

In the Voluntary Carbon Market, Buyers Will Pay for Quality

September 2023

By Paulina Ponce de León Baridó, Jesper Nielsen, Anders Porsborg-Smith, John Pineda, Bayo Owolabi, and Matt Gordon

In the Voluntary Carbon Market, Buyers Will Pay for Quality

Executive Summary

Increasingly, organizations are purchasing credits in the voluntary carbon market (VCM) to fulfill part of their climate commitments. Yet little research exists on buyers' purchase behaviors—the attributes of credit quality that they regard as most important and are most willing to pay for. Such information can elevate VCM quality by guiding suppliers' carbon credit development priorities, buyers' decision making, and third parties' standards and interventions.

In November 2022, to better understand buyer preferences, BCG, with support from the Environmental Defense Fund (EDF), surveyed nearly 500 company leaders whose duties included making voluntary carbon credit purchases for their companies. The survey used conjoint analysis to quantify respondents' preference and willingness to pay (WTP) for key credit quality attributes. Conjoint analysis simulates actual purchase decisions—in which respondents must make tradeoffs between different attributes—instead of directly asking how important an attribute is. This approach makes it possible to identify and quantify the attributes that respondents prefer and are willing to pay for, and it mitigates the risk that respondents will rate all attributes as very important.

The survey showed that buyers across market segments are willing to pay significantly more for credits of demonstrably high quality. This finding indicates that the VCM is not a “race to the bottom” focused on purchasing the cheapest credits. Buyers expressed their highest WTP for credits with higher greenhouse gas (GHG) impact scores from third parties, and they were unwilling to consider credits with lower scores. This finding highlights the importance of giving buyers simple, reliable heuristics for evaluating the quality of credits, especially in view of the many dimensions of quality that companies must assess and companies' lack of resources for assessing them.

Respondents indicated that, of the various quality dimensions that they consider when purchasing credits, the ability to prove impact is most important. In particular, they prioritize project and program transparency and measurement, reporting, and verification (MRV) over other dimensions of quality. Buyers clearly are looking for quality on dimensions that will help them defend their purchase decisions as the VCM faces scrutiny from many stakeholders.

Respondents identified project or program type, co-benefits, and location as the next-most important quality dimensions after GHG impact. Of the two broad types of projects and programs—reductions and removals—respondents across segments preferred removals and were to a large extent willing to pay for them. In choosing among reduction projects and programs, lower-maturity respondents preferred renewable energy solutions; however, recent decline in the cost of renewables, which may put them on par cost-wise with fossil fuels, likely makes these credits lower in quality than other reduction credits. In contrast, higher-maturity segments tended to prefer nature-based solutions (NBS). Although some NBS project types have attracted criticism, other NBS project or program types have the potential to elevate quality in the VCM.

Other dimensions that can help elevate VCM quality have been gaining more stakeholder attention recently, although buyer preference and WTP vary for each. Most respondents said that they preferred and were willing to pay for jurisdictional REDD+ (JREDD+) credits, a sign of the potential that programs using jurisdictional-level approaches and impact quantification may have to attract buyers and elevate quality. Benefit sharing, on the other hand, attracted lower WTP marks, suggesting that respondents considered it a nice-to-have option rather than an essential, and that there is a lack of transparency about this key attribute.

The survey findings have several important implications for the VCM and for VCM stakeholders. First, project developers should tailor their strategies and product portfolios to capture value and drive high-quality credit volumes to meet growing demand. Buyers should shape their future budgets with quality and price increases in mind, while learning procurement best practices from peers and leading VCM buyers. And third parties such as NGOs, standard setters, and rating agencies should continue educating and guiding buyers on credit quality and elevating standards, focusing their efforts where WTP is lowest.

Acknowledgments

The authors wish to thank Pedro Martins Barata, Jordan Faires, Luis Fernández Intriago, Alex Hanafi, Darcy Jones, and Rainer Romero-Canyas of EDF for their invaluable role in shaping the research and the report.

We would also like to thank Ruth Chen and Ryan Song at BCG, and Suzi Kerr, Breanna Lujan, Erica Morehouse, and Amy Morse at EDF for their contributions.

Understanding Carbon Credit Quality

As climate concerns become increasingly urgent, more and more companies are committing to ambitious emissions reduction targets as part of the effort to realize the Paris Agreement’s goal of achieving global net zero by 2050. To meet part of their pledges, many organizations are purchasing credits in the voluntary carbon market (VCM). But allegations of greenwashing (such as when companies use credits of dubious quality to buy their way out of abating their own emissions) and projects of questionable climate benefit have raised concerns about the value of these credits, putting pressure on buyers and casting doubt on the integrity of the VCM—and the market’s potential to mitigate climate change.

The quality of the carbon credits bought and sold in the VCM underpins the market’s ability to deliver real climate impact. The underlying premise of carbon credits is that reducing or removing one particular metric ton of carbon has quantifiably the same impact on emissions as reducing or removing a different metric ton of carbon. In practice, however, this premise does not always hold true because credits can differ dramatically in various critical dimensions of quality. To understand a credit’s impact, therefore, buyers must evaluate these dimensions, including scores that reflect the project’s impact on GHG emissions; social and environmental safeguards; and the co-benefits that the project provides to the community. (See the sidebar, “Quality Attributes Defined.”).

This can be a challenging task. Many companies purchasing credits simply lack the expert capacity to make such assessments. Standard-setting bodies are working to improve transparency, but these efforts are still in their early stages.

In late 2022, to better understand buyer preferences, BCG, with support from the Environmental Defense Fund (EDF), surveyed 478 executives responsible for making voluntary carbon credit purchase decisions for their companies. (See the sidebar “About the Research.”) The survey was designed to answer several important questions:

- What companies buy voluntary carbon credits, and why do they buy them?
- Which dimensions of quality do buyers most care about today, and how much are they willing to pay for them?

- How price sensitive are buyers at each tier of carbon credit quality?
- Where do gaps exist in buyers knowledge and willingness to pay (WTP) for important quality attributes?

The key takeaway is that buyers across market segments are willing to pay significantly more for credits of demonstrably high quality. They especially favor credits for projects or programs that combine a strong commitment to transparency with dimensions such as measurement, reporting, and verification (MRV) to permit more reliable quantification of the project’s impact on GHG emissions.

Credit sellers should not compete on price at the expense of quality. Instead, they should tailor their strategies and product portfolios to meet the demand for quality, while remaining transparent and consistent in their approach.

The Expanding Voluntary Carbon Market

The global VCM has grown rapidly since 2019, as companies purchase carbon credits to meet climate commitments that they are not yet able to address in their own value chains. In 2022, market demand for voluntary carbon credits stood at about 160 million metric tons of carbon dioxide equivalent (tCO₂e)—a fourfold increase in just five years.¹ Projections estimate that demand will reach between 330 million and 1.5 billion tCO₂e by 2030.² These projections take into account various market scenarios that may arise as demand changes amid increased scrutiny of the VCM and substantial growth in climate commitments, economically viable supply, and jurisdictional reducing emissions from deforestation and forest degradation (JREDD+) programs.³

Carbon credits are priced per metric ton of GHG emissions reduced or removed from the atmosphere. As of the end of 2022, voluntary carbon credit prices averaged from \$4 to \$8 per metric ton at wholesale (the price paid to the program or project developer), with prices varying depending on the type of project. For example, afforestation and reforestation credit prices averaged from \$8 to \$15 per metric ton, while energy efficiency credits averaged from \$2 to \$6 per metric ton.⁴

1. Shell and BCG, “The voluntary carbon market: 2022 insights and trends,” 2022.
2. Trove Research, “Global Carbon Credit Demand Projection: Quarterly Update” July 2023; BCG analysis.
3. Reducing emissions from deforestation and forest degradation (REDD+) projects reduce GHG emissions through forest-based activities such as avoided deforestation. A JREDD+ program is defined as a set of these REDD+ activities overseen and measured at the jurisdictional level; it is led by authorities at the national or subnational political or administrative unit level to reduce forest-based emissions and enhance removals within an accounting area in that jurisdiction. These activities are conducted according to a strategy or action plan, supported by systems for forest monitoring and safeguard compliance, and assessed at a jurisdictional-scale reference level.
4. AlliedOffsets; Ecosystem Marketplace; Trove Research, op. cit.

