurisdictions with net-zero goals.[5] The oldest such program is the EU's, under which there has been €140 billion of traded carbon value since it was established in 2005.[6] Mexico's ETS, which became operational this year, is the youngest.[7] According to ICAP, 22 more are in the works. Though this is promising, one of the biggest issues with ETSs is that there is little if any connectivity between systems. To date, the only ETSs that can trade with one another are California's and Quebec's.

[2] Öko-Institut. 2016. "How additional is the Clean Development Mechanism?"
[3] In addition to dropping the Annex B concept, thus setting standards for developing countries and allowing them to participate in carbon markets, Paris broadened its scope to include all GHGs, not just the best-known ones (e.g., CO_2, methane, sulfur, fluorocarbons and nitrous oxides).
[4] To ensure proper accounting at the national and organizational levels, these transactions are also tracked by the United Nations Framework Convention on Climate Change (UNFCCC), the UN's peak body on climate change.
[5] International Carbon Action Partnership. 2022. "Emissions Trading Worldwide: 2022 ICAP Status Report." Since the report was published, the number of ETSs has grown to 28.
[6] International Carbon Action Partnership. 2023. ICAP ETS Map.
[7] Ibid.

VOLUNTARY MARKETS

Because only a small percentage of governments have an ETS in place, equating to less than 20% of global GHG emissions, voluntary markets have emerged as an alternative for companies that have set net-zero goals or made some other GHG commitment to shareholders, customers or financiers.[8]

Some regard voluntary markets as "pre-compliance markets," which has the implied hope that all jurisdictions will one day be part of a regulated carbon market. Voluntary carbon markets date back to the early 2000s, yet make up only about 0.2% of the total market **(Figure 1)**.[9]

Figure 1 also summarizes the differences between compliance and voluntary markets. One of the key differences between the two is voluntary markets' reliance on registries and brokers.

- Registries are paramount to ensuring the environmental integrity of voluntary protocols (i.e., methods, rules and processes applicable), typically working with the scientific community to establish the protocols that govern individual carbon projects. However, not all registries or protocols are created equally, and there is still considerable variability within the industry. The major registries include Verra, Gold Standard, American Carbon Registry, and Climate Action Reserve.
- Brokers, on the other hand, are of particular importance to buyers, like pensions and financial service companies, whose direct carbon footprints are relatively small. Unlike, say, an electric utility, these "smaller" institutions often lack the internal resources necessary to purchase offsets directly from projects and must rely on a broker to procure credits. Here again, there is a lot of variability.

FIGURE 1: SUMMARY OF COMPLIANCE & VOLUNTARY MARKETS

	Compliance market	Voluntary market
Purpose	Regulated market to help countries meet their emissions targets via an ETS	Voluntary market for companies, governments, and individuals to purchase credits to offset emissions
Authority	Regulated by mandatory jurisdictional regimes that set emissions caps and allocate allowances	Utilizes standard protocols monitored or verified by third-party institutions
Market size (2021)	$899 billion	$2 billion
Participants	• Government bodies / regulators • Project developers • End buyers	• Project developers • Registries (i.e., standard-setting bodies) • Brokers • End buyers
Program	• ETS, usually cap-and-trade • Cap gradually declines, reducing the number of available credits and raising the cost of noncompliance • Credits can be used (i.e., retired) or sold	• Carbon offset projects that seek to avoid, reduce or remove GHG emissions beyond a "business as usual scenario" • Project is developed in line with protocol set by the independent registry • Credits are then traded by individuals or companies

Source: Refinitiv, Ecosystem Marketplace, StepStone Group analysis.

[8] In some instances, companies operating within an ETS can use credits bought on the voluntary market to stay under the cap.
[9] According to one Morgan Stanley report, voluntary carbon market is projected to grow from around US$2 billion in 2022 to about US$100 billion in 2030 and around US$250 billion by 2050.

Types of carbon credits and projects

While carbon credits have historically been lumped together, they've recently been categorized into one of two types: avoidance and removal.

Generally speaking, **avoidance** describes activities that reduce the amount of emissions that enter the atmosphere; **removal**, on the other hand, relates to taking carbon out of the atmosphere. Though this sounds simple enough, it can take some sophisticated carbon accounting to keep straight.

