

Sustainability and Risk Practices

# How the voluntary carbon market can help address climate change

The voluntary carbon market is gaining momentum and plays an increasingly important role in limiting global warming. Here's how.

*This article was a collaborative effort by Christopher Blaufelder, Joshua Katz, Cindy Levy, Dickon Pinner, and Jop Weterings.*



**As business leaders** set increasingly ambitious commitments to reduce global greenhouse-gas (GHG) emissions, a market is developing that can help to achieve them by supplementing companies' efforts to reduce their own emissions. This is the rapidly growing market for voluntary carbon credits.

Carbon credits (often referred to as "offsets") have an important dual role to play in the battle against climate change. They enable companies to support decarbonization beyond their own carbon footprint, thus accelerating the broader transition to a lower-carbon future. They also help finance projects for removal of carbon dioxide from the atmosphere—delivering negative emissions, which will be needed to neutralize residual emissions that will persist even under the most optimistic scenarios for decarbonization. However, while the voluntary carbon credit market is currently experiencing significant momentum, it is still relatively small. The recently launched report by the Taskforce on Scaling Voluntary Carbon Markets aims to create a blueprint for solutions that could help overcome obstacles to its further growth. (For more about the Taskforce, which McKinsey supports as a knowledge partner, please read our article "Scaling voluntary carbon markets to help meet climate goals."<sup>1</sup>) This article will explain how carbon credits work and how they can help in the global effort to address climate change.

## The dual role of voluntary carbon credits in addressing climate change

A carbon credit is a certificate representing one metric ton of carbon dioxide equivalent that is either prevented from being emitted into the atmosphere (emissions avoidance/reduction) or removed from the atmosphere as the result of a carbon-reduction project. For a carbon-reduction project to generate carbon credits, it needs to demonstrate that the achieved emission reductions or carbon dioxide removals are real, measurable, permanent, additional, independently verified, and unique (see sidebar, "Criteria for carbon credits"). If a project meets these criteria—as specified by independent

standards such as Gold Standard and Verified Carbon Standard (VCS)—credits can be issued. The impact of a carbon credit can only be claimed—that is, counted toward a climate commitment—once the credit has been retired (canceled in a registry), after which it can no longer be sold. A carbon credit is considered a "voluntary carbon credit" when it is bought and retired on a voluntary basis rather than as part of a process of compliance with legal obligations.

The proceeds from the sale of voluntary carbon credits enable the development of carbon-reduction projects across a wide array of project types. These include renewable energy; avoiding emissions from fossil-fuel based alternatives; natural climate solutions, such as reforestation, avoided deforestation, or agroforestry; energy efficiency; and resource recovery, such as avoiding methane emissions from landfills or wastewater facilities; among others.

While most of these project types including renewable energy, avoided deforestation, and resource recovery focus on *avoiding* carbon emissions, others, such as reforestation, focus on *removing* carbon dioxide from the atmosphere. This is a meaningful difference, illustrating the dual role voluntary carbon credits can play in addressing climate change:

- *In the short term*, voluntary carbon credits from projects focused on emissions avoidance/reduction can help accelerate the transition to a decarbonized global economy, for example by driving investment into renewable energy, energy efficiency, and natural capital. Avoiding emissions is typically the most cost-efficient way to address atmospheric greenhouse gas concentrations.
- *In the medium to long term*, voluntary carbon credits could play an important role in scaling up carbon dioxide removals (or negative emissions) needed to neutralize residual emissions<sup>2</sup> that cannot be further reduced.

<sup>1</sup>Christopher Blaufelder, Cindy Levy, Peter Mannion, Dickon Pinner, and Jop Weterings, "Scaling voluntary carbon markets to help meet climate goals," November 2020, McKinsey.com.

<sup>2</sup>Emissions that can only be eliminated at prohibitive cost or that cannot be eliminated with existing technology.