Quality Attributes Defined

Stakeholders in the voluntary carbon market have established a fairly consistent set of supply-side quality attributes for carbon credit projects or programs. We define the various quality attributes highlighted in this report as follows:¹

- **Additionality.** The emissions reductions or removals would not have occurred without the added incentive of carbon credits.
- **Measurement, Reporting, and Verification.** The project or program has robust principles, provisions, and methodologies to quantify emissions reductions and removals.
- **Permanence.** The credit poses zero risk that the underlying climate benefit might be lost (such as through stored carbon being released as a result of natural or human-caused impacts), or it has adequate provisions to mitigate those risks.
- **Leakage.** The project or program accounts for the degree to which reductions or removals from a mitigation activity are negated by increased emissions elsewhere (for example, a situation where reducing deforestation at one site could lead to increased deforestation at other sites).
- **Transparency.** The project or program facilitates access to relevant nonconfidential information, including assurance that sufficiently detailed information on all projects is publicly available and that program requirements and decision making are transparent.
- **Co-benefits.** The project or program catalyzes significant positive socioeconomic benefits toward the UN Sustainable Development Goals that go beyond GHG emissions reductions.
- **Social and Environmental Safeguards.** The project or program establishes safeguards to ensure no worse than a do-no-harm approach to social and development impacts, particularly by enabling global, regional, and local stakeholders affected by the effort to voice concerns, demand fair treatment, and, when appropriate, pursue redress or compensation.
- **Benefit Sharing.** The project or program establishes a mechanism for equitable distribution of revenue and other benefits in consultation with local stakeholders.



1. Carbon Credit Quality Initiative (CCQI), “Methodology for assessing the quality of carbon credits, Version 3.0, May 2022.”

End buyers typically see higher prices when they purchase credits through intermediary sellers. Resale prices averaged closer to \$17 per metric ton, a figure in line with this report's survey findings.⁵ Other 2022 BCG research indicates that buyers generally expect to pay an average of at least \$15 per metric ton.⁶

The vast majority (85%) of buyers responding to this survey expect their total VCM budgets to increase. This finding is supported by the 2022 BCG research, which indicates that buyers expect to pay \$25 to \$30 per metric ton by 2030. The expected increases in prices and budget are likely driven by increased demand for higher quality credits and potential scarcity—annual credit retirements (and thereby demand) could start exceeding annual issuances (supply) as early as 2024 or 2025 in cases where demand is high.⁷

Buyer Segments

As part of the effort to improve VCM integrity, many organizations have launched initiatives to establish quality standards for buyers and suppliers, and the availability of data on projects and pricing is growing. Yet little is known about the preferences of the buyers themselves—which credit attributes they prefer, how much they are willing to pay for them, and which ones they consider must-haves. To help close this knowledge gap, this survey assessed buyers' purchase motivations and decision making.

Buyers purchase voluntary credits primarily to meet their climate commitments. Most respondents in our survey stated that they use credits to compensate for their own carbon emissions, applying these compensation claims both to near-term goals such as carbon neutrality and to long-term net zero goals. Buyers also use credit purchases to enhance their organization's brand. A small portion of respondents stated that they purchase credits solely for contribution claims—that is, to contribute to net zero globally but not to compensate for their own emissions.

KEY BUYER ATTRIBUTES

In general, purchase patterns differed along two key buyer attributes: carbon intensity and climate maturity.

Carbon intensity refers to the metric tons of carbon dioxide equivalent (tCO₂e) that a company's operations emit divided by the company's revenue. We used industry-level measures of carbon intensity to segment respondents. The energy, industrial goods, and aviation industries are carbon intense, meaning their tCO₂e emissions per unit of revenue are high. The claims that such companies make are likely to receive more public scrutiny than those of less

carbon-intense companies. Carbon intensity, along with emissions per dollar of profit, also has a bearing on affordability because it can affect the total funds a company has available to pay for a carbon credit.

Climate maturity consists of two defining elements: how ambitious the company's climate goals are in the near and long terms (such as a near-term science-based target by 2030 and net zero by 2050, respectively), and how rigorously it tracks and reports emissions. Organizations with high climate maturity have ambitious climate goals and track emissions across Scope 1, Scope 2, and Scope 3, which are defined, respectively, as direct emissions from company-owned and controlled resources, emissions released during consumption of purchased energy, and emissions released by the company's upstream and downstream value chain.

THE FOUR SEGMENTS OF CARBON CREDIT BUYERS

Our analysis revealed four segments of respondents. (See Exhibit 1.) Each segment has a distinct set of preferences and WTP thresholds:

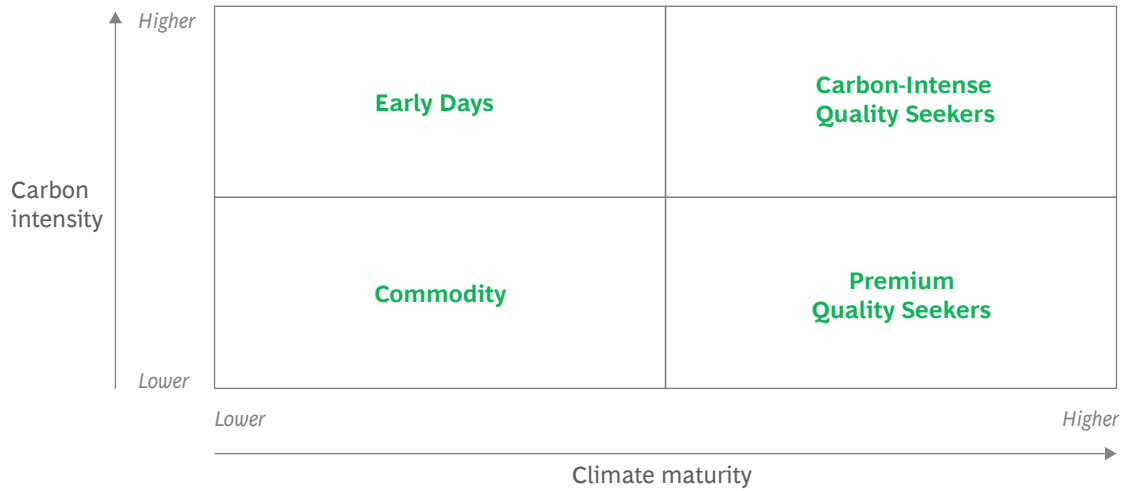
- **Commodity: Lower Carbon Intensity and Lower Climate Maturity.** In our survey, 22% of respondents belong in the Commodity segment. These less carbon-intense companies tend to treat credits more like commodities but still have a minimum quality bar: they tend to purchase the cheapest credits that meet the standards of credible certifications, standard-setters, or other third parties.
- **Early Days: Higher Carbon Intensity and Lower Climate Maturity.** This category accounts for 33% of respondents surveyed. Early Days buyers tend to seek higher quality credits than Commodity segment buyers do because their carbon intensity attracts heightened scrutiny. Even so, they are still in the process of developing more mature quality-assessment capabilities and greater familiarity with a range of high-quality project or program types.
- **Carbon-Intense Quality Seekers: Higher Carbon Intensity and Higher Climate Maturity.** This segment comprises 18% of respondents. Here, buyers are developing higher-maturity programs, tracking their emissions more rigorously and systematically assessing credit quality. Most follow the best practice of building their portfolio for quality over quantity, prioritizing high-quality credits over other portfolio considerations. Some buyers, however, instead place more weight on portfolio quantity, and their carbon intensity may affect their WTP for carbon credits.

