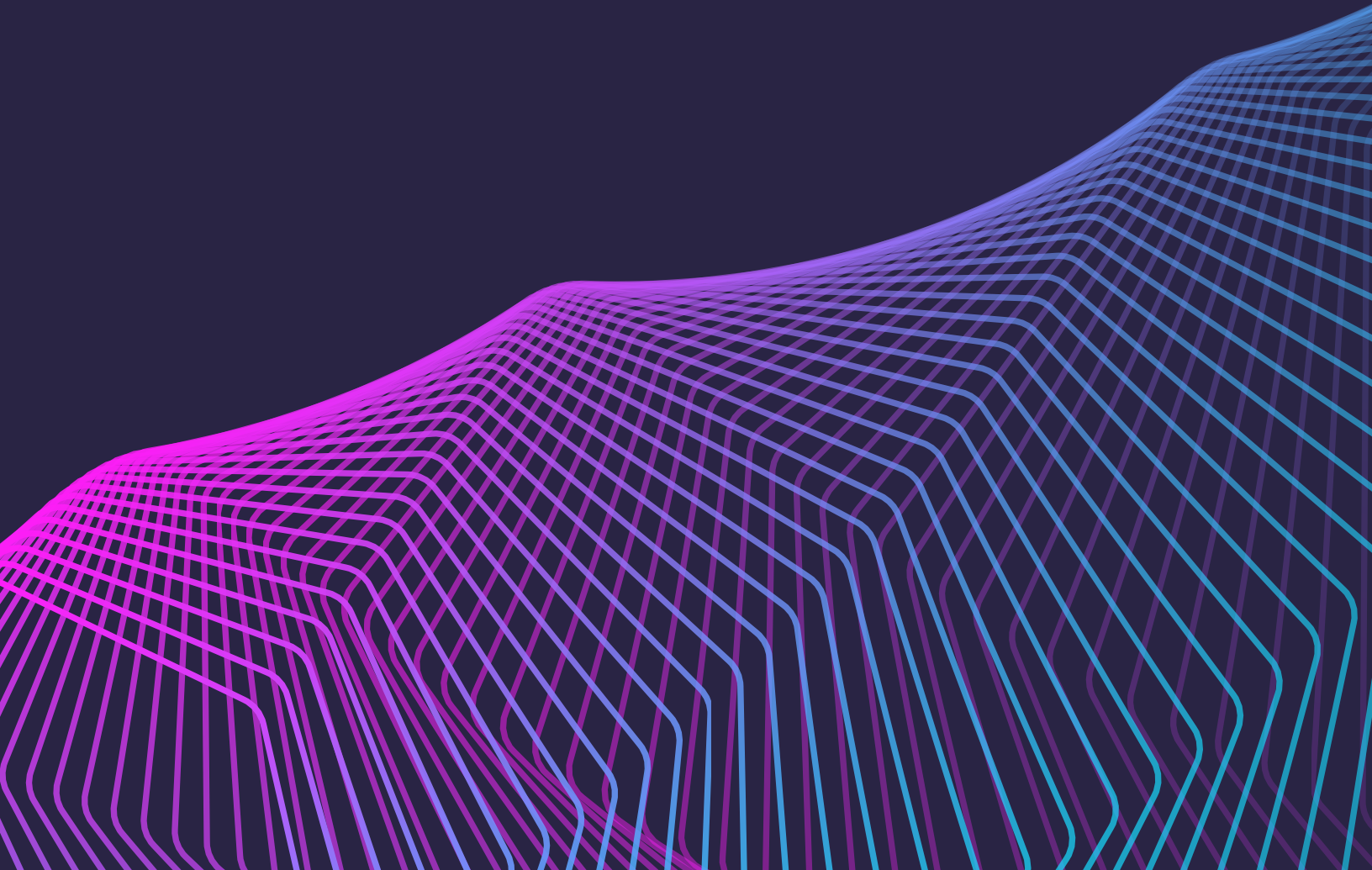


Calyx Global 

 CLEARBLUE
MARKETS

The State of Quality and Pricing in the VCM

FEBRUARY 2025



Executive summary

Calyx Global and ClearBlue Markets have teamed up to report on the State of Quality and Pricing in the Voluntary Carbon Market (VCM). This includes the creation of three new indices to track carbon credit quality, pricing and how these two relate in the VCM.

New Carbon Credit Indices:

- Calyx Carbon Integrity Index™ — Issuances
- Calyx Carbon Integrity Index™ — Retirements
- Calyx-ClearBlue Carbon Price-Integrity Index™

These indices are important indicators of the market's health. The VCM has faced headwinds in the past several years and can only grow and be sustained if confidence is restored. Such confidence is contingent upon robust claims of reducing (or removing from the atmosphere) greenhouse gases (GHGs). Ideally, the price of credits reflects quality. Credits should garner higher prices for higher quality, as this would not only encourage the generation of higher-quality credits but also be good for the planet.

What did we learn and what are the implications for buyers?

- **The GHG integrity of credits in the VCM continues its slow improvement:** Increasingly higher quality credits are available in the market, but buyers should still exercise due diligence when using credits as offsets.
- **Credit prices stabilized after a turbulent year:** Removal-based credits commanded a premium. However, pricing for other categories, such as renewable energy and REDD, remained suppressed due to market confidence issues.
- **High-quality credits are gaining recognition:** The highest tier of GHG-rated credits previously sold at a discount compared to more charismatic, lower-quality credits. This shifted in mid-2023, when higher quality began receiving price premiums, indicating buyers are starting to prioritize quality metrics.

This report includes the following:

1. **State of the VCM and pricing:** A summary by ClearBlue Markets, which tracks VCM data and maintains one of the VCM's largest pricing datasets.
2. **State of quality in the VCM:** A summary by Calyx Global, which has the largest set of project-specific carbon credit ratings.
3. **State of pricing and quality in the VCM:** A combination of these two datasets, which provides unique insights on the interaction of pricing and quality in the market today.