Consider a reduction in methane emissions. At face value this is an avoidance credit. But when you consider that methane is attributed a 27–30x multiplier versus CO_2 under the 100-year global warming potential methodology and remains in the atmosphere for only 10–12 years before breaking down into CO_2, reducing methane emissions has the same effect as removing CO_2 from the atmosphere, resulting in a net cooling effect. This is a key driver of the Methane Pledge, an international effort to reduce anthropogenic methane emissions by 30% by 2030.

Distinguishing between the two is perhaps most relevant for carbon accounting and terminology.

- "Carbon neutrality" refers to the use of avoidance credits to offset one's emissions; however, this still results in a net emission when these two components are considered as a whole;
- "Net zero" refers to the use of removal credits, whereby gross emissions are offset by an equal amount of removals from the atmosphere such that net emissions equal zero when the two component are considered as a whole. For this reason, buyers in voluntary markets are often willing to pay a premium for removal credits.

Credits can also be classified as either nature-based or technology-based.

- **Nature-based credits** come from changing how natural assets (e.g., farmland, timberland, wetlands or forests) are used or managed.[10] Think: creating new forests (afforestation) or restoring natural forests (reforestation).
- **Technology-based credits** come from adopting new or alternative technologies. Think: renewable energy, more efficient heating and lighting, recovering methane from landfills or properly disposing of refrigerants.

Carbon credit quality

As compliance and voluntary carbon markets have evolved, so too has the thinking around credit quality. Historically four qualities have been used to define credit quality:

1. **Additionality:** Credits should be issued to projects that reduce or remove GHGs that would not have occurred otherwise.
2. **Permanence:** Credits should also be issued to projects whose benefits will be long lasting.
3. **No leakage:** A reduction in GHGs in place should not be offset by an increase in GHGs somewhere else.
4. **Proper accounting:** An accredited third party must verify the reductions and ensure that credits are not double-counted and that no leakage has occurred.

[10] Not to confuse matters, but this can include using new technologies.

More recently, the Integrity Council for the Voluntary Carbon Market (ICVCM), following a period of public consultation, has released its Core Carbon Principles for identifying high-quality carbon credits, which includes 10 principles under the areas of governance, emissions impact and sustainable development.

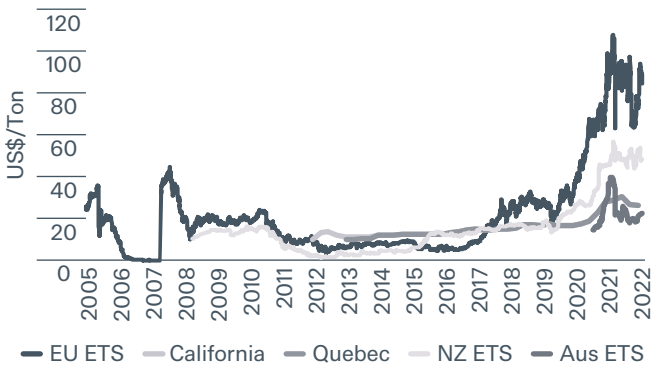
When considering credit quality, we believe investors should consider one additional principle: enforceability. The penalty for intentional reversals or falsifying credits should be legally binding, commensurate with the "crime," and ensure that project owners are legally bound to make good on their commitment.

Collectively, these characteristics form the basis for a robust framework to assess credit quality and instill greater stakeholder confidence, thereby increasing the likelihood that companies will use credits as part of their decarbonization efforts. These characteristics should apply irrespective of whether a carbon credit is generated under a compliance or voluntary protocol.

