

The State of Carbon Credits 2023

How the market can move forward

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Executive summary

- Much of the world recognizes the importance of meeting net zero by 2050, but nearly all companies with net zero targets will fail to achieve their goals if they don't, at a minimum, double the pace of emission reductions by 2030. Earlier this year, Sylvera performed an analysis that showed that companies that purchase carbon credits decarbonize 2x faster than those that don't, debunking the myth that organizations buy credits *instead* of reducing emissions; to the contrary, they do both.
- Across all project types, prices have dropped this year to where they were in 2021 before peaking in 2022. Despite the market-wide price decrease, nature-based projects are priced at a premium compared to technology-based projects. Currently, discerning buyers have the opportunity to find and purchase higher-quality credits while the market is down.
- To date, REDD+ projects are the only Sylvera-rated projects that have received a AA-rating, which is the highest quality rating available currently in the market; we have never rated a project AAA. On the other hand, RES credits pose the most additionality uncertainty and have not been rated above a C.
- Buyers have the opportunity to apply “discounting” when purchasing carbon credits, which has emerged as one risk management tool to account for the range of carbon credit quality. A discounting approach means buyers use more than one credit to compensate for one tonne of CO2e. While this approach can be applied to any project type, certain conditions are required; some credits are too low-quality and no amount of discounting will suffice.
- We see huge potential and are observing real traction in developing areas of the Voluntary Carbon Market for greater investment and improved quality: early-stage or “pre-issuance” projects, jurisdictional approaches and carbon dioxide removal (CDR) activities. Spoiler: 2023 has seen an enormous jump in forward purchases of removals credits. Like all opportunities, there are risks associated with each that buyers must become aware of and prepare for.
- Four key policy trends made an impact in 2023: industry self-regulation fueled by the various integrity initiatives, international regulation and disclosure requirements, Article 6 developments, and the convergence between voluntary and compliance markets. We expect them to continue to influence the market in 2024 and are monitoring closely.

Introduction

This is Sylvera's second annual publication of The State of Carbon Credits. Last year we published an extensive analysis of the market with a spotlight on REDD+ projects. This year, we provide an overview of how the market can move forward after a year of intense scrutiny.

We highlight where quality lies in the market, supported by Sylvera project-level case studies and global data, including credit issuance, retirement and pricing data. We also surface where critical opportunities are in the market, including carbon project innovations, future investment prospects and policy trends.

As the leading carbon data provider, we believe that transparency and in-depth, high-quality data can incentivize investment in real climate action. Our proprietary carbon credit ratings, carbon portfolio analytics, market expertise and cutting-edge research enables investors to access critical data, understand quality and ultimately make informed decisions to buy, trade and sell carbon credits to achieve business objectives and net zero goals.



Data in the report comes from the Verra Registry, with issuance and retirement data covering the years 2021 through the third quarter of 2023. See the appendix for more information on the data used in this report.

Who this impacts

Corporate Sustainability Leader

It is essential to leverage resources to identify high-quality carbon credits that can contribute to your corporate climate commitments, and have visibility into where you are exposed to risk.

Fund Manager

Understand the current state of the VCM, along with promising future opportunities, so you can prepare to face increasing demand from investors for sustainable investment products.

Carbon Trader

It is time to take advantage of this unique moment in the market when quality has not been accurately priced into carbon credits yet, and as a result, some high-quality credits can be purchased at low prices.

Advisory Professional

Get the latest market and carbon project insights to help expand your expertise and improve your client service offering.

Executive Leader

or

Risk Professional

Ensure you can navigate the relevant risks for your organization relating to the climate transition, including investment in and the use of carbon credits. Address greenwashing concerns and the resulting reputational and litigation risks facing organizations by identifying high-quality opportunities available in the market now.

The Sylvera rating system

Our rating system explained

Sylvera carbon credit ratings assess the likelihood that the credits issued by a carbon project have delivered on their claims of avoiding or removing one metric ton of carbon dioxide (tCO₂) or other greenhouse gasses (GHGs). Sylvera ratings are derived from the holistic analysis of a project's carbon performance, additionality and permanence. A separate score is provided based on analysis of the co-benefits the project brings to local communities and the environment.

Each pillar is designed to answer fundamental questions about the project.

- **Carbon performance:** Is the project accurately reporting on its activities, which directly translate to its overall avoidance or removal of CO₂e?
- **Additionality:** Would the emission reductions have occurred without the revenue derived from the offset project? Is there an over-crediting risk?
- **Permanence:** Are the avoided or removed GHGs likely to be maintained for an atmospherically significant period of time?
- **Co-benefits:** Are there additional benefits the project brings to local communities and biodiversity?

A note on Provisional Ratings

Provisional ratings are due to a lack of project data

When we don't have access to all the key project data required to evaluate the carbon performance, additionality and permanence of a project, we cannot publish a complete Sylvera rating. Instead, we issue a Provisional Rating based on the best data currently available. When new data is issued and when it satisfies all our criteria for rigorous analysis, we will reassess the project and issue a complete Sylvera rating.

For the sake of clarity and simplicity in this report, we have converted all Sylvera provisional-rated projects to a letter grade. Sylvera rates some projects on a provisional scale when they lack material data for a complete assessment. We are currently in the process of converting provisional ratings to reflect a letter in the AAA-D scale; this process is expected to be complete by end of 2023 and post-conversion, these ratings would still carry a provisional label.

For this report, we took a conservative approach by converting each provisional rating to the corresponding middle letter grade (i.e. P- becomes C; P becomes BB; P+ becomes AA). *Note: some of these conversions will be different when we release our official update in the coming months.*



The current state of play

Climate action must be at the top of every business agenda

We're heading into the final stretch of 2023 and climate action must be at the top of every business agenda. While the growth of the Voluntary Carbon Market (VCM) has stalled this year, the opportunity to invest in real climate action remains strong.

It will take an estimated capital investment of \$3.5 trillion annually over the next 30 years, from both the public and private sectors, into the technology and infrastructure required to deliver a zero-carbon economy. At the moment, the pace of action and investment lags far behind what is required.

Much of the world recognizes the importance of meeting net zero by 2050, but nearly all companies with net zero targets will fail to achieve their goals if they don't, at a minimum, double the pace of emission reductions by 2030. This will need to include both decarbonization efforts and investments in carbon credits to account for emissions that currently cannot be eliminated in full.

Increased scrutiny on climate claims in the press, accusations of greenwashing and a lack of clear guidance on how to best participate in the VCM hamstrung the market's growth this year. While forthcoming regulatory updates and integrity initiatives will likely provide needed confidence in the near future, buyers are proceeding with caution and delaying carbon credit purchases right now.

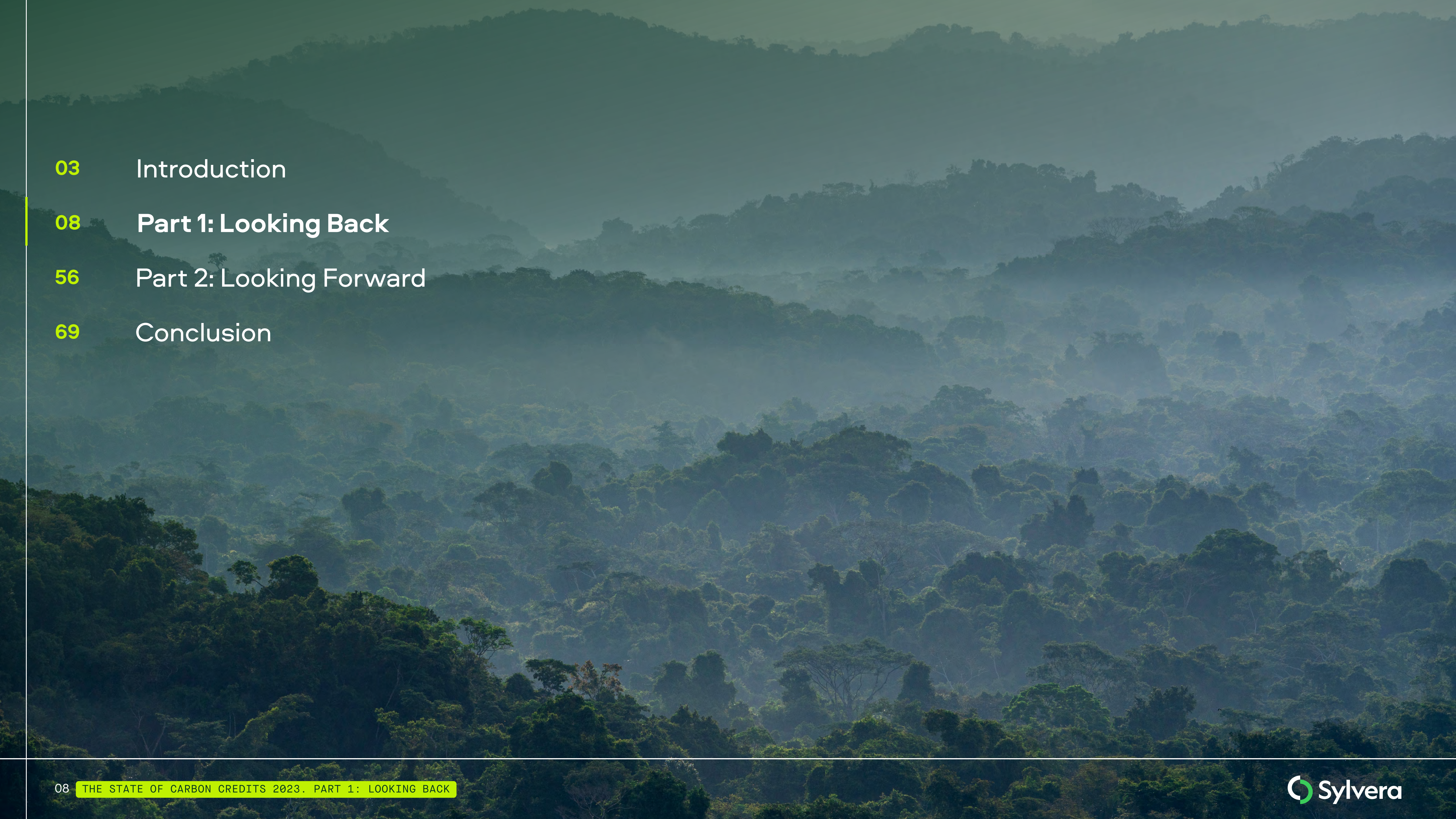
However, purchasing carbon credits, which fund projects around the world like protecting rainforests from deforestation or providing clean cooking stoves, is one of the most established and scalable ways to channel finance to effective climate outcomes.

As pressure rises for more companies to turn net zero targets into real action, it is estimated that the total size of the VCM could reach \$250 billion by 2030, and \$1.5 trillion by 2050. The VCM, and carbon credits specifically, remain essential mechanisms to prevent and reverse the effects of climate change and meet 1.5C targets in line with the Paris Agreement.

This year Sylvera performed an analysis that showed that companies that purchase carbon credits **decarbonize 2x faster** than those that don't. This finding has since been supported in subsequent reports by Trove Research and Ecosystem Marketplace, debunking the myth that organizations buy credits instead of reducing emissions; to the contrary, they do both.

Moreover, a recent survey conducted by Boston Consulting Group found that carbon credit investors are willing to pay significantly more for credits of demonstrably high quality, underscoring the need to give buyers the data to discern and evaluate quality. As market transparency increases with credit ratings, buyers can invest with more confidence and demand high-quality carbon credits.

Using data and individual carbon project case studies, this report highlights where buyers can find quality in the market currently, along with real examples of carbon projects that investors should continue to assess with caution. As a collective, the time is now to leverage these solutions and channel finance the high-quality projects making a real impact.



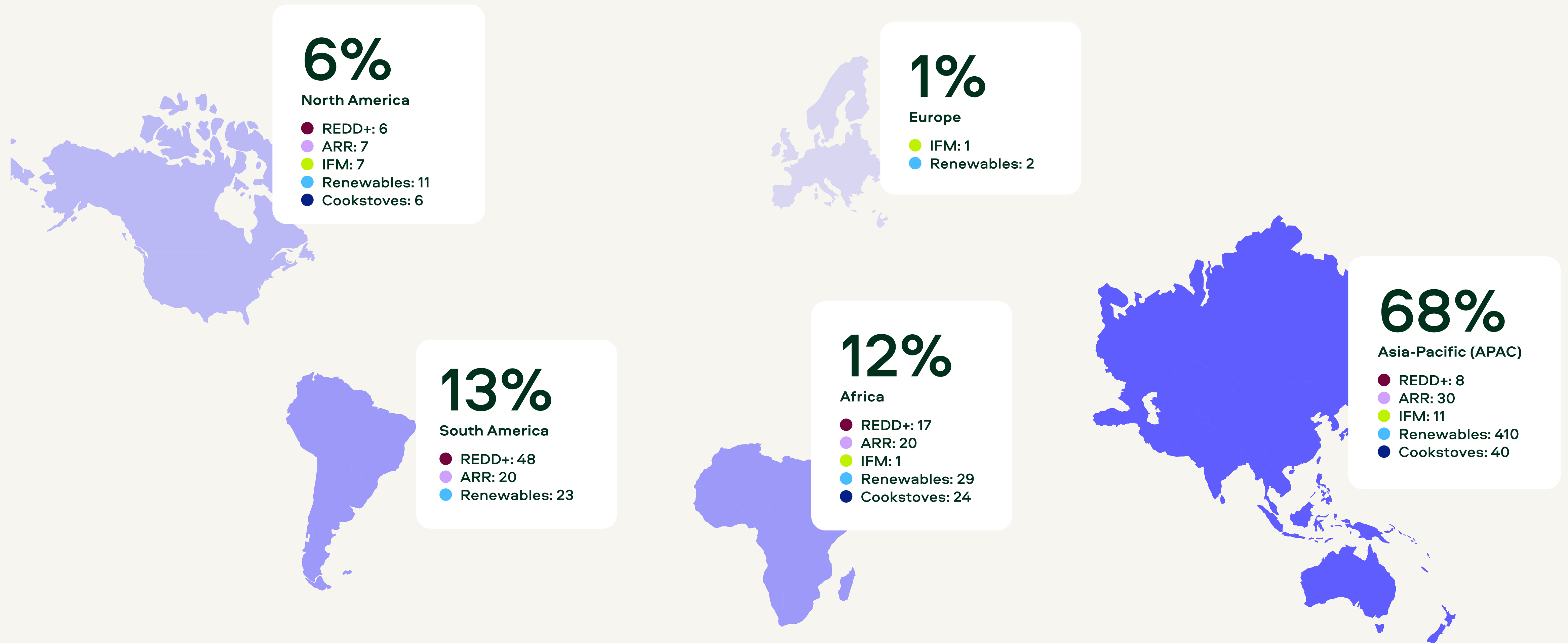
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Credit issuance by project type

	Project type	Number of issuing projects	Issued credits	Average issuance / project	Average issuance / year
Nature-Based Solutions	ARR	77	28,859,166	374,794	9,619,722
	IFM	20	9,752,175	487,609	3,250,725
	REDD+	79	233,445,000	2,955,000	77,815,000
Technology-Based Solutions	Centralized Solar	81	42,320,913	522,480	14,106,971
	Cookstoves	70	19,021,705	271,739	6,340,568
	Distributed Solar	4	1,781,595	445,399	593,865
	Hydropower	151	98,796,469	654,281	32,932,156
	Wind	239	77,371,153	323,729	25,790,384

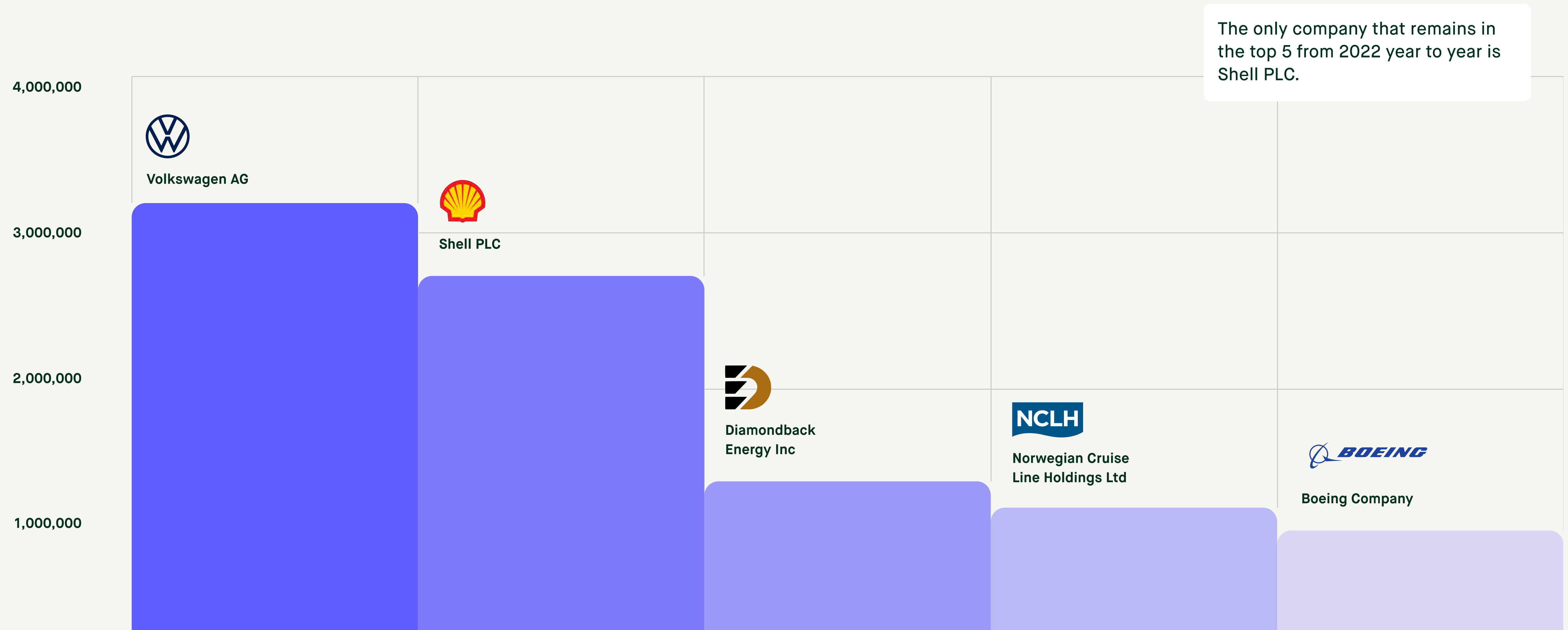
REDD+ remains the category with the highest credit issuance year over year. It is followed by hydropower renewable projects, which are issuing 68% less credits than REDD+ projects this year despite having almost double the amount of projects in the market.

Global distribution of issuing carbon projects

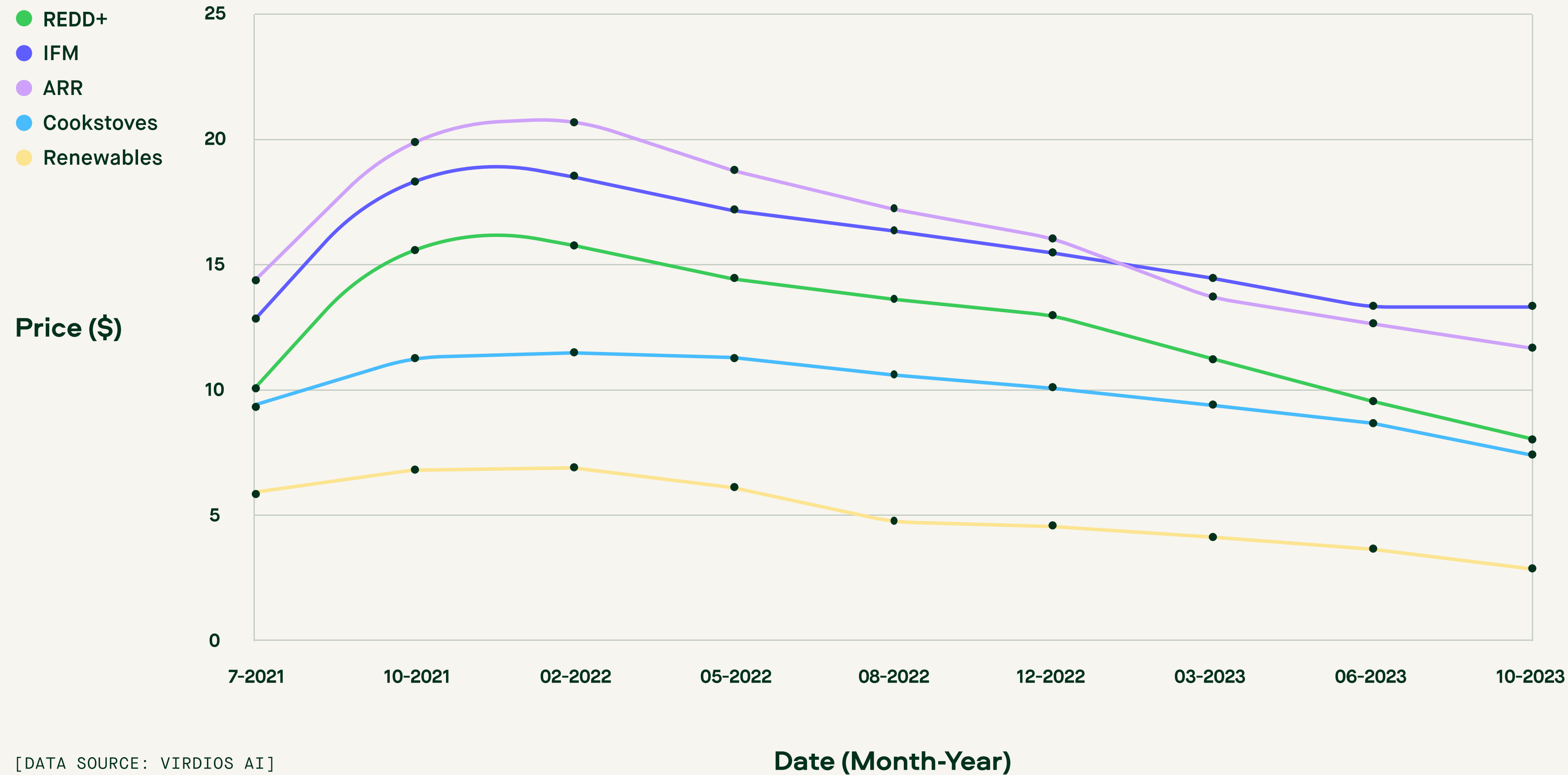


[DATA SOURCE: VERRA REGISTRY]

Top 5 companies that retired credits in 2023



Project-type pricing trends



Across all project types, prices have dropped to where they were in 2021 before peaking in 2022.