## Criteria for carbon credits

Carbon credits should represent emission reductions or carbon dioxide removals that are:

- real and measurable—realized and not projected or planned, and quantified through a recognized methodology, using conservative assumptions
- permanent—not reversed; relating to projects with a reversibility risk such as forestry projects, which could suffer from fire, logging, or disease. Here, comprehensive risk mitigation and a mechanism to compensate for any reversals need to be in place.
- additional—would not have been realized if the project had not been carried out, and the project itself would not have been undertaken without the proceeds from the sale of carbon credits
- independently verified—verified by an accredited, independent third party
- unique and traceable—transparently tracked in a public registry and not double-counted

Additionally, it is important that appropriate safeguards are in place to ensure projects comprehensively address and mitigate all potential environmental and social risks.

In a recent analysis, we found that at least 5 gigatons of negative emissions will be needed annually to reach net-zero emissions by 2050. These could be realized through a combination of natural climate solutions such as reforestation (for example, sequestering carbon in trees) and nascent technology-based carbon capture, use, and storage solutions such as direct air capture with carbon storage (DACCS), and bioenergy with carbon capture and storage (BECCS). Voluntary carbon credits can help finance the scale-up of these solutions.

### **The role of voluntary carbon credits in corporate climate commitments**

A credible corporate climate commitment begins with setting an emissions reduction target that covers both a company's direct and indirect greenhouse gas emissions: if a company does not already have an emissions baseline from which to set a target, creating one is a necessary first step.

Aligning such a target's ambition level with the latest climate science is widely seen as best practice. In other words, the target needs to be in line with the level of decarbonization required to limit global warming to well below 2 degrees Celsius above preindustrial levels at a minimum—and ideally be in line with a 1.5-degree pathway, which scientists estimate would reduce the odds of initiating the most dangerous and irreversible effects of climate change. The Science Based Targets initiative has developed methodologies for setting such a target, which have been already adopted by more than 1,000 companies, including many leading multinationals. To achieve the required emissions reductions, companies can pull levers such as improving energy efficiency, transitioning to renewable energy, and addressing value chain emissions.

As a next step, a company may commit to a target that involves the use of voluntary carbon credits—either to compensate for emissions

that it has not been able to eliminate yet or to neutralize residual emissions that cannot be further reduced due to prohibitive costs or technological limitations. These types of targets come with various designations (for example, carbon neutral, climate neutral, net-zero, carbon negative, climate positive) but they all typically involve a company supplementing reductions achieved within its own carbon footprint by financing reductions elsewhere through the purchase and retirement of voluntary carbon credits (see sidebar, “Types of carbon targets”). By offsetting its remaining emissions in this way, a company can claim it is mitigating its residual impact on the climate. Some, such as Microsoft, have gone further by setting aspirations to make a net-positive impact on the climate.

### **Strong momentum, mainly driven by new corporate commitments and point-of-sale offerings**

Following three years of robust growth, the voluntary carbon market<sup>3</sup> reached a record high in 2019, both in terms of issuances and retirements (exhibit). Issuances were 138 million tons of carbon-dioxide equivalent—almost double the 2018 volume—and retirements 70 million, a 33 percent increase compared with 2018. This growth has been driven by a combination of new corporate climate commitments, such as those to carbon neutrality and net-zero, as well as so-called “point of sale” offerings of voluntary carbon credits, such as Shell’s carbon-neutral fuel, which is a bundled

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<sup>3</sup>We estimated the voluntary carbon market size based on five standards: VCS, Gold Standard, Climate Action Reserve, American Carbon Registry, and Plan Vivo. We excluded ARB-eligible credits and Gold Standard-labeled Certified Emission Reductions (CERs) used for meeting compliance targets.

## **Types of carbon targets**

In the context of corporate target setting, “carbon neutral” refers to offsetting all unabated greenhouse-gas emissions through the application of carbon credits to a given part of an organization’s footprint (for example, company-level, activity-level, product-level), usually on an annual basis. The term carbon neutral is typically used to cover other greenhouse gases as well; relevant standards, such as PAS2060, clearly specify carbon neutral’s scope as including carbon dioxide equivalent (CO<sub>2e</sub>) emissions, beyond just carbon dioxide.