Carbon prices

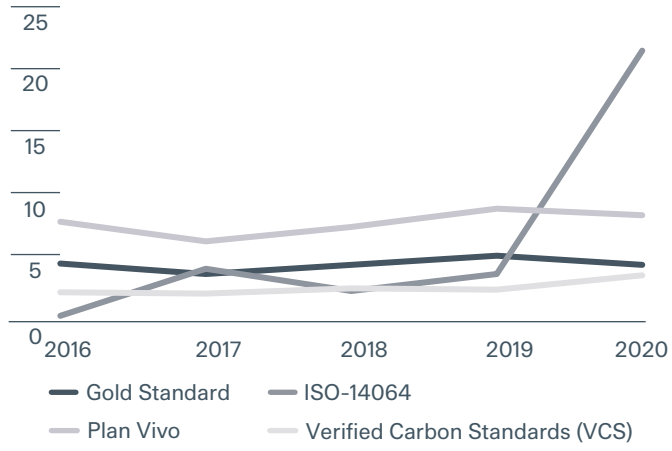
As carbon regulations and markets have evolved, carbon credit prices have increased owing to a combination of reducing caps on emission allowances (supply) and increased economic coverage (demand) within the jurisdictions that employ ETSs. As you can see in **Figure 2**, prices can vary significantly from one regime to the next. One reason why is an ETS's age; as the system matures, the cap on emissions generally decreases. At the same time coverage can often expand, encompassing a greater range of industries and company sizes. Launched in 2005, the EU's cap-and-trade program is the oldest in the

FIGURE 2: EVOLUTION OF CARBON PRICES IN COMPLIANCE MARKETS



Source: ICAP Allowance Price Explorer, 2022; Clean Energy Regulator Q4 2022 Quarterly Carbon Market Report, December 2022; StepStone analysis.

FIGURE 3: EVOLUTION OF CARBON PRICES IN VOLUNTARY MARKETS ($US)



Source: Ecosystem Marketplace, 2022.

ICVCM's 10 core carbon principles

GOVERNANCE

1. **Effective governance.** The carbon-crediting program shall have effective program governance to ensure transparency, accountability, continuous improvement and the overall quality of carbon credits.
2. **Tracking.** The carbon-crediting program shall operate or make use of a registry to uniquely identify, record and track mitigation activities and carbon credits issued to ensure credits can be identified securely and unambiguously.
3. **Transparency.** The carbon-crediting program shall provide comprehensive and transparent information on all credited mitigation activities. The information shall be publicly available in electronic format and shall be accessible to non-specialized audiences, to enable scrutiny of mitigation activities.
4. **Robust independent third-party validation and verification.** The carbon-crediting program shall have program-level requirements for robust independent third-party validation and verification of mitigation activities.

EMISSIONS IMPACT

5. **Additionality**. The GHG emission reductions or removals from the mitigation activity shall be additional, i.e., they would not have occurred in the absence of the incentive created by carbon credit revenues.
6. **Permanence.** The GHG emission reductions or removals from the mitigation activity shall be permanent or, where there is a risk of reversal, there shall be measures in place to address those risks and compensate reversals.
7. **Robust quantification of emission reductions and removals.** The GHG emission reductions or removals from the mitigation activity shall be robustly quantified, based on conservative approaches, completeness and scientific methods.