Despite the market-wide price decrease, nature-based projects are priced at a premium compared to technology-based projects (Renewable Energy Sources and Improved Cookstoves).

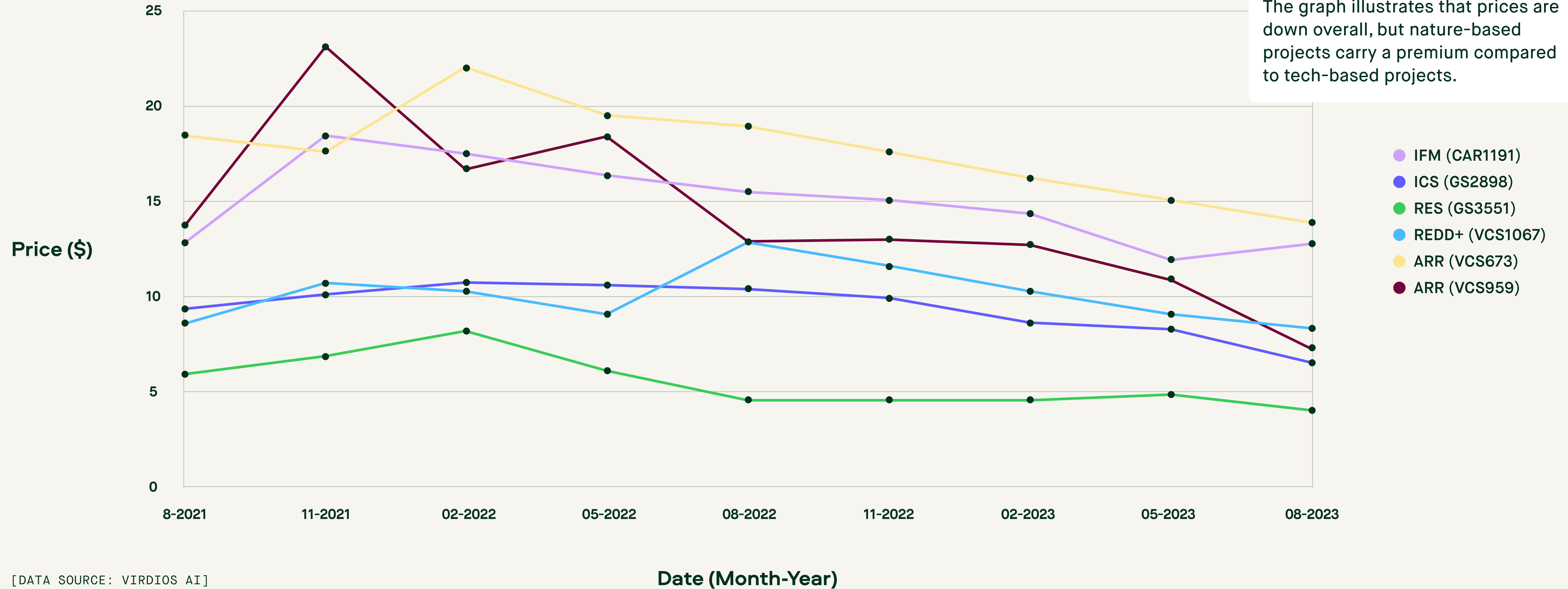
Nature-based projects also happen to have a wider spread of credit quality, which we will explore in this report. **Currently, discerning buyers have the opportunity to find and purchase higher-quality credits while the market is down.**

Renewable Energy Source (RES) credits are broadly low-quality due to their lack of additionality, which we will dive into later, and are the cheapest. While these prices may seem enticing to some buyers, the majority of RES credits will not drive real climate impact and should be considered with caution.

[DATA SOURCE: VIRDIOS AI]

Project-specific pricing trends

These are the pricing trends for the case studies featured in the report. The graph illustrates that prices are down overall, but nature-based projects carry a premium compared to tech-based projects.



[DATA SOURCE: VIRDIOS AI]

Nature-Based Solutions

Nature-based solutions

Nature-based solutions (NBS) is the biggest category of carbon credits available in the VCM, accounting for the largest volume of credits.

It is also the project category that continues to get the most investment (\$9bn between 2020 - 2022, Trove Research).

NBS projects – when developed, executed and maintained well – can offer strong co-benefits for local communities and biodiversity, which tech-based solutions cannot deliver.

NBS projects can be classified as removals or avoidance.




[Learn more about removals vs avoidance](#)



More sophisticated and experienced carbon credit buyers tend to prefer NBS projects. As clearly stated in the previously cited Boston Consulting Group survey, “Although some NBS project types have attracted criticism, other NBS project or program types have the potential to elevate quality in the VCM.”

It is essential that we recognize and promote projects that are bolstering the quality of the overall market, and crucially preserving Earth’s carbon sinks.

NBS carbon credit breakdown

Project type	Percentage	Total issuing projects	Issued credits	Average issuance/project	Average issuance/year
 REDD+	86%	79	233,445,000	2,955,000	77,815,000
 ARR	11%	77	28,859,166	374,794	9,619,722
 IFM	3%	20	9,752,175	487,609	3,250,725

Reducing Emissions from Deforestation and Forest Degradation

REDD+

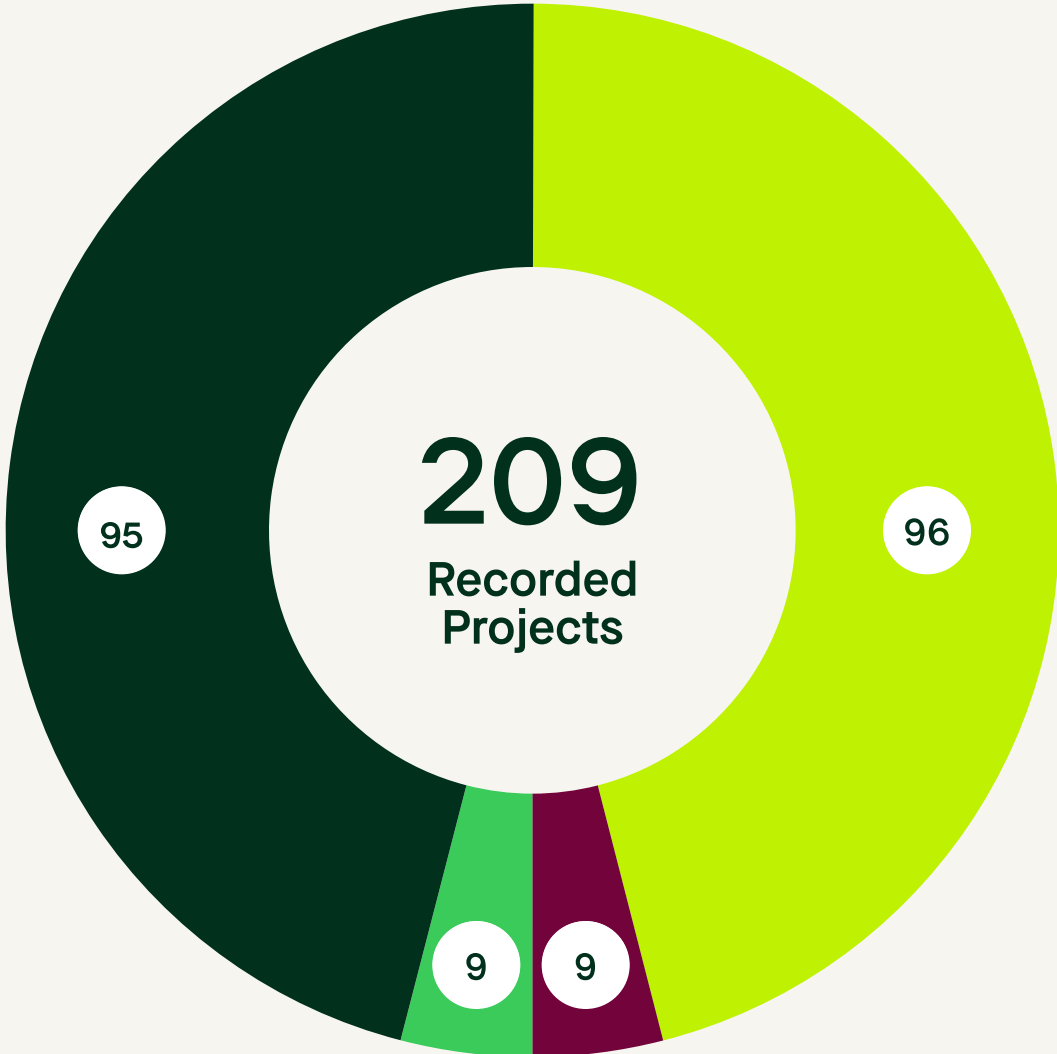
What is REDD+?

Reducing Emissions from Deforestation and Forest Degradation (REDD+) is a type of avoidance credit that finances activities that focus on the sustainable management and conservation of at-risk mature forests. Sovereign carbon credits, or Jurisdictional REDD+, are not included in the scope of this assessment but are discussed later in the report.



Recorded REDD+ projects

REDD+ Project Statuses



46%

REGISTERED

4%

REGISTRATION REQUESTED

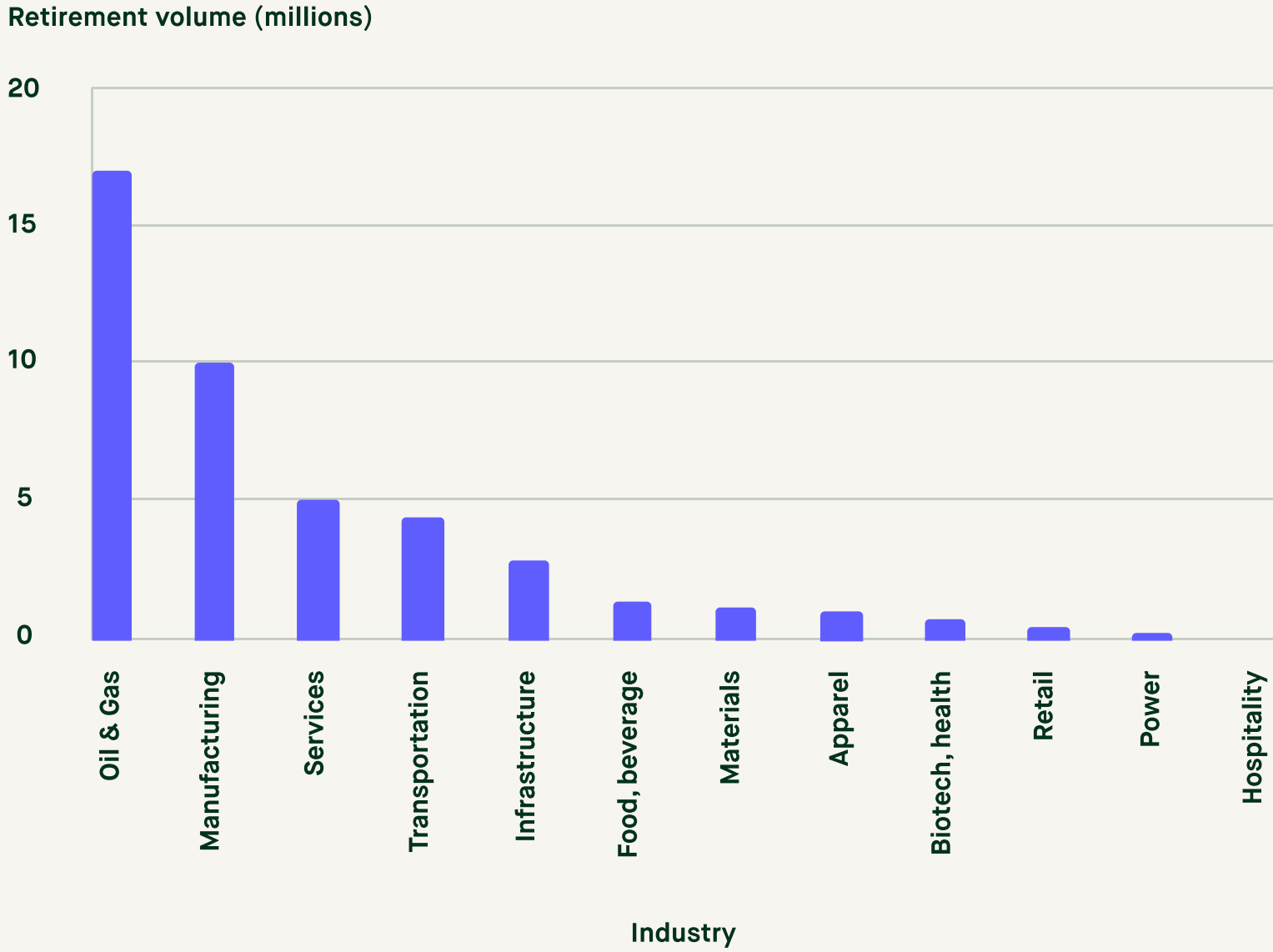
4%

REJECTED/WITHDRAWN

46%

UPCOMING PROJECTS

Leading Industries Retiring REDD+ Credits



Historically, the Oil & Gas, Manufacturing, Services* and Transportation industries have bought, sold and retired large volumes of carbon credits. As REDD+ projects make up the majority of NBS, which is the most heavily invested in carbon project category, it is not surprising to see the most experienced carbon credit purchasers retiring the highest volumes on average of REDD+ credits. **These industries represent 80% of REDD+ carbon credit retirements.**

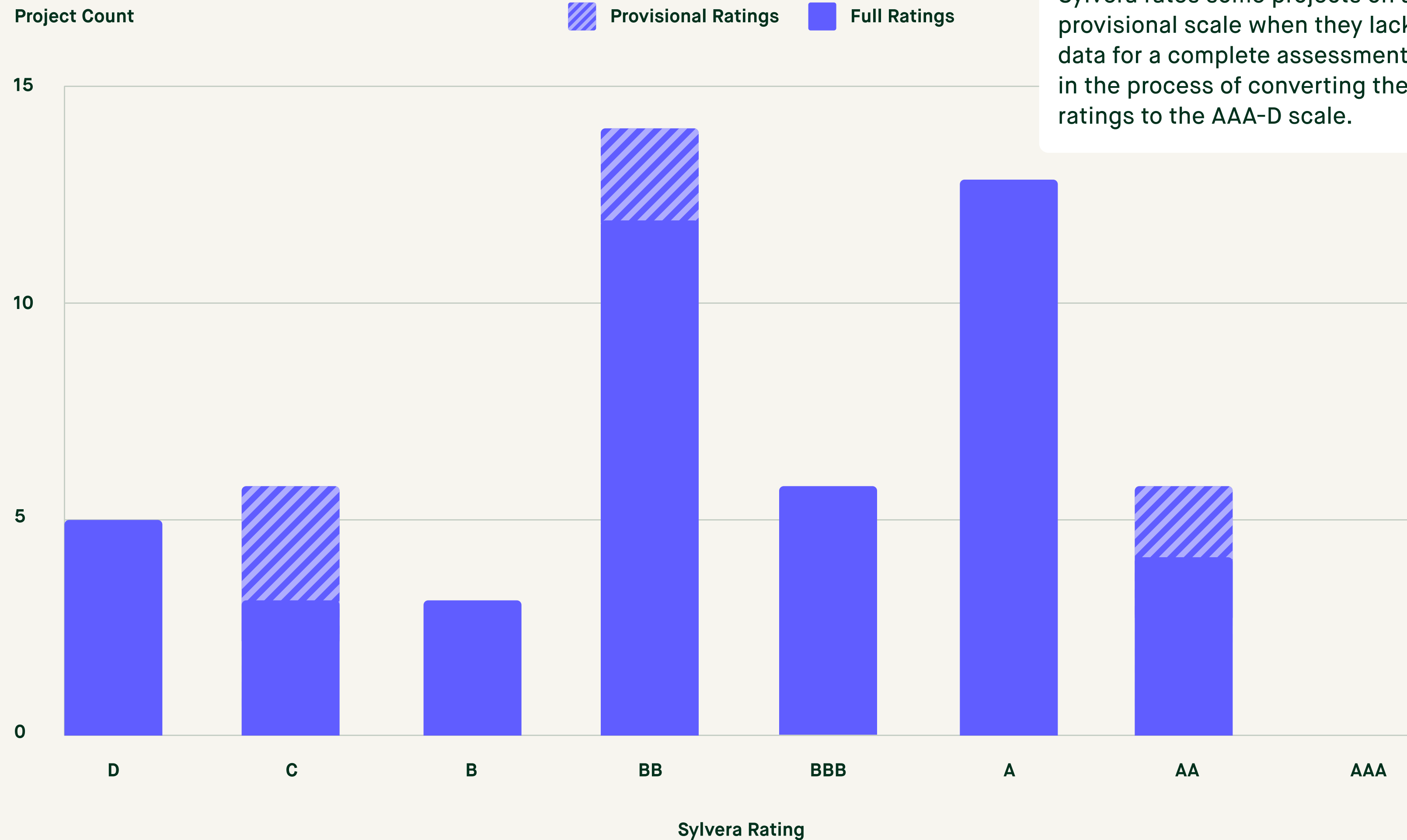
*Services encompasses:
 Financial Services
 Professional Services
 Media & Telecommunication Services
 Web & IT Services

REDD+ Regional Credit Issuance Breakdown



Region	Credit Issuance Breakdown
North America	8%
South America	61%
Africa	21%
Asia	8%
Oceania	2%

Silvera's REDD+ ratings summary



Silvera rates some projects on a provisional scale when they lack material data for a complete assessment. We are in the process of converting these ratings to the AAA-D scale.

So what do Silvera's ratings reveal?

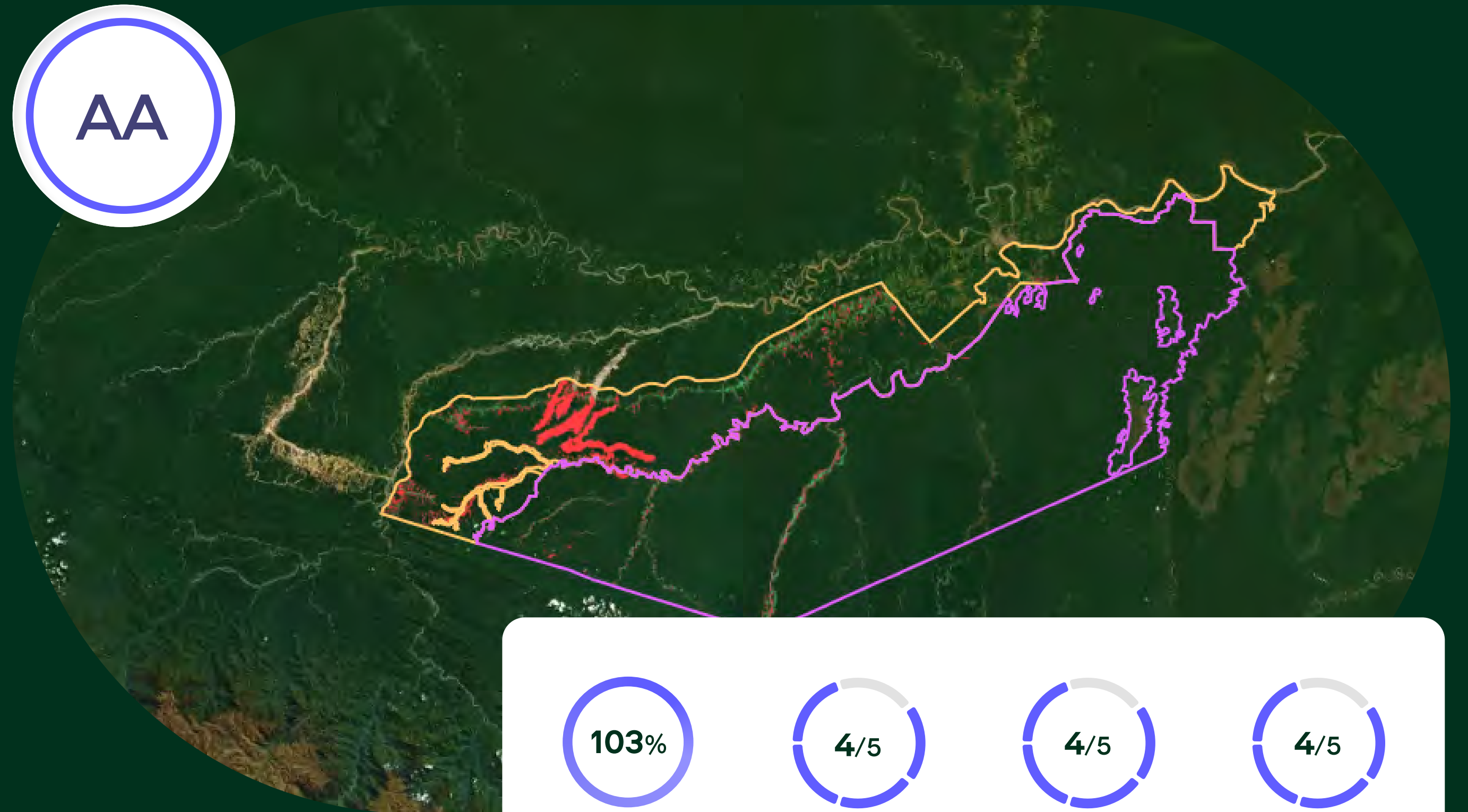
While REDD+ projects continue to make headlines due to questions surrounding their quality, we have found that there is high-quality (AA-A) supply in the market, which we will provide a case study of below, accounting for 36% of rated REDD+ projects (including our AA-provisional ratings).

Note, we have never issued our highest rating of AAA to any project. The majority of REDD+ projects are rated as mid-quality (BBB-B), accounting for 43% of rated projects.

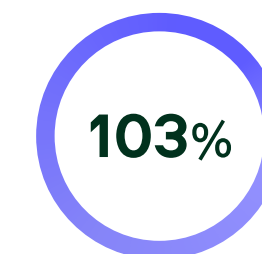
Silvera also believes that buyers have the opportunity to apply “discounting” when purchasing carbon credits, which has emerged as one risk management tool to account for the range of carbon credit quality. Simply put, a discounting approach means buyers use more than one credit to compensate for one tonne of CO₂e. This approach can be applied to any project type.

Case Study: Tambopata

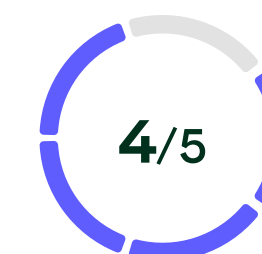
- Registry ID: VCS 1067
- Location: Madre de Dios, Peru



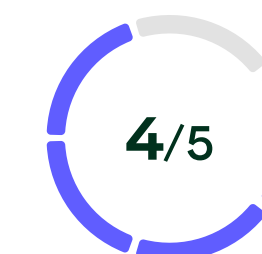
All case studies in this report represent a summary of the full Sylvera assessment at a moment in time. Ratings and assessments can change in the future; projects are re-evaluated when new material information is available.