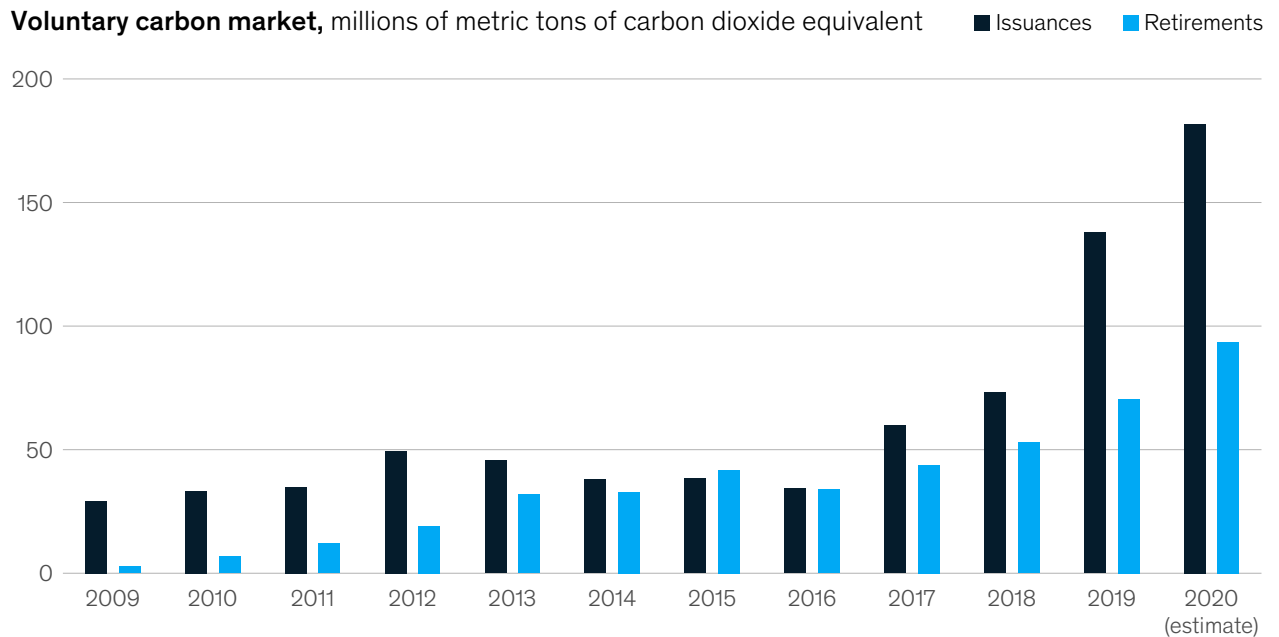
“Climate neutral” is often used interchangeably with carbon neutral, but it places more of an emphasis on covering greenhouse gases beyond carbon dioxide. In addition, it can include climate impacts other than greenhouse-gas emissions, for example, radiative forcing from aircraft contrails.

While the exact definition of “net zero” is still being debated, it is considered a forward-looking commitment requiring companies to reduce their emissions and balance remaining (residual) emissions by a given target year. There is an emerging view among stakeholders including nongovernmental organizations and corporate climate leaders that a credible net-zero target requires reducing emissions in line with the latest climate science and neutralizing residual emissions (at net zero) using carbon dioxide removals (not carbon credits from emissions avoidance/reduction projects).

Finally, both “carbon negative” and “climate positive,” which are used interchangeably, have not yet been clearly defined, but they imply going beyond the targets described above to make a net-positive impact on our climate.