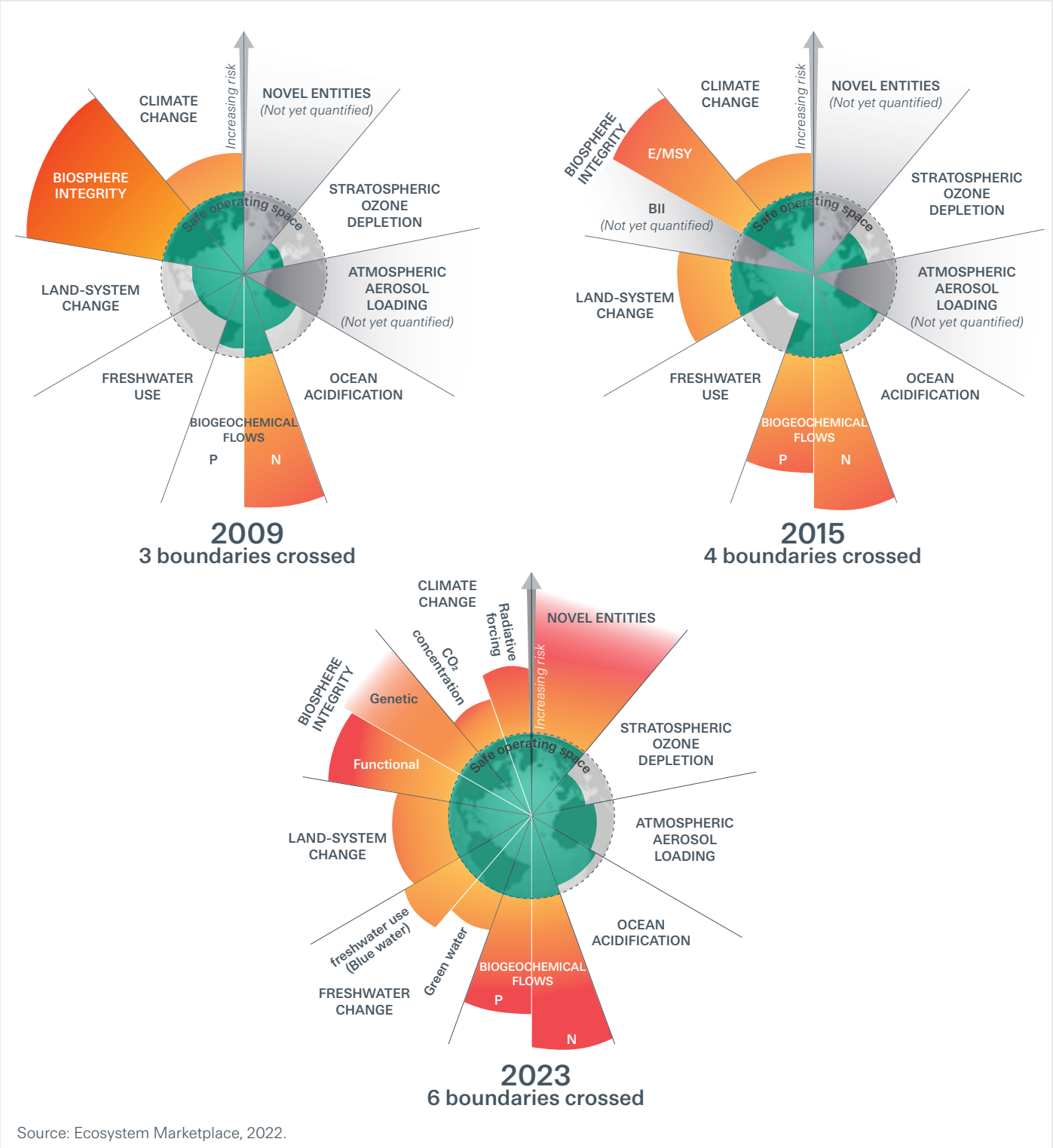
SUSTAINABLE DEVELOPMENT

8. **No double counting.** The GHG emission reductions or removals from the mitigation activity shall not be double counted, i.e., they shall only be counted once toward achieving mitigation targets or goals. Double counting covers double issuance, double claiming and double use.
9. **Sustainable development benefits & safeguards.** The carbon-crediting program shall have clear guidance, tools and compliance procedures to ensure mitigation activities conform with or go beyond widely established industry best practices on social and environmental safeguards while delivering positive sustainable development impacts.
10. **Contribution to net-zero transition.** The mitigation activity shall avoid locking in levels of GHG emissions, technologies or carbon-intensive practices that are incompatible with the objective of achieving net-zero GHG emissions by mid-century.

Source: ICVCM.

The role of carbon credits and offsets

According to the Stockholm Resilience Centre, Earth has now exceeded six of the nine planetary boundaries, including the one relating to climate change. This analysis highlights the need to act now, to use all available tools to mitigate climate change while society solves the highly complex challenge of decarbonizing our economy—hence our support of carbon markets, alongside supply chain decarbonization, in helping to bring about a decarbonized future as quickly as possible.



Source: Ecosystem Marketplace, 2022.

world and has experienced the greatest change on both fronts. Another factor is whether participants can use offsets to satisfy part or all of their emission reduction obligations, and if they can, what types of credits are allowed. The more flexible the ETS in terms of offsetting, generally the lower the carbon price.

While compliance market carbon prices vary greatly by jurisdiction, prices within each jurisdiction tend to be uniform irrespective of the protocol to which the credit relates. This contrasts with voluntary markets where the key driver of price is the registry or protocol, based on buyer perception of quality (i.e., characteristics of the credit), with the price for any given protocol relatively uniform. Characteristics that are most relevant for voluntary markets include whether it is a removal or an avoidance credit and the perceived quality of the relevant protocol. There is an additional consideration for buyers: potential "co-benefits," such as those relating to the local ecosystem, biodiversity and social community outcomes arising from the activity responsible for generating the carbon credit. For example, in the case of afforestation, in addition to carbon sequestration in the resulting forest, this activity can make the local ecosystem more biodiverse, healthier and more resilient to withstand climate change. Forest management, sustainable harvesting and timber processing can also provide increased employment in often disadvantaged rural communities.