Carbon Score



Additionality



Permanence



Co-benefits



1. Key highlights

Tambopata is a 20-year REDD+ project in Madre de Dios, Peru, to protect 541 kha of publicly-owned land from unplanned deforestation due to local subsistence agriculture and small-scale informal mining activity.

The project's baseline is conservative, and it implements activities that offer robust forest protection beyond what would have occurred in the "business-as-usual" (BAU) scenario.

The project is located within two protected areas, namely Tambopata National Reserve and Bahuaja-Sonene National Park. However, the protected status of the Project Area (PA) does not negatively impact additionality. Due to a lack of adequate funding, the National Service of Natural Protected Areas of Peru (SERNANP) could not effectively protect the PA from deforestation agents in the BAU scenario; therefore, protection provided by the project activities can be seen as additional.

2. Carbon accounting

Sylvera detects lower deforestation than was reported by the project. Deforestation has been increasing slightly since the latest issuance; however, total project area forest loss is minimal and is not currently a cause for significant concern.

3. Additionality of activities

There was patrolling of the PA before project implementation, however, carbon revenue has allowed for an improvement in the capacity of rangers and has introduced daily patrols.

The project activities have also provided locals with alternative income sources through training in activities such as agroforestry to reduce their reliance on mining and conventional deforestation-driving agricultural practices.

4. Over-crediting risk

Sylvera finds that the project's baseline was modeled conservatively.

The project's baseline matches deforestation rates observed by Sylvera in the project's Reference Area (RA) during the pre-project period. These rates have increased since the project began, showing the deforestation pressure in the Madre de Dios region.

Sylvera also modeled a subset of the RA, to match the deforestation pressure in the PA. This subset was immediately adjacent to the PA, in the vicinity of the Interoceanic Highway, and reflected the risk of increased illegal gold mining in the proximity of the PA. Subset deforestation rates support the finding that the project's baseline is conservative.

5. Permanence

The project's overall risk of losing significant carbon stocks to fire is very low. Sylvera's fire analysis reveals that fires have historically affected a relatively small portion of vegetation in the PA.

Risk is limited by internal factors including the experience of the project team and the direct involvement of the national government in the project which reduces the likelihood of issuance rights being threatened or retracted during the project period.

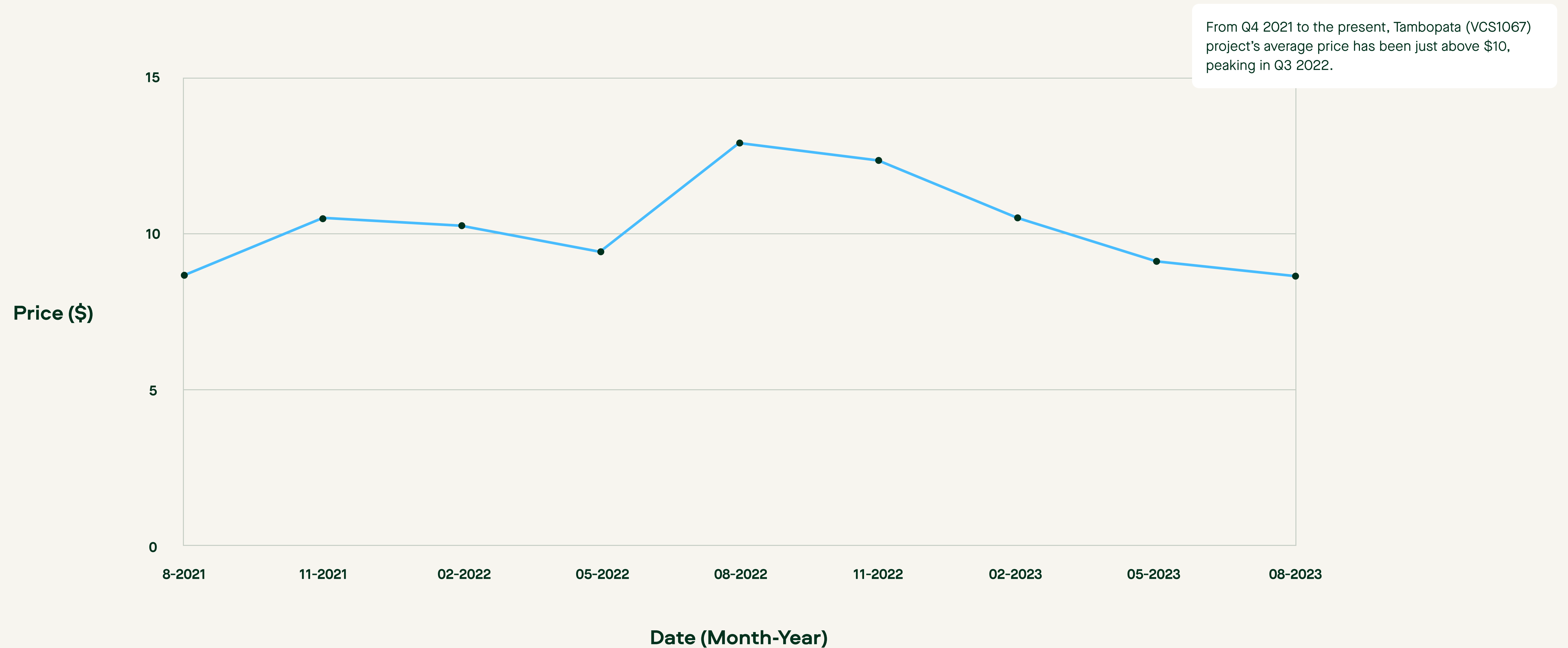
6. Co-benefits

Tambopata delivers strong overall co-benefits. The project's impact on biodiversity conservation is strong and project activities provide moderate benefits for the local community.

The PA contains a high level of species diversity, including several threatened species. The project implements frequent ranger patrols alongside indirect measures such as introducing activities to promote alternative livelihoods to disincentivize deforestation.

The project has had a moderate impact on three of the UN Sustainable Development Goals (SDGs): SDG 5 (Gender Equality), SDG 16 (Peace, Justice and Strong Institutions) and SDG 8 (Decent Work and Economic Growth).

Tambopata (VCS 1067) pricing trend



Afforestation, Reforestation & Revegetation

ARR

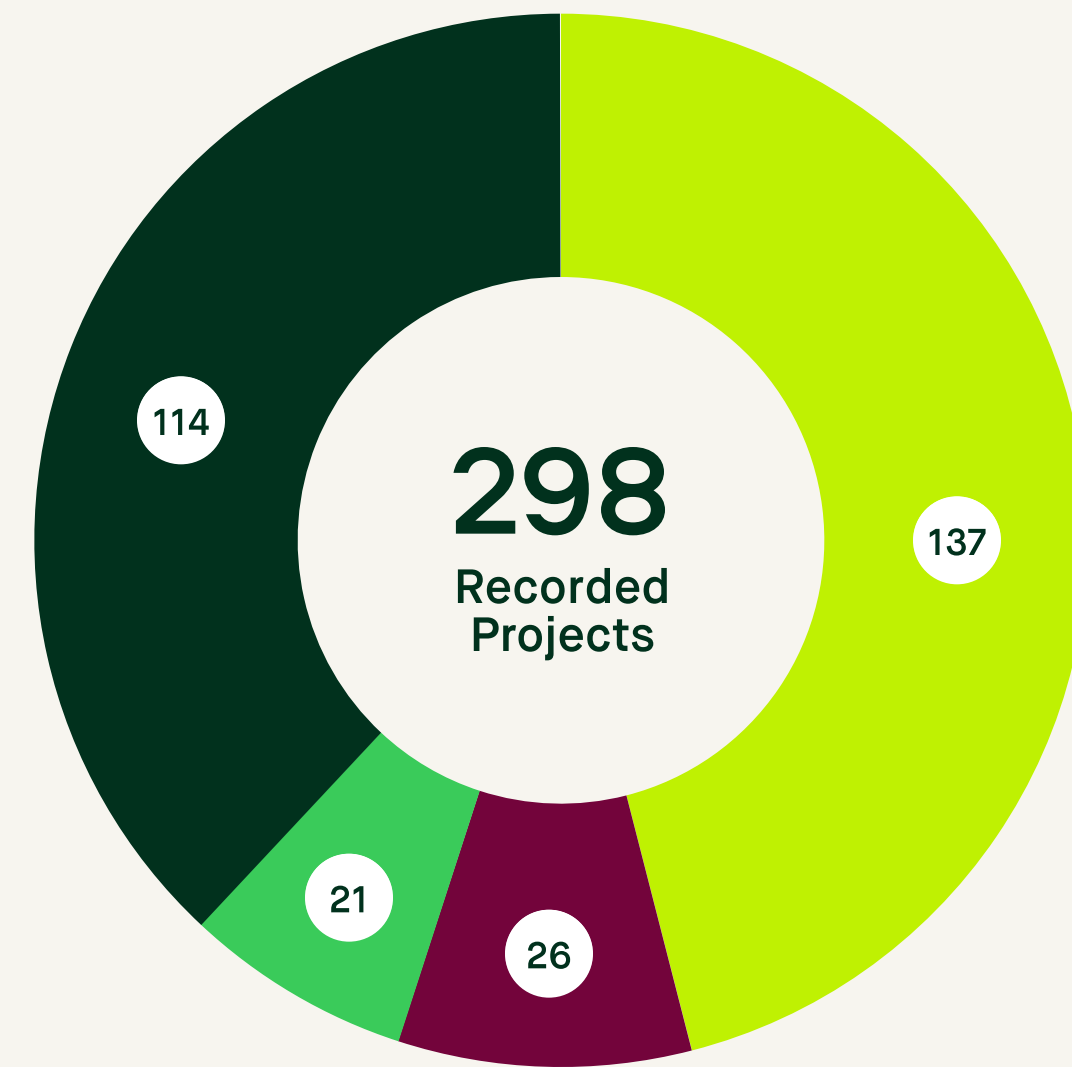
What is ARR?

Afforestation, Reforestation & Revegetation (ARR) is a type of removals project that utilizes carbon financing to restore forests and woodland via replantation.



Recorded ARR projects

ARR Project Statuses



46%

REGISTERED

9%

REGISTRATION REQUESTED

7%

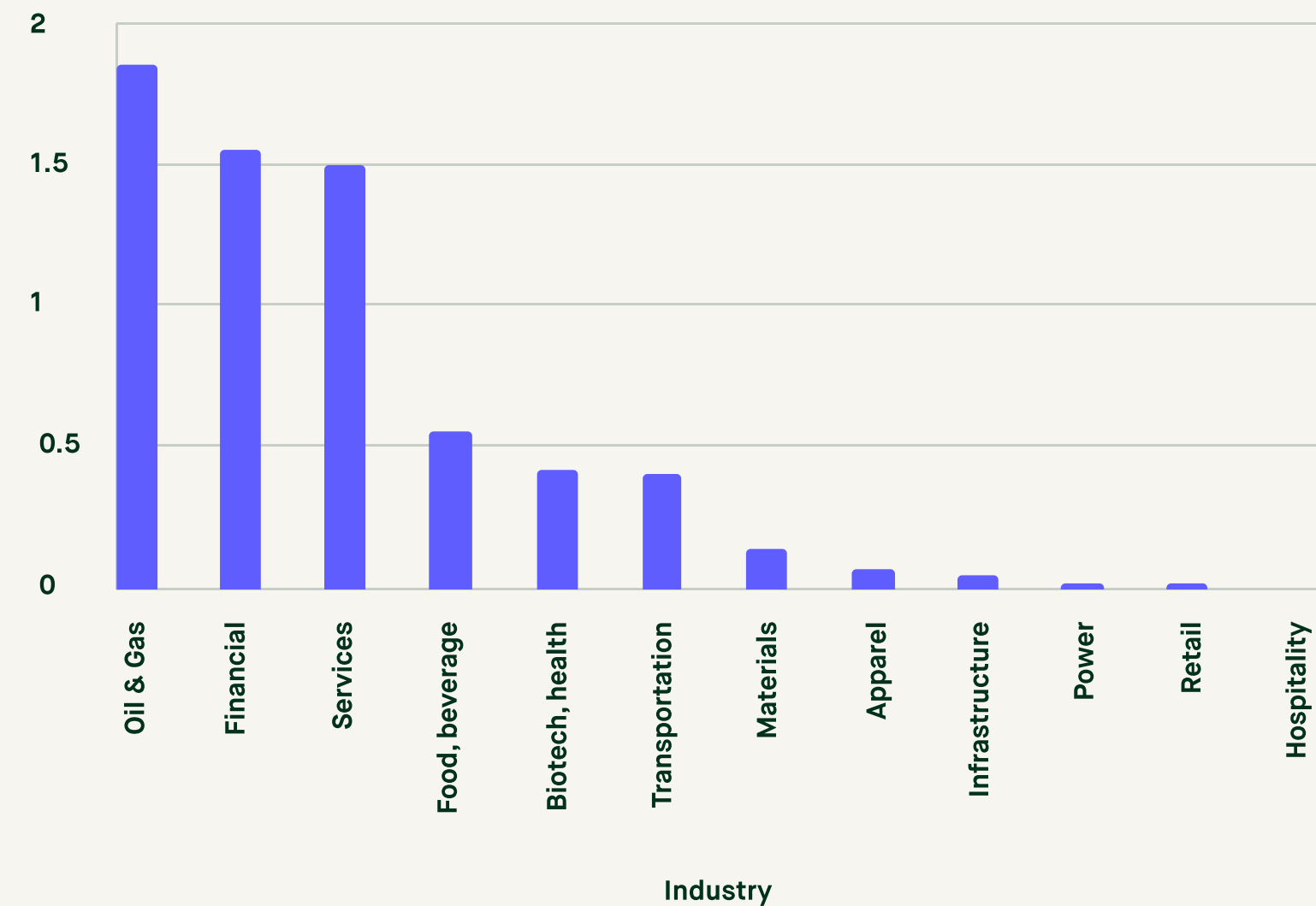
REJECTED/WITHDRAWN

38%

UPCOMING PROJECTS

Leading Industries Retiring ARR Credits

Retirement volume (millions)

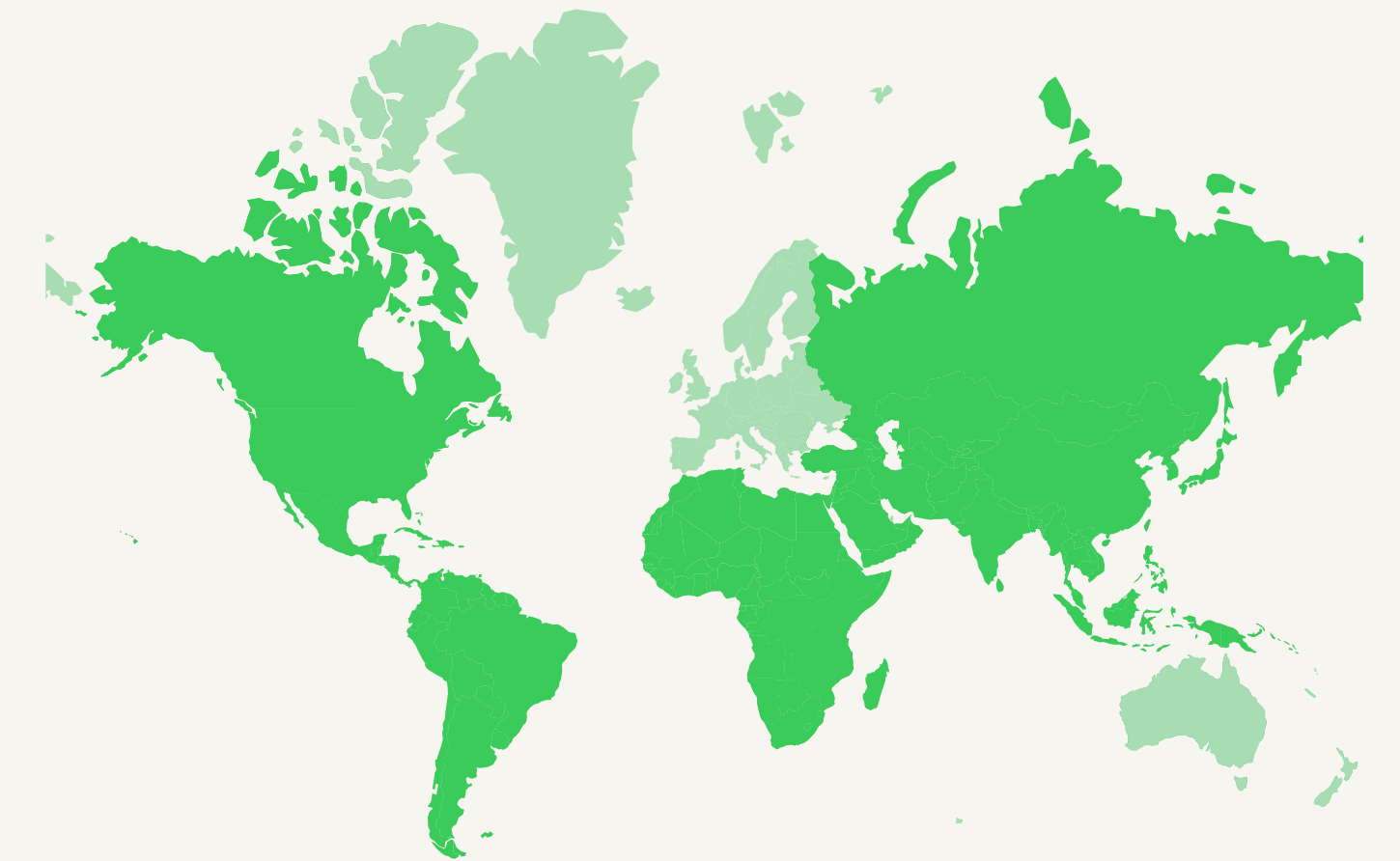


Most notably, the volumes of carbon credit retirements across all industries are much smaller than REDD+ retirements. This is due to the fact that REDD+ carbon credits dominate the supply of carbon credits on the market; ARR projects are issuing 88% less carbon credits than REDD+.

Looking at the Oil & Gas industry alone, more than 17 million REDD+ carbon credits have been retired from 2021 to 2023, while under 2 million ARR carbon credits have been retired over the same time period.

While there is less supply of ARR credits available for purchase and therefore retirement, there is a significant amount of ARR projects in development, labeled as “Upcoming projects” in the ARR Project Status chart. Sylvera is in the process of helping companies assess projects that are in early-stage development, which we will elaborate on later in the report.

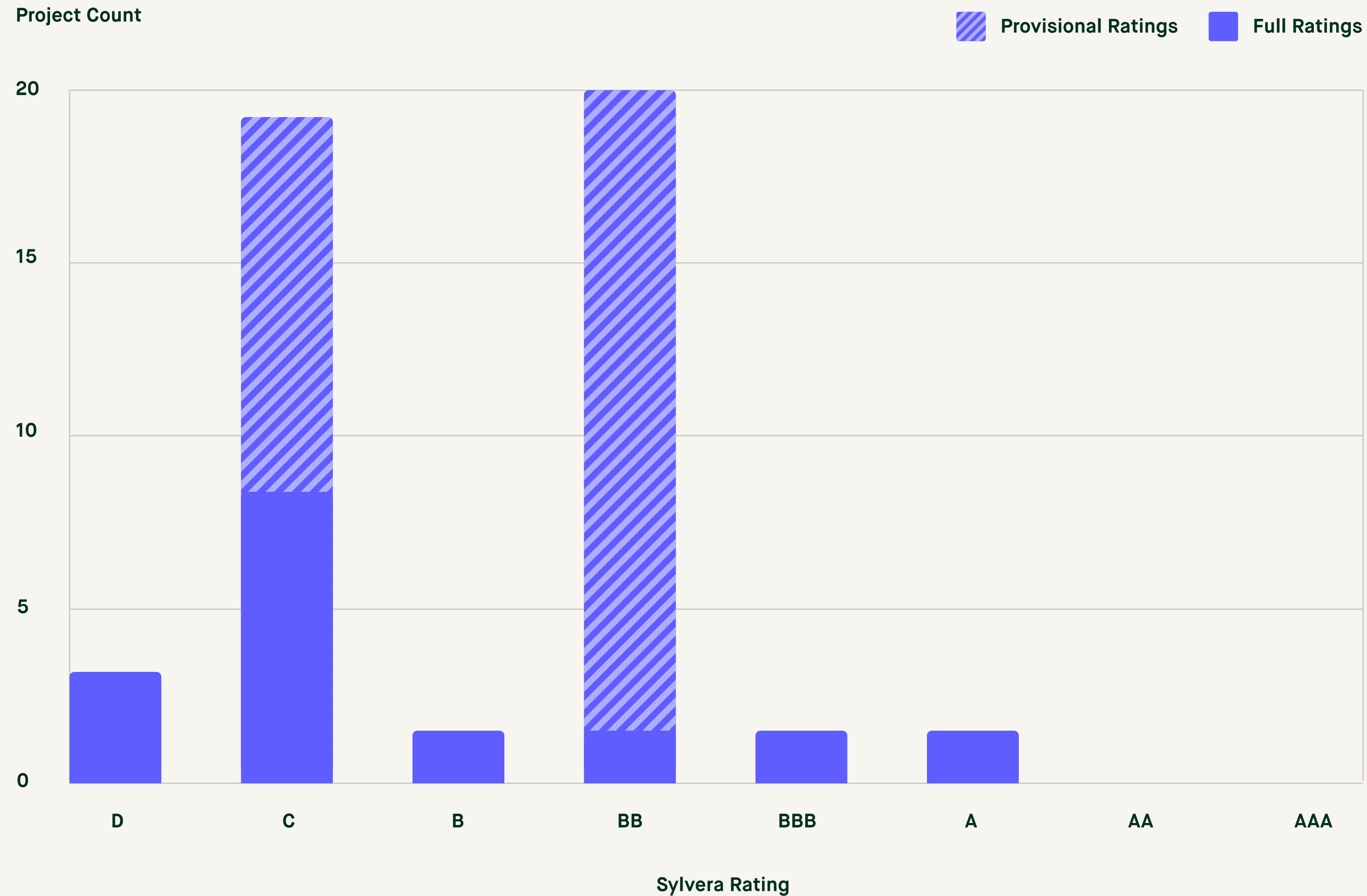
ARR Regional Credit Issuance Breakdown



Region	Credit Issuance Breakdown
North America	9%
South America	26%
Africa	26%
Asia	39%

Unlike REDD+ projects, ARR projects are distributed and issuing credits more evenly around the world.

