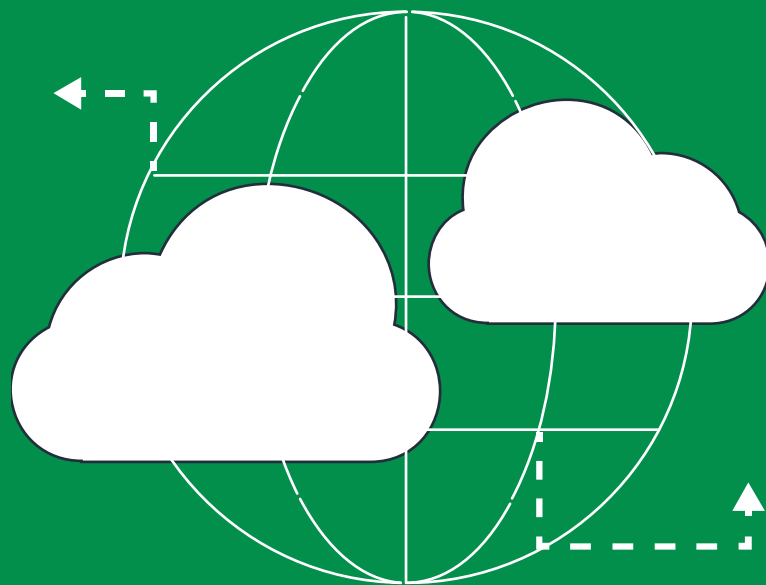


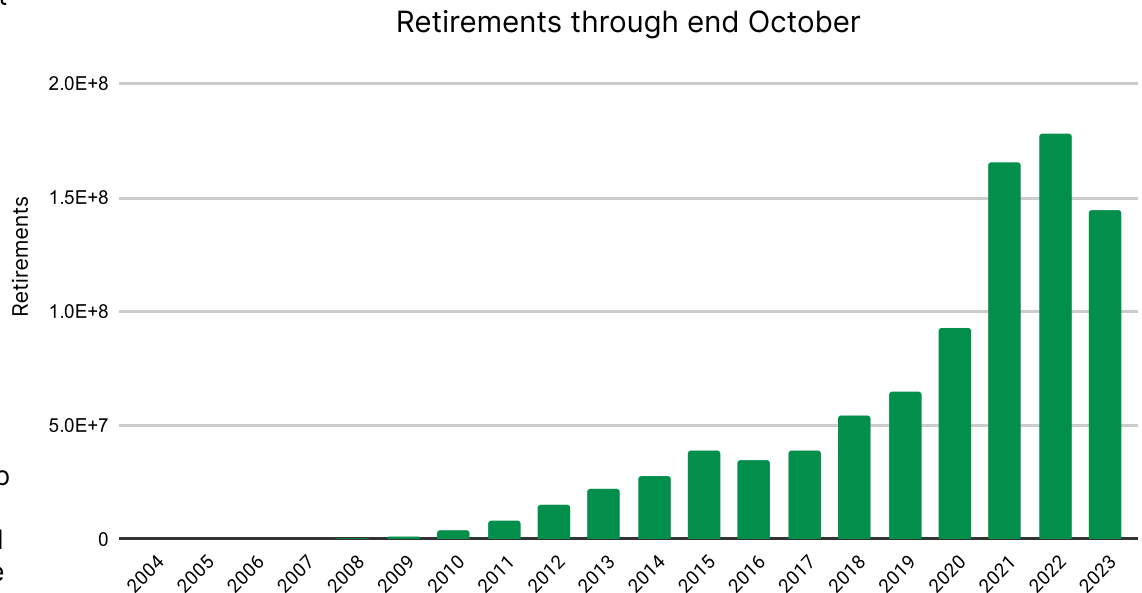
Navigating the Future of Carbon Markets through Supply, Demand, and Price Forecasting Scenarios



2023 has proved to be a lackluster year for the voluntary carbon market. With less than two months left in the year, there have been a total of just under 150m tCO₂e retired across the 21 registries we monitor. While the activity levels in the VCM are well above the pre-2021 levels, the retirements through end of October are about 20% below the same time a year ago. Combine that with the lowered prices in the market, and the impression is that the industry has taken a step back this year.

That's not to say that it was all clouds, no silver linings: projects from the US registries, ACR and CAR, have seen record credit retirement volumes; certain project types have seen prices hold up despite the negative press; and new companies and projects continue to enter the market.

In this report, we recap the big (data-driven) trends of the year, and look at what the future may hold for the VCM in 2024 and beyond.



Data Updates

The data in the report builds on exciting developments at AlliedOffsets: we've added forward-looking components to our data. While this is something we had done as a simple time-series analysis in the past, the data underpinning this research is driven by the current market features. This is done from three perspectives: supply, demand, and pricing.

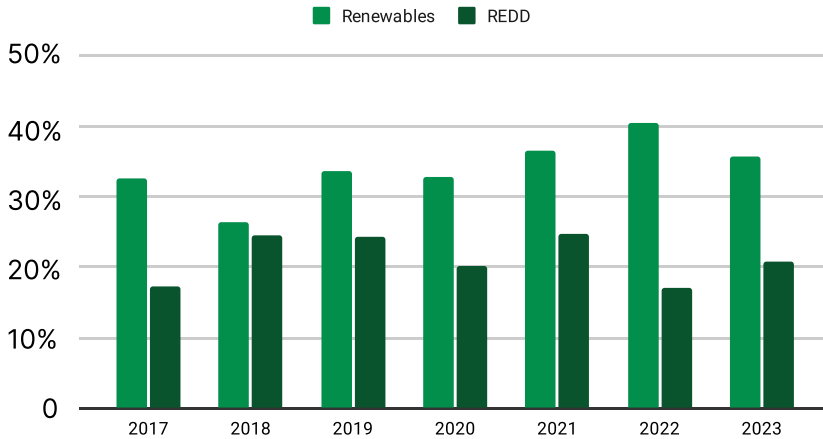
Supply: In order to forecast supply in the market, we've incorporated two new data points into the database. The first is the [country policy rating](#), which we use to understand where the number of projects being set up is likely to increase as a result of friendly regulations. Secondly, we have pulled in data on projects that are currently pending in the registries: these projects have clear projections on how many credits they're likely to issue in the near future. We have revised these figures to assume that only a certain percentage of projects will be approved, and that only a certain percentage of estimated credits will be issued. This, on top of our time series modeling that accounts for seasonality in VCM issuances and retirements, allows us to better project the supply of credits in the market.