The role of carbon credits and offsets

While StepStone believes that companies should make reducing supply chain emissions a priority, not all have access to the alternative business models or technological solutions that would allow them to materially reduce their emissions today. Similarly, many companies operate in jurisdictions that do not yet have ETSs. In both instances, purchasing offsets may be the only alternative to make a material contribution to climate change mitigation today. By providing companies facing these constraints with a viable interim solution, offsets allow companies to be part of the climate solution while they reduce emissions in line with science-based targets.

MITIGATION WHILE DEVELOPING & IMPLEMENTING TECHNOLOGY

Even industries that have access to business models or technology to materially reduce emissions will typically still have an emissions profile, which these industries should still consider mitigating through offsetting.

However, many industries do not have this profile, and meaningful reductions in emissions are years, if not decades, away from becoming a reality. These industries should be contributing to climate change mitigation while they develop and implement technology over the long term, as unmitigated these emissions will continue to contribute to climate change, and offsetting provides the means to do so.

Take, for example, the aviation industry, which requires significant technological advance if it is to achieve net zero. Fuel efficiency gains, though helpful, won't be sufficient. Although improved fuel efficiency may lower emissions by one-third relative to business as usual, total industry emissions will continue to rise thanks to industry growth outweighing fuel efficiency gains. Experts also don't expect new propulsion systems and other technologies that would allow more meaningful strides toward net zero to be available until the mid-2030s.[11]

Critics of offsets argue that by purchasing offsets, the aviation industry is delaying the uptake of these technologies. We find the counterargument more convincing.

[11] McKinsey, 2022. "Decarbonizing aviation: Making net zero possible."

Purchasing offsets allows the aviation and other carbon-intensive industries to mitigate their emissions, until disruptive technologies become commercially available. By accounting for a carbon cost in their financial reporting, companies in these industries also become motivated to fund technology, research and development to reduce their costs, and ultimately their emissions.

The need to take decisive action to decarbonize needs to balance the short-term costs to society. The argument that delaying action will increase costs over the long term is valid. So is the argument that technology costs to achieve abatement will decrease over time. This duality underscores the complex trade-offs that need to be made in the transition to net zero. It also differs from industry to industry.

Proponents of supply chain emission reductions irrespective of the costs ignore the social reality. If the cost or practicalities of decarbonization become unbearable for society in the short term, there is a real risk that gains will be short-lived, public support will be lost or diminished, and the path to long-term sustainable emission reductions will be prolonged. To be successful, efforts to decarbonize the economy must maintain public support, and offsets can help manage the transition in a cost-effective manner.

VOLUNTARY MARKET FOUNDATION FOR A COMPLIANCE FUTURE

Though the number of ETSs is growing, more than 80% of emissions come from countries where there is no compliance-based GHG market mechanism.[12] For the jurisdictions that do not yet have a compliance-based market, voluntary carbon markets provide a means of establishing a price on GHG emissions and facilitating the transition to net zero—in effect acting as a "pre-compliance market." By establishing market frameworks, pricing signals, and incentives, voluntary markets lay the foundation for implementing compliance markets in the future.

The resulting cost to emitters is also consistent with the "polluter pays" principle, an environmental law concept that underpins the EU's environmental policy and many other environmental regulations.

As carbon credit prices increase over time, companies have greater incentive to reduce emissions through supply chain abatement. Further, while companies could still decide to make emission reduction commitments in the absence of offsetting, without this tool emitters would likely take a less ambitious approach to setting targets, given they wouldn't have access to credits that provide flexibility to manage abatement shortfalls, and the associated risk of public criticism.

ALIGNMENT WITH SCIENCE-BASED TARGETS

Another important consideration is how offsetting aligns with the Science Based Targets initiative (SBTi), which is generally considered to be the benchmark for companies seeking to achieve net zero. Under SBTi, companies must set science-based supply chain abatement targets in the near term (~7 to 10 years) to put themselves on a path to net zero by 2050. Under SBTi, near-term targets must be met through supply chain abatement, and not offsetting, to prioritize Scope 1, 2 and 3 emission reductions.