5. AlliedOffsets, op. cit. Our survey also used the Van Westendorp Pricing Sensitivity Meter to determine a range of prices for voluntary carbon credits that buyers generally consider acceptable. This analysis indicated that \$15 to \$30 was an acceptable range of prices for the current set of voluntary carbon credits.

6. Shell and Boston Consulting Group, op. cit.

7. Shell and Boston Consulting Group, op. cit.; Trove Research, "Supply-demand gap analysis (2023 update)," April 2023.

Exhibit 1 - Carbon Credit Buyers Fall into Four Segments



Source: BCG analysis.

Exhibit 2 - Attributes That Survey Respondents Used to Evaluate Credit Purchases

		Levels									
Attributes	GHG impact score ¹	1 (Very Low)		2 (Low)		3 (Moderate)		4 (High)		5 (Very High)	
	Project type ²	Reduction: energy efficiency, fuel switch and/or transport	Reduction: renewable energy	Reduction: waste and industrial processes	Reduction: household devices	Reduction: REDD+	Reduction: jurisdictional and/or nested REDD+	Reduction: other nature-based	Removal: forestry-based	Removal: other nature-based	
	Co-benefits	No co-benefits		Socioeconomic		Adaptation		Environmental (excluding biodiversity)		Biodiversity	
	Benefit sharing and safeguards	Mechanisms not included					Mechanisms included				
	Location	Not near or within buyers' value chain			Country is in or adjacent to buyers' value chain			Community/region is in or adjacent to buyers' value chain			
	Price	Randomly simulated from \$2 to \$50									

Source: BCG analysis.

Note: The survey also included registry and certification and vintage as attributes. The order of preference for each level is not necessarily as displayed in the exhibit. For example, some respondents may have preferred socioeconomic co-benefits over biodiversity co-benefits, even though these levels appear in the reverse order in the exhibit.

¹Defined as a quality score from a third party—specifically, a carbon credit rating by a third party or NGO, separate from registry, determined on the basis of additionality, permanence, and measurement, reporting, and verification.

²The two general types of projects are reductions and removals.

- **Premium Quality Seekers: Lower Carbon Intensity and Higher Climate Maturity.** This segment, 27% of respondents, consists of companies in less carbon-intensive industries that are leaders in the VCM. Premium Quality Seekers purchase high-quality credits because they want to be market makers and leaders in the sustainability effort. They are keen to acquire the highest-quality credits possible and have set ambitious climate targets. Moreover, they view the VCM as an opportunity to fund investments in newer climate technologies such as direct air capture (DAC), and they are willing to pay a high premium for them.

Assessing Buyers' Preferences

Buyers in the VCM consider a range of attributes for every project or program that they wish to support through credit purchases. (See Exhibit 2.) We used conjoint analysis to determine the attributes that buyers deemed most important. (See the sidebar “Conjoint Analysis.”)

GHG IMPACT IS THE NUMBER ONE PRIORITY

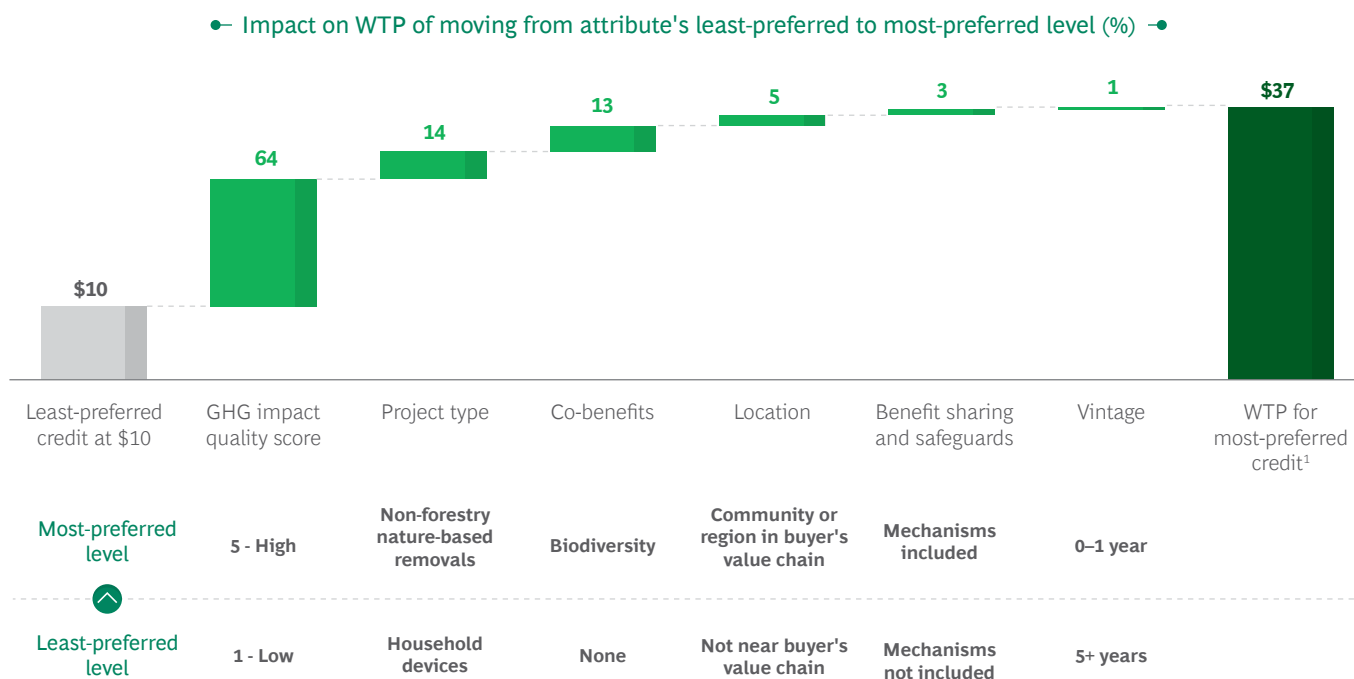
Respondents were most willing to pay a premium for confidence in the GHG impact of the credit, as represented by a simplified third-party GHG impact score. (See Exhibit

3.) This score, which includes dimensions such as additionality, permanence, and MRV, is analogous to scoring systems that ratings agencies and NGOs have created to assess the quality dimensions, including GHG impact, of a credit. These systems aim to help buyers and stakeholders evaluate credit quality if they lack the resources to assess it themselves.

Respondents across segments largely regarded a moderate (level 3 out of 5) score as a minimum requirement. Companies in the Early Days, Carbon-Intense Quality Seeker, and Premium Quality Seeker segments were unwilling to purchase credits with low (level 2) or very low (level 1) scores, while Commodity buyers were willing to purchase lower-score credits only if the price dropped significantly. (See Exhibit 4.)