Sylvera's ARR ratings summary



So what do Sylvera's ratings reveal?

Sylvera-rated ARR projects have a greater spread in quality than REDD+ projects we've rated. We provide examples of both high-quality (rated A) and low-quality (rated C) ARR projects below. The low-quality ratings (C-D) are most commonly driven by a low Additionality Score.

Many of the ARR projects on the market are some form of plantation, and very often commercial monocultures of non-native species (e.g., eucalyptus), rather than reforestation with native species and assisted natural generation, which is more beneficial for local ecosystems. While this is allowed by the methodology, Sylvera's view is that the additionality of activities in such projects is uncertain, as commercial plantations receive significant secondary revenue from outside of the carbon market.

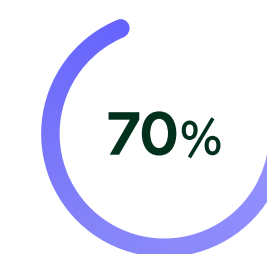
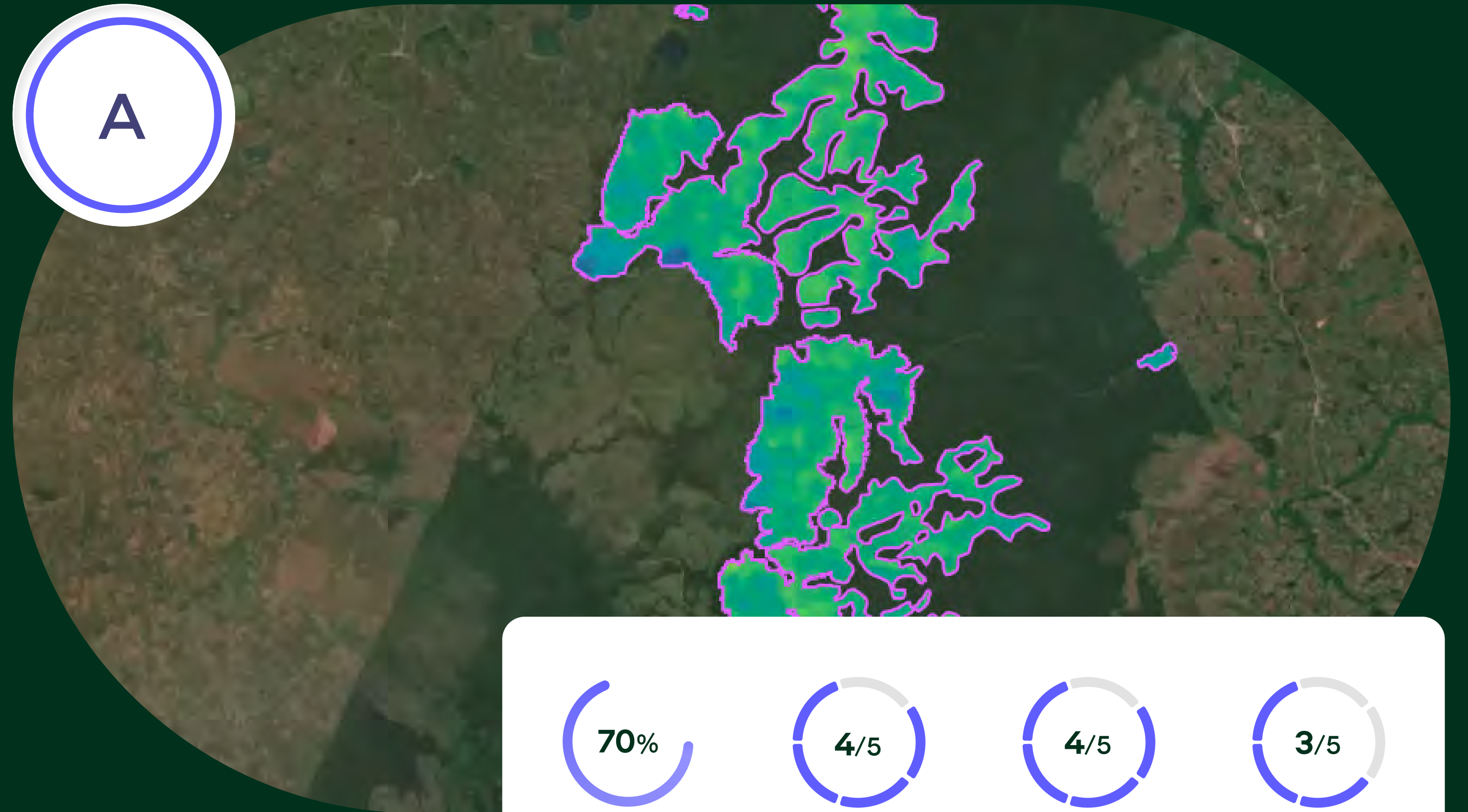
Other common reasons that can negatively impact the Additionality Score of an ARR project:

- the project activity is already common practice in the region, indicating that planting does not require additional funding as it was feasible without carbon credits
- the developer is a timber company with other assets established without carbon credits
- the project activity matches activities already supported by regional or national governments, indicating funds could have been obtained elsewhere.

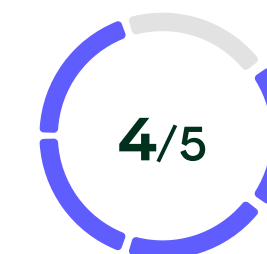
Lastly, the number of Sylvera Provisional ratings is driven by the lack of shapefiles and data available—this is typically due to the fact that shapefiles are not available from registries or developers have declined to provide them, despite Sylvera having made requests.

Case Study: Kibale

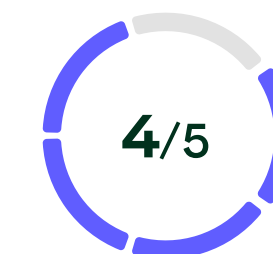
- Registry ID: VCS 673
- Location: Uganda



Carbon Score



Additionality



Permanence



Co-benefits



1. Key highlights

Kibale is a 74-year ARR project in Uganda with an aim to restore a forest area of 10 kha on land previously degraded by human encroachment in Kibale National Park. Project activities include planting of native tree species and assisted natural regeneration (ANR).

The project received an A rating driven by very positive additionality indicators.

Planting native species in order to restore natural forests, adapted to the specific environmental conditions, brings several positive aspects across different pillars (higher additionality as there are no other incentives to plant, higher permanence as species are better adapted to any natural risks, and higher benefits for the local biodiversity).

2. Carbon accounting

The project plans to restore 10 kha and over the 1995–2020 period reports replanting on 2,755 ha, and natural regeneration on 2,593 ha; natural regeneration is not included in the Carbon Score.

The project overreported planting by 1,019 ha, meaning that Sylvera detects 63% of reported planted forest.

3. Additionality of activities

The project activities are very likely additional, as reforestation and regeneration with native species is not common practice in Uganda, and forest policies in Uganda do not effectively promote and support similar activities, which are financially hard to conduct.

There is some uncertainty, as Kibale National Park has a history of scientific forestry research and similar planting activities may have been pursued for research purposes using grant funding in a BAU scenario.

4. Over-crediting risk

The project is not at material risk of over-crediting, as there is no evidence that primary forest was cleared 10 years prior to the project start, and the project is not conducted on land classes (peatlands and wetlands) that have the potential to become a source of carbon emissions when disturbed by planting.

5. Permanence

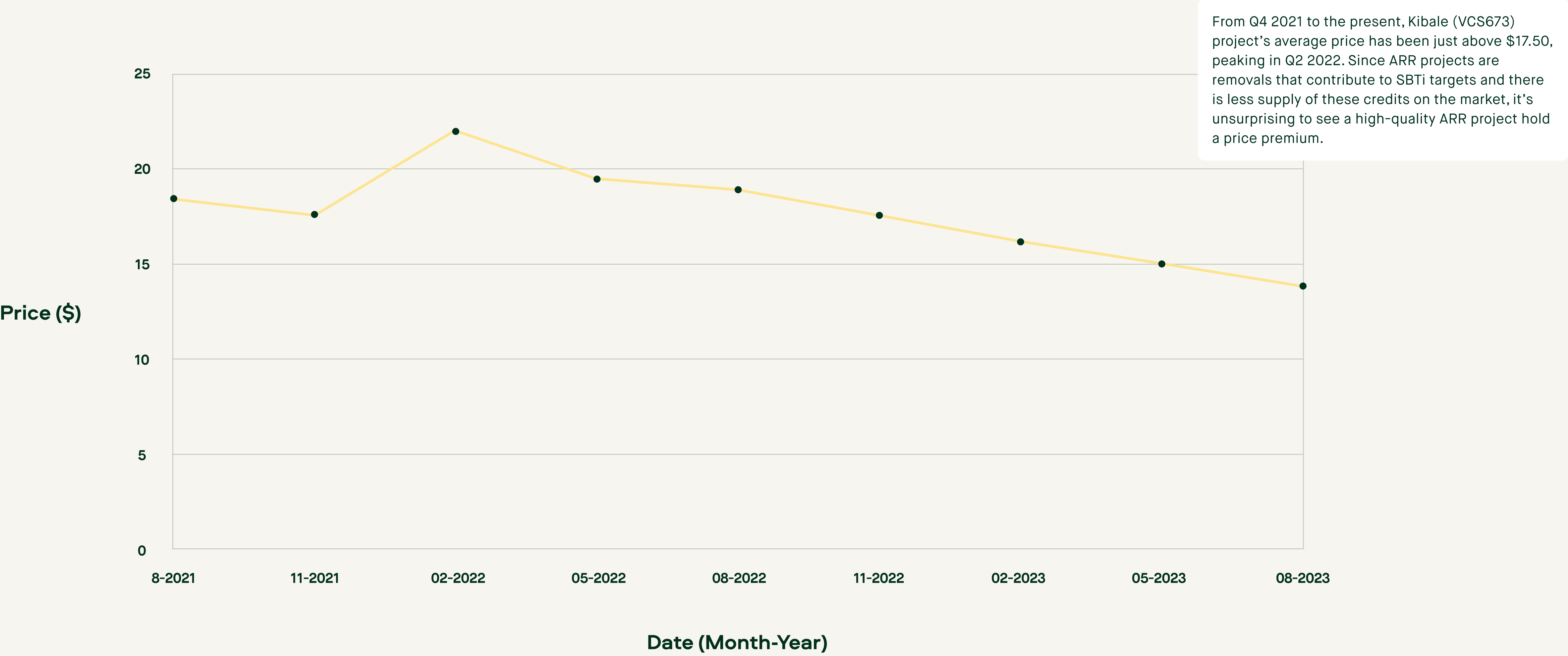
The likelihood of fire and drought is moderate, the rest of the risks are low and are mitigated by the project design, as native species adapted to the local conditions are planted.

6. Co-benefits

Since the project plants a range of native species, and among them are some considered vulnerable and endangered by the IUCN, this has a strong positive impact on the biodiversity of the area.

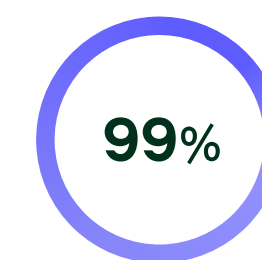
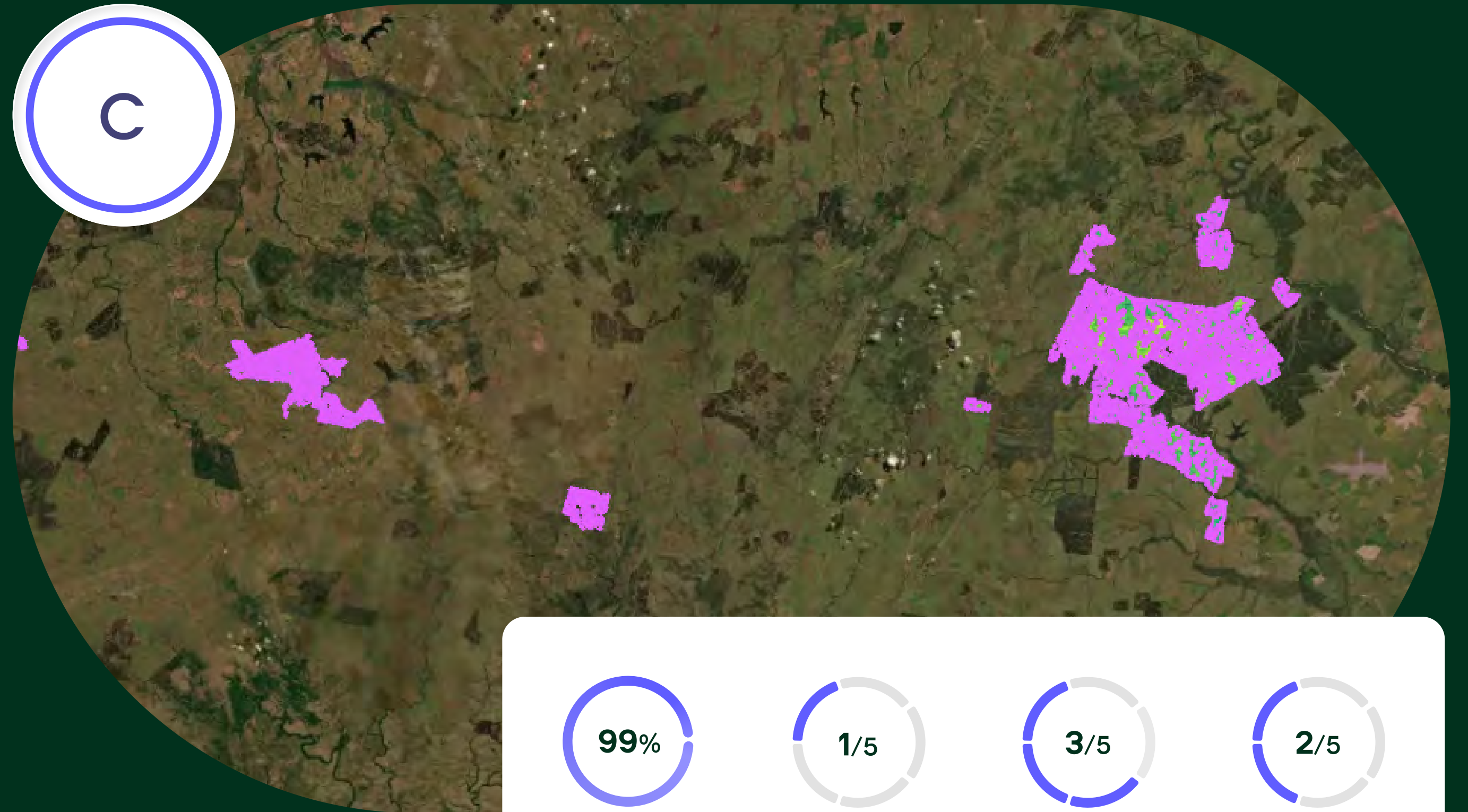
There is only a moderate benefit to the local community as the project employs a relatively low percentage of women (4%).

Kibale (VCS 673) pricing trend

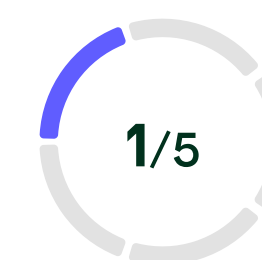


Case Study: Guanaré

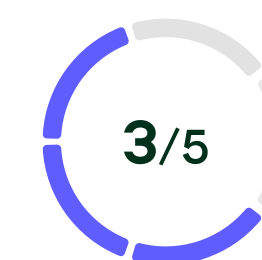
- Registry ID: VCS 959
- Location: Uruguay



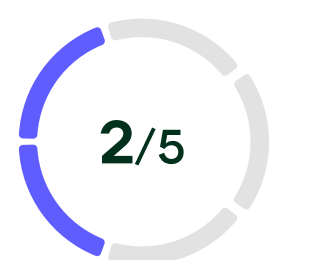
Carbon Score



Additionality



Permanence



Co-benefits



1. Key highlights

Guanare is a 60-year ARR project in Uruguay, with the aim to establish a plantation forest consisting of eucalyptus and pine, on 18.6 kha of privately owned grasslands previously utilized for cattle grazing.

The rating is driven down because of low certainty in the additionality of the project, as Sylvera believes planting could have likely happened without carbon revenues; on the other hand, planting was conducted as reported, leading to a high Carbon accounting score. The negative Additionality Score, however, carries more weight to the overall rating, meaning that even with a high Carbon Score, there is low certainty those emission reductions are additional.

Moderate permanence score reflects moderate drought likelihood which also exacerbates fire risk, while the project design (non-native commercial monoculture) does not contribute to risk mitigation.

2. Carbon accounting

The project has only very slightly underdelivered on the emission reduction claims, as it accurately reported on the planted area and forest loss events. Guanare has exhausted its credit allowance as it reached the Long Term Average by 2018.

3. Additionality of activities

Guanare is unlikely to be additional as project activities are unlikely to exceed what would occur in the business-as-usual scenario. Forest plantations are a common economic activity in Uruguay and especially in departments Terinta y Tres and Cerro Largo, where the project is located. Forest policies in the country also promote planting trees, by offering financial incentives. Since the project is a commercial plantation and receives additional revenue from outside of the carbon market, it is likely that it would have occurred without carbon financing.

4. Over-crediting risk

There is no evidence that the project area (PA) was intentionally cleared from vegetation in the 10 years prior to project start, which could indicate a malicious intent of cutting trees in order to set up an ARR project; the project is also at low risk of over-crediting

5. Permanence

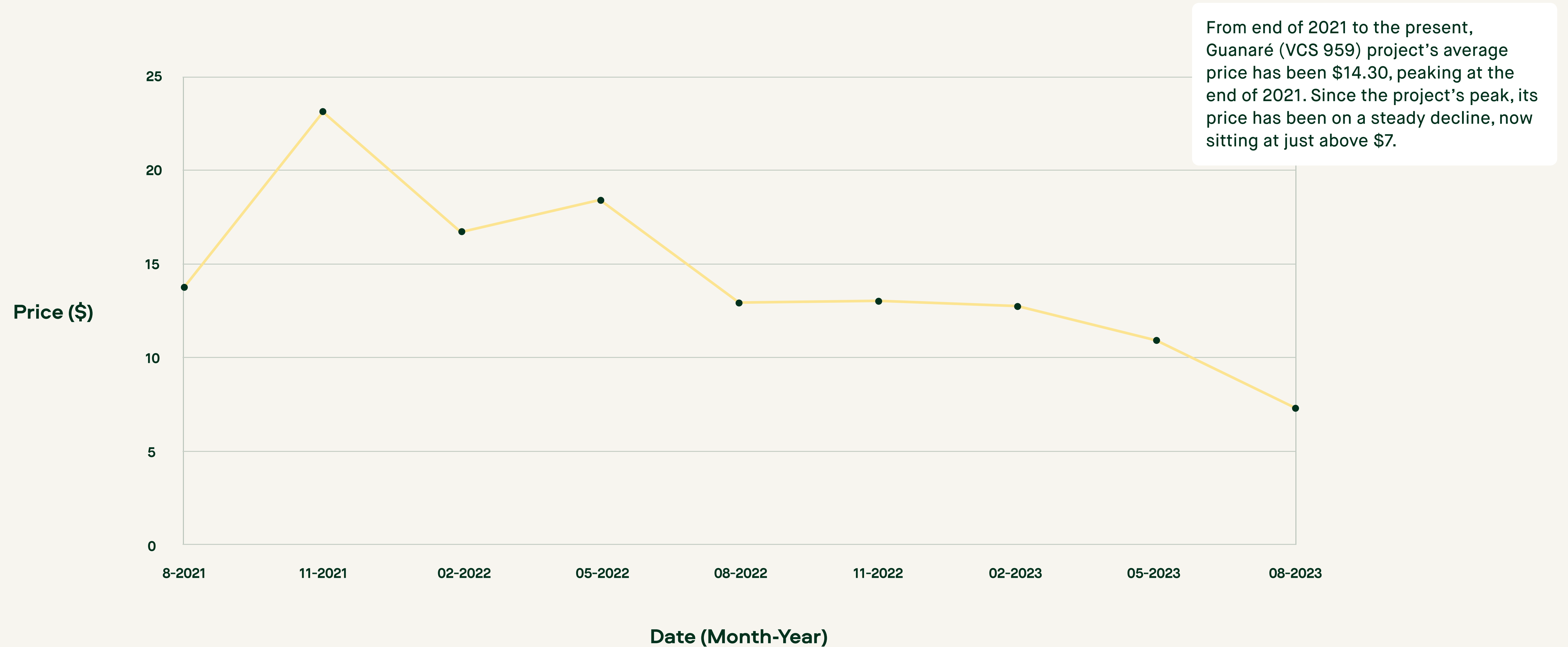
The project is exposed to moderate risk levels, with the key risk driver bringing a moderate likelihood of droughts, which also exacerbates fire risk. Risk is exacerbated by the plantation structure, as monocultures of non-native trees are more susceptible to pest attacks and other environmental conditions they are not well adapted to.

6. Co-benefits

Planting non-native, fast-growing commercial tree species has a very limited positive impact on local biodiversity. The project also applies numerous pesticides and fertilizers, known to have damaging effects on local biodiversity.

Although the project increases local employment, only around 5% of employees are women. Apart from limited contribution to SDG4 (Quality Education), the project does not utilize funds to further improve conditions for the local community.

Guanaré (VCS 959) pricing trend



Improved Forest Management

IFM

What is IFM?