Demand: In order to model potential demand for credits, we have collected thousands of data points on company emissions, focusing on companies that have at any point been active in the VCM. We've also collected data on their stated emissions reductions pathways, and modeled the [Scope 1, 2, and 3](#) emissions for each company into the future. This has allowed us to have a clear understanding of potential demand coming from companies that are currently in the VCM.

Price: We are currently developing exciting tools to help our users better understand how supply and demand will interact, where the price will be in a given scenario, and what the makeup of projects will be at a given price level. Stay tuned for that in the coming weeks! In the meantime, we have created a [Sentiment Index](#) that has a strong correlation with price movements of our AO500 Index 2 and 4 weeks later.

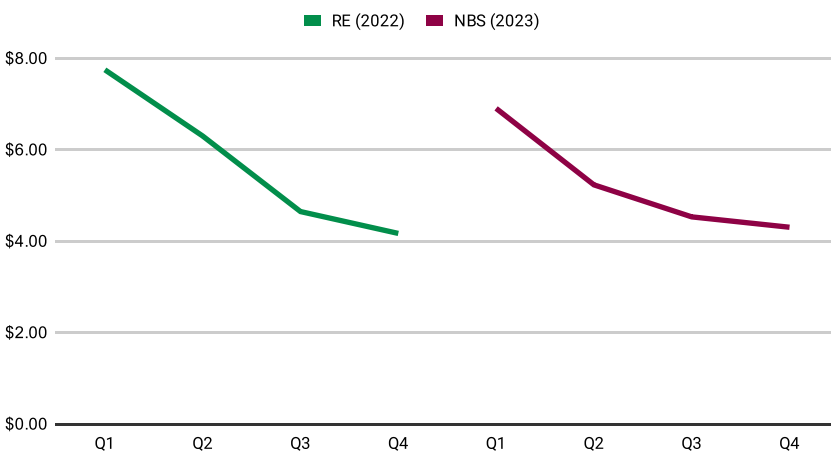
At the start of the year, we projected retirements for 2023 to reach 240m tCO₂e – a modest increase of under 10% – based on a time series analysis of the previous years’ retirements. The 95% confidence interval put the retirement range between 188m and 313m. With only a couple of months to go in 2023, it’s likely that the total retirements for the year will land under 200m, barely staying within the 95% confidence interval. Here some insight on how the market has fared this year.

Renewables and REDD market share



REDD+ retirements have increased in market share despite criticism: the scrutiny of REDD+ projects began early this year, which would suggest that buyers would shy away from these credits. On the contrary, we’ve seen the share of REDD+ credits retired go up vs. last year. Renewable energy projects (and especially those from CDM) have instead reduced market share. Some of this is likely explained by the falling prices for REDD+, as this year, buyers could buy NBS credits for prices that were quoted for renewable energy projects last year (the chart below left shows average prices for VCS REDD credits and VCS renewable energy credits).

Prices

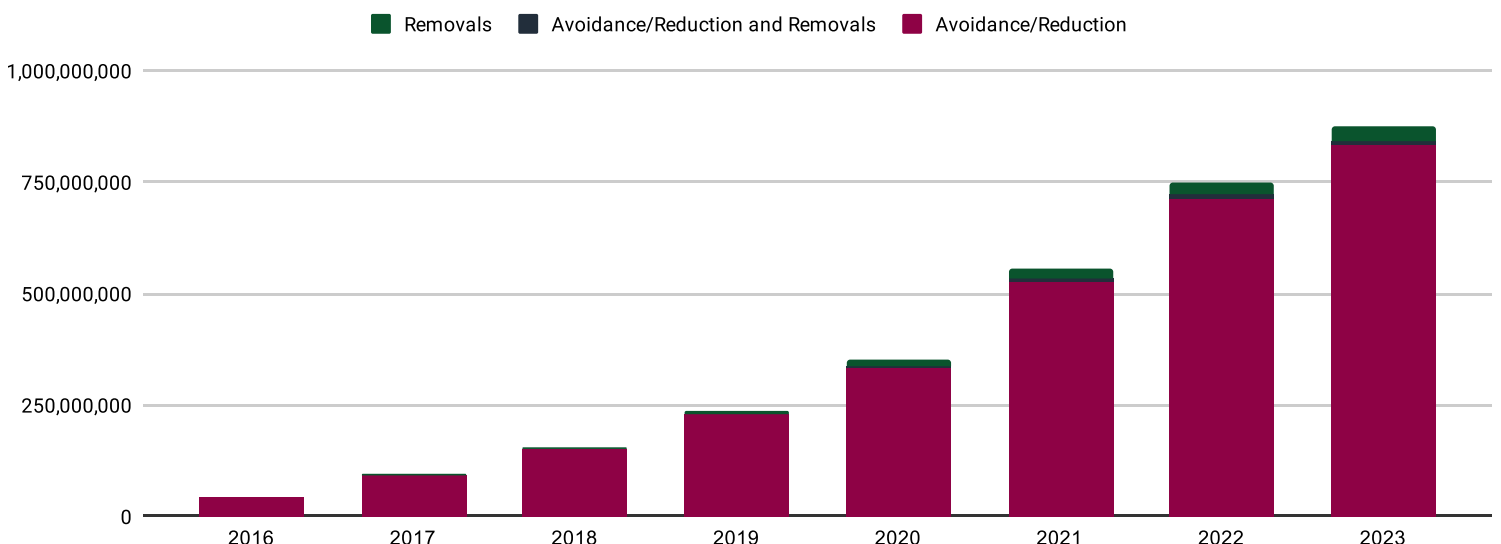


A couple of other bright spots for the market include the increased activity from projects that are registered with certain registries:

More retirements than in 2022 (already)	On path to retire more in 2023 than in 2022
Acorn	Gold Standard
CAR	ACR
Plan Vivo	CoICX
Woodland Carbon Code	
UCR	

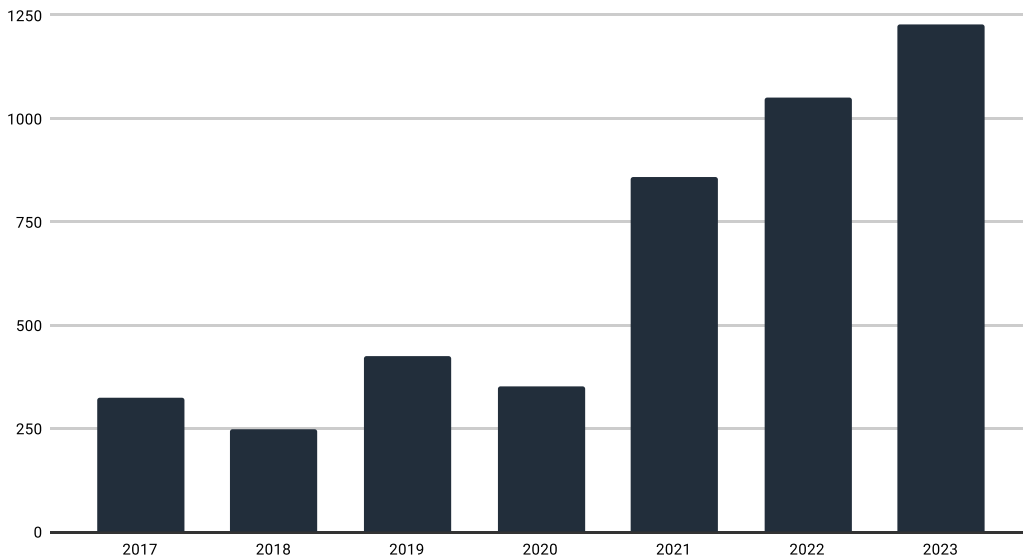
And removals credits have also seen a slight uptick in retirements this year, making up a small but growing part of the market (this doesn’t include advance market commitments):

Cumulative Retirements, 2016-today



Perhaps the most uplifting news for VCM stakeholders is that the number of unique companies in the market continues to grow. The chart below shows that there were 1,200 more companies in the market than in 2022.

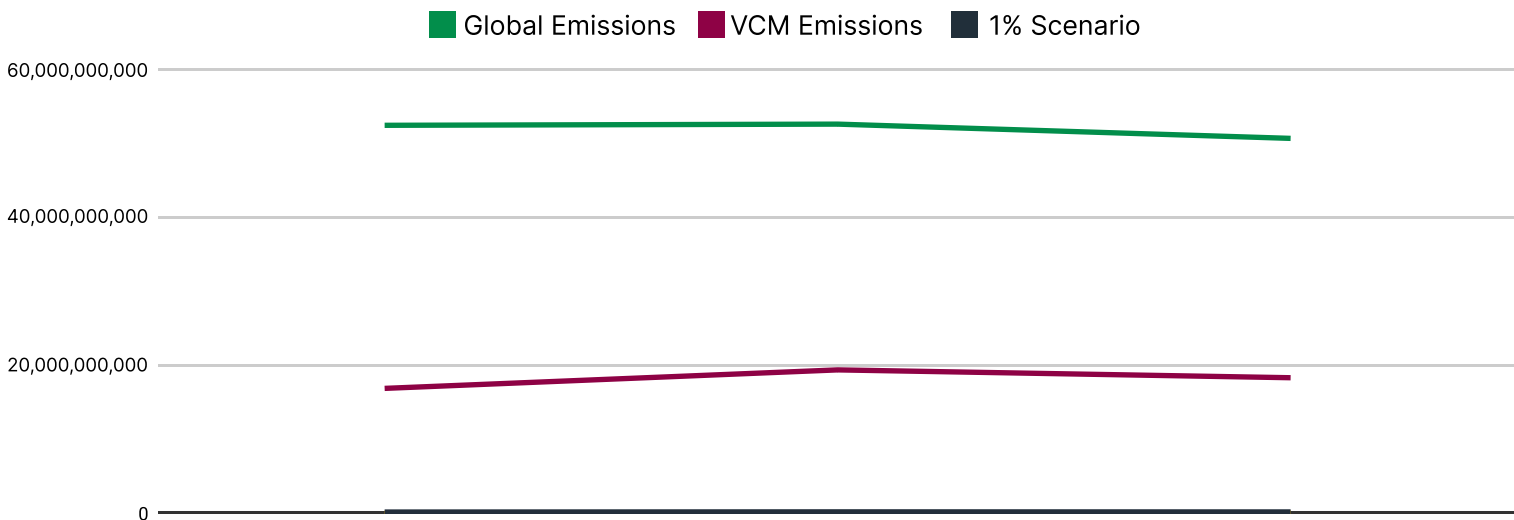
Change of Number of Unique Buyers in the Market



And the potential for demand can be massive (more on this later in the report). As we've started to track the emissions of companies that are active in the VCM, we can see that they account for about 1/3 of global emissions – however, they're offsetting only a tiny fraction of their overall (scope 1, 2, and 3) emissions, about 0.24% in 2020.

If firms already in the VCM decided to offset even 1% of their emissions, their demand for credits would expand 4 fold.