All segments had the greatest WTP for credits with a very high (level 5) score, and a substantial WTP increase attended each jump in level. Commodity and Early Days respondents were willing to pay a 30% premium for a level 5 credit over a level 3 credit, assuming the level for every other attribute was the same; Carbon-Intense Quality Seekers and Premium Quality Seekers were willing to pay a 50% premium.⁸

Exhibit 3 - Respondents Consider the GHG Impact Score to Be the Most Important Attribute of Credit Integrity



Source: BCG VCM buyer survey, November 2022 (N = 478).

Note: WTP = willingness to pay.

8. Our analysis used level 3 as the GHG impact score reference point for the price premium because respondents indicated that they were largely unwilling to buy level 1 or 2 credits.

Conjoint Analysis

This survey used conjoint analysis to identify the attributes of credit quality that respondents most preferred, allowing quantification of the attributes that drove the greatest willingness to pay (WTP). In traditional surveys, respondents may be given a list of attributes and asked which, in their view, are important. This approach can lead respondents to give an undifferentiating answer—namely, that many attributes are important—without being forced to distinguish one attribute from another. Also, such direct questioning is not designed to determine the specific level of a given attribute respondents most prefer. By contrast, in conjoint analysis, respondents are asked to make tradeoffs between products. This approach better reflects the actual environment in which buyers make purchase decisions. As a result, it enables more robust modeling and forecasting of what buyers are likely to prefer.

The first step in our conjoint analysis was to define, with the help of buyer interviews and pre-existing research, a list of key attributes that buyers prioritize and that drive today's differences in credit prices. This list included GHG impact score; project or program type; co-benefits; social and environmental safeguards; location (defined as being in geographic proximity to the respondent's value chain); and price. Each attribute existed at two or more levels, such as a 1 to 5 scale for the GHG impact score.

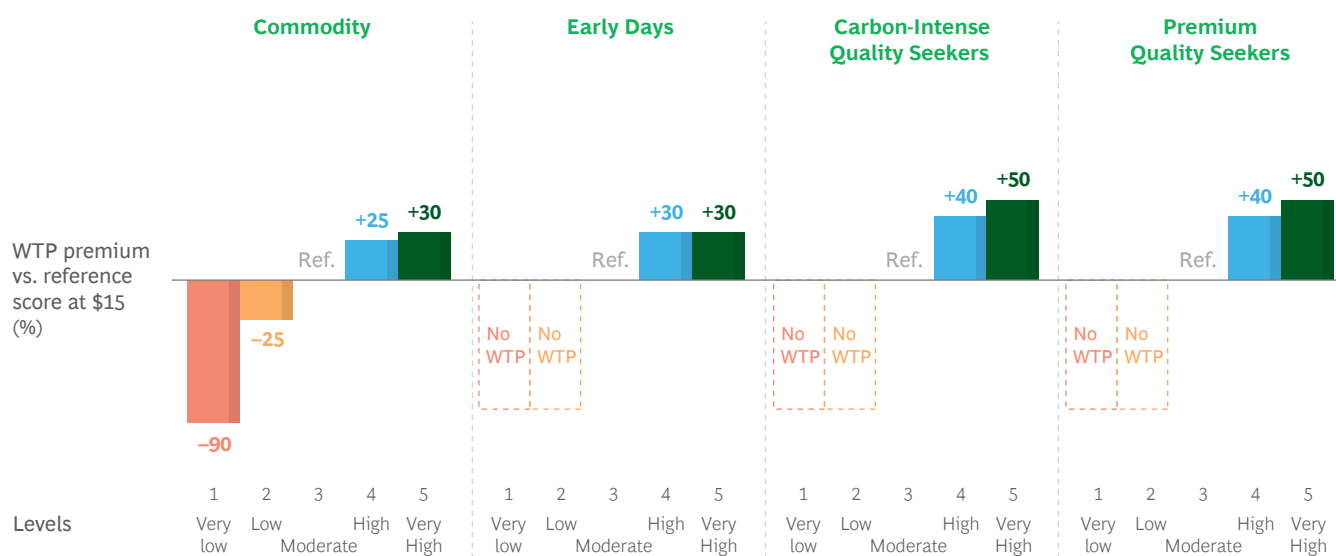
By selecting one level for each attribute, the survey software was able to build many different theoretical credits. We narrowed down our list of attributes and levels so that these credits represented realistic tradeoffs that respondents could process quickly. For example, we excluded engineered removals: they are much more expensive than other carbon credits, and so are not usually considered in trade-off decisions. Rather, buyers tend to evaluate engineered removals separately from other types of projects and programs when balancing credit portfolios precisely because of the large price difference. We also provided respondents with definitions of the attributes and the levels. For example, we defined the GHG impact score as the “rating of carbon credit by third party or NGO, separate from registry, based on: additionality, permanence, and measurement, reporting, and verification (MRV).”

Generating three credits at a time, the survey asked respondents to identify which option they would buy if they could select only one. We repeated this exercise several times with each respondent, using different credits in each round. This methodology allowed us to quantify each respondent's preference and WTP for each level of each attribute.

For the purpose of this discussion, WTP is the price premium over a base-credit price point where the number of buyers willing to pay the premium for the higher-level credit is equal to the number of buyers willing to pay the base price for the base credit. For example, if 60% of respondents were willing to pay \$15 for a base REDD+ credit, and 60% were willing to pay \$20 for a base forestry removal credit, and the credits had all the same levels, we would define the WTP for a forestry removal credit as \$5 more than the WTP for a REDD+ credit. Some buyers would be willing to even pay more than the reported WTPs for a particular level, though fewer buyers would be willing to pay for that level if the price rose higher.



Exhibit 4 - All Segments Consider Quality Very Important When Purchasing Carbon Credits



Source: BCG VCM buyer survey, November 2022 (N = 478).

Note: The reference value for the reported WTP premium percentages is a quality level of 3 (Moderate). “No WTP” = No price reduction would suffice to make respondents as willing to purchase carbon credits at the specified level as at level 3. WTP = willingness to pay.

Different ratings agencies and NGOs take different approaches to developing their scoring systems, and they face the same transparency challenges that end buyers do. As a result, scores in the market can be inconsistent. Nevertheless, these heuristics have the potential to mobilize financing for high-quality projects and programs, given how highly respondents in our survey valued the GHG impact score and how difficult it can be for buyers to evaluate quality.

BUYERS REGARD TRANSPARENCY AND MRV AS ESPECIALLY IMPORTANT QUALITY DIMENSIONS

To clarify which dimensions in a quality rating are most significant, we asked respondents to rate the importance they place on a subset of quality dimensions (via a standard survey question outside of the conjoint analysis).