[12] Supra note 5.

However, in the interim, GHGs will continue to accumulate in the atmosphere, exacerbating climate change; companies should seek to offset those emissions to mitigate this impact until they achieve their science-based targets. Consistent with this, SBTi is an active proponent of Beyond Supply Chain Mitigation (BSCM) to take immediate action above and beyond science-based targets to contribute to reaching societal net-zero as soon as possible, which can include activities that avoid or reduce GHGs emissions or remove and store GHG from the atmosphere, such as through offsetting.

Further, the SBTi acknowledges that some residual emissions are unlikely to be abated and that these emissions need to be offset by carbon removals, which requires the development of an efficient offset market that can provide least-cost removals to support the final stage of the path to net zero. Carbon markets, and the revenues from offsetting, are a means to channel investment into the development of these essential sources of carbon removals.

Lastly, supply chain emission reductions are unlikely to be linear, often requiring significant capital expenditure, which results in a "stepped" trajectory. This is likely to culminate in companies being behind and ahead of their SBTi targets at any point in time. In such circumstances, we believe companies should use offsets to ensure their impact on climate change is consistent with their targets, even though the offsets are not counted toward their target under the SBTi—thereby maintaining the carbon accounting integrity of the SBTi framework, which is the same framework adopted by many compliance-based ETSs.

Pricing nature

Thus far, society has fundamentally mispriced natural capital and the ecosystem services it provides. Thanks to carbon markets and offsets, this is beginning to change. By purchasing nature-based credits, companies channel capital into the protection and restoration of natural capital.[13]

One of the risks, and criticisms, of carbon markets specifically and environmental policy more broadly is that they can be overly restrictive, especially for developing economies. Suppose that a company purchases offsets that come from conservation or restoration of a forest. Depending on the needs of the local community, the resulting encumbrance of the forest could be a boon or a hindrance. To be successful and sustainable, offset projects must balance long-term environmental goals with short-term societal needs. Sharing the financial benefit derived from carbon credit sales with the local community offers a means to balance the competing interests of the environment and society. The potential financial gains from extractive activities, such as forest clearing to create farmland, have historically been the primary driver of deforestation and loss of ecosystems and biodiversity. This is particularly relevant in disadvantaged local communities.

Deforestation continues globally despite generally increasing regulatory restrictions and activism that seek to mitigate such activities. Offset markets provide an alternative means to mitigate the loss of nature, where the participation by local communities in carbon credit revenues incentivizes protection, or more sustainable extraction, resulting in a win-win for the environment and these local communities.

Carbon market criticisms

While carbon credits have the potential to play an important role in climate change mitigation, they are by no means perfect. Criticism of carbon credits and the process of offsetting has centered upon their efficacy and integrity.

EFFICACY

Some critics contend that carbon markets provide a license to pollute: If you can afford it, you can pollute rather than reduce your emissions. Others think of carbon markets as a zero-sum game: One company can choose to reduce its emissions by

[13] To learn more, read our 2022 white paper "We Don't Value Nature."

one credit while another company can purchase the right to emit by one credit.

In our opinion, this fails to appreciate the role carbon markets play in creating a financial incentive to drive outcomes that wouldn't otherwise exist. They also confuse buying and selling credits with buying and selling emissions, which are entirely different. Further, these criticisms are inconsistent with our observation that the carbon markets are creating new revenue streams, which are changing behaviors across the economy, and creating a mechanism to channel investment into protecting and restoring the environment that would otherwise not occur.

The criticism that voluntary carbon markets facilitate inaction and allow emitters to continue polluting is also inconsistent with observations in the market. Recent research published by Forest Trends' Ecosystem Marketplace, based on 7,415 corporate disclosures to CDP, suggests that:

- Companies engaged in the voluntary carbon markets outperform their peers in accelerated climate action, with 59% reporting lower gross emissions YoY compared with 33% for those not participating in voluntary carbon markets.
- Voluntary carbon buyers are three times more likely to have science-based targets to address climate change, and their targets are more ambitious.
- Voluntary carbon buyers lead the pack when it comes to emissions transparency and accountability, and are 1.2x more likely to disclose their emissions to CDP.