State of the VCM and pricing

2024 was a year of contrasts for the VCM. Progress toward the operationalization of Article 6 of the Paris Agreement, coupled with the first approvals and rejections for The Integrity Council for the Voluntary Carbon Market (ICVCM) Core Carbon Principle (CCP) label, added new layers of both opportunity and challenge. Issuances hit a four-year low, while retirements reached record levels, signaling shifting dynamics in supply and demand. 2024 retirements show participants gravitated toward newer, perceived high-quality credits, particularly those with carbon removal characteristics, which commanded a premium. However, issues such as overcrediting, additionality concerns and limited market transparency continue to test the resilience of the VCM.

Credit prices began to stabilize after the turbulence of prior years, offering some hope for a balanced market. While nature-based solutions (NbS) removal credits retained strong demand and sustained high prices, other categories, such as renewable energy, cookstoves and reduced emissions from deforestation and forest degradation (REDD) projects, faced persistent challenges. Price disparities and confidence issues underscored market complexities, reflecting a landscape where opportunities coexist with significant headwinds.

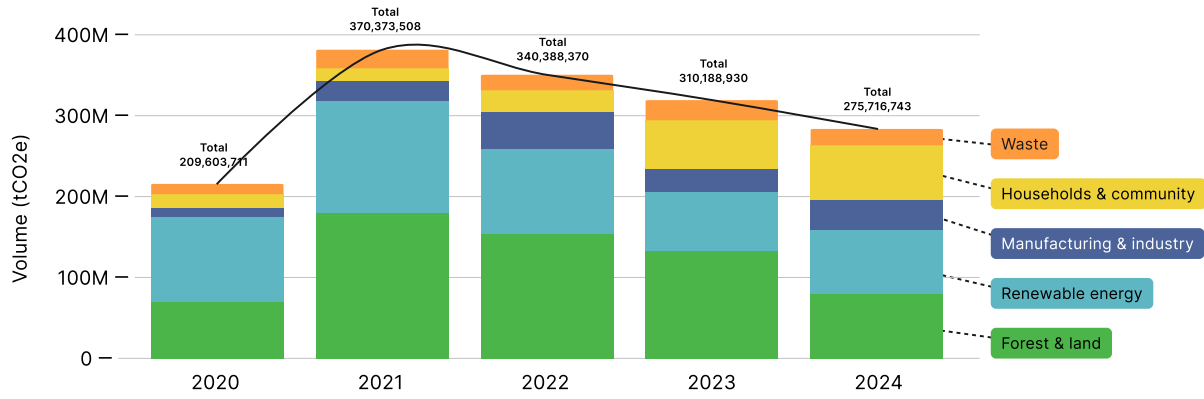
Continue reading to gain an understanding of the current landscape of the VCM and the key developments that shaped it throughout 2024.

Key trends in carbon issuances and retirements

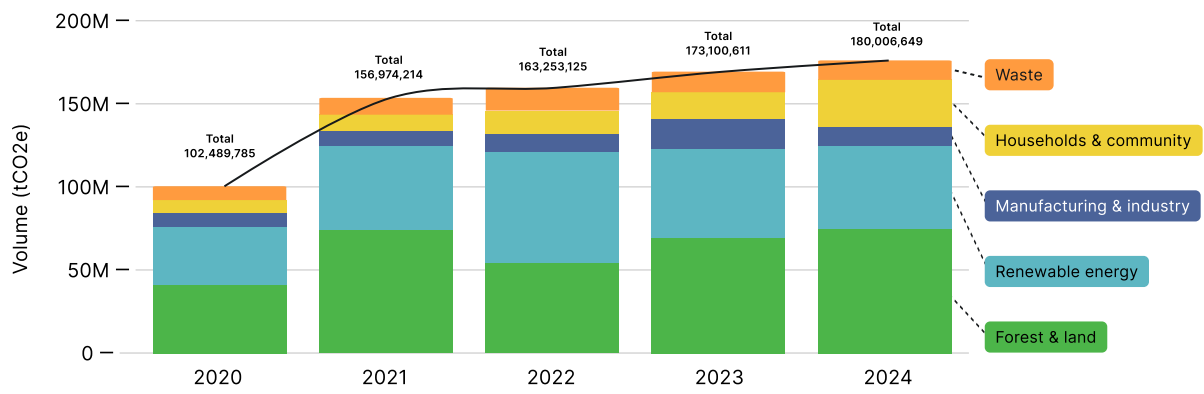
Issuances fell to a four-year low in 2024, continuing a sustained trend since 2021, when issuances reached a record high. The consistent decline has been most pronounced in forestry and renewable energy credits, which have decreased by 56% and 40%, respectively, since their all-time highs seen in 2021. The current available supply of credits (i.e., issued but not yet retired) stands at nearly 1 billion, providing market participants with a deep pool of credits to select from and suggesting that issuances may continue to face pressure until demand increases.

In contrast to issuances, credit retirements reached an all-time high in 2024. This surge was primarily driven by increased retirements in forest and cookstove credits. There was also notable demand for credits with a recent vintage, with those issued within the past five years accounting for 65% of total retirements in 2024. Market participants also demonstrated a strong preference for removal credits. Retirements of such credits totaled over 24 million in 2024 and, for the first time, exceeded issuances by a significant margin of 10 million.