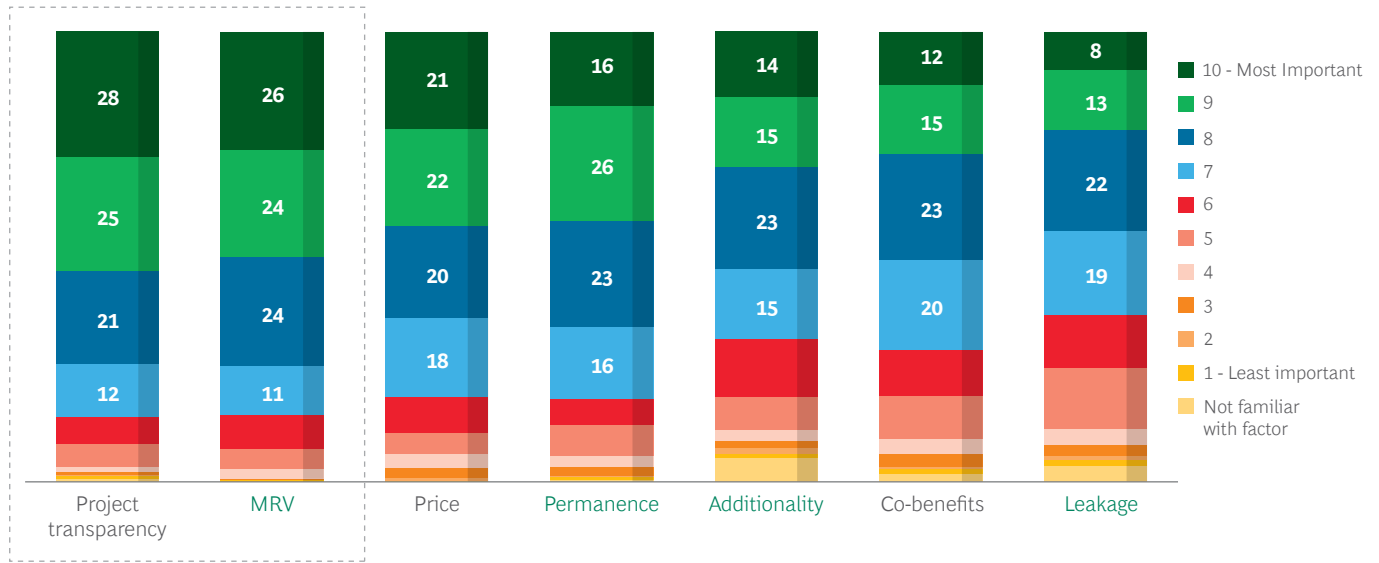
Respondents rated project transparency and MRV as the most important dimensions, likely because these components of a project provide palpable evidence of credit quality and impact. (See Exhibit 5.) In light of stakeholders’ intense scrutiny of credit purchases, companies want to be able to demonstrate that their purchases actually reduce emissions. “It’s getting to the point that I need these offsets unimpeachable or at least auditable,” one Commodity respondent said. “It doesn’t have to be the most expensive offsets, but at least ones that I can argue in front of a board of directors.”

RESPONDENTS NEXT PREFER PROJECT OR PROGRAM TYPE, CO-BENEFITS, AND LOCATION

Next after a high GHG impact score, respondents were most willing to pay premiums for attractive project type, co-benefits such as biodiversity, and location. Respondents across segments are reasonably consistent in the levels they most prefer, though segments differ in their views of certain types of reduction projects.

Exhibit 5 - Respondents Regard Transparency and MRV as the Most Important Dimensions of Quality

Respondents who chose each rating (%)



XX = Dimension with a direct tie to GHG impact score

XX = Subset of other key dimensions included in the survey question

Source: BCG VCM buyer survey, November 2022 (N = 478).

Note: Survey question: “Please rate how important the following factors are when your organization evaluates carbon credit quality. (1 = least important; 10 = most important).” MRV = measurement, reporting, and verification.

Project or Program Type. Buyers often use project or program type as a proxy for quality, especially when the information for evaluating quality dimensions is limited and the buyer is familiar with the particular type of project. Buyers also use choice of project or program type for storytelling in their climate communications: a company with land-intensive activities may highlight its forestry efforts, or a Premium buyer may highlight how its high-priced purchases are funding innovation in advanced carbon removal technology. (See the sidebar “Types of Carbon Credit Projects and Programs”).

Removals vs. Reductions. All four respondent segments prefer nature-based solution (NBS) removals to all types of reduction projects or programs. (See Exhibit 6.) Respondents generally perceive that removals are higher in quality. “We invest in growing new forests because you want to show that you want the next level of leadership in that space,” one Carbon-Intense Quality Seeker interviewee noted. “It’s more expensive and credible, since afforestation is easier to measure.” Even so, most credits sold today are reductions, and removals are in short supply.

Guidance from standard setters such as the Science Based Target initiative Net-Zero Standard and the Oxford Principles likely have driven the preference for removal credits, especially among the more mature segments. But both reduction and removal credits are critical for addressing the climate crisis. According to the UN Food and Agriculture Organization, more hectares of forest are deforested annually than are afforested and reforested annually.⁹ Meanwhile, the Tropical Forest Credit Integrity Guide reports that emerging project or program types like JREDD+ may elevate the quality of reduction credits.¹⁰

Varying Preferences Within Reduction Credits. Preferences for reduction projects vary from one segment to another. The two most mature segments, Premium Quality Seekers and Carbon-Intense Quality Seekers, tend to prefer NBS reduction credits over the engineered reduction solutions on the market. They shy away from renewable energy (RE) projects because many experts and standard-setting bodies no longer consider these to be additional: renewables have become cost-competitive with fossil fuels in most instances.¹¹

9. UN FAO, “The State of the World’s Forests,” 2020.

10. TFCI, “Tropical Forest Credit Integrity Guide for Companies, Version 2,” February 2023.

11. Verra, “The Future of the Voluntary Carbon Market,” April 2023; S&P Global, “Reckoning with renewables: As carbon certifiers tighten rules, renewable energy may re-evaluate options,” February 2022.

Types of Carbon Credit Projects and Programs

Each project or program uses one of two broad approaches to drive impact—removals, which pull carbon from the atmosphere, or reductions (also referred to as “avoidances” in the survey), which protect existing carbon sinks and thereby reduce the volume of emissions that would other-

wise be released into the atmosphere. In addition, each project or program falls into one of two solution types: nature-based or engineered (technology-based). (See the exhibit.)

The Two Main Dimensions of Project or Program Type Are Reductions vs. Removals and Nature-Based Solutions vs. Engineered Solutions