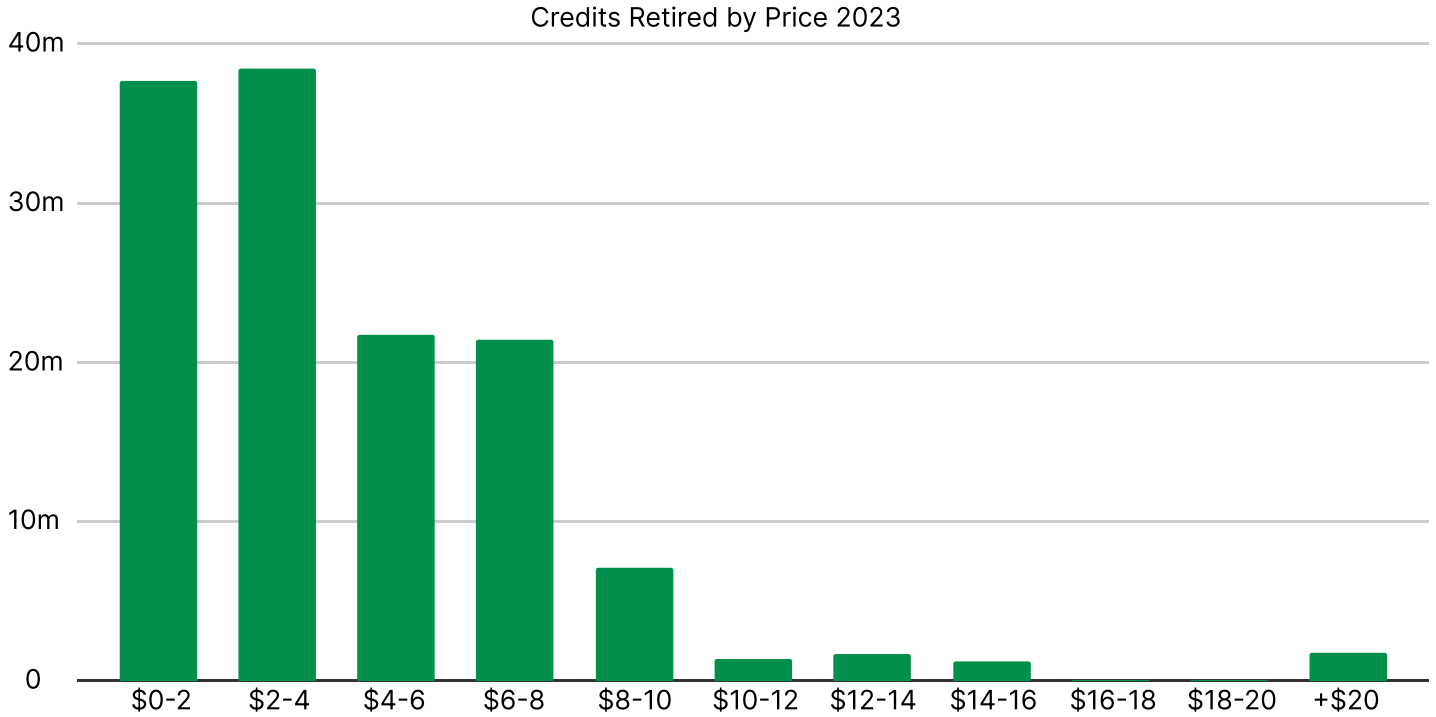
VCM Emissions and Retirements



In order to further explore the potential supply and demand scenarios going into the next few years, we have analyzed where credits may come from in order to meet the demand, and what supply may look like at different levels of offset coverage in the future.

Carbon Dioxide Removals

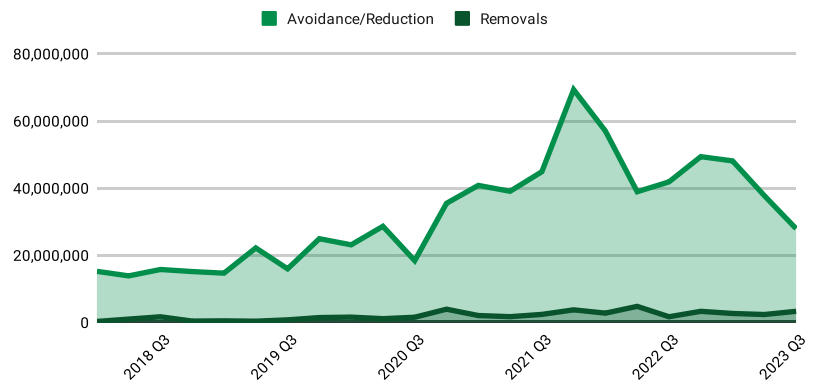
Using price as a proxy for quality, the VCM is still characterized by a preference for cheap credits, with over half of 2023 retirements to date estimated at under \$2. In fact, our data shows that the vast majority of all retired credits in 2023 have been priced between \$0 and \$6 per ton - and it shows how the number of retirements drastically decreases when the price exceeds \$8 per ton.



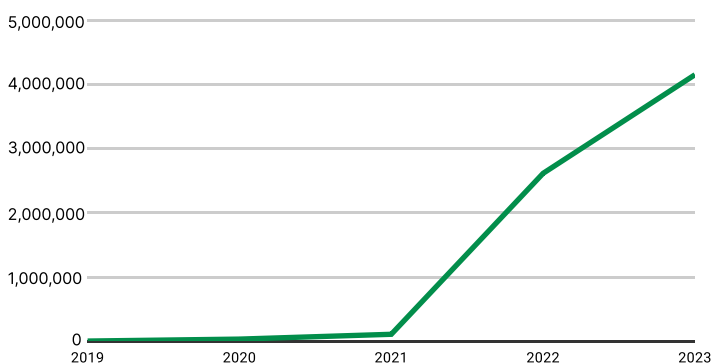
Demand for cheap, low quality credits is still high but demand for engineered solutions (CDR) is growing.

The market is still dominated by cheaper avoidance credits. Yet, there is some evidence that buyers will pay a premium for high-quality credits, with the number of CDR credits purchased increasing 10-fold since 2021. Still, CDR commitments are relatively small compared to traditional retirements, and are unlikely to scale until CDR suppliers can reduce carbon prices.