Historical annual VCM issuances

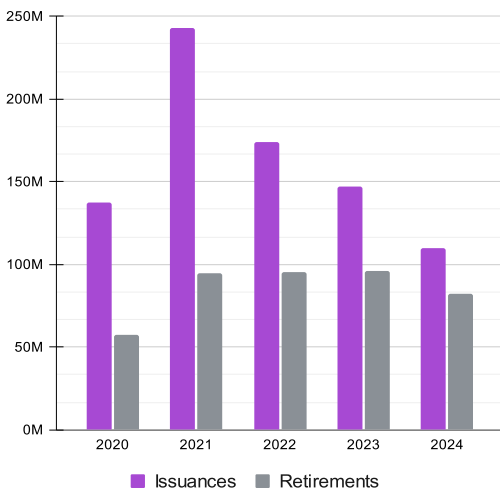


Historical annual VCM retirements

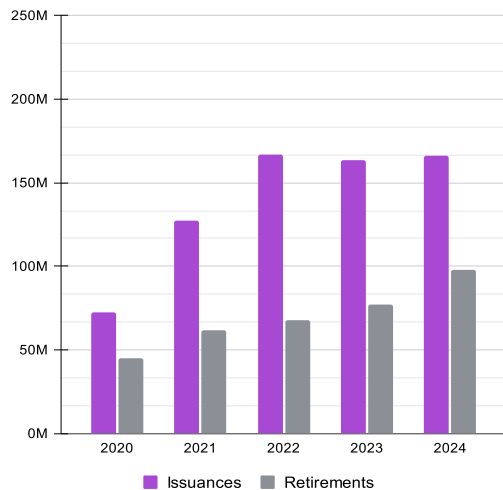


The biggest movement with regard to issuances was the decline of REDD and renewable energy credits. Such credits comprised over 55% of the VCM from 2021-2023, but only 40% of issuances in 2024. By contrast, all other project types, in aggregate, saw increases in both issuances and retirements – suggesting that the remainder of the market is healthier than the market for REDD and renewable energy.

Issuances and retirements of REDD and Renewable energy credits



Issuances and retirements of all other credits (non-REDD, non-renewable energy)



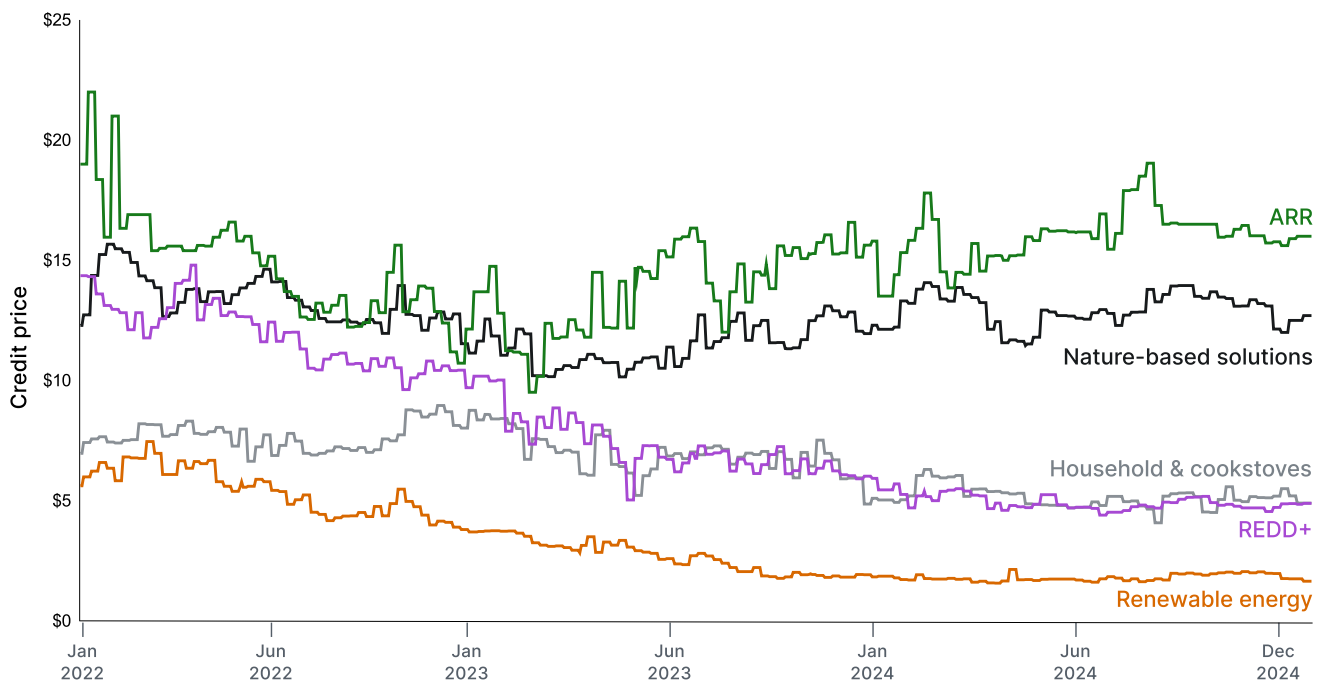
Note: Issuance and retirement data is based on seven registries: ACR, CAR, Verra, Gold Standard (GS), ART, COLCX and Cercarbano

Insights into current credit pricing dynamics

2024 was marked by credit price stabilization following a turbulent year. The demand for nature-based solutions* credits was reflected in the sustained high price point endorsed by market participants. Still, price spreads across different sub-types within NbS persist, driven by a demand for removal-based credits, such as afforestation, reforestation and revegetation (ARR) credits, and public perceptions of project quality among market participants. In particular, REDD projects have faced significant price deterioration over the past three years, following high-profile media exposés related to over-crediting and human rights issues associated with highly-traded projects.

The prices for household projects (e.g., cookstoves) and renewable energy projects have also declined, although not as severely as in 2023. Concerns surrounding overcrediting and additionality remain key factors suppressing prices. The ICVCM's rejection of many renewable-energy methodologies for the CCP label compounded these issues, as CCP-labeled credits are expected to trade at a premium relative to non-CCP-labeled counterparts, a trend currently observed in the market.