These statistics do not support claims that voluntary carbon markets facilitate inaction. To the contrary, they support claims that companies are using voluntary markets to take comprehensive action. If we are going to criticize companies that abuse offsets, we should equally applaud the companies that use them appropriately.

In short, we believe high-integrity carbon credits are part of the climate change solution, not part of the problem.

INTEGRITY

We share some of the critics' concerns and believe progress needs to be made to improve the integrity of the market.

To this end, the academic community is playing a vital role in critically evaluating and contributing to the growing body of research regarding the design and implementation of carbon markets, and how they can be improved to deliver on their full potential.

While the industry has engaged and sought to work with academia to address identified shortfalls, the historical cycle of protocol iteration has been slow relative to the pace of research and knowledge development in the sector. To mitigate the risk of over-crediting and undermining confidence in carbon markets, market evolution through new iterations of protocols needs to be expedited. New projects should not be registered under protocols with known material deficiencies until they are addressed through new protocols, and this requires registries to move more quickly to incorporate the latest research and ever-evolving best practices.

The key focus of claims regarding carbon credit integrity relates to the determination of baselines, i.e., the carbon benchmark used by projects to assess the level of carbon avoidance or removal relative to observed outcomes in order to determine the volume of carbon credits.

For many carbon project types, this is an estimate of a counterfactual (a theoretical alternative outcome) that has not occurred because of the presence of a carbon project and its associated activities. Consequently, it is impossible for such an estimation to be 100% correct. However, this highlights the

On carbon research

Researchers are subjecting a range of topics to academic rigor, from scrutinizing the effectiveness of carbon markets and optimal project design to refining protocols. This academic scrutiny should be and is being embraced. This is nowhere more evident than in the response to the recent scrutiny of Reducing Emissions from Deforestation and Forest Degradation (REDD), which has successfully led to the enactment of new iterations of protocols. This is exactly the response one would expect to see in a transparent and functioning market.

However, while research and scrutiny should be welcomed, some media claims regarding the integrity of offsets (e.g., REDD) have misrepresented the findings of well-intended research. The research being referenced to justify certain claims is also an estimation of an outcome, based on its own methodologies and associated limitations, as often noted in these research papers.

For example, research relies on desktop methodologies that can be applied using public and subscription-based data services:

- Relying on methodology generated assumptions for each property that do not, or to a lesser extent, take into account local knowledge and expertise.
- Relying on satellite imagery data that does not incorporate more granular proprietary site-specific data, such as can be obtained through physical measurement and other technologies, such as lidar.
- Relying on counterfactual estimation methods that do not necessarily incorporate local market expertise and trends.

Highlighting these limitations is not intended as a criticism nor an attempt to undermine this essential research; rather, it's a reminder that research is another estimation that is equally open to evaluation. Research should be used appropriately, instead of being considered an unquestionable fact, as evidenced by the occurrence of contradictory claims from two different researchers regarding deforestation benefits for the same REDD projects—though to be fair, both studies question the absolute volume of credits being issued.

risk associated with baselines: They are generally based on methodologies and assumptions that will always result in an estimate with a level of estimation error, which the industry must strive to reduce.

There is no question the approach to setting baselines must improve. There need to be greater levels of standardization, whether for specific methodologies or review processes for updating protocols. The industry should:

- Seek to eliminate inconsistencies between different protocols for the same or similar project types. These inconsistencies increase complexity and open the door to gaming the system.
- Have a minimum set of standards or requirements that can be applied to baseline methodology development, including a standardized independent methodology review process that can be applied universally across all project types and registries.
- Introduce dynamic baselines which take into account changes in market conditions over time.

The offset industry would also benefit from standardization more broadly across the industry, especially as it relates to measured versus modelled protocols. Though less precise, modeling is handy when measuring isn't possible or practical, especially for emerging protocols for which the cost of measurement can be excessive. However, modeling does increase the risk that credited outcomes will not correspond with actual carbon abatement benefits. Ultimately all protocols should work towards a measurement approach. Such outcomes would mitigate what is a foreseeable area of criticism for the industry.