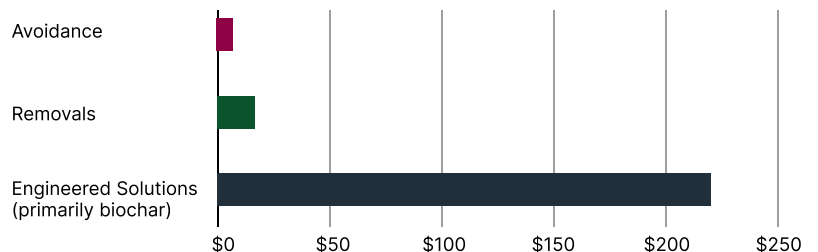
Avoidance/ Reduction and Removal



CDR Purchases, 2019-2023



Price by offset type

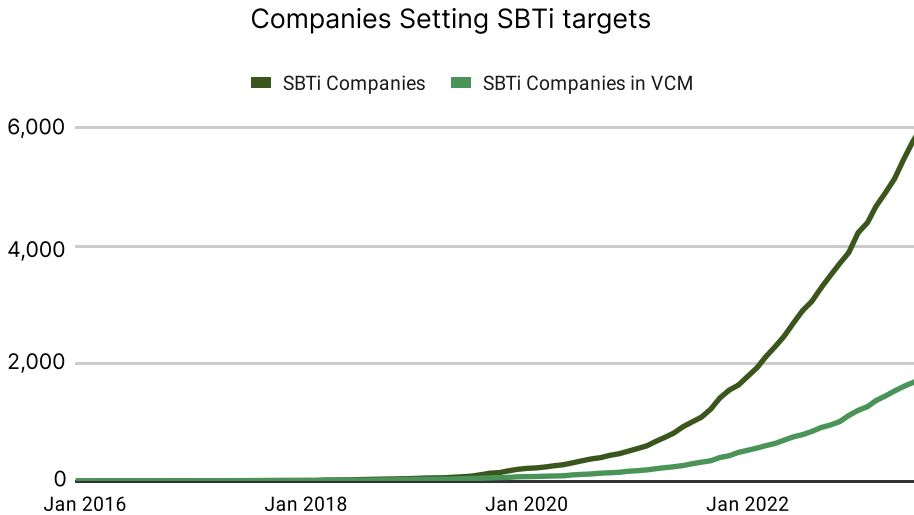


Indications of a Growing Market

As the world grapples with environmental challenges of unprecedented scale, it becomes imperative to understand not only how the VCM functions today, but also how it is likely to evolve in the coming years.

In this section of the report, we explore potential scenarios of carbon markets, highlighting the connections between supply, demand, and price dynamics. As we strive to transition to a more sustainable, low-carbon future, this analysis equips stakeholders with the knowledge needed to navigate the ever-evolving voluntary carbon market.

SBTi Commitments



SBTi commitments have increased exponentially since 2020, with approximately one third of companies with targets engaging in the VCM as of September 2023. The surge in SBTi commitments signifies a broader transformation in the corporate landscape. This movement, fueled by a sense of global environmental urgency, demonstrates that organizations are not merely acknowledging climate action, but are also actively taking action to reduce their emissions. While it's not yet clear how offsets will fit into SBTi's Beyond Value Chain Mitigation framework, the fact that more companies are looking at ways of reducing their emissions is likely a positive sign for the VCM.

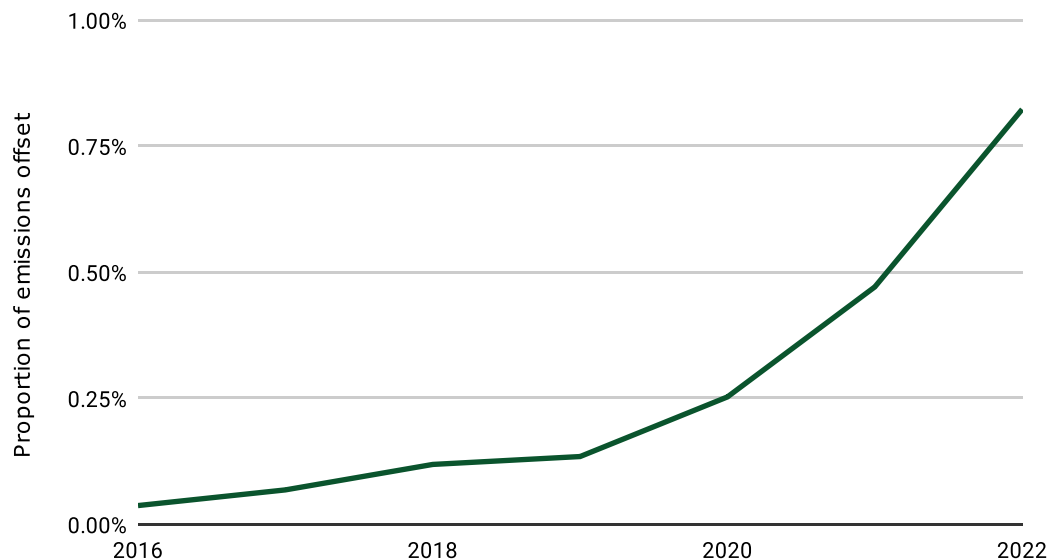
Proportion of Emissions Offset

Offsetting trends in Hard-to-Abate Sectors

While emissions are predicted to go down, not all sectors will be able to meet their targets solely with reductions.

Companies in hard-to-abate sectors have been retiring higher proportions of their emissions each year.

In fact, the proportion of emissions offset have increased from just above 0.02% in 2016 to over 0.75% in 2022.