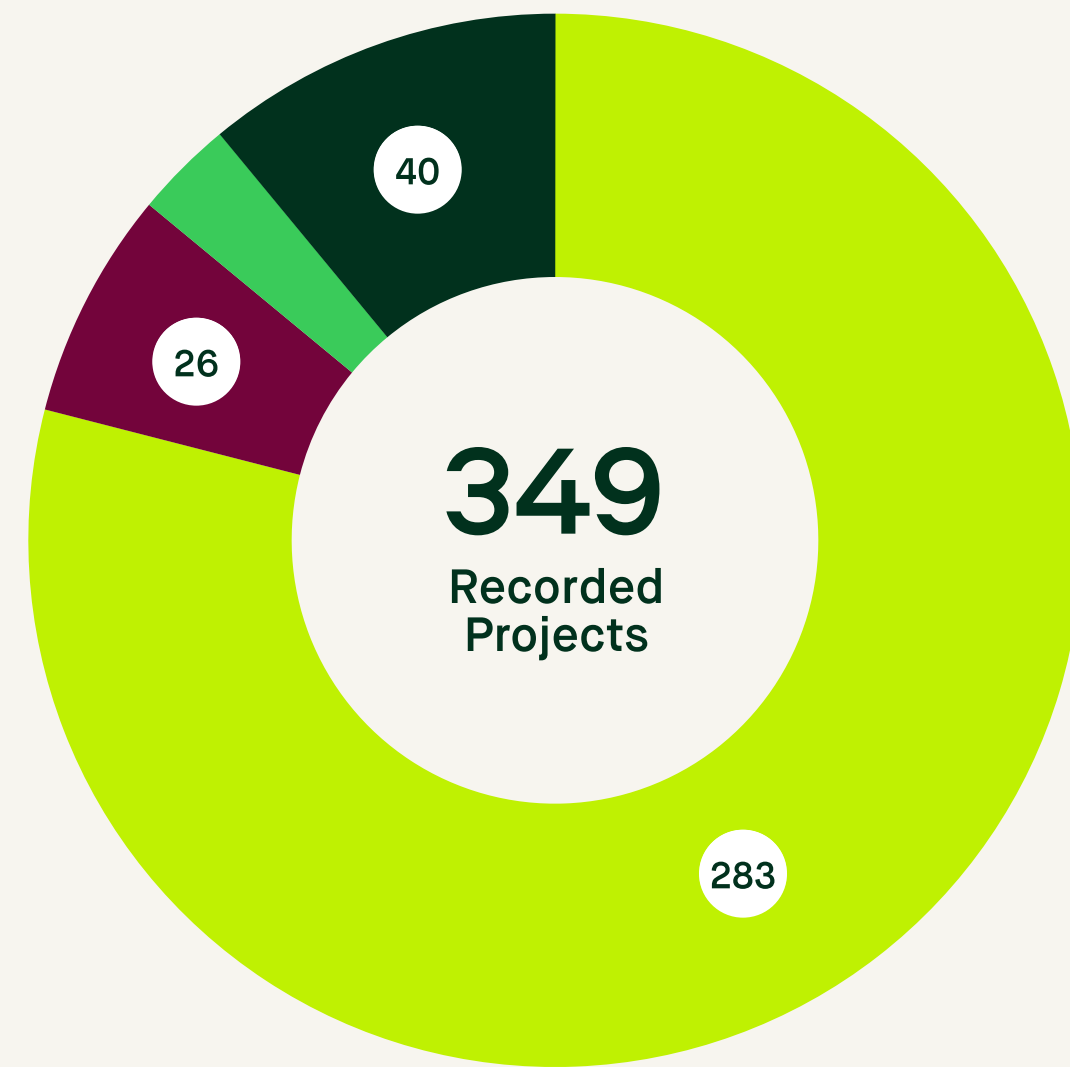
Improved Forest Management (IFM) can be considered both removals and avoidance projects depending on the activity being funded. The activities could include refraining from logging or implementing improved practices to promote enhanced forest growth (i.e. extension of harvesting rotation length, or the use of thinning.)

IFM is the smallest project type in Nature-Based solutions with the least amount of carbon credit issuances (only 3% of all NBS issuances) and retirements.



Recorded IFM projects

IFM Project Statuses



79%

REGISTERED

7%

REGISTRATION REQUESTED

3%

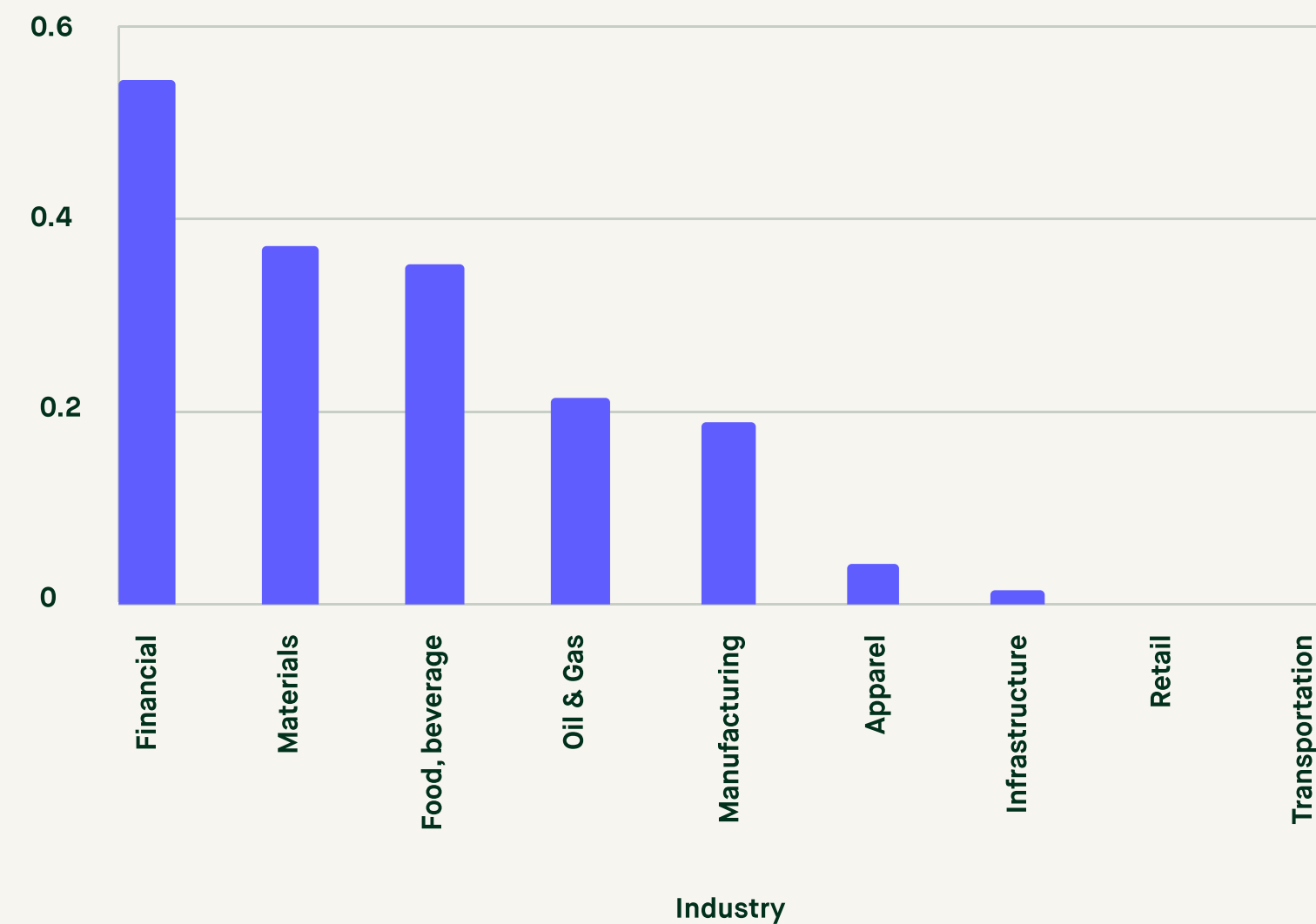
REJECTED/WITHDRAWN

11%

UPCOMING PROJECTS

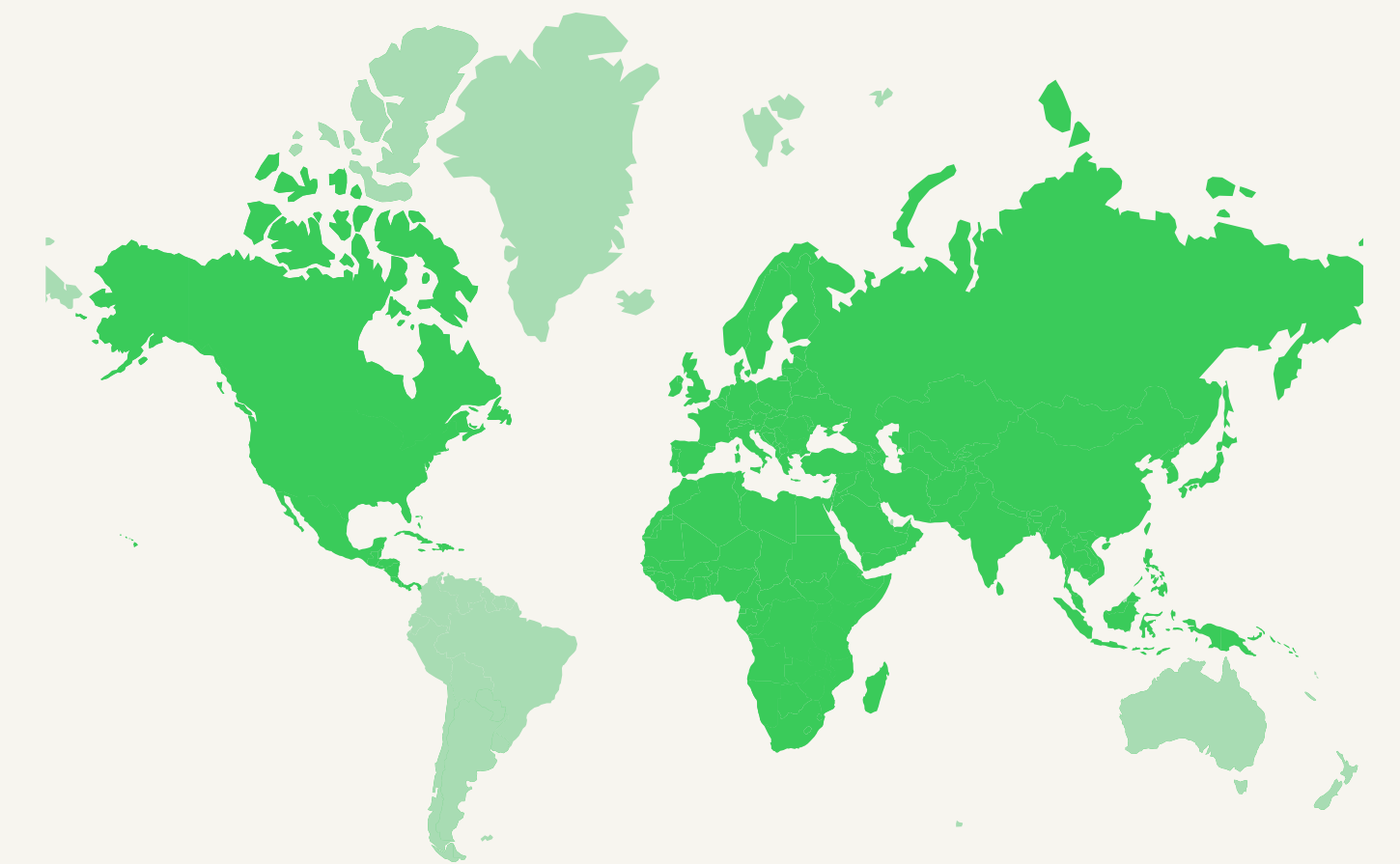
Leading Industries Retiring IFM Credits

Retirement volume (millions)



IFM retirement volumes are significantly smaller than REDD+ and ARR retirements.

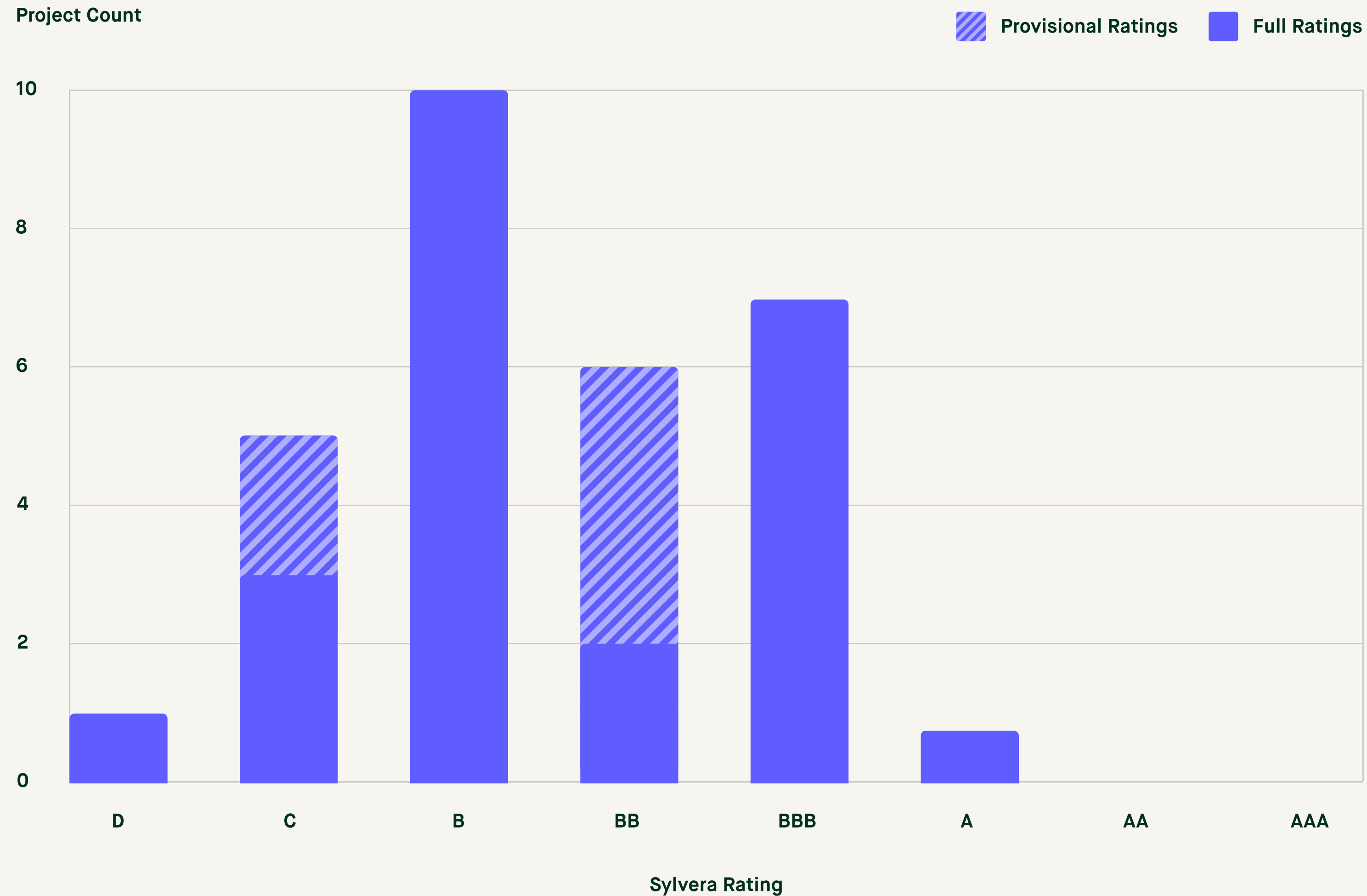
IFM Regional Credit Issuance Breakdown



Region	Credit Issuance Breakdown
North America	35%
Europe	5%
Africa	5%
Asia	55%

IFM credits are being issued in South America, but none are registered with the Verra Registry.

Sylvera's IFM ratings summary



So what do Sylvera's ratings reveal?

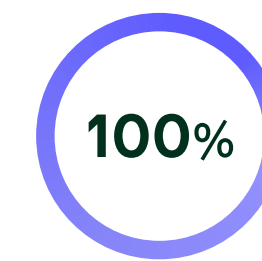
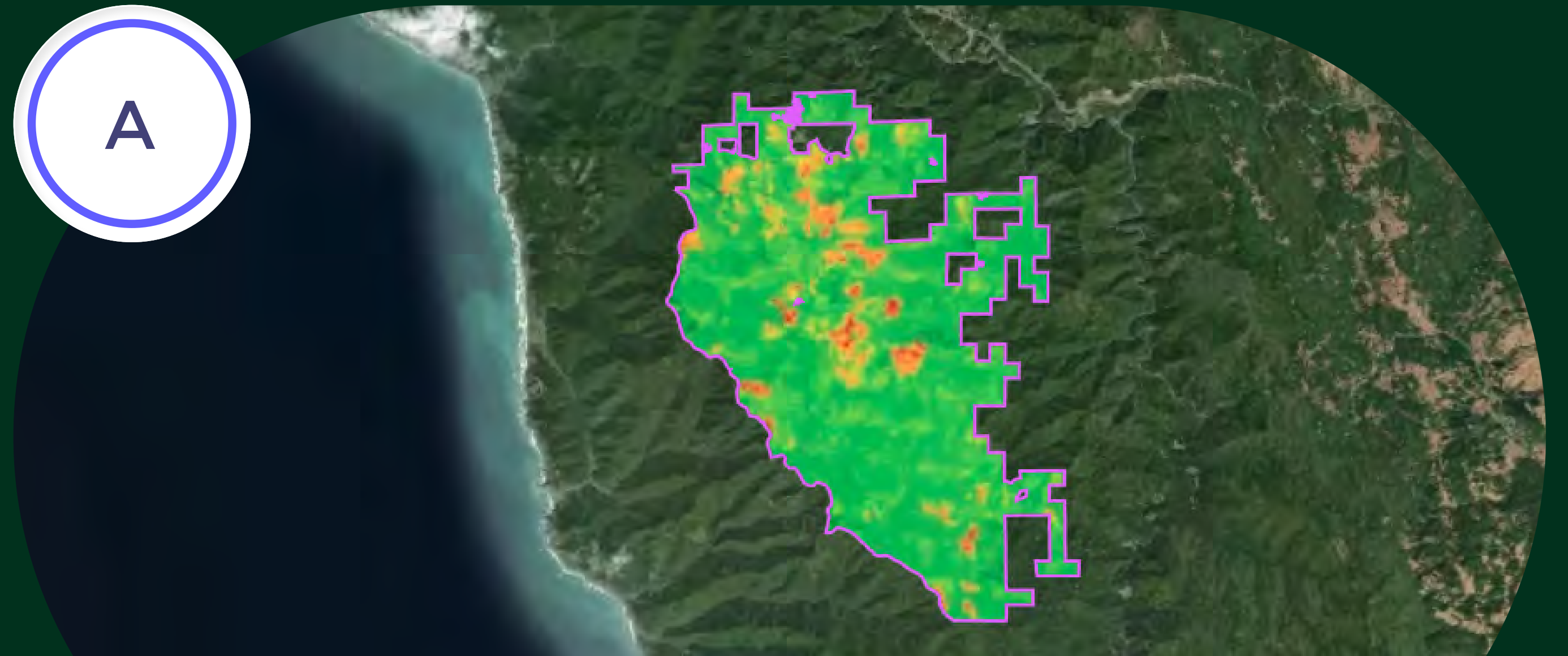
The majority of IFM projects sit in our mid-quality rating range: B, BB and BBB. Nearly 20% of projects are low-quality (C-D and C-provisional rated), with only 3% rated as high-quality (A). To date, we have found that projects located in Mexico fall in the B-BBB range because they have financial additionality through the use of carbon credits since they lack government funding for forestry. However, there are stronger standards for sustainable forest management already present.

Projects based in the United States have the largest spread of quality (from D - A); we provide a case study on an A-rated project below.

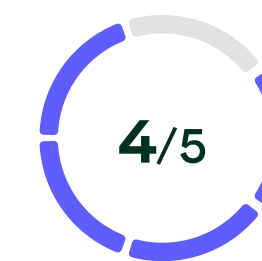
On the other hand, we have rated projects that do not have credible "Business as Usual" (BAU) baselines. In some cases this has been due to the fact that the project area already had terms to preserve the land and reduce harvesting, leading to uncertain additionality. In other cases, projects can model their baselines on common practices in the region, but do not have to provide evidence there would have been intention to harvest in the absence of the project, also leading to uncertain additionality.

Case Study: Hollow Tree

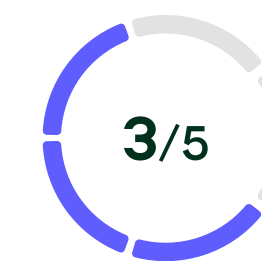
- Registry ID: CAR 1191
- Location: California, US



Carbon Score



Additionality



Permanence



Co-benefits



1. Key highlights

Hollow Tree is a 25-year IFM project on 8.2 kha of forestland in California, US. Hollow Tree is very likely additional, as carbon revenue compensates for reducing the intensity of harvesting and switching to more complex harvesting practices. The project's reported data aligns well with Sylvera's findings.

Permanence risks are moderate. The expected increase in drought occurrence due to climate change is partially mitigated by the project.

2. Carbon accounting

Sylvera finds the project's reporting is likely accurate. The project's reported carbon stock growth, the primary variable on which credit issuance is based, aligns well with Sylvera-detected canopy cover change over time. The other component of the score is based on the reported volumes of harvested wood, which are a reasonable match for clear-cutting Sylvera detected.

Credits amount to nearly 1 million tCO₂e over 7 years (968,828 after credits for buffer pool are subtracted). However, the concept of annual emissions reductions is not as straightforward for Climate Action Reserve IFM projects.

The baseline modeling and crediting mechanism allow for claiming a significant number of credits in the first year, i.e., before the actual reductions took place. Based on the trend in annual credit issuance for this project, initial issuance (660,635) is likely to be over 30% of total credits issued during the project's crediting period of 25 years.

3. Additionality of activities

Project activities are very likely additional and are a good example of a considerable shift in timber production practices. The landowner and project operator is the Mendocino Redwood Company (MRC), a timber company that utilized the forest's resources through even-aged sustainable management before the project.

These practices allowed for an economically optimal carbon stock increase. For the baseline, MRC proposes a scenario of continued even-aged management, which Sylvera finds credible. In contrast, project activities involve both switching to uneven-aged management and reducing the intensity of harvesting.

4. Over-crediting risk

Sylvera found this risk very low. Initial issuance is not inflated by either underestimating regional common practice carbon stocks of forests similar to the project area (PA), nor by manipulating boundaries of the PA to exclude areas with lower tree density, i.e., parts of the forest with lower carbon stocks per unit area. Leakage appears accounted for.

5. Permanence

Permanence risks are moderate for this project due to drought. Drought has not been very frequent historically, but climate projections indicate an increase in occurrence, while project activities don't deal with it comprehensively.

All other risks, including fire risk, are low.