Average project type credit prices



*Nature-based solutions include reducing emissions from deforestation and forest degradation in developing countries (REDD), ARR, improved forest management (IFM) and others.

State of quality in the VCM

Last year we published our first “State of Quality in the VCM.” In that report, we noted the first hints that the VCM was turning a corner on quality – in particular, improvement in the GHG integrity of credits that caused the crisis of confidence over the past several years. This updated report presents further evidence that quality is improving in the VCM.

Because the VCM is, by definition, not driven by a regulatory authority (i.e., it is “voluntary”) it can only be sustained if there is confidence in the GHG claims being made. This is because the majority of credits are used by companies as offsets (i.e., to neutralize their emissions or make net-zero claims).

This year, Calyx Global created a “Calyx Carbon Integrity Index” to track the quality of GHG claims for issued and retired carbon credits within the VCM. Calyx Global leverages its in-depth, extensive set of rated VCM credits to do so.

Carbon credit quality, however, is more than just GHG integrity. That is why Calyx Global assesses quality on three dimensions – GHG integrity, Sustainable Development Goal (SDG) impact and effective safeguards for local peoples and ecosystems. Today’s VCM has the capacity to not only help tackle climate change but simultaneously benefit vulnerable communities, support threatened ecosystems and reduce global and local inequities. Carbon projects can also cause harm – that is why Calyx Global introduced environmental and social risk analysis. This is an area that we believe is critically important but considerably underdeveloped in the VCM. In this section of the report, we look at all three aspects of quality.

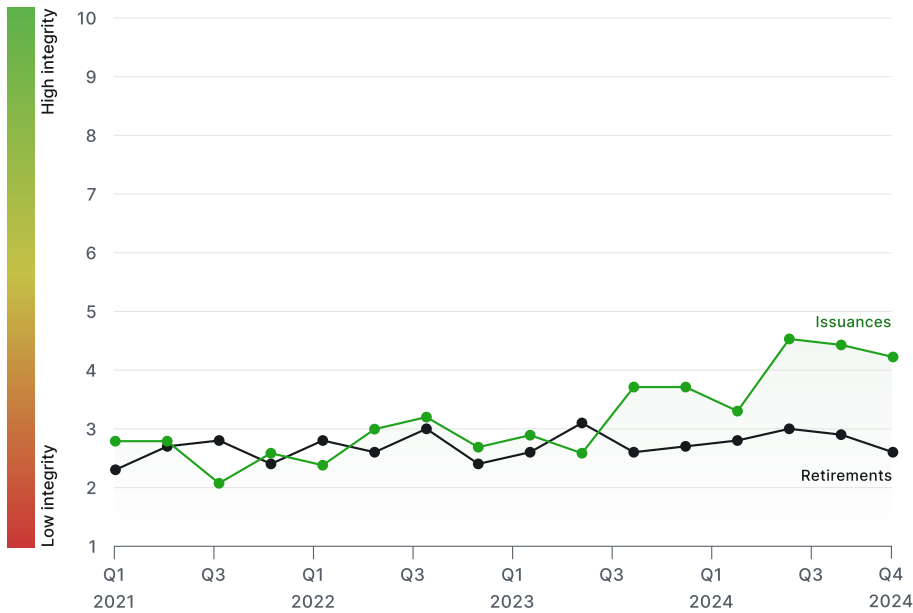
The Calyx Carbon Integrity Index™: Slow but steady improvement

Calyx Global’s Calyx Carbon Integrity Indices track changes in the quality of the VCM over time. The Indices pull from Calyx Global’s 680+ ratings, which cover 70% of all retirements and 56% of all issuances from 2021-2024 (for the indices these are extrapolated to cover even larger portions of the market, see Appendix for details). We will continue to track VCM quality on a periodic basis.

Our first index, which tracks the GHG integrity of the VCM, shows slow but steady GHG integrity improvement. Issuances are a “leading” indicator, as project developers may issue credits (including to brokers) in anticipation of being able to sell such credits. By contrast, retirements are a “lagging” indicator as many buyers may have forward contracts for several years that need to wind down before they change course. As such, the shift toward quality among issuances took a much more significant leap starting in the second half of 2023 and continued into 2024. Based on this trend, we hope to see improvements in retirement quality over time.

Calyx Carbon Integrity Index™

Average quarterly GHG integrity



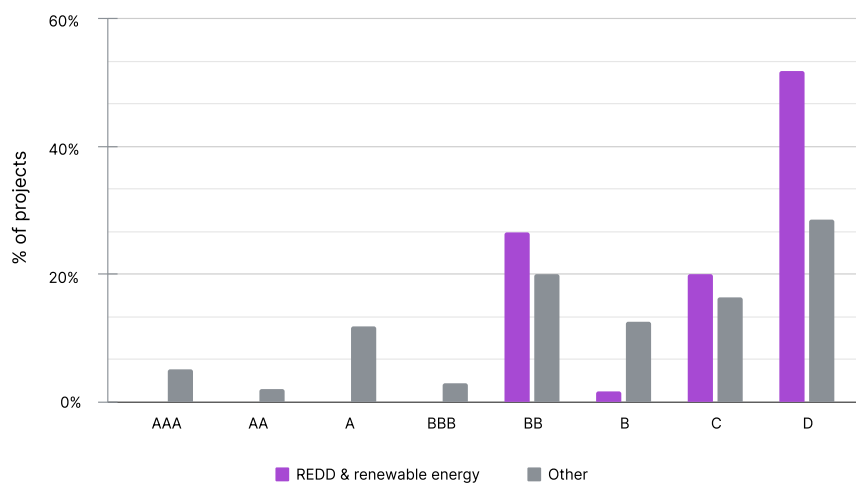
A score of 10 indicates high confidence that VCM issuances and/or retirements have high GHG integrity. By contrast, a score of 1 indicates that the VCM is highly risky and nearly all credits issued or retired do not represent a unique, permanent tonne of reduced (or removed) CO₂e. For more information on the indices, see the Appendix.