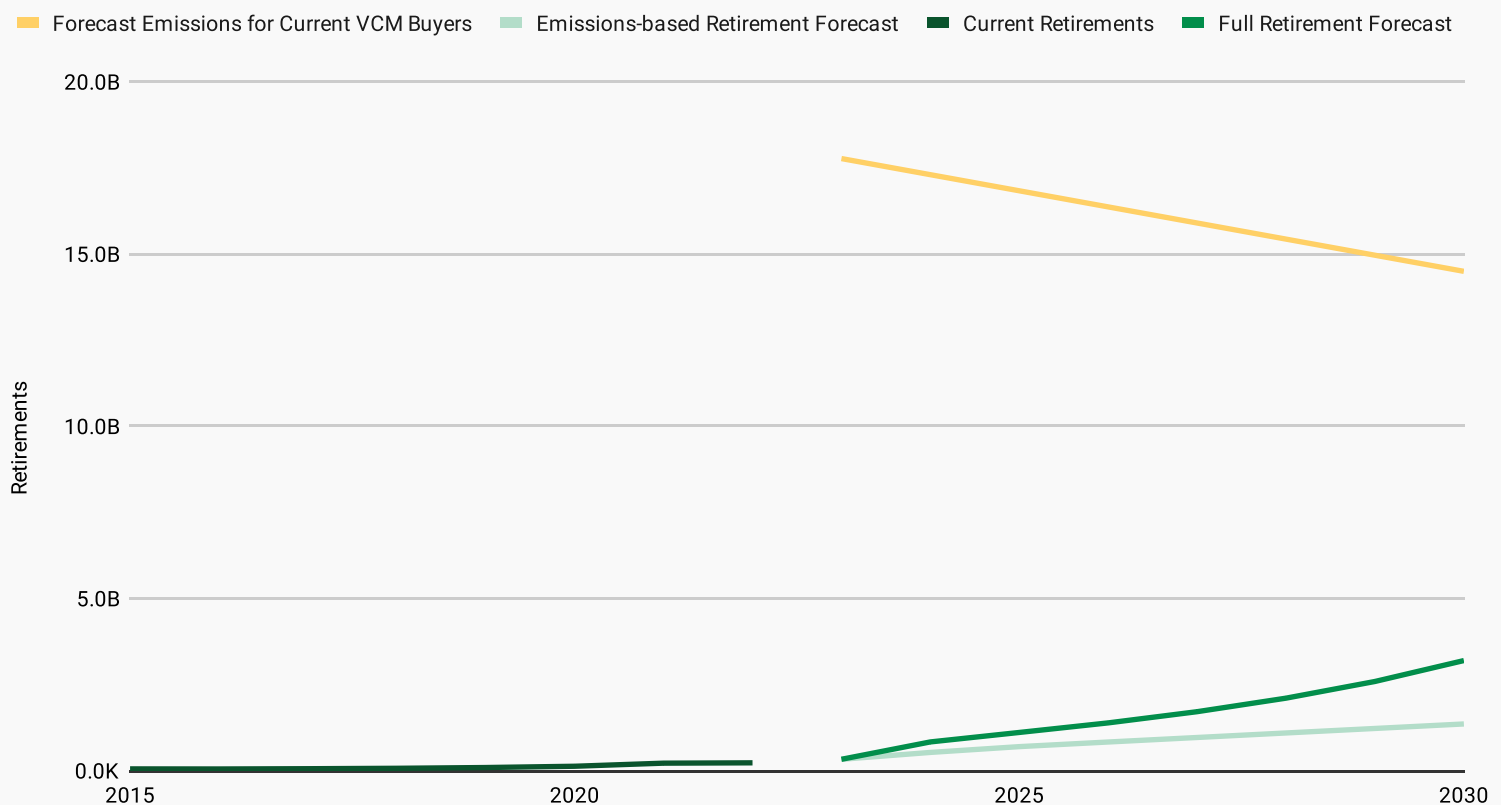
Demand forecasting involves assessing the carbon credit needs of various stakeholders. This encompasses corporate entities seeking to offset their emissions, countries fulfilling international climate commitments, and individuals contributing to a sustainable future.

Price forecasting is another dimension that adds nuance to the carbon market landscape. With the global shift towards carbon pricing, understanding the dynamics affecting credit prices is vital. Economic forces, policy changes, and market sentiment all come into play, influencing the cost of carbon credits. These price fluctuations have profound implications for market participants and demand for credits.

If companies enter the market at consistent rates, demand could reach up to 4 billion tons per year.

Demand Forecast for Existing Corporate Buyers: AlliedOffsets employs a data-driven approach, considering Scope 1, 2, and 3 emissions as well as buyer retirement trends. The analysis indicates that existing corporate buyers may drive demand for up to 1.5 billion tonnes of carbon credits by 2030. This projection reflects a growing commitment to offset emissions within the corporate world, aligning with global sustainability objectives. The market's potential to meet this demand is pivotal in advancing corporate environmental responsibility.

Forecast Scenario - Retirements



Supply Forecast Scenario

Supply forecasting, drawing from historical data, project pipelines, and regulatory changes, gives us insight into the availability of carbon credits. Understanding the supply dynamics is paramount in understanding the market's capacity to meet the increased demand and rising number of buyers entering the market.

Based on the issuance trends of existing and new projects in the market, AlliedOffsets predicts supply for credits could reach up to 600 million tonnes by 2030. Our data suggests that existing projects, are expected to contribute a maximum of 380 million tonnes to the impending carbon credit issuances. Meanwhile, new projects are projected to contribute to around 210 million based on the average growth rate from the past eight years.

