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What Every Leader Needs to Know About Carbon Credits

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In the absence of government regulations requiring dramatic reductions of greenhouse gas (GHG) emissions that are causing climate change, a growing number of companies are adopting “net zero” targets. More than one third of the world’s 2,000 largest publicly held companies have declared net zero targets according to Net Zero Tracker, a database compiled by a collaboration of academics and nonprofits. These targets typically entail public commitments to reduce GHG emissions through measures such as process modification, product

reformulation, fuel switching, shifting to renewable power, investing in carbon removal projects — and a pledge to zero-out their remaining emissions by purchasing carbon offsets, also known as carbon credits. Carbon credits are financial instruments where the buyer pays another company to take some action to reduce its greenhouse gas emissions, and the buyer gets credit for the reduction.

As companies creep closer to their net zero target years, many have already begun purchasing carbon credits. The market for carbon credits is projected to grow 50-fold within a decade, from nearly \$2 billion in 2022 to nearly \$100 billion by 2030, and as much as \$250 billion by 2050, according to Morgan Stanley. But navigating the world of carbon credits creates brand risk because the market remains immature and complex, with wide variation in project types, developers, location, and cost, resulting in unclear quality, transparency, and credibility.

Companies routinely choose to purchase rather than produce goods and services that other companies can create more inexpensively, and this decision doesn't often attract the attention of activists or the media. Not so for carbon mitigation: Activists are vocal about how companies choose to meet their net-zero goals. Corporate carbon mitigation plans viewed as overly reliant on buying carbon credits rather than making carbon reductions to their own operations and supply chains risk being accused of not being sufficiently serious about decarbonization and seeking to “buy their way out” of meaningfully achieving their goals. In part, this is because the carbon credit market is far too small to accommodate the dramatic carbon reductions necessary to meet companies' net-zero goals or for the world to reduce GHG emissions by 45% by 2030 and reach net zero by 2050 that the UN claims is necessary to avoid the worst effects of climate change by limiting the global average increase to 1.5 degrees Celsius. Questions about credits' credibility abound, including whether they deliver on their promise to

reduce GHGs, whether any such reductions will endure, and whether the project would have occurred even without the sale of carbon credits. From John Oliver's [claim](#) that "offsets are bullshit" to the [Guardian](#) calling some carbon credits purchased by Disney, Gucci, and Shell "largely worthless," some offsets receive charges of "greenwashing" — environmental performance claims that outstrip reality. That's hardly the reputation boost firms seek.

Yet, the voluntary carbon market has the potential to drive billions of dollars over the coming decade into climate solutions, creating along the way an estimate of cost-of-carbon in goods and services. What's the best way to participate in the market when carbon credits claiming to avoid or remove one metric ton of GHG [range in price from nearly \\$2 per ton to \\$1,800 per ton](#)? Which types of credits are considered to be the highest quality, and thus least likely to lead your company to be named and shamed? Despite the emergence of standards and registries meant to inject confidence in the market, many quality concerns remain. Leaders need guidance to apply due diligence to decisions regarding the carbon credit market.

What projects create carbon credits?

Carbon credits are created from projects that avoid the generation of GHG emissions or that remove GHGs from the atmosphere. These projects include "nature-based solutions," such as reforestation and regenerative agriculture efforts, and "engineered solutions," such as combusting methane emitted from landfills to generate electricity and direct air capture.

Examples of Carbon Credit Projects

This table illustrates the differences between nature-based and engineered solutions for both carbon emissions avoidance and carbon removal.

	Carbon emissions avoidance	Carbon removal
Nature-Based Solutions	Preservation of forest land to avoid its conversion into farmland	Regenerative agriculture practices that sequester (embed) atmospheric carbon into soils and vegetation
Engineered Solutions	Carbon capture and storage of GHGs from smokestacks at coal- and natural-gas-fueled power plants and other types of factories New solar-and wind-power plants that substitute for fossil fuel electricity Combustion of stockpiles of ozone-depleting substances that would otherwise leak into the atmosphere Combustion of methane emissions from landfills	Direct air capture of GHGs from the atmosphere with deep-well storage

Source: Varsha Ramesh Walsh and Michael W. Toffel



Some companies focus only on some of these types. [Microsoft](#), for example, invests only in carbon removals. Others create a portfolio across the spectrum, such as Delta's [\\$137 million investment in carbon credits that include REDD+ \(reducing emissions from deforestation and forest degradation\)](#) avoidance credits, avoidance credits from solar and wind-power projects, and removal credits including afforestation and carbon capture and storage.

Who are the players?

Unlike with stock exchanges, carbon credits lack widely adopted standards and large centralized marketplaces. This makes it difficult to find, understand, and compare carbon credit projects.

Instead, leaders have to navigate a maze of various standards and players with frustratingly overlapping roles. There are numerous carbon credit registries and standards bodies that provide minimum

requirements for various project attributes and in some cases list projects that meet their own standards.