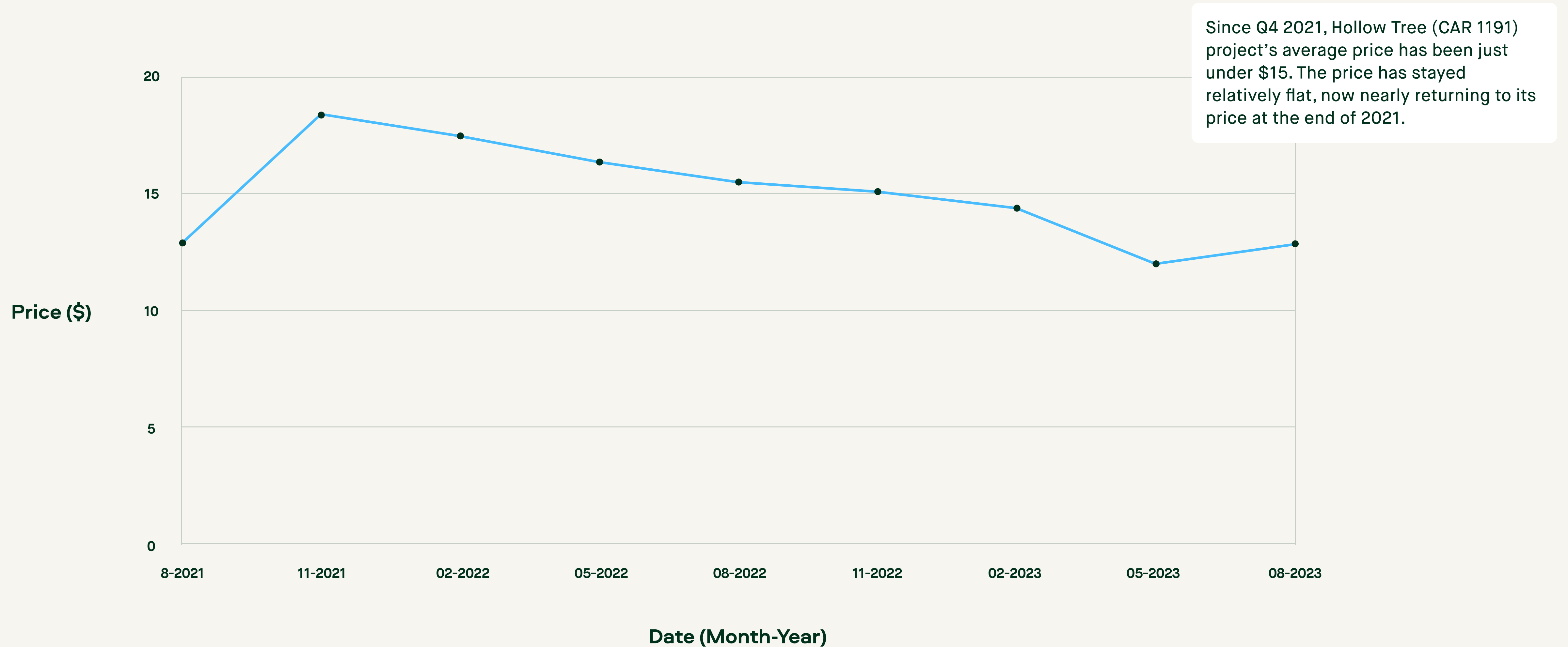
6. Co-benefits

Hollow Tree offers weak benefits for the community and moderate benefits for biodiversity.

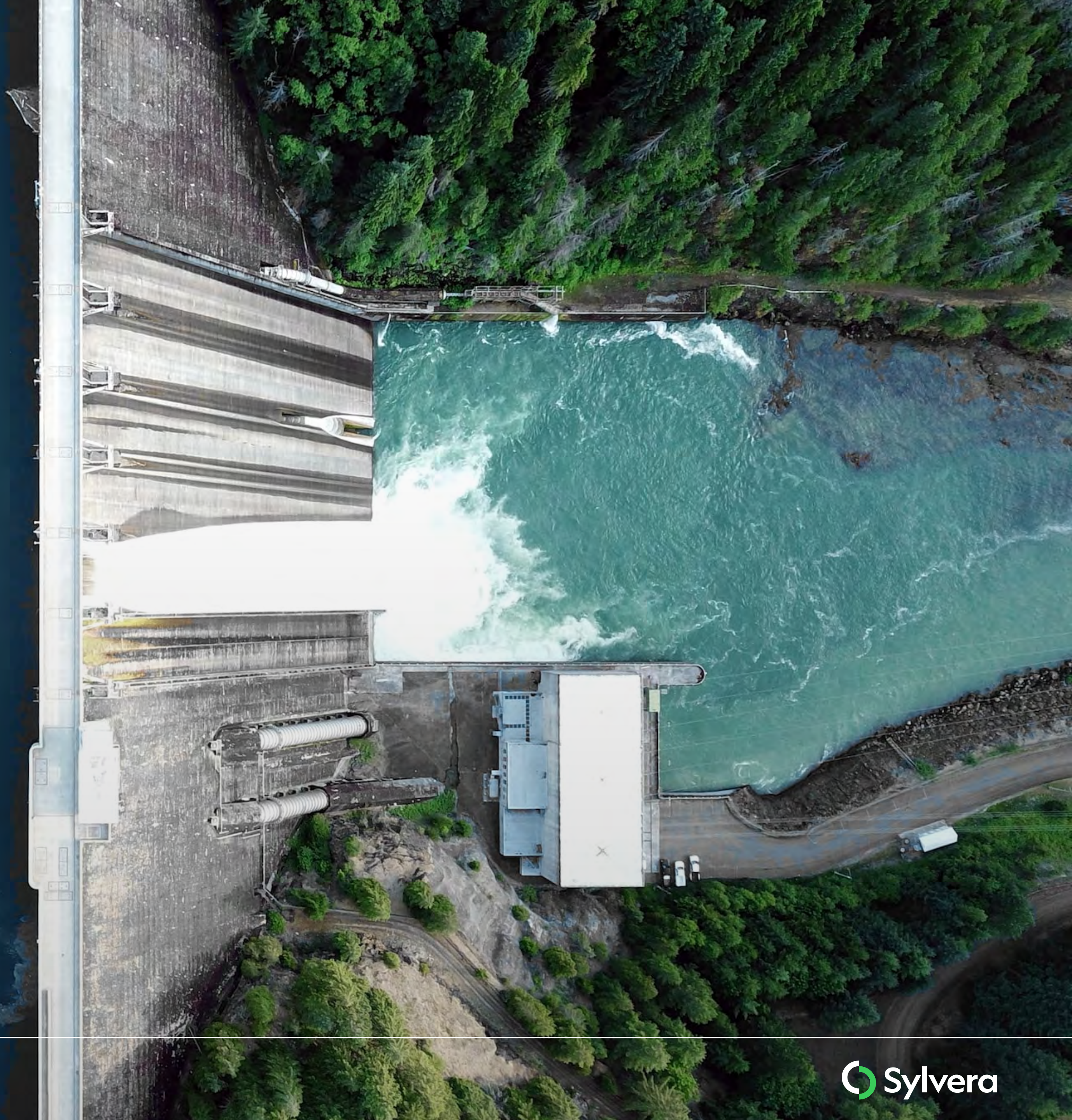
The project activities' benefits for the community target one Sustainable Development Goal, SDG 8 (Decent work and Economic Growth) as the project employs professional foresters and field staff.

The PA has a moderate abundance of species, i.e., potential for impact is a bit lower, and the project implements few activities beneficial to the ecosystems, although its FSC certification suggests biodiversity is monitored regularly.

Hollow Tree (CAR 1191) pricing trend



Technology- Based Solutions

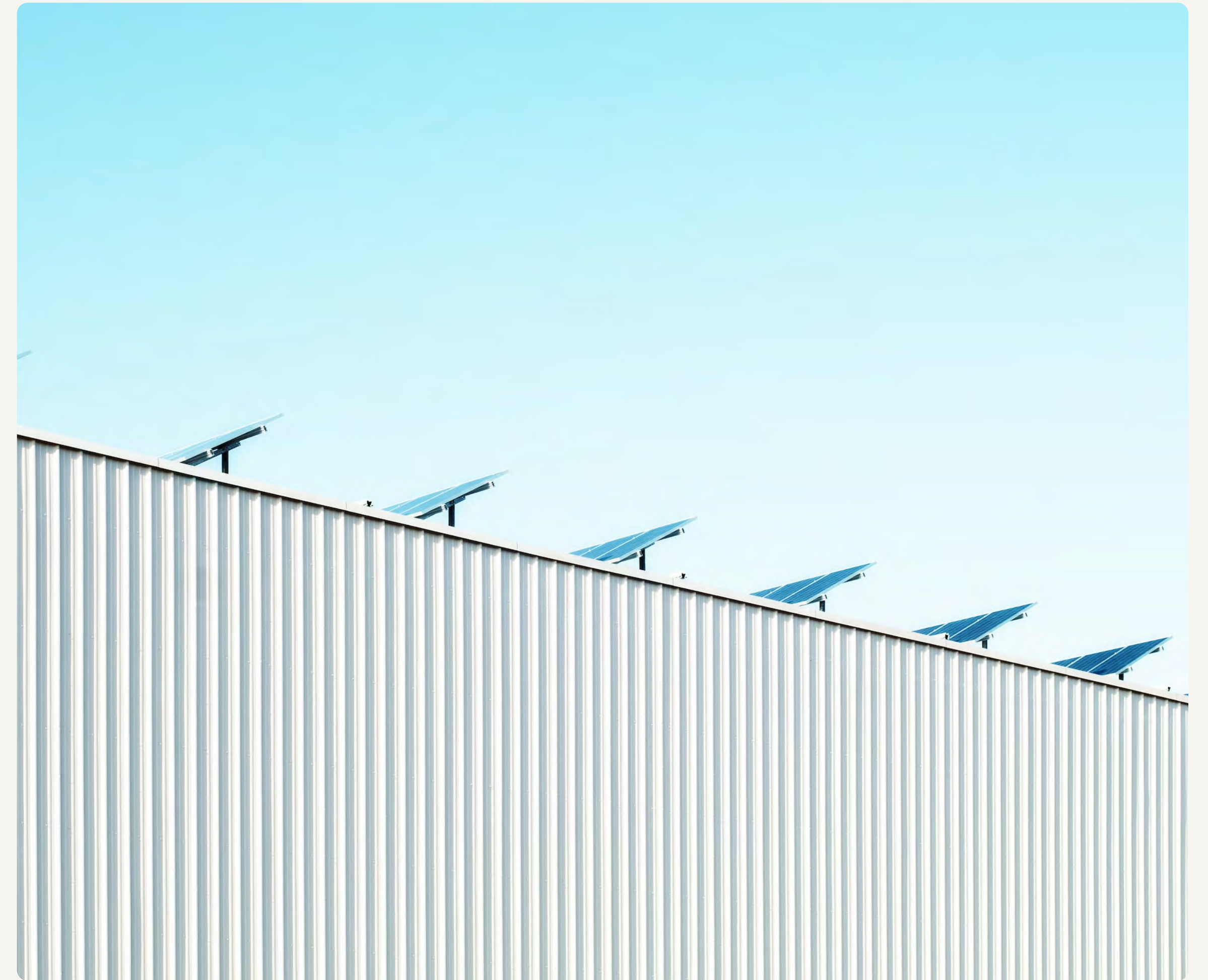


Technology-based solutions

Technology-based solutions (TBS) play a crucial role, along with NBS, in mitigating climate change.

A technology-based solution is an approach that leverages technologies, such as Renewable Energy Sources (RES), Improved Cookstoves (ICS), Carbon Capture Utilization and Storage (CCUS) technologies or Direct Air Capture and Storage (DACs) to achieve significant reductions in greenhouse gas emissions.

Tech-based solutions incentivize emission reduction activities and promote sustainable practices, ultimately contributing to real climate impact.



TBS carbon credit breakdown

Project type	Percentage	Total issuing projects	Issued credits	Average issuance/project	Average issuance/year
Hydropower	41%	151	98,796,469	654,281	32,932,156
Wind	32%	239	77,371,153	323,729	25,790,384
Centralized Solar	18%	81	42,320,913	522,480	14,106,971
Cookstoves	8%	70	19,021,705	271,739	6,340,568
Distributed Solar	1%	4	1,781,595	445,399	593,865

Renewable Energy Sources

RES

What is RES?

Renewable Energy Sources (RES) projects avoid emissions associated with traditional energy sources. These projects displace emissions from fossil fuel power plants and supply electricity to a grid through renewable energy.

In a recent study done by Trove, it was found that RES projects “represent a declining share of VCM project funding, as these projects are increasingly cost-effective without carbon credit finance and are no longer eligible for carbon credits.”

Sylvera's assessments of RES projects align with Trove's findings. Sylvera employs its proprietary financial model for each RES project, and this analysis has revealed a lack of financial additionality in most of the RES projects evaluated thus far. The majority of RES projects are now financially viable independently, either because they no longer require the additional revenues from carbon credits to operate or because the income generated from these credits does not bridge the viability gap sufficiently.

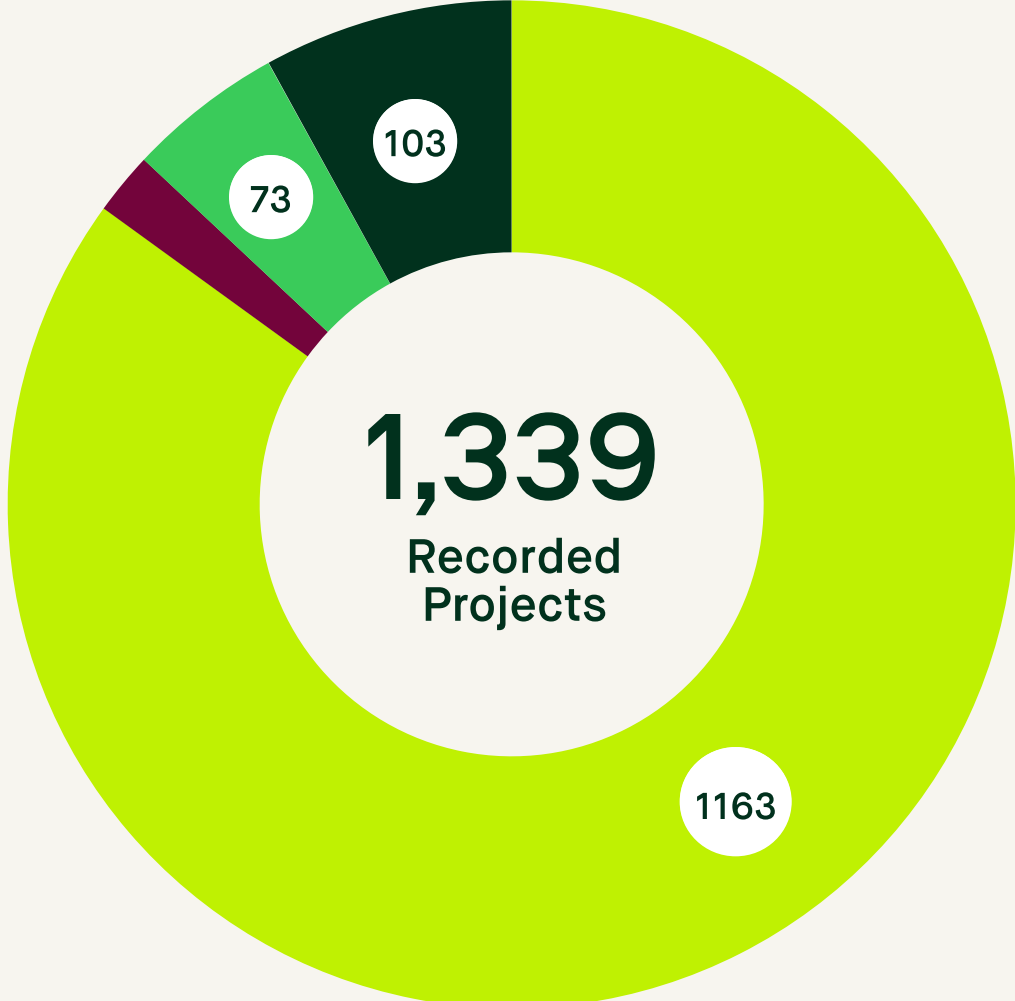
Moreover, RES projects often fall short of demonstrating compliance with the non-common practice test developed by Sylvera, further undermining their additionality scores.

Below, we provide a case study to illustrate how RES projects often fail to deliver both financial additionality and meet the common practice test requirements.



Recorded RES projects

ARR Project Statuses



85%

REGISTERED

2%

REGISTRATION REQUESTED

5%

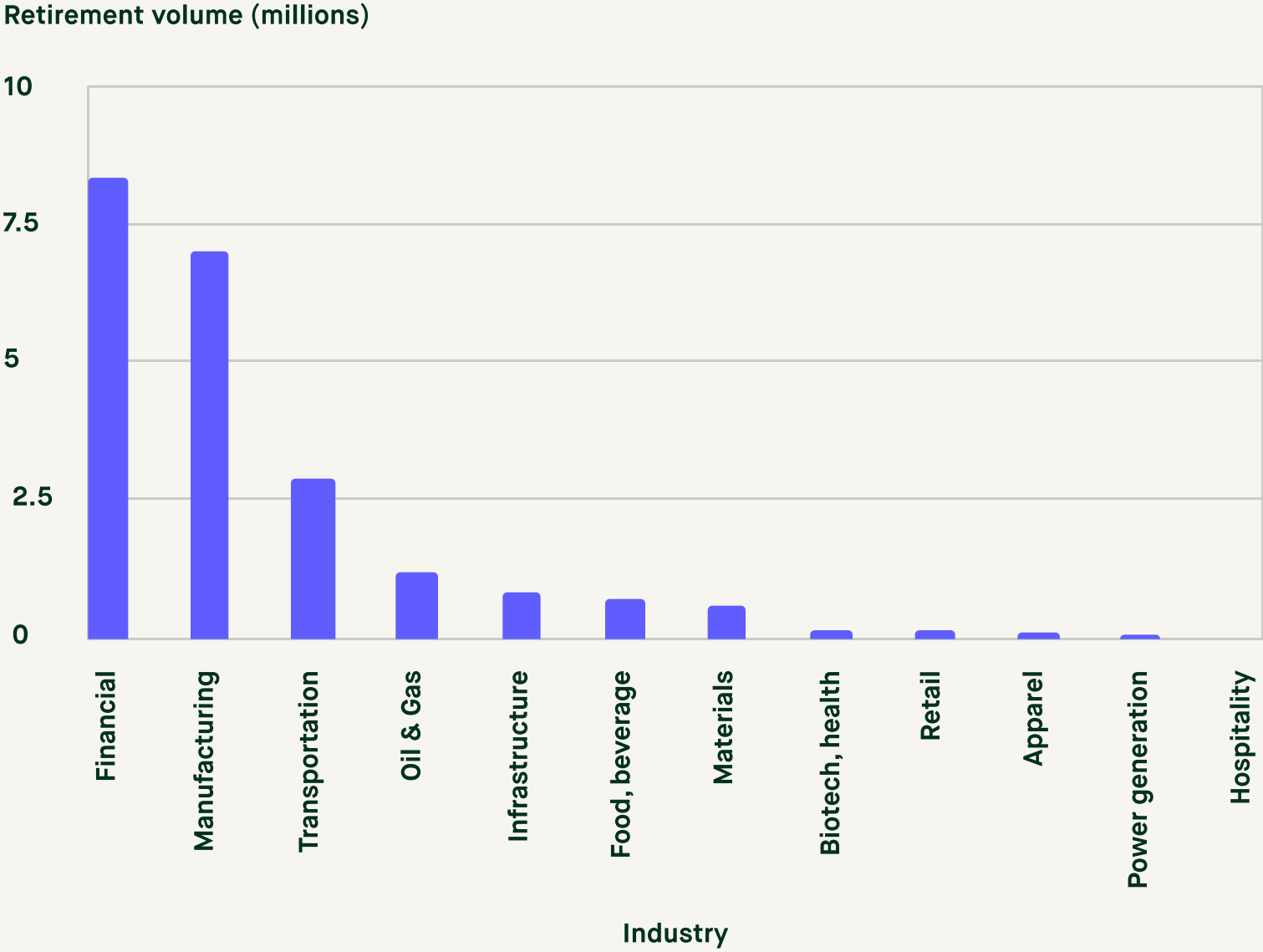
REJECTED/WITHDRAWN

8%

UPCOMING PROJECTS

At this point, the main supply of RES credits are registered with Verra, with a significantly smaller portion representing upcoming projects. This may be due to the recognition that carbon credits are not required to fund these efforts and don't produce additional climate impact.

Leading Industries Retiring ARR Credits



Across all project types, retirement volumes of RES credits are the second highest in the market, behind REDD+ credits. Despite accounting for a large retirement volume, RES credit retirements are just shy of half of REDD+ credit retirement volumes. The Financial Services and Manufacturing industries account for nearly 70% of RES credit retirements.

ARR Regional Credit Issuance Breakdown



Region	Credit Issuance Breakdown
North America	2%
South America	10%
Africa	6%
Asia	82%

Asia clearly dominates, accounting for over 80% of RES regional credit issuances, which we suspect is driven by several macro trends over the last 25 years. Primarily, Asia has experienced huge population and economic growth, which has led to an increase in energy demand.