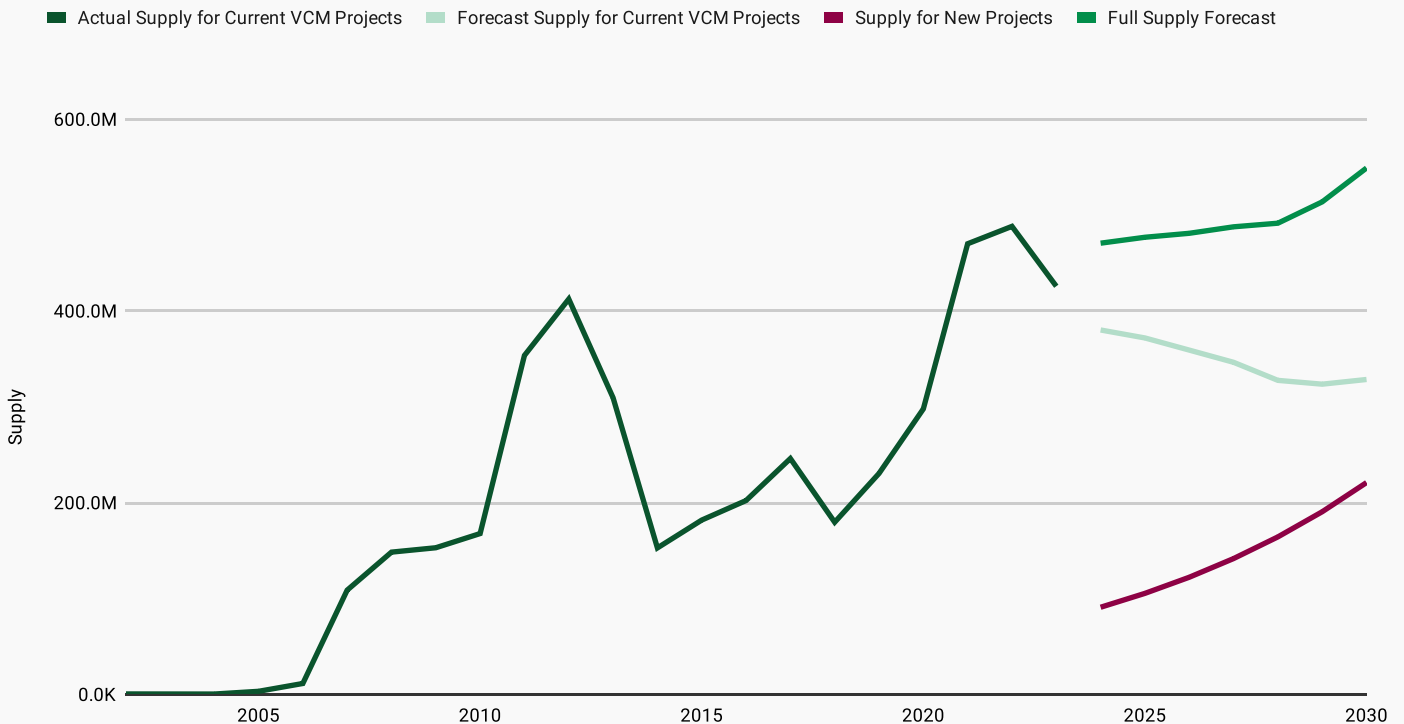
600m

supply for credits could reach up to 600m tons by 2030

210m

million credits is expected from new projects

Forecast Scenario - Supply

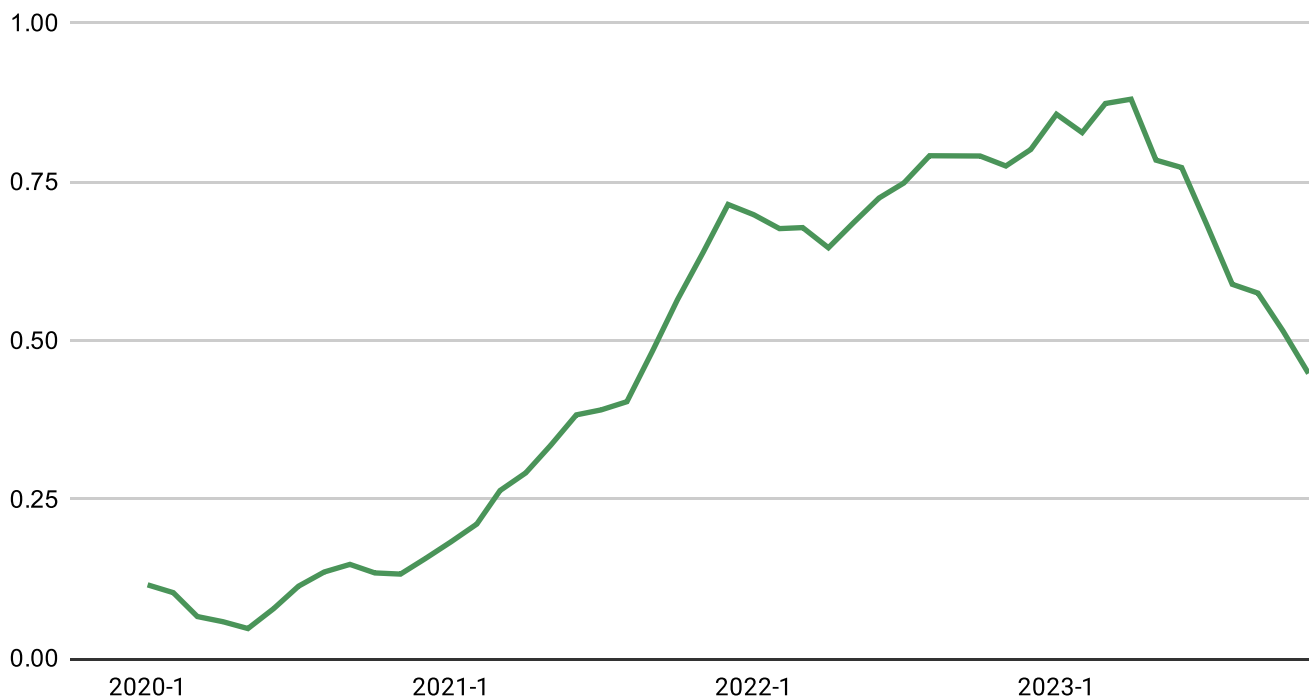


The market sentiment index is built off a variety of data points including new entrants in the market, SBTi claims, trades and retirements. The data shows a positive correlation with the AlliedOffsets 500 Index, which tracks the weighted average price of the top 500 projects (by number of retired credits) and individual projects prices as shown in the table.