- **Carbon credit verifiers**, also known as validation/verification bodies (VVBs), assess whether projects meet certain standards. They range from global companies to niche players that focus on just one type of project.
- **Carbon credit brokers and marketplaces** connect buyers with project developers. Some list projects they helped finance and develop, raising the potential for conflicts of interest.
- **Carbon credit ratings agencies** assess carbon credit projects along various dimensions, including but not limited to the attributes featured in standards. They tend to sell their ratings via a subscription model to prospective credit buyers. These ratings agencies provide much-needed transparency and convey key attributes of the projects they rate.

With so many players and many standards, it's no wonder companies find it difficult to navigate the landscape. The [Voluntary Carbon Markets Integrity Initiative](#) or [Oxford Net-Zero Aligned Offsetting Principles](#) provide holistic carbon credit and offsetting principles and are a great place for leaders to start, but even these are updated periodically to keep pace with the changing landscape.

Examples of players in the carbon credit marketplace

- **Carbon credit registries and standards bodies:** [VERRA's Verified Carbon Standard \(VCS\)](#), [Gold Standard](#), [Climate Action Reserve](#), [American Carbon Registry \(ACR\)](#), [Puro.Earth](#), and [Isometric](#)

- **Carbon credit and offsetting principles:** Integrity Council for the Voluntary Carbon Market's [Core Carbon Principles](#) and Oxford [Net Zero-Aligned Offsetting Principles](#)
- **Carbon credit verifiers:** [SCS Global Services](#) and [DNV](#)
- **Carbon credit brokers and marketplaces:** [3Degrees](#), [Cloverly](#), [Lune](#), [Patch](#), [South Pole Group](#), and [Terrapass](#)
- **Carbon credit ratings agencies:** [BeZero](#), [Calyx](#), and [Silvera](#)

What makes for a high-quality carbon credit?

It's crucial to understand the key dimensions that differentiate the quality and brand risk associated with different types of credits. While the most reputationally sensitive organizations might choose to pursue high quality along all dimensions, others are more willing to make tradeoffs. Some buyers prefer credits related to their industry — such as food companies that prefer nature-based approaches in agriculture — and are willing to accommodate higher permanence risk, or the risk that a project's climate benefits might only be temporary rather than permanent. Some companies prefer credits generated from newer technologies, hoping that early purchases encourage them to continue developing their technology to scale up and reduce their costs.

While standards bodies and registries have attempted to clarify what quality means, they have not kept up with the pace of innovation and explosive growth of the carbon credit market. Some of the older methodologies have accumulated limited proof of climate impact, and projects with novel technology are meanwhile trying to measure and communicate their climate impact with scientific rigor. The proliferation of standards has [created conflict](#) and confusion.

Below, we describe five attributes that constitute high-quality carbon credits and discuss the co-benefits.

Additionality

This refers to the idea that the carbon credit project would not have occurred without the expected revenue from selling the carbon credit. For a project to be additional, the revenues from selling the carbon credits must play a decisive (“make or break”) role in the project developer’s decision to implement the project. Evaluating additionality is often subjective: Projects are reviewed by registries, scientists via the peer review process, and third-party evaluators to determine if the project can demonstrate financial, technological, or institutional additionality.

For an example where additionality is clear, consider startup Heirloom Carbon Technologies. It uses limestone to extract carbon dioxide from the atmosphere and relies on the promise of carbon credit revenues to fund its capital-intensive process. [Stripe Climate](#) and other leaders in the carbon dioxide removal space have expressed high confidence that Heirloom’s carbon credits exhibit additionality. For some companies, such as [Google](#), additionality is the main attribute they look for when selecting carbon credits. “If Google hadn’t invested in an offset project, it wouldn’t have been built. We want to make sure that those tons of carbon wouldn’t have been avoided or sequestered hadn’t it been for our investment,” [said](#) Anna Escuer, the lead for water and carbon at Google. She also noted that additionality enables companies to claim “that it was [their] money that really made that project happen.”

One caution: Additionality can be a moving target. Innovations that reduce technology costs and public policies such as new subsidies can mean some types of projects to no longer meet additionality tests. For example, a particular project developed a few years ago that passed additionality tests and thus created carbon credits might, if launched today, become profitable even without selling credits — meaning it would not be additional, thus would not be able to issue carbon credits.

The takeaway: Pay close attention to additionality claims. Carbon removal projects are more likely to be additional because their carbon credits more clearly depend on credit revenue.

Quantification

This refers to the method a project uses to determine the volume of carbon dioxide reduced, avoided, or removed. Carbon credits are supposed to represent one metric ton of carbon dioxide equivalent gas. How do we know that the quantity reported by a project is accurate? Project methodologies define standard quantification approaches, and these are used to establish both a baseline scenario — how much GHG emissions would be released without the project — and to estimate how much less GHG emissions result due to the project, which determines how many carbon credits the project generates.