What is behind the improvement in GHG integrity of the VCM?

GHG integrity improvement is primarily due to the reduction in issuances of REDD and renewable energy credits (see page 4). Because these two categories receive lower ratings, as illustrated below, fewer issuances boosts marketwide integrity. Many REDD credits overestimate achieved emission reductions and most renewable energy credits are challenged to prove their additionality.

The quality of the remainder of the market is somewhat better – we have found credits across the entire spectrum of our ratings, from AAA to D. It is worth noting, however, that while the integrity of other credit types may be better on average than REDD and renewable energy, there is also significant variability.

GHG Ratings of REDD and renewable energy projects compared to all other project types

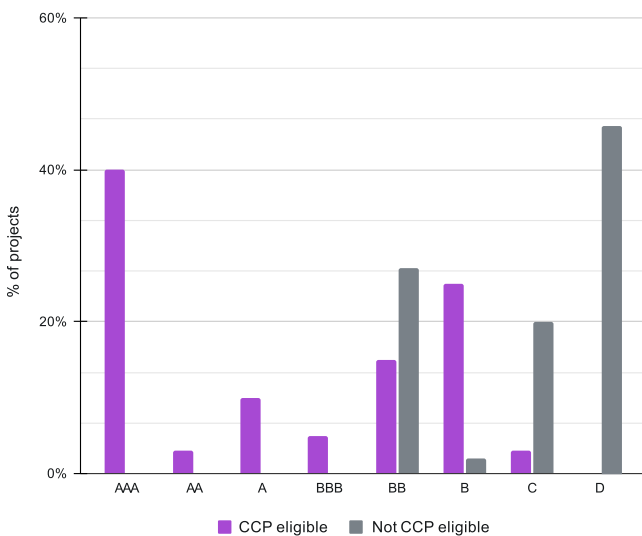


Does the ICVCM's CCP label or CORSIA eligibility indicate GHG integrity?

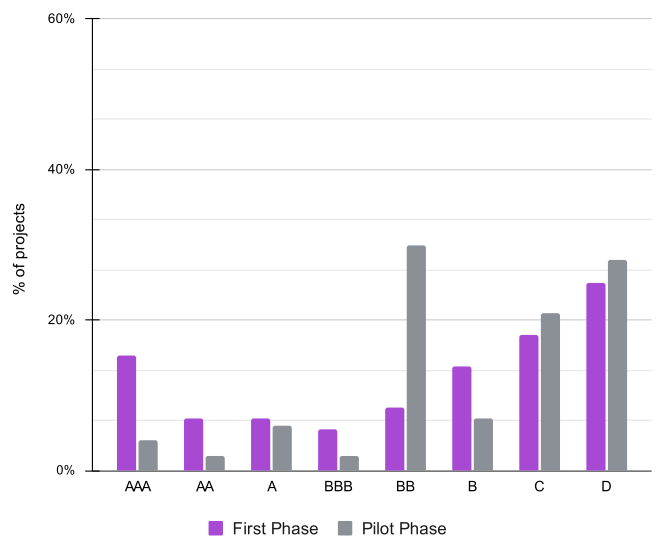
The ICVCM, to date, has segmented the market for GHG integrity better than the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). A CCP-labeled credit is more likely to have a higher GHG integrity rating than those that will not receive the CCP label. The average Calyx Global rating for a CCP-eligible project is an A, compared to a C for a project that cannot currently receive the CCP label. That said, we caution that there are also CCP-eligible credits that have high GHG integrity risk.

By contrast, many credits that qualify for CORSIA – whether the pilot phase or first phase (conditional on host country approval) – appear to have high GHG integrity risk. The average Calyx Global rating for CORSIA credits is somewhere between a BB and a B. Credits eligible for CORSIA's first phase exhibit a slightly better distribution, largely due to the International Civil Aviation Organization's (ICAO) decision to exclude renewable energy projects generating over 15 MW. However, a significant percentage of projects generate credits that carry significant GHG integrity risk (i.e., are C or D rated).

Distribution of Calyx Global GHG Ratings for projects eligible for the CCP label versus those that cannot receive the label



Distribution of Calyx Global GHG Ratings for CORSIA's Pilot and First Phase



Note: "No CCP label" represents projects that have either been explicitly rejected by the ICVCM or projects that will not receive the CCP label because a carbon crediting program has excluded it from its application to the ICVCM.

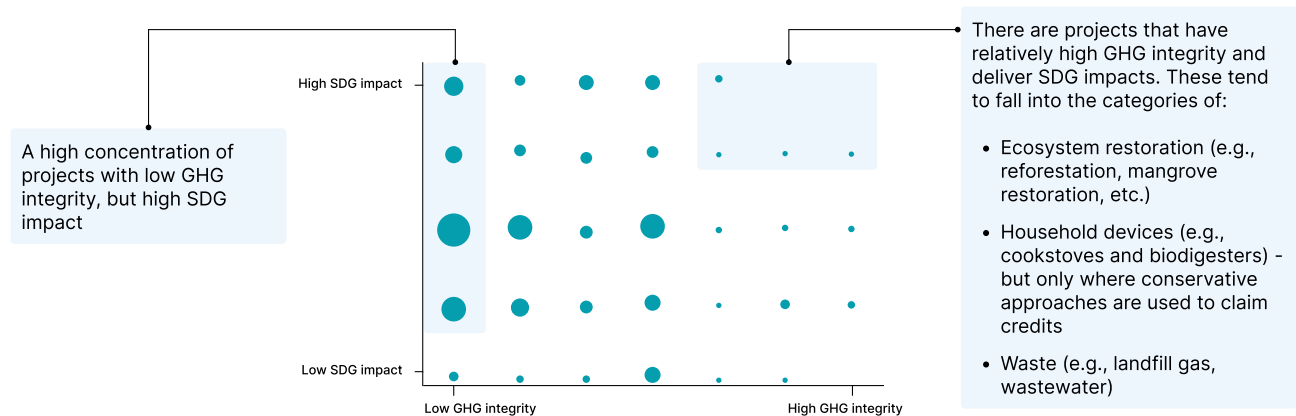
Is there a correlation between GHG integrity and SDG impact?