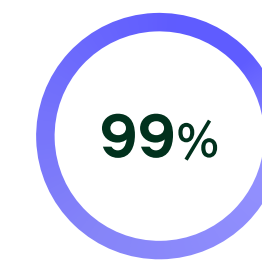
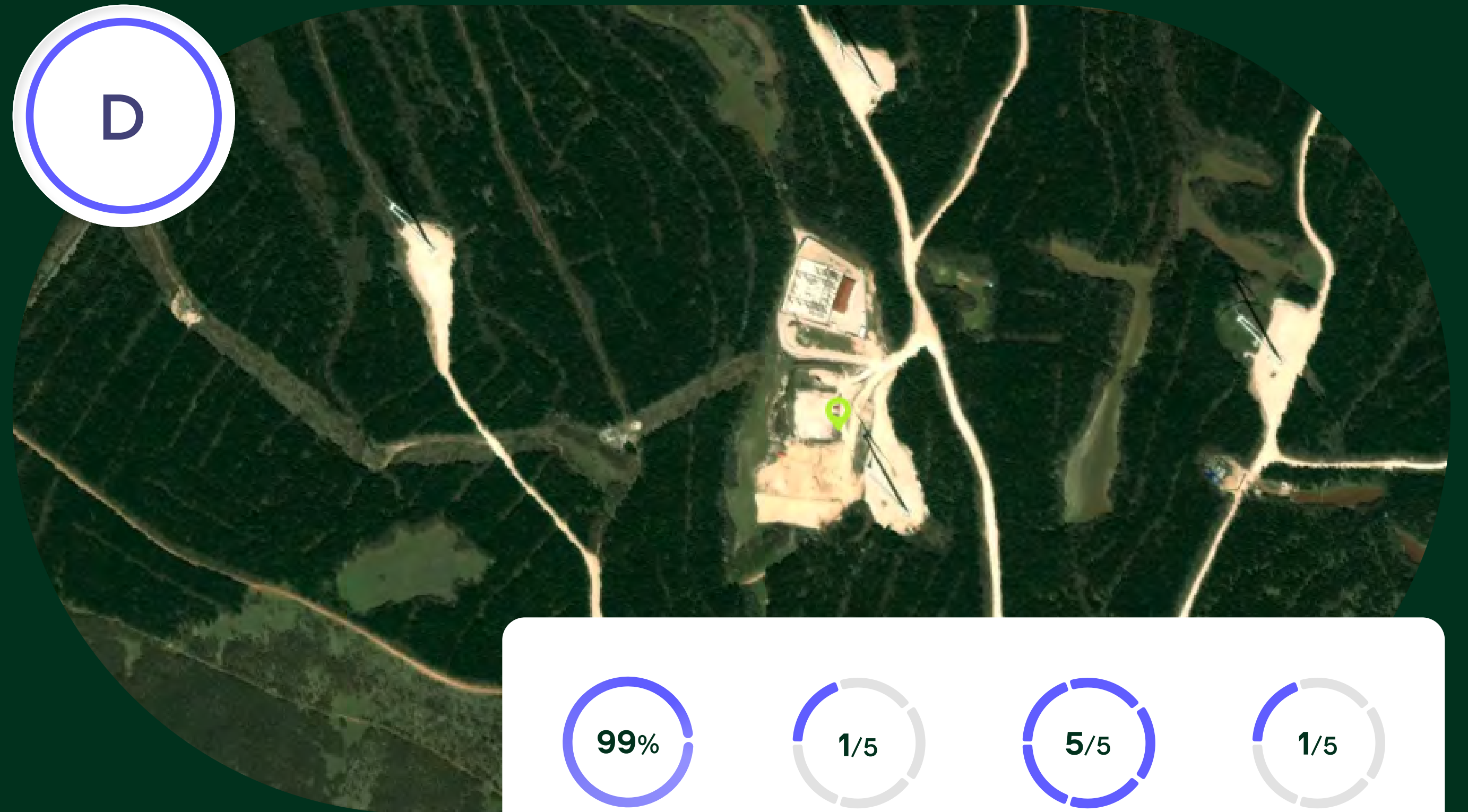
Additionally, many government initiatives have been established to incentivize renewable energy development, whereas similar development had already been under way in Europe and North America. Lastly, the growth of the region presented large market opportunities for investors and project developers. All of these factors have contributed to the high concentration of issued RES credits coming out of Asia.

Silvera's RES ratings summary

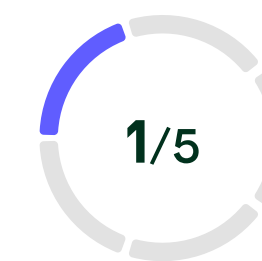


Case Study: AIRRES-4

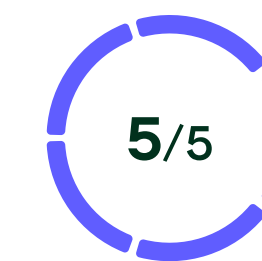
- Registry ID: GS3551
- Location: Turkey



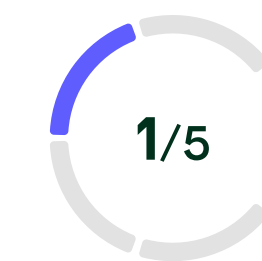
Carbon Score



Additionality



Permanence



Co-benefits



1. Key highlights

AIRRES-4 WPP is a 21-year project financing a 55 MW wind power plant situated in Turkey which started in 2017.

Despite the project's strong carbon accounting score, the project presents weak financial additionality and co-benefits score, suggesting a significant risk that carbon revenue and negative impact on biodiversity are not responsible for emission reductions claimed by the project.

2. Carbon accounting

Sylvera's analysis shows that the net generation reported by Airres-4 WPP is well aligned to publicly available grid generation data.

The Airres-4 WPP project was permitted to issue 489,760 carbon credits from July 24, 2017 to December 31, 2021. Sylvera calculates that the project is eligible to issue 483,075 carbon credits over the same period, giving the project a carbon score of 99%.

The project planned to generate emission reductions (ERs) of 108,692 tCO₂e per annum, in its first 7-year crediting period.

3. Additionality of activities

Sylvera's proprietary economic model found that the plant was already likely economic in the Business-As-Usual (BAU) scenario without carbon revenue, suggesting a high risk that the plant was not reliant on future carbon revenue to cover its development and operating costs.

The project doesn't present major risks to policy and regulation about the development of RES in Turkey.

At the time of the project's operation start, the development of WPPs was considered common practice in Turkey, further undermining project additionality of activities claims.

4. Over-crediting risk

Sylvera found that Airres-4 WPP baseline had marginally underestimated the emissions intensity of the Turkish power grid from the project's start to the present day, indicating that there is no over-crediting risk from baseline overestimation.

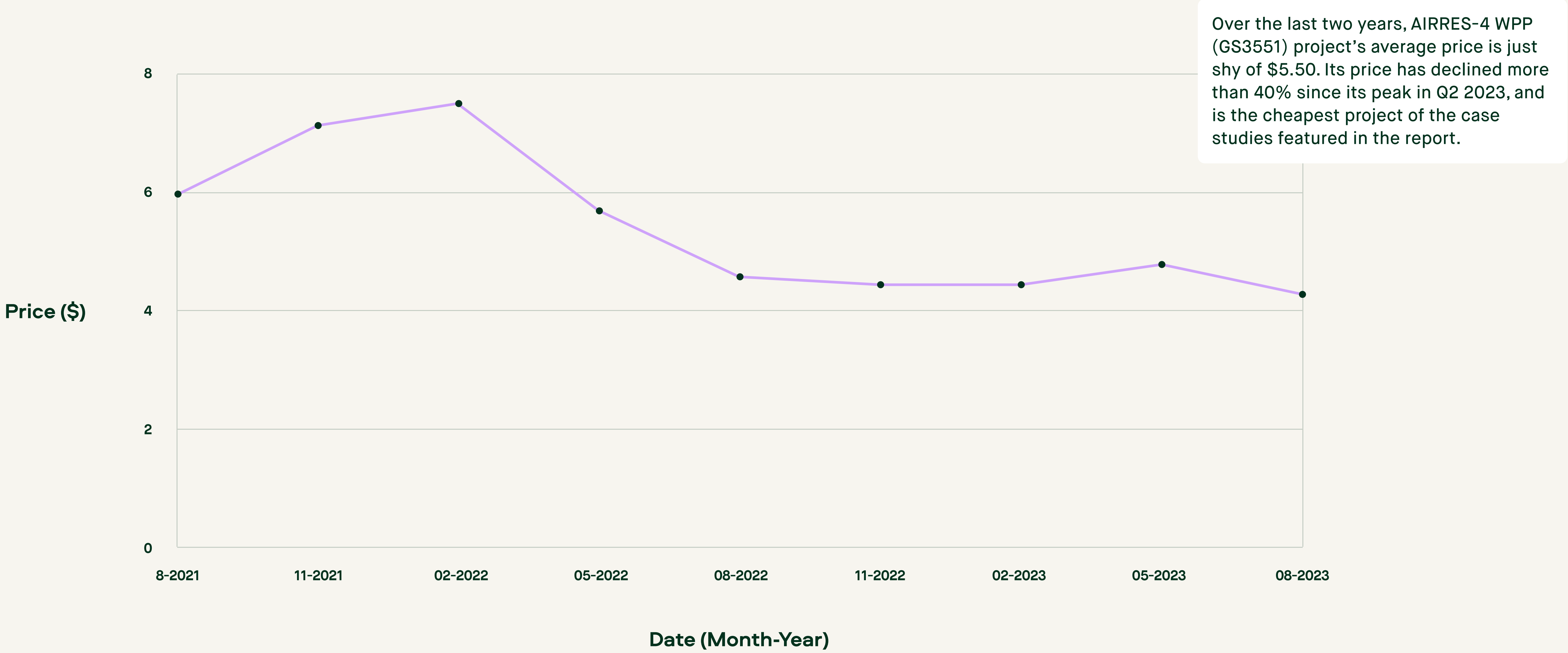
5. Permanence

Sylvera considers that the project has no permanence risks. Renewable energy projects do not create or store carbon stocks; therefore, historical (ex-post) avoided emissions are not subject to a risk of reversal.

6. Co-benefits

The proponent does not implement substantial measures to mitigate the damage inflicted by the plant on local biodiversity. The project provides a relatively narrow range of benefits to facilitate the sustainable development of the local community by employing local residents in plant operations.

AIRES-4 WPP (GS 3551) pricing trend



Improved Cookstoves

ICS

What are Improved Cookstoves?

Improved cookstoves are designed to be more efficient and cleaner burning than traditional cookstoves, which are commonly used in many parts of the world, especially in developing countries.

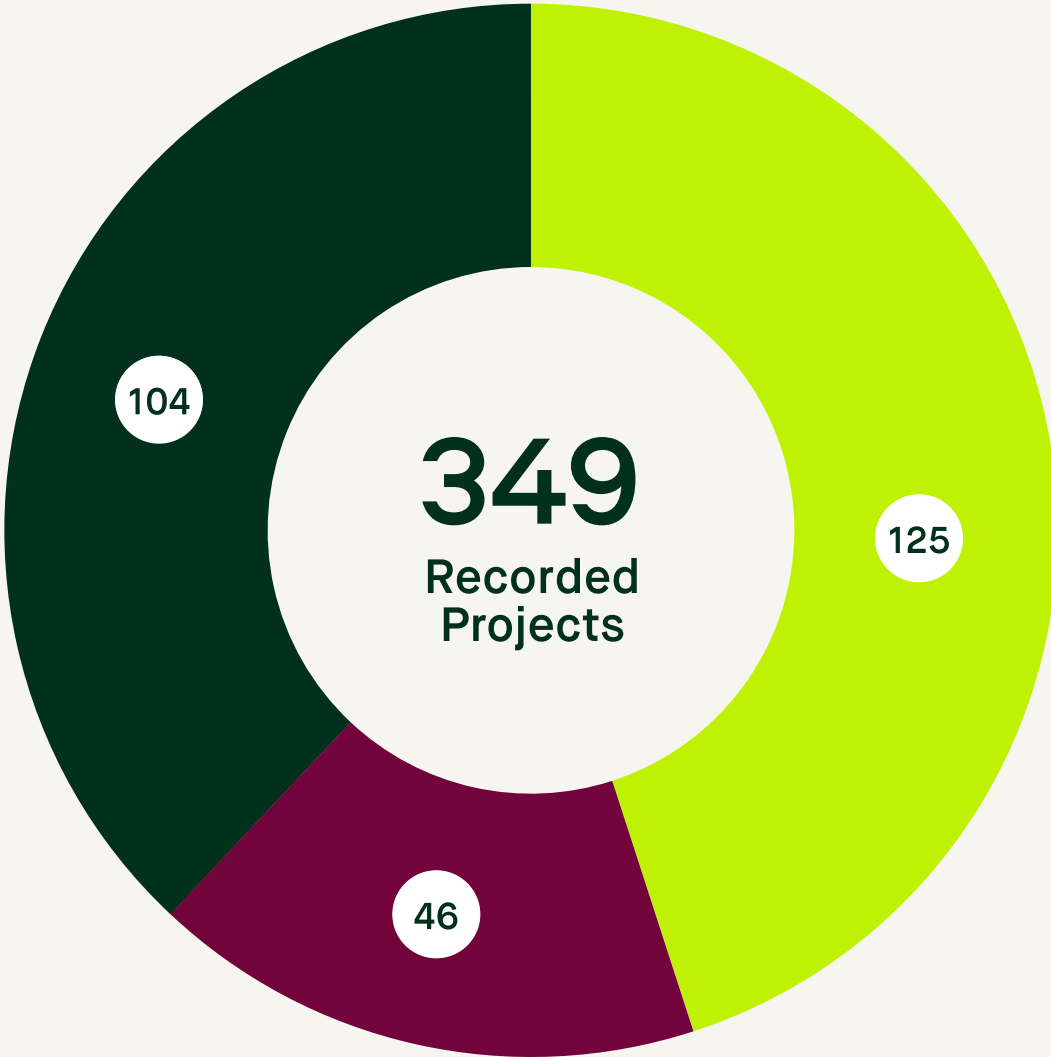
Traditional cookstoves typically burn solid fuels such as wood, coal or agricultural waste, which can produce large amounts of smoke and other harmful pollutants. In addition to their negative health effects, these stoves also contribute to deforestation and climate change.

Improved cookstoves, on the other hand, are designed to use less fuel and burn more efficiently, reducing emissions of harmful pollutants and greenhouse gases. They can also be designed to be safer to use and more durable than traditional stoves. Overall, improved cookstoves projects offer a compelling combination of simplicity, co-benefits and additionality of activities, which makes them a popular option in the voluntary carbon market.



Recorded ICS projects

ICS Project Statuses



45%

REGISTERED

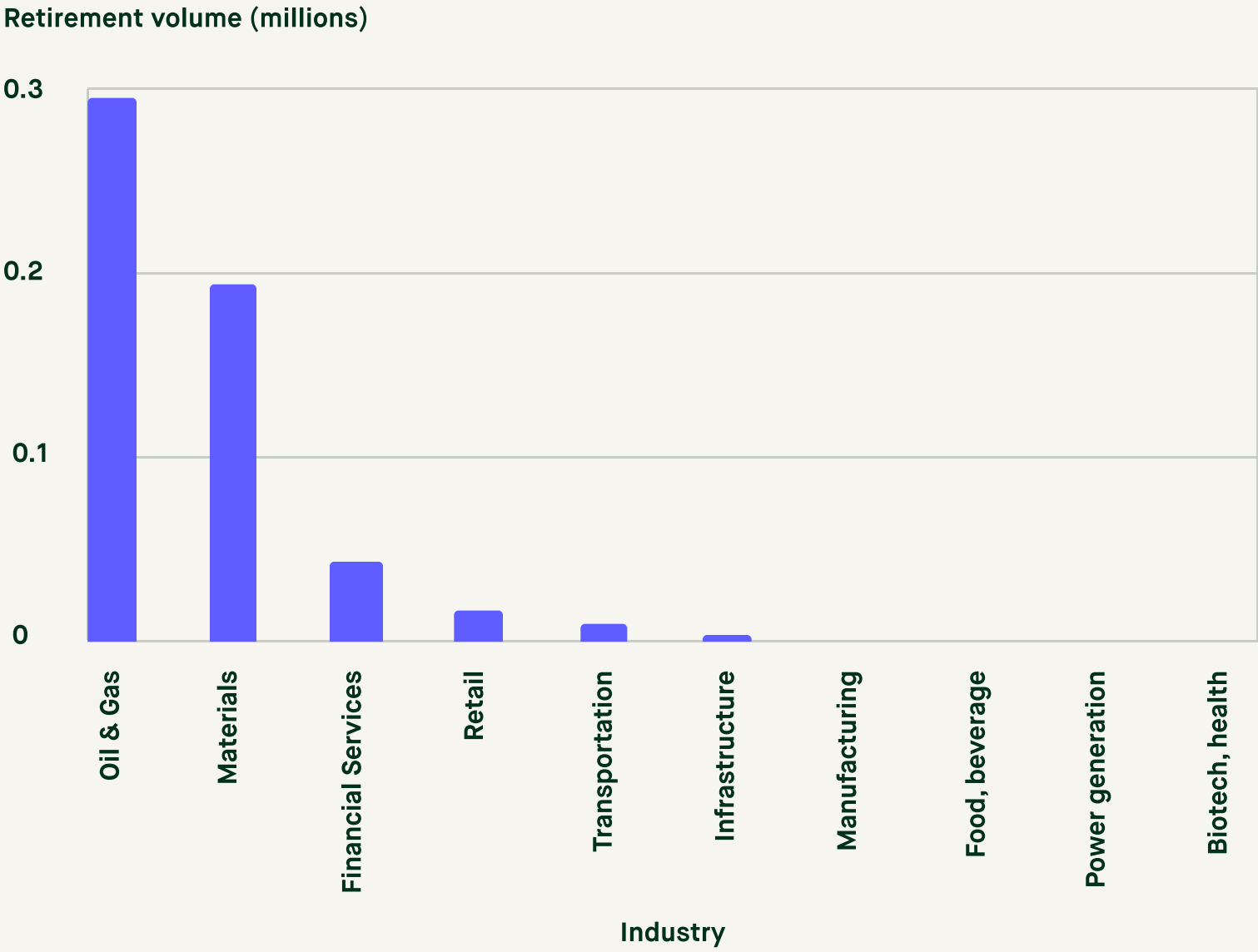
17%

REGISTRATION REQUESTED

38%

UPCOMING PROJECTS

Leading Industries Retiring ICS Credits



Improved Cookstoves are still a developing project type. As seen in the ICS Project Statuses chart, nearly 55% of ICS projects are upcoming or requesting registration. We expect to see more supply to enter the market, but for now there are fewer ICS credits to buy and therefore retire. At the moment, buyers from the Oil & Gas industry alone have made 51% of ICS credit retirements.

ICS Regional Credit Issuance Breakdown

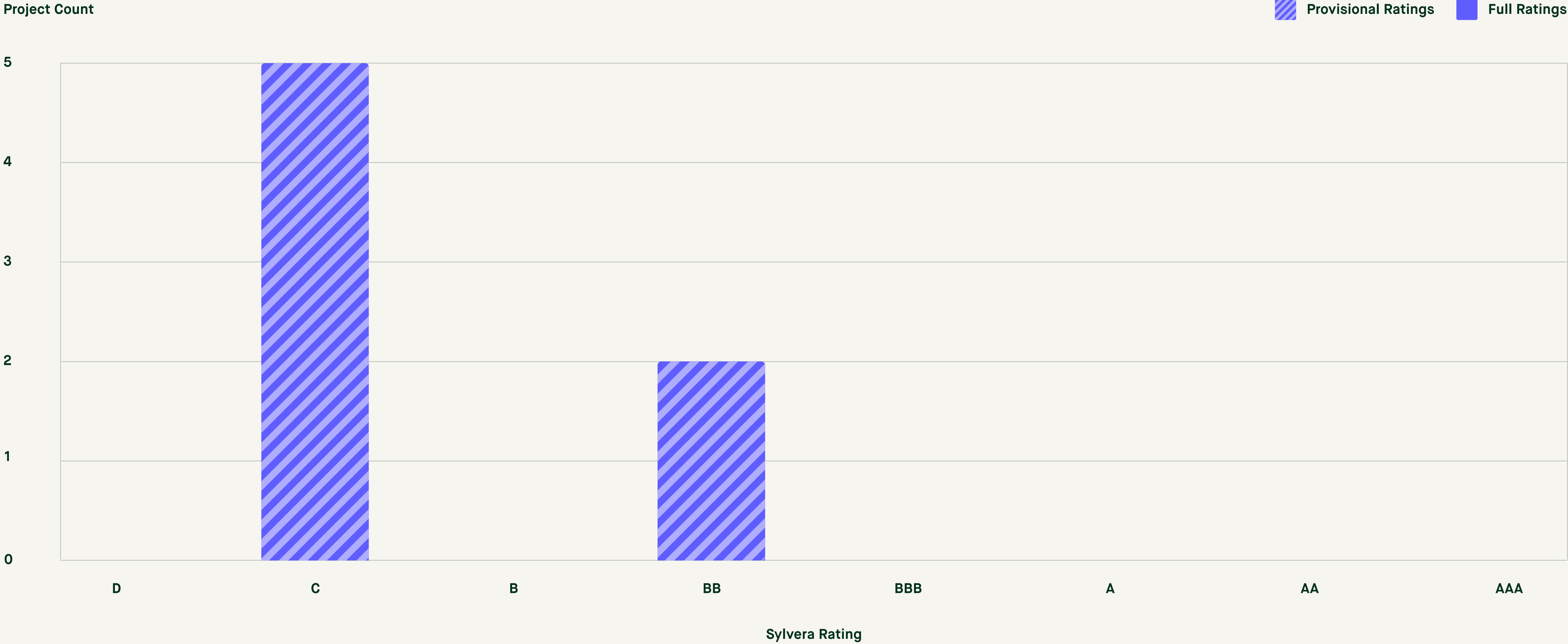


Region	Credit Issuance Breakdown
North America	9%
Africa	34%
Asia	57%

Similar to RES projects, Asia accounts for nearly 60% of ICS credit issuances around the world. This seems to be due to concerted efforts to increase access to clean cooking related to national development plans between governments and institutions (e.g. the China Clean Stove Initiative, or India’s Pradhan Mantri Ujjwala Yojana).

Furthermore, results-based financing mechanisms (including carbon finance) are explicitly used in policies to accelerate change which becomes reflected in the regional markets. Lastly, as India and China are the most populous countries, there are more rural communities being targeted via Improved Cookstove schemes.