There also needs to be greater accountability for co-benefits that are promised as part of carbon projects, in particular community revenue sharing and investment, to ensure local communities are beneficiaries and aligned to deliver the changes in practices needed for more sustainable management of local natural assets.

All markets can be exploited, and the carbon market is no exception. Instances of profiteering have undermined confidence in certain protocols and registries. The industry needs to close the gaps that allow this to occur. Like financial markets, which are continually being adjusted, the carbon market can and should be refined. Financial consequences are necessary to help mitigate bad actors undermining the integrity of the system.

Rationale for institutional investment

As with most nascent market opportunities, activity in carbon markets is being led by the private commercial sector. However, increased participation from more sophisticated and credible groups presents a significant opportunity, especially for institutional investors that can invest at scale as a result of this increase in integrity.

In addition to following the rules contemplated by protocols, institutional investors generally have their own commitments to responsible investing that offer another layer of rigor and risk mitigation to the fledgling carbon market. Institutional investors bring their own organizational commitments and capabilities, which can help reinforce a prudent approach, enhance the integrity of projects and the credits they generate,

and instill confidence in the sector for users of carbon markets and other stakeholders, including the general public. Put simply, institutional investors can play a leading role in increasing the sophistication and integrity of carbon markets. They also stand to benefit financially as credits become more valuable over time as a result of this increase in integrity.

Institutional investors are also ideally positioned to leverage their capital to drive change at a governance level, in particular for developing standards that improve minimum requirements across the market, such as through the ICVCM, an independent governance body seeking to establish global standards to ensure the integrity of voluntary carbon credits, and the VCMI, which seeks to establish global standards regarding how credits are used to offset, and the resulting carbon claims. There is also a need for ratings agencies to play a greater role in carbon markets. While there are already active players in voluntary carbon markets, increased institutional participation and the creation of demand for rating services are critical to drive the scale necessary for the development of expertise in carbon markets.

StepStone is highly supportive of initiatives that seek to build consensus to improve the approach to the development and implementation of protocols, projects and offsetting practices, including the ICVCM and VCMI, with the ultimate objective of strengthening the integrity of the voluntary carbon market.

As standards continue to develop and both the integrity and perception of carbon credits improve, they are expected to drive more funding into carbon market projects and assist in the global transition to net zero. In the long term, as the standards for carbon markets converge, they will help to establish a global carbon price that mitigates many of the challenges associated with jurisdictions establishing independent GHG frameworks that have the potential to distort markets and result in unintended adverse consequences.

Conclusion

Carbon markets are not perfect; however, the desire for a perfect system should not become a barrier toward utilizing one that is good. As carbon markets continue to evolve and improve over time, their role in effecting a low-carbon economy will grow. In their current iteration, this role includes:

- Offering a means to reduce the emissions of those sectors of the economy that do not currently have access to commercially viable technologies or alternative business models to achieve meaningful supply chain abatement in the short to medium term.
- Creating a pricing signal to incorporate the cost of GHG emissions into the economy, which will weaken the competitiveness of carbon-intensive models and enhance that of low-carbon business models.
- Facilitating a cost-efficient transition to net zero, which will minimize the impact on society, help to retain public support, and ensure gains toward net zero are sustainable.
- Supporting the development of environmental markets, which seek to put a price on the ecosystem services provided by Earth's natural capital that is essential to society. We expect this will improve how society manages Earth's natural capital.

In summary, carbon markets create new revenue streams that encourage investment in emission reductions that might not have occurred otherwise. However, although carbon markets have a lot of potential, there is room for improvement.

The patchwork of compliance and voluntary markets results in a highly complicated and inefficient system. There are bad actors who threaten to undermine confidence in carbon markets. Standards need to be developed that can be applied universally across markets, which would improve integrity, help mitigate the risk associated with carbon markets, and

potentially facilitate the convergence of the multitude of carbon markets over time.

Institutional investors are uniquely placed to play a role in the development of this market given their existing organizational capabilities and responsible investment frameworks. Their participation has the capability to improve practices within the industry and leverage their capital and scale to develop standards, all of which will increase confidence, utilization and effectiveness of carbon markets, while possibly rewarding those investors who participate in this process.

We believe carbon credits are part of the climate change solution, not part of the problem.

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All data is as of October 2023 unless otherwise noted.

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