As mentioned in the introduction to this report, the “quality” of carbon credits goes beyond GHG integrity. Many credits also claim contributions to SDGs. One might consider the “highest quality” credit to have both strong GHG integrity *and* SDG impact.

However, across all projects rated by Calyx Global, there is a negative correlation between credits with high GHG integrity and credits that claim high SDG impact (i.e., projects that report and certify high SDG impact often have low GHG integrity). This means that, in today’s VCM, buyers have to make a decision based on a trade-off between high GHG integrity and SDG impact.

That said, there are project types that have relatively high GHG integrity and also deliver strong SDG impact. These tend to be related to ecosystem restoration or are community-based projects that apply conservative approaches to their emission reduction claims.

GHG integrity vs. SDG impact



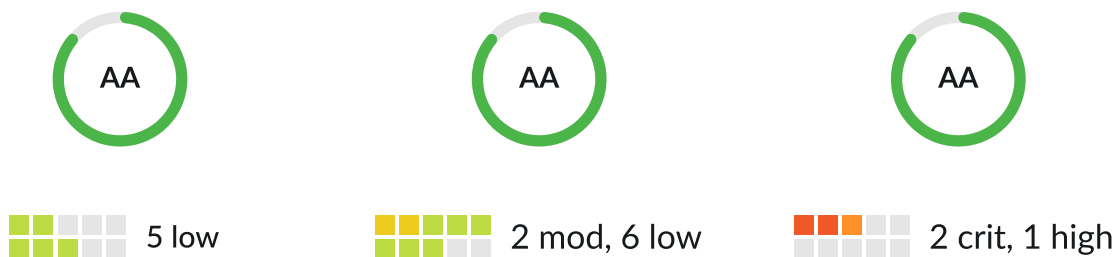
Note: This chart represents Calyx Global SDG-rated projects, which only includes projects with verified contributions certified under the GS4GG and projects holding Verra’s CCB and SD-Vista. The size of the bubble is correlated to the number of projects rated by Calyx Global.

Do high GHG integrity credits have lower environmental and social risk?

Given the many media exposés in recent years, many buyers are seeking out credits that avoid reputational risk. This can result from credits having poor GHG integrity (i.e., they do not represent one tonne of CO2e reduced or removed from the atmosphere) or from other environmental and/or social risks caused by the project.

Since 2023, Calyx Global has been assessing project “safeguards” to identify environmental and social risks (ESR) and evaluate if adequate measures are in place to manage such risks. In December 2024, we began incorporating ESR screenings into the Calyx Ratings Platform. To date, we have not found a correlation between high GHG integrity and low ESR. Our findings indicate that all projects inherently carry ESRs, influenced by diverse contextual factors. Therefore, we suggest that buyers engage in extra due diligence to ensure projects have effective safeguards in place.

GHG integrity vs. environmental and social risk



Note: Examples of several projects with high GHG integrity ratings, but variable ESR. Calyx Global screens 10 areas and assigns a risk level: Low, Moderate, High, Critical or Not Applicable.

The 10 areas Calyx Global assesses for environmental and social risk:

- Benefit sharing
- Biodiversity & sustainability
- Community health & safety
- Cultural heritage
- Gender equity
- Human rights & IPLC
- Worker rights & conditions
- Land rights & resettlement
- Resource efficiency
- Transparency & engagement

State of pricing and quality in the VCM

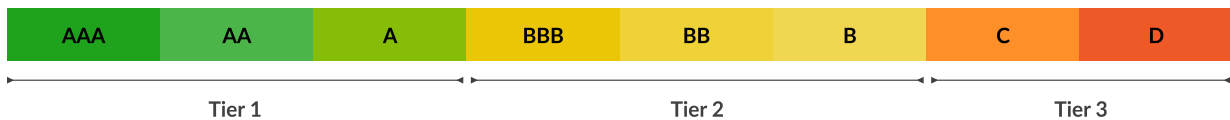
Calyx Global and ClearBlue Markets have teamed up to provide information on the relationship between price and carbon credit quality. This is only possible through the combination of two large datasets related to carbon credit quality. The analysis used data from more than 670 unique projects rated by Calyx Global and pricing, including more than 200,000 price points by ClearBlue Markets.

Ideally, price discovery in the market would result in higher prices for higher-quality credits. This would result in more robust climate action. We see a recent increase in the correlation between GHG integrity and pricing. This is a positive sign for a relatively nascent and slowly maturing market.

Calyx Global's Tiered Ratings

Calyx Global's ratings are from AAA to D. For the Calyx-ClearBlue Carbon Price-Integrity Index that follows, we use our "tiered" ratings, which segments our ratings into three tiers. As of late January:

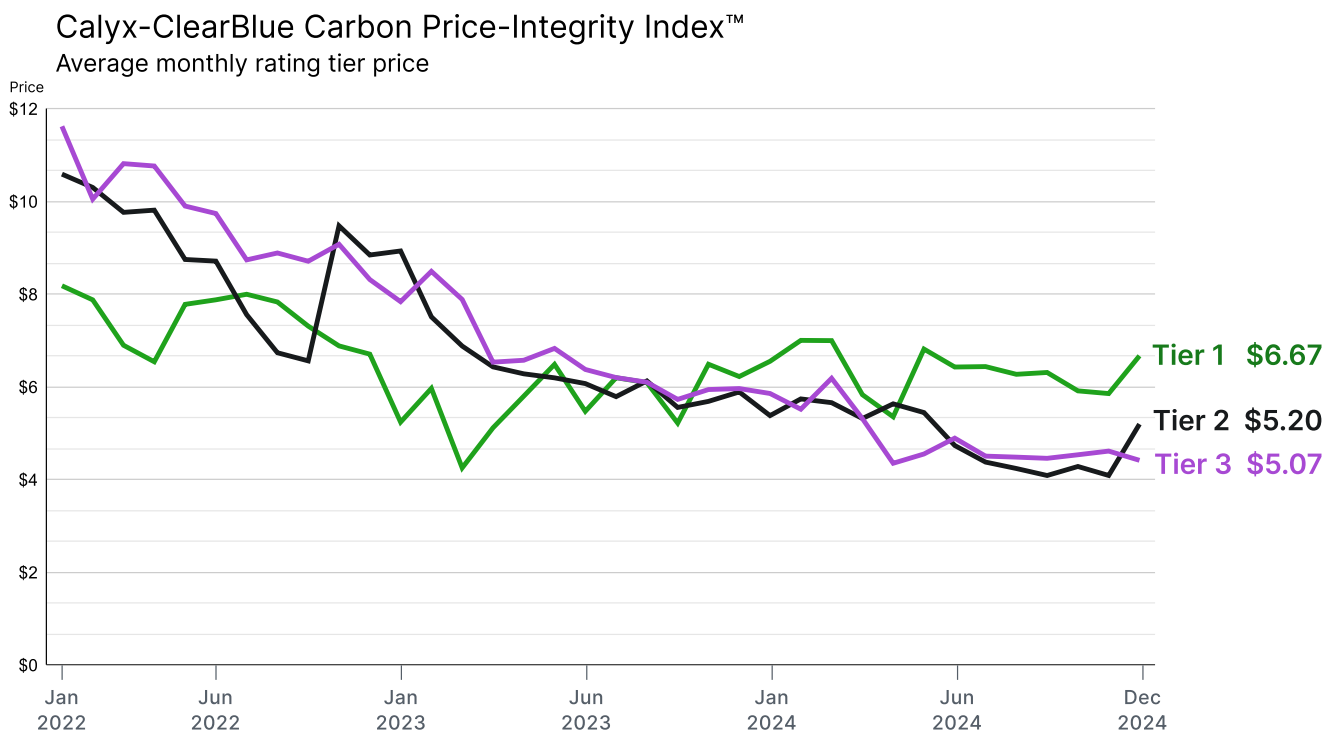
- Tier 1 (AAA, AA, A): The project is among the top 13% of Calyx Global-rated. Credits have a low non-additionality risk, but may be overstating mitigation achieved and have some risk of non-permanence and/or overlapping claims.
- Tier 2 (BBB, BB, B): The project is among the top 47% of the projects Calyx Global has rated to date. It likely has one or more of the following risks: non-additionality, significant over-crediting, non-permanence and/or overlapping claims.
- Tier 3 (C, D): The remainder of our ratings. There is a high risk that the project activity is not additional or is significantly over-crediting, has serious non-permanence risks and/or has significant overlapping claims.



Introducing the Calyx-ClearBlue Carbon Price-Integrity Index™

Our first price-quality index tracks how pricing relates to the GHG integrity of credits in the VCM. It combines Calyx Global's "tiered ratings" with price data from ClearBlue Markets. The methodology for the index is described in the Appendix.

The key takeaway: There is a price premium for higher GHG integrity (Tier 1) credits, but this only started to occur in Q4 2023. Prior to this, higher GHG integrity credits were selling at a discount compared to lower GHG integrity credits. This is likely due to the higher prices that REDD credits, in particular, received at a time when buyers did not fully understand the quality issues they presented



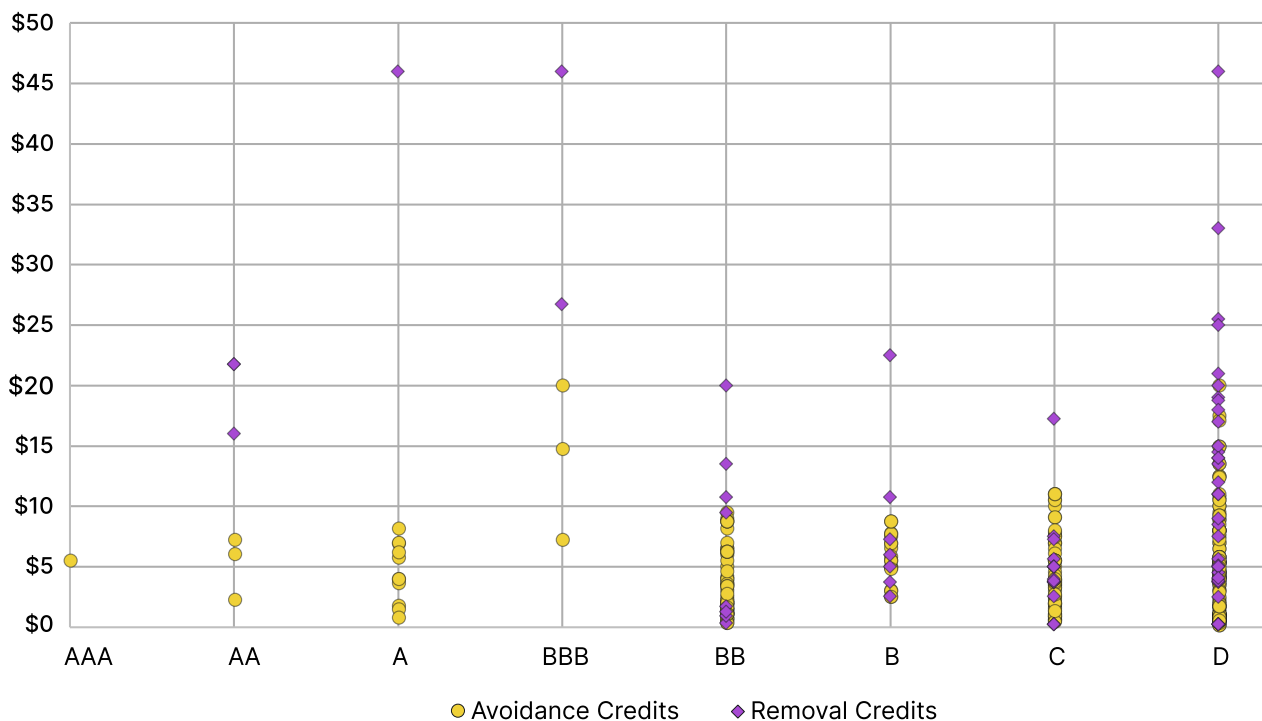
Removal credits are getting higher prices, irrespective of quality