Often, project developers describe in their calculations any deviations they made from those standard approaches to reflect unique aspects of their process. Even the most rigorous of projects tend to require some degree of estimation. Projects address this by highlighting potential discrepancies and building adequate buffer pools. Carbon credit buyers can also mitigate the risk of overestimating carbon benefits by purchasing more credits than they need in order to build in a buffer for reduction claims such as achieving net zero targets.

The takeaway: Understand the quantification risks that your carbon credit projects entail, including any deviations and discrepancies from standard quantification approaches, and develop strategies to mitigate those risks, such as overpurchasing or building in a buffer pool.

Leakage

This is the risk that emissions avoided or removed by a project are pushed outside the project boundary. For example, if you are paying to avoid deforestation, does the project's cordoning off some land

simply shift the deforestation pressure to adjacent land? Do projects that entail the destruction of stored ozone-depleting chemicals spur the manufacture of new ozone-depleting chemicals that wouldn't have otherwise been produced? High-quality projects account for many potential sources of leakage and quantify their impact into the number of credits they generate.

The takeaway: Similar to quantification, look for projects that take leakage into account and develop a sound approach to incorporating it into your quantification estimates. Assessing these project-specific details requires technical expertise that credit buyers can invest in or can ascertain from assessments provided by carbon credit rating agencies.

Permanence risk

This refers to the possibility that the GHG emissions avoided or removed from the atmosphere as a result of a carbon credit project might be temporary rather than permanent benefits, with a “reversal” resulting in such carbon being released into the atmosphere. For example, consider carbon credits sold based on the emissions avoided because a project prevented some hectares of forest from being cut down. It can be quite difficult to estimate the probability that the forest will never be cut down — or perhaps catch fire — in the future, either of which would undo the project's carbon benefits. On the other hand, carbon credits created from a project that utilizes direct air capture and stores that carbon in a sealed well are very likely to remain there indefinitely.

Many standards set the permanence target as 100 years, with Frontier Climate setting the most stringent standard: 1,000 years. Carbon credits with very high confidence of permanence — that is, that exhibit low permanence risk — exist but are in short supply and tend to be quite expensive. Due diligence efforts should assess the likelihood that

policymakers might authorize and even encourage policy changes that can override today's permanence claims, such as future policies that foster the development of lands previously conserved via carbon credit projects.

To manage permanence risk, some carbon credit providers include a form of insurance: They set aside a percentage of the carbon credits generated by a project to hold in reserve and offer as compensation if reversals occur. Alternatively, buyers can self-insure by purchasing more credits than they currently need.

The takeaway: When purchasing carbon credits with permanence risk, buyers can manage reversal risk — that carbon benefits might turn out to be temporary — by purchasing insurance or by self-insuring, and should include this insurance cost when comparing carbon credits.

Vintage

This refers to the year that credits were issued by the project. Buying credits that were recently issued and/or that were generated from projects that were recently launched increases the odds that your funds will go towards organizations that are actively innovating and launching projects. In addition, these credits are more likely to have met more stringent voluntary certification standards, which in general have become more rigorous over time as scientific knowledge has evolved. In fact, some crediting schemes — such as the aviation sector's CORSIA program — only allow for project vintages starting at 2016.

The takeaway: Recent vintage carbon credits can take advantage of improved standards and can reward and encourage active project developers focusing on high-quality credits.

Co-benefits

Some carbon credit projects not only avoid or remove GHG emissions; they also provide co-benefits such as reducing health problems, enhancing biodiversity and water quality, and creating jobs. For example, the [Yagasu Project](#) that restored mangrove forests in Sumatra, Indonesia to sequester carbon also created a [village revolving fund](#) and empowered women to serve in management roles and to participate in town hall meetings to discuss local business development.

Such co-benefits can provide tangible publicity benefits to credit buyers. For example, [Infosys describes the co-benefits](#) of investing in biogas and cookstove carbon credit projects in India as generating “over 2,400 jobs” that benefit “more than 102,000 families.”

Purchasing carbon credits with co-benefits can also provide confidence that your funding had social *and* environmental impact. Equinor, which recently bought carbon credits in partnership with Sylvera, strategically chose a portfolio of different types of carbon credit projects, [prioritizing those with co-benefits](#).

The takeaway: Carbon credit projects that produce co-benefits can offer enhanced reputational benefits and diversify the impact of the project — but don’t eliminate the need to understand carbon credit quality.

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With the enormous growth in companies’ use of carbon credits to meet their sustainability goals and carbon footprint reduction targets, there is an increasingly wide range of projects that are generating carbon credits from which to choose. Companies should choose the carbon credit strategy that best meets their objectives. Purchasing high-quality credits reduces the risk of negative publicity and greenwashing charges and bolsters the odds that the carbon you think you are avoiding or

removing is *actually* being avoided and removed — in both the short and long terms.

Editor's note (12/22/23): CarbonPlan, which does not create or sell ratings of credits or offset projects, has been removed from the list of carbon credit ratings agencies.

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