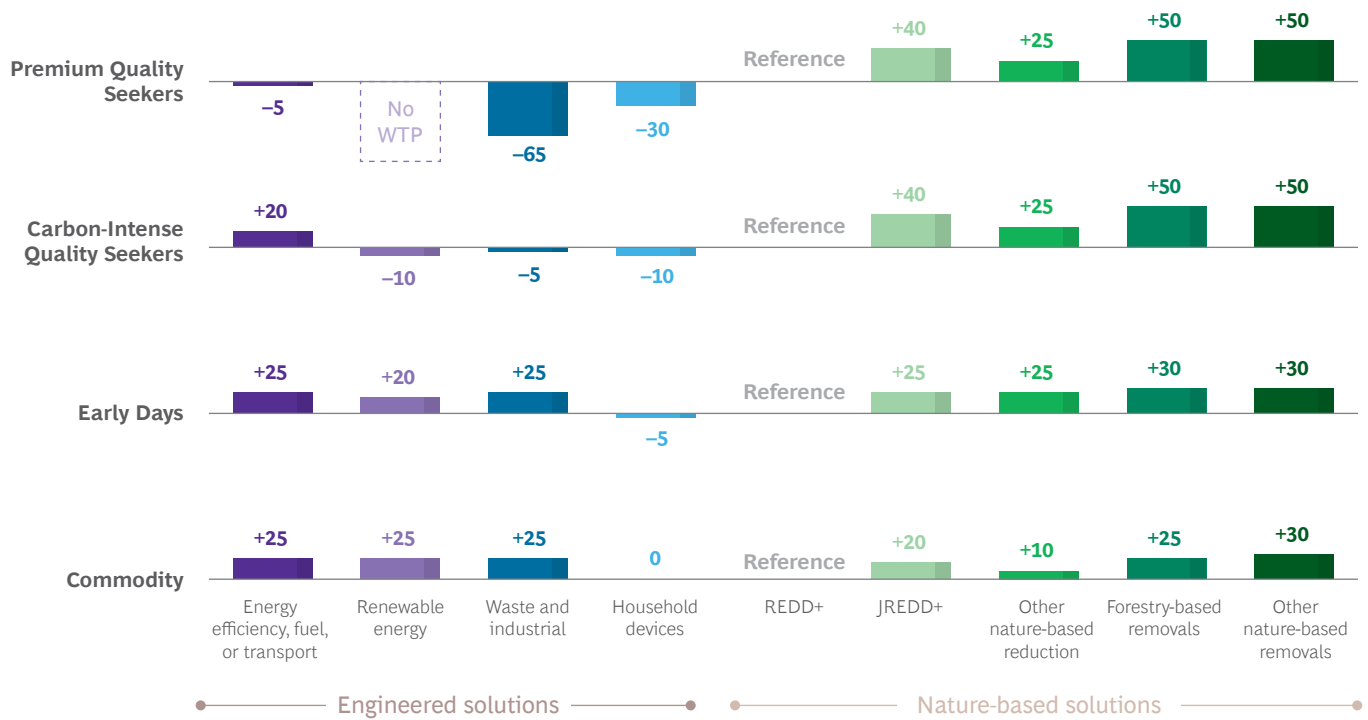


Sources: Hepburn et al., “The technological and economic prospects for CO₂ utilization and removal,” *Nature*, 2019; Fuss et al., “Negative emissions – Part 2: Costs, potentials and side effects,” *Environmental Research Letters* 2018; Keith et al., “A Process for Capturing CO₂ from the Atmosphere,” *Joule* 2018.

Note: The solutions listed here are not necessarily recommended. JREDD+ = jurisdictional REDD+; REDD+ = reducing emissions from deforestation and forest degradation.

Exhibit 6 - More-Mature Segments Prefer Nature-Based Solutions, While Less Mature Segments Prefer Engineered Reductions

WTP premium for project type vs. REDD+ at \$15, by low-carbon intensity segment (%)



Source: BCG VCM buyer survey, November 2022 (N = 478).

Note: The reference value for the reported WTP premium percentages is use of REDD+ as the project type. “No WTP” = no price reduction would suffice to make respondents willing to choose the project type in place of REDD+. JREDD+ = jurisdictional REDD+; REDD+ = reducing emissions from deforestation and forest degradation; WTP = willingness to pay.

Respondents in the less-mature segments prefer RE and other engineered reduction credits to NBS credits. Familiarity plays a role here: RE credits make up a significant portion of market volumes, and they have existed on the VCM for many years. “We select credits based on what my team and I understand,” one Commodity respondent explained. “We know renewable energy credits and how they are produced and that they are tangible and quantifiable offsets.” In addition, media scrutiny of REDD+ credits may be reducing buyers’ preference for nature-based reduction credits—a preference that may evolve as buyers observe more-mature segments moving away from RE credits or as stakeholders enact initiatives to elevate the quality of nature-based reduction credits.

Co-benefits. Respondents across all four segments indicated that they were willing to pay more for co-benefits because these projects do more than reduce GHG emissions—they also have positive non-GHG impacts on the community. Moreover, at least one carbon-credit issuing registry requires co-benefits, so some buyers may view them as a minimum standard. Respondents most valued environmental co-benefits, particularly biodiversity, followed by a lower but still significant WTP for socioeconomic and adaptation co-benefits.

More-mature respondents had a higher WTP for these co-benefits than did less mature buyers. For example, more-mature buyers indicated that they are willing to pay a 50% premium for biodiversity, whereas less-mature buyers are willing to pay a premium of 30%. The two more-mature segments often regard co-benefits not only as a strong indicator of quality but also as a valuable component of their climate narrative. “The story is important, such as supporting local communities and protecting native land,” one Carbon-Intense Quality Seeker noted.

Location. All four segments said that they were willing to pay a premium for a project or program located near their value chain. More-mature segments were willing to pay 30% to 40% more for such credits, while less-mature segments were willing to pay 20% to 25% more. Because of expectations that companies should clean up their own value chains, some buyers likely consider projects that are nearby to be next best. Moreover, location allows companies to communicate a more powerful climate narrative to stakeholders. “Location is important to us. It’s a bit counterintuitive because global warming is a global issue, but we want to have a connection to the site of the project,” one Carbon-Intense Quality Seeker stated.

BUYERS ARE WILLING TO PAY FOR MANY QUALITY FEATURES THAT ARE RECEIVING MORE ATTENTION

Recently, stakeholders have been bringing more attention to attributes and specific project and program types that may help elevate the overall quality of the VCM. Although buyer WTP for these attributes varies, they point the way to actions that market players might take to raise the integrity of the VCM and of their own credit purchases.

Jurisdictional REDD+ (JREDD+) credits. Most respondents had a strong preference and WTP for JREDD+ credits. More-mature segments expressed a higher WTP for JREDD+ credits than for other reduction credits. This finding aligns with emerging guidance that suggests JREDD+ programs produce better outcomes on some of the most important dimensions of quality, especially issues related to leakage, additionality, and permanence.¹²

Respondents from less mature segments, however, valued JREDD+ similarly to other non-REDD+ reduction project types such as renewable energy. This may reflect a simple lack of awareness, a lack of supply, or a lower preference for NBS in general. The knowledge gap may close as the supply of JREDD+ credits increases and as organizations launch more jurisdictional-level programs and initiatives, such as those in compliance with the ART TREES crediting standard and those participating in the LEAF Coalition.¹³

Technology-Based Removals. Respondents greatly valued technology-based removal projects such as DAC because of their clear and immediate impact. More than three-quarters of respondents said that they would buy tech removal credits at \$50, more than half would pay \$100, and at least one-fifth (mostly more-mature buyers) would pay up to \$200. (See Exhibit 7.)

This finding suggests that as technology costs drop and tech-based removals grow more frequent, prices may reach a tipping point below \$200 and thereby gain traction, especially with the more mature buyer segments.

Despite the allure of these technologies, their impact is as yet uncertain. At \$200 to \$1,500 per metric ton, engineered removals are much more expensive than nature-based reductions.¹⁴ Moreover, engineered removals account for only a small slice of the VCM pie. Today, the removal capacity of DAC is less than 10,000 metric tons a year.¹⁵ Bioenergy with carbon capture and storage projects capture approximately 2 million metric tons annually.¹⁶ Both figures are orders of magnitude lower than the 290 million metric tons of total voluntary carbon credits issued in 2022.¹⁷ Significant cost reductions and scale will be needed if these technologies are to play a meaningful role in climate action.

Social and Environmental Safeguards. Social and environmental safeguards and benefit sharing are essential to ensure equity for local communities where projects and programs occur. The findings from our survey, which groups these two attributes together as “benefit sharing and safeguards,” indicate that respondents have lower WTP for them than for various other attributes. Follow-up interviews, however, showed that respondents regarded safeguards differently from benefit sharing.

In those interviews, respondents consistently stated that they considered social and environmental safeguards to be a minimum requirement. “I remember well a nature-based project where [safeguards were] a very hot topic,” one Carbon-Intense Quality Seeker respondent recalled. “It was not likely well-embedded in the community around, and so we decided we should not support it.” Many respondents expressed this view about safeguards protecting Indigenous Peoples and minority populations. “We do surveys,” an Early Days respondent noted. “If we saw a lot of concern about there not being enough safeguards protecting Indigenous people and their rights, that was a big no-no.”