Exhibit

## The voluntary carbon market has grown significantly in recent years.



Note: We estimated the voluntary carbon market size based on 5 standards: Verified Carbon Standard (VCS), Gold Standard (GS), Climate Action Reserve (CAR), American Carbon Registry (ACR), and Plan Vivo. We excluded ARB-eligible credits and Gold Standard-labeled CERs used for meeting compliance targets. Data was retrieved from aforementioned registries on December 2, 2020 for YTD volumes up until the end of November (ie, 150 million tCO<sub>2</sub>e of issuances and 81 million tCO<sub>2</sub>e of retirements). We projected volumes for full-year 2020 based on extrapolation in line with historical seasonality (last 5 years), and did not adjust for any COVID-19 related impacts on seasonality patterns. Source: ACR; CAR; GS; Plan Vivo; VCS

retail offering of gasoline and voluntary carbon credits, and airline passenger offsetting programs, which enable passengers to offset the emissions of their flights through the airline's website.

Based on year-to-date volumes and an extrapolation in line with historical seasonality patterns, we expect the market to set another record this year, with issuances and retirements both growing by approximately one-third compared with 2019. After years of declining prices (from an average price of around \$7 per ton in 2008 to around \$3 per ton in 2019<sup>4</sup>) due to supply outpacing demand, we expect average prices to go up in the near to medium term, mainly due to strong demand growth especially for higher-cost project types such as reforestation and carbon dioxide removal

projects more generally (see sidebar, "Issuances and retirements"). While still relatively small, the voluntary carbon market is experiencing significant momentum and its impact (and future potential) is getting more and more attention.

Natural climate solutions (NCS), a category including project types such as reforestation, avoided deforestation, improved forest management, and agroforestry, have grown faster than any other project category and contributed significantly to the voluntary carbon market's growth trajectory. From 2016–19, issuances within this category more than doubled every year, on average—and in 2019, NCS accounted for 53 percent of total issuances. Meanwhile, retirements

<sup>4</sup>According to the Ecosystem Marketplace.

## Issuances and retirements

To analyze the voluntary carbon market, we focus on two metrics: issuances and retirements, which together give a good idea of market dynamics. Issuance volume is a proxy for supply, as it represents voluntary carbon credits issued by a standard (for example, Gold Standard, VCS) upon the successful verification of emission reductions or carbon dioxide removals realized by a certified carbon-reduction project. Retirement volume is a proxy for demand, as it represents voluntary carbon credits bought and canceled in a registry, preventing the onward sale of the certificates. Only upon retirement can the buyer in whose name the credit was retired claim its impact (that is, count the credit toward a climate commitment).

in this category have also rapidly grown (close to 50 percent per year, on average). We believe this trend could be the result of increased awareness of NCS's potential (they can deliver one-third of the emissions reductions needed to align with the Paris Agreement between now and 2030<sup>5</sup>), a growing focus on carbon dioxide removal (of which NCS is the most cost-effective and technologically proven method), and buyers' preference for co-benefits beyond climate change mitigation, such as biodiversity and impact on local communities.

### What's next: challenges and opportunities

To accelerate the voluntary carbon market's growth trajectory and realize its full potential, it will be important to address some significant challenges. These include the need to strengthen impact and quality assurance, to align stakeholders on the criteria for credible use of voluntary carbon credits as part of an overall climate strategy, build new market infrastructure, and reduce regulatory uncertainty. We believe that implementing innovative solutions to these challenges could unlock further growth. The recently launched Taskforce on Scaling Voluntary Carbon Markets aims to create a blueprint for these solutions.

### Strengthening impact and quality assurance

While reputable standards such as Gold Standard and VCS certify projects' adherence to the requirements of their respective methodologies, buyers typically have limited transparency on the progress of the carbon-reduction projects in their portfolio. Stakeholders also regularly raise questions about certain types of projects, such as those related to additionality in large-scale renewable energy projects; biodiversity in the context of afforestation projects planting non-native species and/or monocultures; leakage and insufficient local community engagement in the case of avoided deforestation; or permanence of natural climate solutions more broadly (see sidebar, "Additionality, leakage, and permanence defined").

While reputable standards have implemented safeguards to address these issues, the combination of insufficient transparency and continued stakeholder skepticism has led buyers to demand a further strengthening of impact and quality assurance. As a result, we expect innovation in measurement, reporting, and verification practices to accelerate over the coming years.