The short-term price forecasts show the market bottoming out in the next few weeks. In terms of long term, there is opportunity for projects in the VCM to command high prices for their credits. However, this is contingent on the market addressing quality concerns and improving trust. Furthermore, a significant numbers of projects will need to register to meet demand in the pipeline by 2030.

Weeks Delay	AO500 Correlation
2	0.457
4	0.242
12	0.114
24 (6 months)	0.016

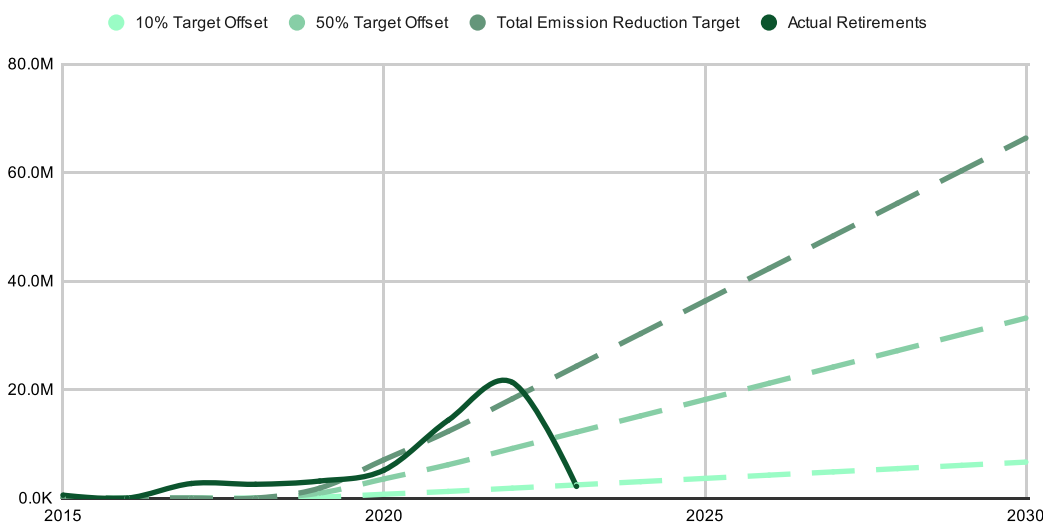
Monthly VCM Sentiment Index Trend Over the Past 3 Years



With the ICAO's CORSIA Phase I (CP1) due to commence at the beginning of next year, airlines operating international flights will be required to offset any emissions above 2020 levels with CORSIA Phase I eligible credits. Of the nearly 50 airlines that have previously been active in the VCM, 15 have made some kind of SBTi or Net Zero commitment. As airlines are in a hard-to-abate sector, it is likely that companies will need to offset a large portion of their emissions reduction targets to stay on track with their commitments.

If these 15 airlines offset even just 10% of their emission reductions targets through 2030, their demand for CORSIA-eligible credits will reach 34m cumulatively between now and 2030. If all airlines set emissions reduction targets in line with the Paris Agreement, this number could increase to 250m.

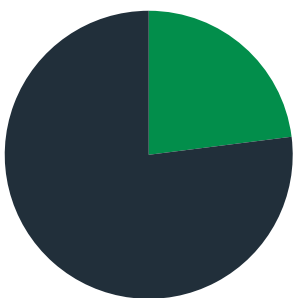
Reduction Targets vs. Offsetting, Airlines in VCM



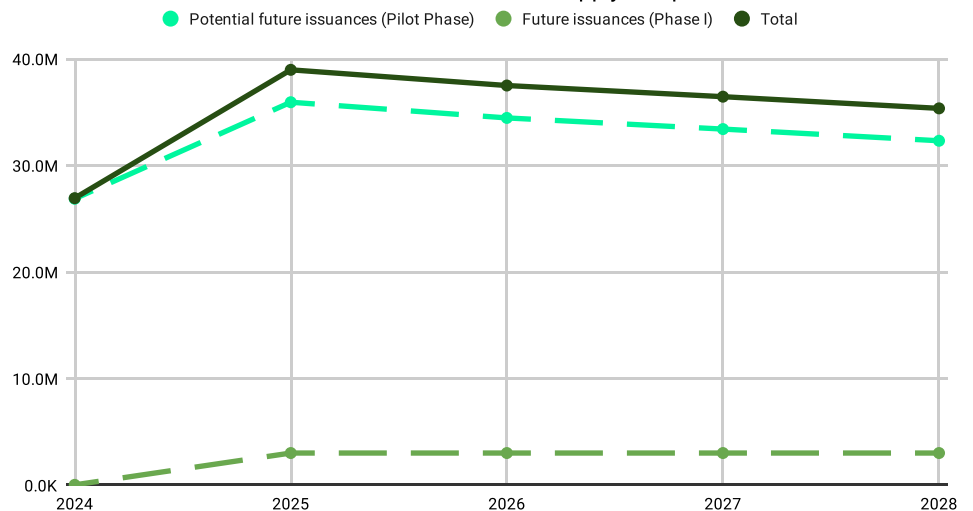
There are only 35m potential (subject to corresponding adjustment authorisation) CP1 credits available in the VCM currently, and projects in the pipeline are only expected to add 3m credits per year through the duration of CP1. This supply will only meet a minimum-demand scenario from airlines. Keep in mind airlines have accounted for only one quarter of CORSIA Pilot Phase credit demand thus far.

CORSIA Eligible Retirements by Buyer Sector

Airlines 23% Other Sectors 77%



CORSIA Potential Phase 1 Credit Supply in Pipeline



* Pilot Phase credits shows the issuances from projects on registries currently in Pilot Phase (VCS, GSR, CAR), which have applied to CORSIA Phase I; Phase I shows issuances from projects on ACT and ART

AlliedOffsets expects this likely mismatch between supply and demand of CP1 credits to drive the price of CP1-aligned credits up in the short term. Indeed, AlliedOffsets has seen early evidence of CP1-aligned futures fetching a premium in the market, despite uncertainty around corresponding adjustments.