Buyers recognize that some registries lack sufficient safeguards. The same Carbon-Intense Quality Seeker noted, “Environmental and social safeguards are not covered sufficiently by the registries. If they were, then we wouldn’t have had this last-minute issue [about buying the credit].” Across dimensions where registries can improve, he continued, “Safeguards would for sure be very high on our agenda, and we would appreciate transparency on those.”

12. TFCI, “Tropical Forest Credit Integrity Guide for Companies Version 2,” February 2023.

13. ART TREES; LEAF Coalition.

14. Hepburn et al., “The technological and economic prospects for CO₂ utilization and removal,” 2019; Fuss et al., “Negative emissions—Part 2: Costs, potentials and side effects,” 2018; Keith et al., “A Process for Capturing CO₂ from the Atmosphere,” 2018; Realmonte et al., “An inter-model assessment of the role of direct air capture in deep mitigation pathways,” 2019; World Bank; IPCC; AlliedOffsets; Expert interviews; BCG analysis.

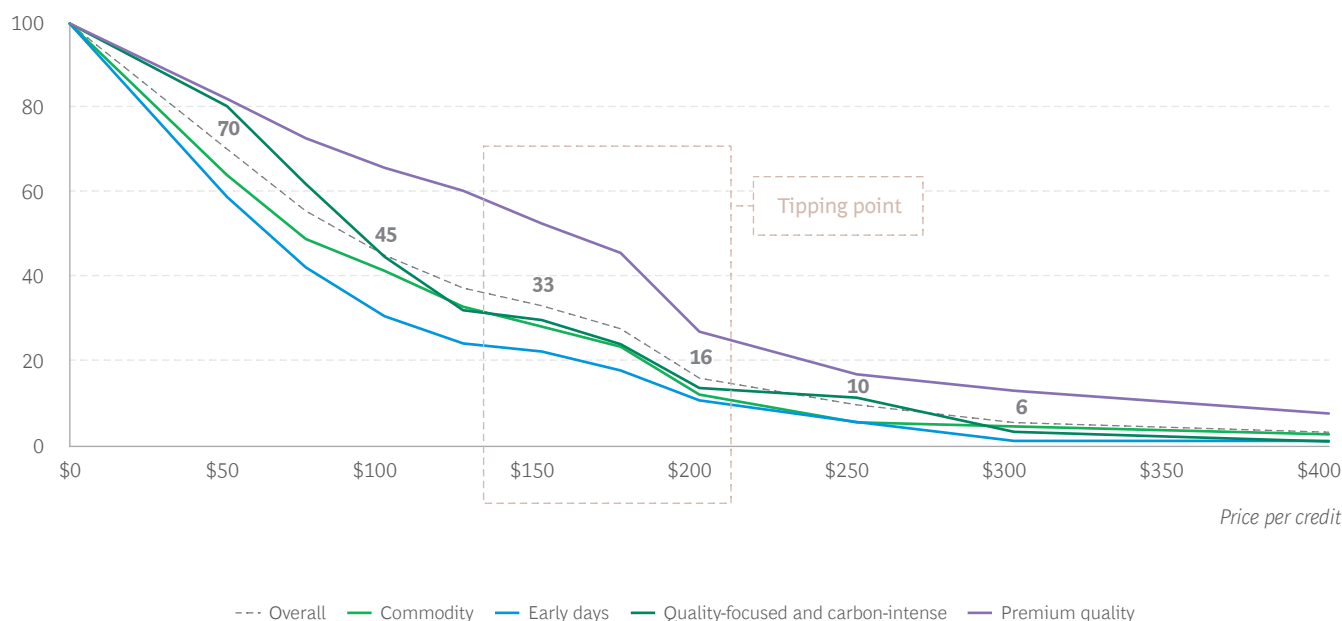
15. IEA, “Direct Air Capture,” July 2023.

16. IEA, “Bioenergy with Carbon Capture and Storage,” July 2023.

17. AlliedOffsets, “VCM Retirement Analysis and 2023 Forecast,” January 2023.

Exhibit 7 – Price Has a Major Impact on Buyers’ Willingness to Pay for Tech Removal Credits

Likelihood of purchasing technology-based removal credits as 5% of the organization’s voluntary carbon credit portfolio, by price point (%)¹



Source: BCG VCM buyer survey, November 2022 (N = 478).

Note: Survey question: “How likely would your organization be to purchase technology-based removal credits (e.g., direct air carbon capture) as 5% of your voluntary carbon credit portfolio at \$X per credit?”

¹The percentage given for each price point includes respondents who chose “Probably would buy” and “Definitely would buy.”

“We do surveys. If we saw a lot of concern about there not being enough safeguards protecting Indigenous people and their rights, that was a big no-no.”

Benefit Sharing. Buyers do recognize that, broadly speaking, equitable benefit sharing is an important element in supporting local communities. One respondent said, “It’s giving directly a benefit to the people and country. It’s looking at who is getting what benefit, as well as what is the benefit they’re getting. It shouldn’t be [split] 90-10 or 80-20—there should be some correlation [with community impact].”

Yet, when forced to make tradeoffs, respondents prioritized performance on other quality attributes, such as GHG impact score, over benefit sharing. “Honestly speaking, we don’t look at benefit sharing enough,” one Carbon-Intense Quality Seeker said. “Our focus first is on the credibility of the credits. We’re so busy worrying about credibility that we’re not as focused on benefit sharing. But if it could be more transparent, then for sure we’d look at it more.”

“Honestly speaking, we don’t look at benefit sharing enough. Our focus first is on the credibility of the credits. We’re so busy worrying about credibility that we’re not as focused on benefit sharing. But if it could be more transparent, then for sure we’d look at it more.”

Accordingly, if project developers and intermediaries improve transparency about a project’s benefit-sharing structure, they may help increase buyers’ WTP for this attribute. If increases in benefit sharing drive prices beyond buyers’ WTP, standard-setting bodies should consider raising the floor for benefit sharing standards.

Implications for Stakeholder Action and the Future of the VCM

Although it is critically important for buyers to focus on purchasing high-quality credits, all stakeholders should make a concerted effort to improve the quality of the VCM. The fact that low prices are not a primary motivator of credit purchase decisions suggests that project developers, buyers, and third parties should not base their interventions on an assumed “race to the bottom” model. Rather, they should use WTP to strengthen the integrity and impact of the voluntary carbon market.

SUPPLIERS AND INTERMEDIARIES

Buyers' strong WTP for higher-quality credits suggests that project developers and suppliers have opportunities to fund higher-quality projects. They may even have opportunities to increase market volumes through crediting projects or programs that would become financially viable at higher credit prices.

To tap into these opportunities, project developers and intermediaries need to focus their efforts on four areas:

- **Invest in credit quality and transparency.** Buyers' WTP indicates the existence of both an ethical case and a business case for investing in raising credit quality. Increased confidence in GHG impact currently commands a substantial increase in price and preference, but buyers are willing to pay for other quality attributes as well. Accompanied by greater project transparency (for example, via partnerships with stakeholders to standardize information sharing), efforts by project developers and intermediaries to improve quality can elevate the credibility, value, and impact of the entire VCM.
- **Understand the risks of not meeting buyers' quality expectations.** Buyers across segments are crystallizing their view of mandatory minimum quality standards, such as sufficient confidence in GHG impact and social and environmental safeguards. Project developers and intermediaries must recognize that underinvesting in these quality attributes poses a financial risk to projects by potentially suppressing demand amid high scrutiny of the VCM.
- **Educate less-mature buyers—and tailor portfolios of project and program types—with a focus on quality.** Suppliers can educate less-mature buyers on the quality and potential impact of high-integrity nature-based reduction credits such as JREDD+, especially since renewables' cost parity with fossil fuels is likely to lower the quality of RE credits. Across segments, project developers and intermediaries can help drive a balanced preference for reductions versus removals, in light of the critical need to reduce emissions in the near-term. Or they can consider unlocking more removal projects by pointing higher-maturity buyers with higher WTP toward removal projects.
- **Use co-benefits and location to elevate market value.** Projects and programs that provide GHG reduction activities with co-benefits—especially biodiversity co-benefits—can raise quality and drive positive impact on communities and ecosystems in ways that go beyond reducing GHGs. Similarly, project developers and intermediaries can increase carbon credit funding by directly providing companies with high-quality projects or programs that are closer to their value chains.