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<sup>5</sup> Bronson Griscom et al., "Natural climate solutions," *Proceedings of the National Academy of Sciences*, October 2017, Volume 114, Number 44, pp. 11645–50, pnas.org.

## **Additionality, leakage, and permanence defined**

A carbon-reduction project is considered “additional” when its impact (emission reductions and/or removals) would not have been realized if the project had not been carried out, and that the project itself would not have been undertaken without the proceeds from the sale of carbon credits. As technology costs continue to fall, a growing number of renewable energy projects no longer need the proceeds from the sale of carbon credits to be viable—a key reason why the criterion of additionality is particularly relevant in the context of renewable energy projects. In response, standard bodies have started to phase out large-scale renewable energy projects. For example, VCS no longer certifies new, grid-connected renewable energy projects unless they’re located in least-developed countries.

Leakage occurs when a carbon-reduction project displaces emission-causing activities and produces higher emissions outside the project boundary. For example, protecting a certain forest area may cause loggers to go elsewhere. Leakage risk can be mitigated by strengthening project design as well as conservatively quantifying emission reductions and removals, making appropriate adjustments for estimated leakage.

Carbon-reduction projects should realize permanent emission reductions and/or removals. Where projects have a reversibility risk—such as forestry projects, which could suffer from fire, logging, or disease—comprehensive risk mitigation and a mechanism to compensate for any reversals needs to be in place. It is common practice for standard bodies to include buffer provisions (requiring all projects with reversibility risk to set aside a certain percentage of credits in a buffer or insurance pool). In the unfortunate event of a reversal of emission reductions and/or removals (for example, due to fire or disease), credits from the buffer would be used to cover the losses.

### **Aligning stakeholders on credible use of voluntary carbon credits**

There is currently no consensus among stakeholders on what it takes to use voluntary carbon credits credibly as part of an overall climate strategy. Therefore, companies may have different interpretations of the role voluntary carbon credits could play in their journeys toward net-zero. Key points of discussion include the extent to which a company can rely on voluntary carbon credits versus reducing its own footprint; the type of credits (for example, emissions avoidance/reduction versus carbon dioxide removal) to use, and how their role may evolve over time. There is a clear distinction between the role of voluntary carbon credits today and that which they will play when a company has all but fully decarbonized its footprint and needs only to neutralize its residual emissions.

### **Building new market infrastructure**

Today, voluntary carbon credits are mainly traded over the counter, resulting in limited transparency

on market data (for example, transaction volumes, price levels) and a paucity of reference data, which was a key barrier to market growth in the past. Standardized, tradable products and contracts could help increase liquidity and scale transactions, provided that the quality of credits traded and integrity of market participants are ensured.

### **Reducing regulatory uncertainty**

The negotiations about the Paris Agreement’s Article 6, which introduces a new international carbon market/mechanism, are ongoing. As a result, the implications of Article 6 for the voluntary carbon market are still unclear. Should voluntary purchases of carbon credits by private sector actors help countries achieve their post-2020 climate pledges (which are referred to as nationally determined contributions), or should they be incremental to such targets? Will governments continue to allow projects to issue voluntary carbon credits? When is double-counting an issue, and how can that be avoided? Reducing regulatory uncertainty may encourage

more buyers to make long-term commitments, and developers to make large-scale investments.



Voluntary carbon credits could play a critical role in helping the world attain a 1.5-degree pathway. They can both accelerate the transition to a lower-carbon future by enabling companies to support decarbonization beyond their own

carbon footprint and help neutralize residual emissions by financing carbon dioxide removal projects. To realize this potential, significant practical effort is required to address current challenges and scale up the voluntary carbon market. Achieving that will create significant benefits not just in the battle against climate change but also in preserving nature and the untold benefits it provides to humanity.

**Christopher Blaufelder** is a partner in McKinsey's Zurich office; **Joshua Katz** is a partner in the Stamford office; **Cindy Levy** is a senior partner in the London office; **Dickon Pinner** is a senior partner in the San Francisco office; and **Jop Weterings** is director of environmental sustainability, based in the Amsterdam office.

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