The graph below looks at pricing for emission reductions versus removals, but also provides information on the GHG integrity of the credits. First of all, it's important to note that Calyx Global has not seen a [differentiation between reductions and removals with regard to their GHG integrity](#) so far.

When combining Calyx Global ratings with ClearBlue Markets pricing, we find that **removal-based credits are receiving a higher price, irrespective of GHG integrity**. For example, a number of commercial tree plantations that have questionable additionality are receiving higher prices, likely because they represent removals.

By contrast, many waste-related projects that have a higher likelihood to be additional, but reduce emissions, receive lower prices – perhaps because they are uncharismatic. This is unfortunate because the atmosphere is better off if companies purchase higher-GHG integrity credits. The irony is that the money spent for lower-quality removal-based credits (e.g., >\$40 per unit) could be better used to purchase greater than 8 times more high-quality reduction credits that sell for <\$5/tonne.

Price Distribution by GHG Integrity Letter Grade and Removal Status



What's next

The VCM is a dynamic market impacted by various market actors, policy changes and sentiment. Track how quality of the market evolves in 2025 and beyond with the Calyx Carbon Integrity Index™ and Calyx-ClearBlue Carbon Price-Integrity Index™ [here](#).

Appendix

About Calyx Global

Calyx Global is a carbon credit ratings agency that helps organizations find carbon credits with confidence. Rigorous GHG and SDG ratings, and environmental and social risk analysis help carbon buyers do good for people and the planet. From nature-based solutions to emerging technologies, Calyx Global leads the market with over 680 rated projects (and counting) and the broadest coverage of project types. To learn more visit www.calyxglobal.com.

About ClearBlue Markets

ClearBlue Markets is an award-winning leader in compliance and voluntary carbon markets, dedicated to helping organizations achieve their emission reduction goals through strategic, data-driven solutions. Its customizable services, including market intelligence, advisory, project development and market access, are powered by ClearBlue Vantage, an AI-enabled platform that provides robust insights and a comprehensive market view. Trusted by hundreds of companies worldwide, ClearBlue enables clients to take decisive action, manage risks and unlock financial value through effective carbon market strategies. Learn more at www.clearbluemarkets.com.

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Data and methodologies for the report

Taxonomy: The report at times separates credits by project type – such as REDD or renewable energy – or into five main categories: (1) Forest & Land (REDD, AR, improved forest management, grassland management, etc.); (2) Household & Community (cookstoves, biodigesters, etc.); (3) Industrial (HFCs, N₂O, ozone-depleting substances, etc.); (4) Waste (landfill gas, wastewater, manure, etc.) and (5) Renewable energy (wind, solar, hydropower, etc.).

State of the VCM and pricing graphs: Retirements exclude those retired for Toucan on the Verra registry, as Verra banned the practice of creating instruments or tokens based on retired credits due to concerns of greenwashing arising from their environmental benefits already being consumed.

Calyx Carbon Integrity Index: The total issuances and retirements rated by Calyx Global were segmented by project type and country, resulting in distinct “market segments” (e.g., large-scale wind-India). The rating distribution for each market segment was calculated by determining the proportion of credits assigned to each rating category within that segment. To assess how evenly credits were distributed across the different rating letter grades – whether the distribution was balanced (credits spread relatively evenly across letter grades) or concentrated (credits clustered in one or two categories) – Shannon’s Diversity Index was applied as a measure of rating variability. This served as the basis for establishing minimum quality criteria for extrapolation. A linear mapping was applied, correlating variability with a minimum credit coverage percentage threshold for issuances and retirements. Segments with lower variability required a lower threshold for inclusion in the extrapolation. Rating distributions were subsequently applied to market segments that met the established criteria. By extrapolating, the coverage of the market expands to 70% for issuances and 83% for retirements.

Calyx-ClearBlue Carbon Price-Integrity Index™: This was developed using 333 Calyx Global ratings that mapped onto ClearBlue Markets pricing. The projects were selected to ensure consistency, as they represent highly traded projects with active pricing data in recent years, providing a representative view of the current VCM. Pricing data for all projects was collected dating back to 2022 and includes bid, ask and trade data. A monthly average price was calculated at the project level wherever sufficient data was available. The monthly tier average price was then determined as the average of the monthly project-level prices within each tier. All projects within a given tier were assigned equal weighting in the calculation of the tier’s monthly average price.

Removals vs. Reductions: Carbon removal credits represent the extraction of CO₂ from the atmosphere and its storage in long-term reservoirs. For this analysis, only nature-based solutions (NbS), such as ARR, IFM, soil carbon sequestration and blue carbon, were considered, excluding technological carbon dioxide removal (CDR) methods like direct air capture or bioenergy with carbon capture and storage. Carbon reduction credits represent actions taken to reduce or avoid CO₂ emissions that would have otherwise occurred. These credits are typically generated through projects like switching from fossil fuels to renewable energy, improving energy efficiency or preventing deforestation through REDD projects.