BUYERS

Buyers can continue to improve the quality of their VCM portfolio and effectively shape their VCM budget by following best practices from peers and market leaders. Several practical measures are especially useful in this regard:

- **Learn from leading VCM buyers.** Buyers should look to market leaders for examples of the kinds of credits that will advance their own climate maturity. More-mature buyers expect and are willing to pay more for higher-quality credits. When it comes to project or program type, their preferences follow emerging standards that reflect lower confidence in the GHG impact of renewable energy projects, and they have a greater WTP for higher-quality nature-based reduction credits.
- **Stay on top of quality trends.** As credit standards evolve, buyers should look for opportunities to elevate credit quality where stakeholders have recently focused greater attention. For example, buyers should keep an eye open for jurisdictional-scale credits such as JREDD+ that start coming to market. They should also reassess the importance of attributes such as benefit sharing that many buyers currently regard as only a nice-to-have, although stakeholder expectations may be higher.
- **Shape future budgets with the right expectations of VCM evolution.** Credit prices are likely to rise over the next few years, and buyers should adapt their budgets accordingly. A long-term VCM procurement program must be grounded on an understanding of which attributes are most important to meet company expectations and stakeholder standards, and what budget will be necessary to meet those preferences and standards.

THIRD PARTIES: NGOS, STANDARD SETTERS, AND RATING AGENCIES

By expanding education, raising standards, and simplifying credit evaluation, NGOs, standard setters, and rating agencies can continue encouraging buyers to differentiate between credits on the basis of quality and can appropriately value attributes deemed essential for a high-quality credit. Several considerations are noteworthy here:

- **Education has been and can continue to be effective.** After years of educating buyers and establishing procurement standards, NGOs and standard setters can see that buyers are willing to pay for quality. Third parties should continue to educate less mature buyers on emerging quality attributes and project or program types, such as benefit sharing and JREDD+ programs. NGOs can provide education on the value of developing a balanced portfolio of reduction and removal credits, with guidance on how to balance credits from reducing deforestation projects with emerging engineered solutions such as DAC.¹⁸
- **Rating heuristics have high potential.** Buyers have many dimensions of credit quality to consider, and in some cases, there may not be enough project transparency, or companies may not have the capacity to conduct robust evaluations on their own. Scores and other heuristics offer strong potential, especially for buyers that are willing to pay for quality. Although these rating systems are not yet widespread and may differ in their conclusions about quality, they have the potential to help elevate procurement practices and thereby the overall quality of the VCM.
- **Focus on raising standards for essential attributes that have the lowest preference and WTP.** Buyers' current WTP may be insufficient to elevate some important credit quality attributes, such as benefit sharing. Third parties should, therefore, focus their intervention efforts on elevating expectations and WTP for these attributes.

Amid the recent scrutiny of the VCM, quality remains top of mind for buyers, and they are willing to pay for it. This quality-first mentality will support the long-term success of the VCM as it develops the scale and impact necessary to accelerate a just global transition to net zero GHG emissions.

18. See, for example, the Tropical Forest Credit Integrity Guide, which recommends that companies “prioritize purchase of high-quality emissions reductions credits over removals credits, with a view to conserving standing forests until global goals of halting deforestation are achieved.” TFCI, “Tropical Forest Credit Integrity Guide for Companies, Version 2,” February 2023.

About the Research

BCG and EDF surveyed 478 individuals responsible for making voluntary carbon credit purchase decisions for their companies. The survey included conjoint analysis to isolate respondents' preferences and willingness to pay (WTP) for voluntary carbon credit attributes, as well as direct questions about their current purchasing behavior and preferences. Key details about the survey's methodology include the following:

- **Survey Date.** The survey was conducted in November 2022.
- **Global Coverage.** Among the countries included in the survey were the US (62%), the UK (11%), India (5%), France (4%), Germany (4%), Italy (3%), Spain (3%), Netherlands (1%), and Canada (1%).
- **Industry Representation.** Respondents spanned all industries, but 53% of them worked in five sectors: manufacturing and industrial goods (21%), energy (11%), financial services (15%), technology (11%), professional services (8%), and oil and gas (9%).
- **Company Size.** The number of employees in respondents' companies ranged from less than 50 (12%) to more than 50,000 (8%), with 44% having between 500 and 10,000 employees.
- **Product Categories.** The survey focused on reduction and removal carbon credits.

To ensure survey sample quality, we included quality-checking questions that either required respondents to have knowledge of the topic in order to answer them accurately or identified respondents who raced through the survey and therefore did not provide reliable responses. We excluded from the results all filled-in surveys from respondents who did not meet the standards of the quality-checking questions, resulting in our final sample of 478 qualifying respondents.

In addition, we conducted two sets of interviews with buyers about their purchase patterns and preferences. We did a first round of interviews to guide the design of the survey and conjoint analysis. Then, after conducting the survey we followed up with respondents to learn more about their purchase rationale or to validate survey insights on specific topics of interest, such as benefit sharing.

About the Authors



Paulina Ponce de León Baridó is a managing director and partner in the San Francisco-Bay Area office of Boston Consulting Group. You may contact her at PoncedeLeon.Paulina@bcg.com.



John Pineda is a managing director and partner in the firm's San Francisco-Bay Area office. You may contact him at Pineda.John@bcg.com.



Jesper Nielsen is a managing director and senior partner in the firm's London office. You may contact him at Nielsen.Jesper@bcg.com.



Bayo Owolabi is a principal in BCG's London office. You may contact him at Owolabi.Oluseye@bcg.com.



Anders Porsborg-Smith is a managing director and partner in BCG's Oslo office. You may contact him at Porsborg-Smith.anders@bcg.com.



Matt Gordon is a principal in the firm's San Francisco-Bay Area office. You may contact him at Gordon.Matt@bcg.com.

For Further Contact

If you would like to discuss this report, please contact the authors.



Boston Consulting Group partners with leaders in business and society to tackle their most important challenges and capture their greatest opportunities. BCG was the pioneer in business strategy when it was founded in 1963. Today, we work closely with clients to embrace a transformational approach aimed at benefiting all stakeholders—empowering organizations to grow, build sustainable competitive advantage, and drive positive societal impact.

Our diverse, global teams bring deep industry and functional expertise and a range of perspectives that question the status quo and spark change. BCG delivers solutions through leading-edge management consulting, technology and design, and corporate and digital ventures. We work in a uniquely collaborative model across the firm and throughout all levels of the client organization, fueled by the goal of helping our clients thrive and enabling them to make the world a better place.

One of the world's leading international nonprofit organizations, Environmental Defense Fund ([edf.org](https://www.edf.org)) creates transformational solutions to the most serious environmental problems. To do so, EDF links science, economics, law, and innovative private-sector partnerships. With more than 3 million members and offices in the United States, China, Mexico, Indonesia and the European Union, EDF's scientists, economists, attorneys and policy experts are working in 28 countries to turn our solutions into action.