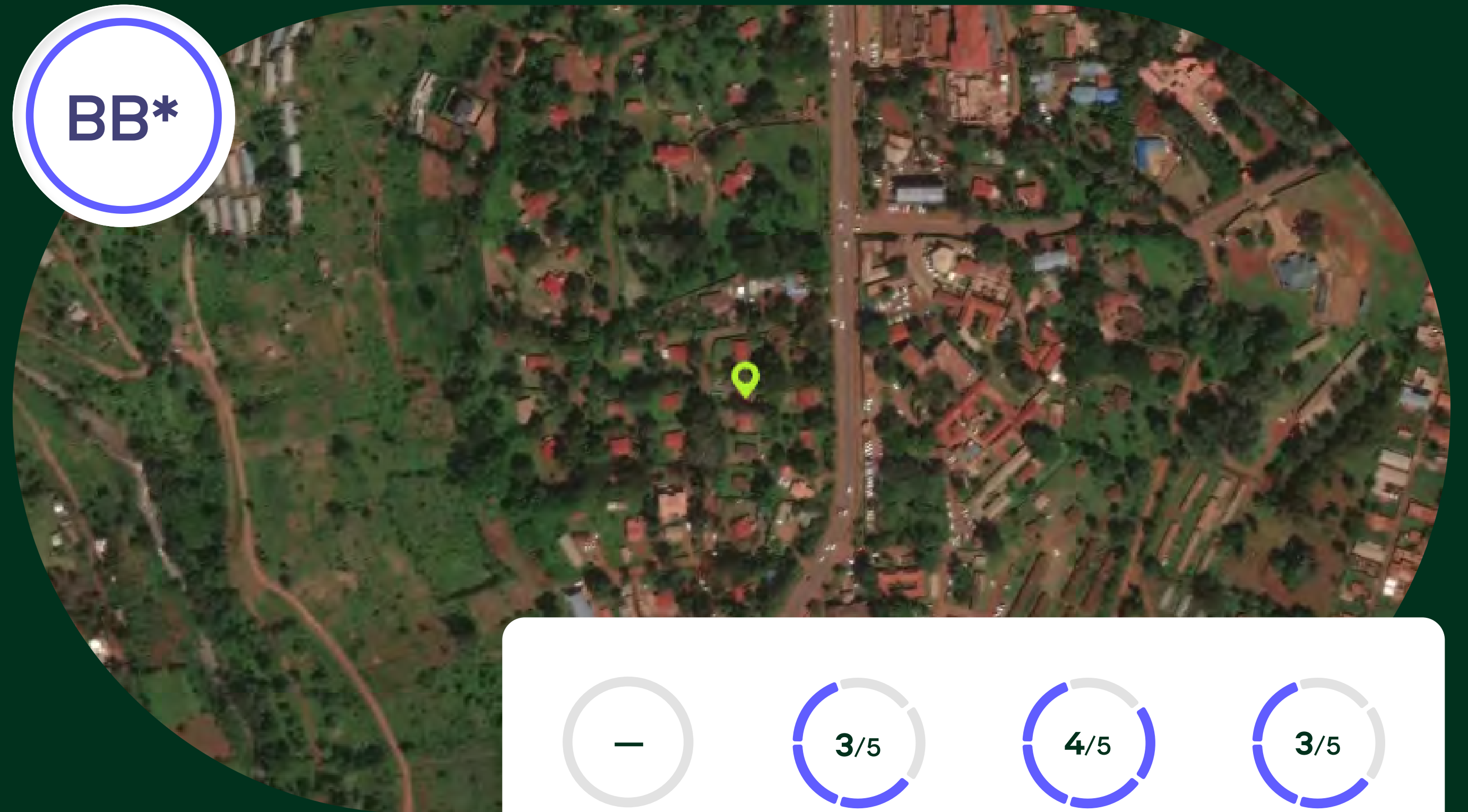
Silvera's ICS ratings summary



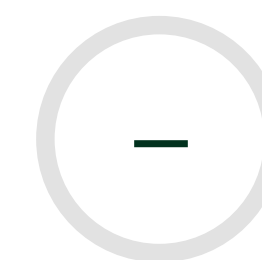
Case Study: HIFADHI ICS in Embu County

- Registry ID: GS 2898
- Location: Kenya

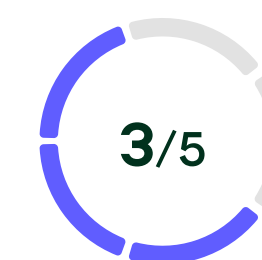
BB*



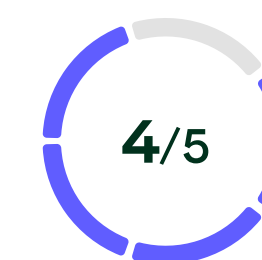
*This is a BB-provisional rating.
This rating letter may change once we
do our official provisional conversions.



Carbon Score



Additionality



Permanence



Co-benefits

HIFADHI ICS in Embu County

CASE STUDY



CARBON SCORE: P
ADDITIONALITY: 3/5

PERMANENCE: 4/5
CO-BENEFITS: 3/5

1. Key highlights

This project has been distributing wood-burning rocket cookstoves in rural areas in Embu County in the Eastern Province of Kenya since 2013 to reduce emissions from inefficient traditional cooking methods and associated forest degradation.

The project activities are likely additional compared to a "business-as-usual" (BAU) scenario. However, there is a moderate risk of over-crediting which indicates that the project is likely overstating emission reductions from ICS use and is not responsible for the volume of claimed credits. The over-crediting risk is driven by non-conservative values in some assumptions.

2. Carbon accounting

All ICS projects have been assigned a neutral Carbon Score due to limitations in measuring the levels of forest degradation and drawing a causal connection between forest degradation and cookstove activities across large distribution networks.

The project has been permitted to issue 1,735,706 credits for the period from April 16, 2013 to December 31, 2021.

3. Additionality of activities

The project activities are likely additional, facilitating an increase in ICS uptake in Kenya beyond what would have occurred under a business-as-usual (BAU) scenario. Although overall market penetration of ICS technologies has reached relatively high levels, wood fuel continues to be the most common cooking fuel in Kenya, meaning there is scope for promoting continued uptake by the project. Despite several policies to support the transition to improved cookstoves in Kenya, carbon finance plays a significant role in bridging barriers to ICS uptake.

4. Over-crediting risk

There is a moderate over-crediting risk related to the quantification of emissions reductions due to the mixed test results, where non-conservative values are used in some assumptions, whereas more conservative values are used in others. There are also general uncertainties around verifying the volume of credits claimed in ICS projects due to periodic monitoring not being able to continually observe stove use and the exact amount of fuel burnt daily by all households.

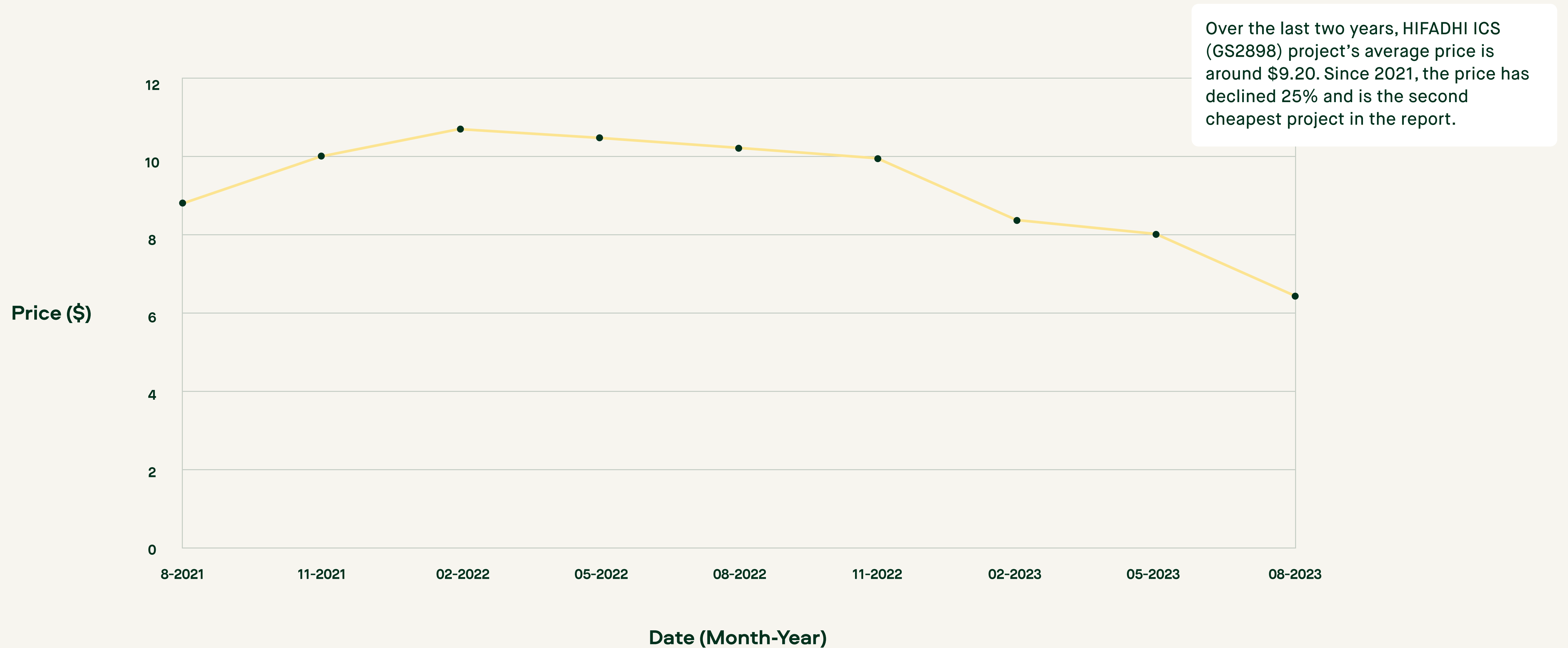
5. Permanence

The permanence assessment determines risks to forests at the regional level within Embu County in the Eastern Province of Kenya. The project's claimed ex-post emission reductions attributable to the preservation of forest carbon stocks are exposed to low reversal risks from both human and natural factors.

6. Co-Benefits

The project has a moderate positive impact on the development of the local community through benefits that align with five UN Sustainable Development Goals (SDGs): SDG 1 (No Poverty), 3 (Good Health and Well-Being), 5 (Gender Equality), 7 (Affordable and Clean Energy), and SDG 8 (Decent Work and Economic Growth) through the distribution of ICS within the target communities in Kenya.

HIFADHI ICS (GS 2898) pricing trend



Carbon Capture, Utilization and Storage-Enhanced Oil Recovery

CCUS-EOR

What is CCUS-EOR?

CCUS-EOR stands for Carbon Capture, Utilization and Storage-Enhanced Oil Recovery, which refers to the integration of CCUS technologies with Enhanced Oil Recovery (EOR) techniques.

The main objective of CCUS-EOR is to capture carbon dioxide (CO₂) emissions from industrial sources such as power plants or cement factories and use the CO₂ to boost oil production from depleted or hard-to-reach reservoirs.

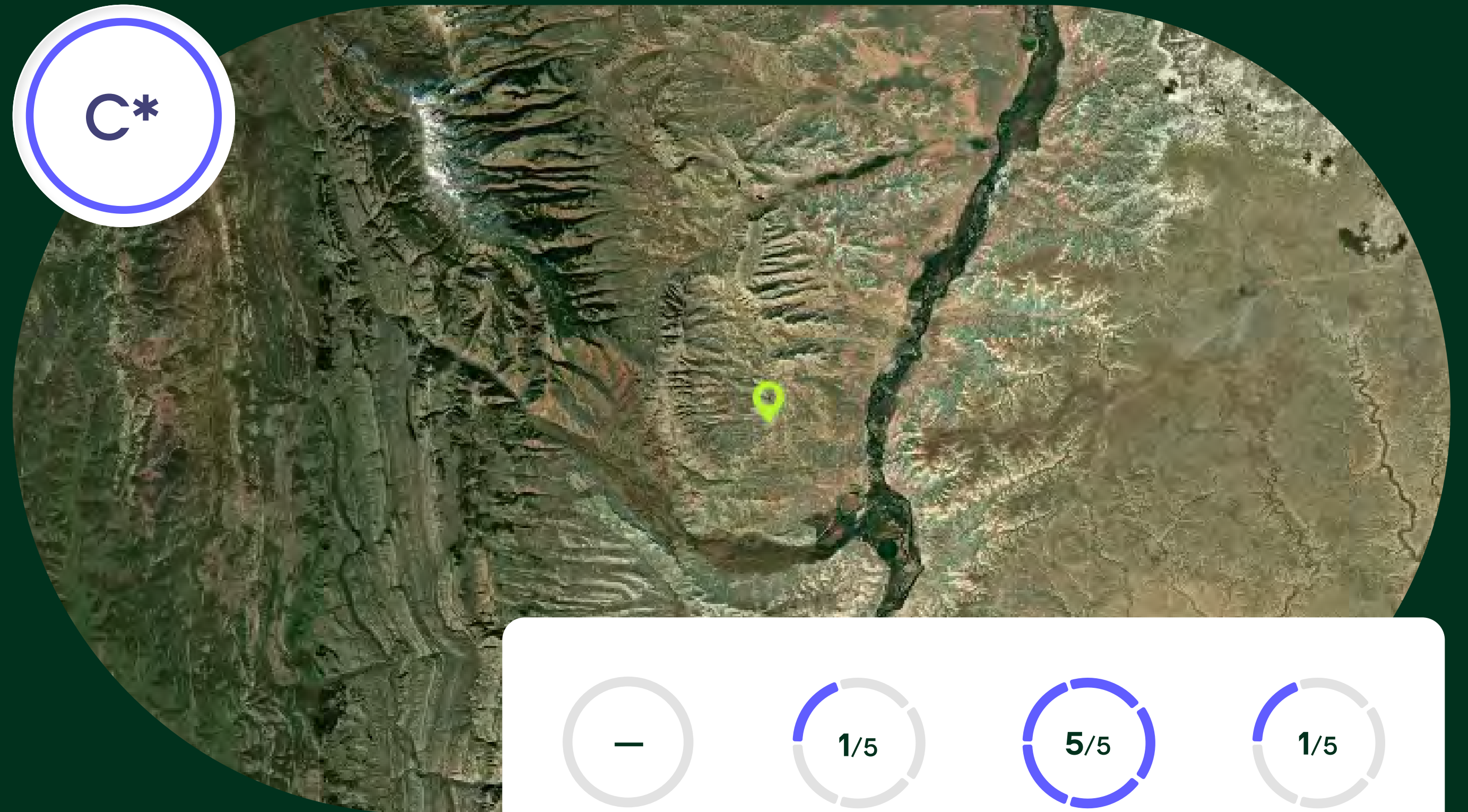
One of the distinct advantages of CCUS-EOR lies in its capacity to intercept emissions at their source, mitigating their release into the atmosphere. Nevertheless, the effectiveness of CCUS-EOR projects varies, influenced by geological factors, regulatory evolution, and the enhanced oil recovery processes are not always well taken into account under the life cycle assessment of the projects.

The ACR Methodology

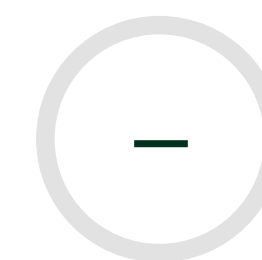
In 2008, the ACR methodology, which was employed to monitor and account for carbon reductions in EOR projects, came to a halt due to a significant oversight in the methodology—specifically, it failed to consider the carbon emissions associated with oil production as part of the process. This oversight had far-reaching implications for the project, as it resulted in the project's inability to continue granting carbon credits. The ACR method didn't take into account the carbon footprint of extracting and producing oil, which is a key factor in EOR projects.

Case Study: Monell Geo-Seq

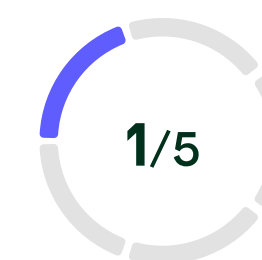
- Registry ID: ACR118
- Location: Wyoming, US



*This is a C-provisional rating. This rating letter may change once we do our official provisional conversions.



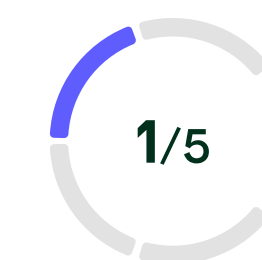
Carbon Score



Additionality



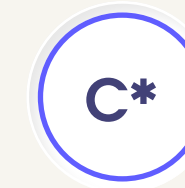
Permanence



Co-benefits

Monell Geo-Seq

CASE STUDY



CARBON SCORE: P

ADDITIONALITY: 1/5

PERMANENCE: 5/5

CO-BENEFITS: 1/5

1. Key highlights

Monell Geo-Seq is a Carbon Capture Storage Enhanced Oil Recovery (CCS-EOR) project, designed to capture carbon dioxide from the Shute Creek Gas Plant (Wyoming, USA) and inject it underground at the Monell EOR Field (Wyoming, USA). The project issued credits from 01/01/2004 to 31/12/2008.

The project obtained a negative rating driven by its uncertainty about the weak additionality claim, its negative impact on biodiversity, and limited impact on the local communities due to its EOR operations.

2. Carbon accounting

Due to a lack of third-party data and sufficient granularity in the information provided by the project, Sylvera is unable to accurately audit the emissions sequestered during the project's operation. This leads to uncertainty in correctly assessing the Carbon Score of the project.

Monell Geo-Seq was authorized to issue 1,748,409 carbon credits from January 1, 2004 to December 31, 2008.

3. Additionality of activities

Revenue from the sale of carbon credits does not significantly contribute to the plant's economic viability as Sylvera estimates that the project was economically viable before registration as a carbon project.

The project doesn't present evidence of local, governmental or financial policy incentives that would have encouraged the project's development in the absence of carbon revenues.

At the time of the project's final investment decision, Carbon Capture, Utilization, and Storage for Enhanced Oil Recovery (CCUS-EOR) establishment in the United States was common practice, further undermining the project's additionality claims.

4. Over-crediting risk

Sylvera's analysis indicates a significant over crediting risk due to the exclusion of emissions associated with additional oil production as a result of the development of the CCUS-EOR project.

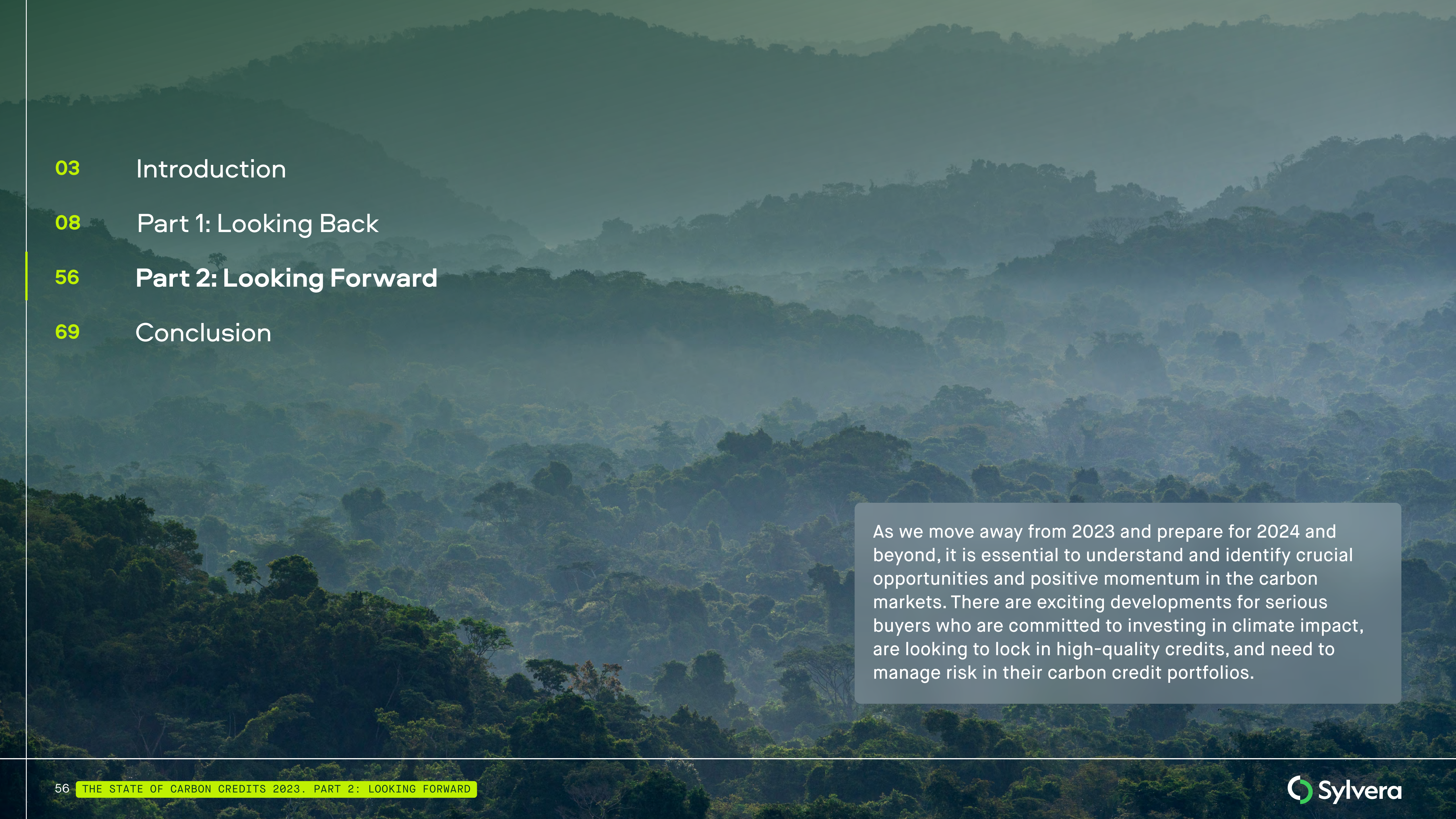
5. Permanence

Sylvera's assessment indicates that the risk of CO2 stored underground by Monell Geo-Seq returning to the atmosphere is minimal.

6. Co-Benefits

The project has limited co-benefits. The project's net impact on the local biodiversity was likely negative due to its EOR operations. Furthermore, the project didn't offer substantial benefits to facilitate the sustainable development of the local community.

Note: due to lack of data, we are unable to offer pricing trends for Monell Geo-Seq (ACR118).



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As we move away from 2023 and prepare for 2024 and beyond, it is essential to understand and identify crucial opportunities and positive momentum in the carbon markets. There are exciting developments for serious buyers who are committed to investing in climate impact, are looking to lock in high-quality credits, and need to manage risk in their carbon credit portfolios.

The pre-issuance opportunity

Organizations of all sizes are looking upstream, or in other words, funding projects early in development before credits have been issued on the market, to secure high-quality supply.

Buyers are looking for independent assurance of over-crediting, additionality and permanence risks, and project co-benefits. They are also keen to understand delivery risk from early-stage projects.

Investment in upstream projects catalyzes the growth of high-quality credit supply. Sylvera uses the terms Pre-Issuance Projects and Issuing Projects to distinguish between projects that have delivered verified credits to market and those that have not yet.

A recent report by Trove, which Sylvera sponsored, found that many organizations are taking action into their own hands to finance projects that are not yet on the market:

“Many corporates intend to make use of carbon credits and are investing in projects themselves or making advanced purchase commitments. [This] analysis shows that around a third of announced financial commitments to generate or purchase carbon credits are from the corporate sector” and that “over \$15bn has been, and is intended, for nature-based projects.”

While it is encouraging to see investment continue and committed for high-quality supply, the rate of investment must accelerate significantly in order to deliver the volume of credits needed by 2030 within a 1.5C scenario.

To learn more, this [Primer](#) will get you up to speed on pre-issuance investments.

	Pre-Issuance				Issuing
Stage	Stage 1: Site Selection & Feasibility	Stage 2: Pre-Validation (Preparation)	Stage 3: Pre-Monitoring (Validated)	Stage 4: Pre-Verification (Monitored)	Stage 5: Issuing (Ongoing verification & monitoring)
Documents	No Project Documents	Draft PDD	PDD	PDD + MR	PDD + MR + VR
Project / Developer Activity	Developer defines initial parameters of project (type of activity, location, methodology)	Developer prepares to list project on registry	Initial project design validated by VVB and project listed on registry	Emissions reductions or removals monitored & pending verification by VVB	Carbon credits issued + Periodic issuances Emissions reductions or removals verified
Data	Disparate and limited information available	Vastly different information available	Usually all necessary information available	Almost definitely all necessary information available	Almost definitely all necessary information available
Sylvera Assessment	Sylvera Pre-Issuance Assessment				Complete Rating or Provisional Rating (if missing data)

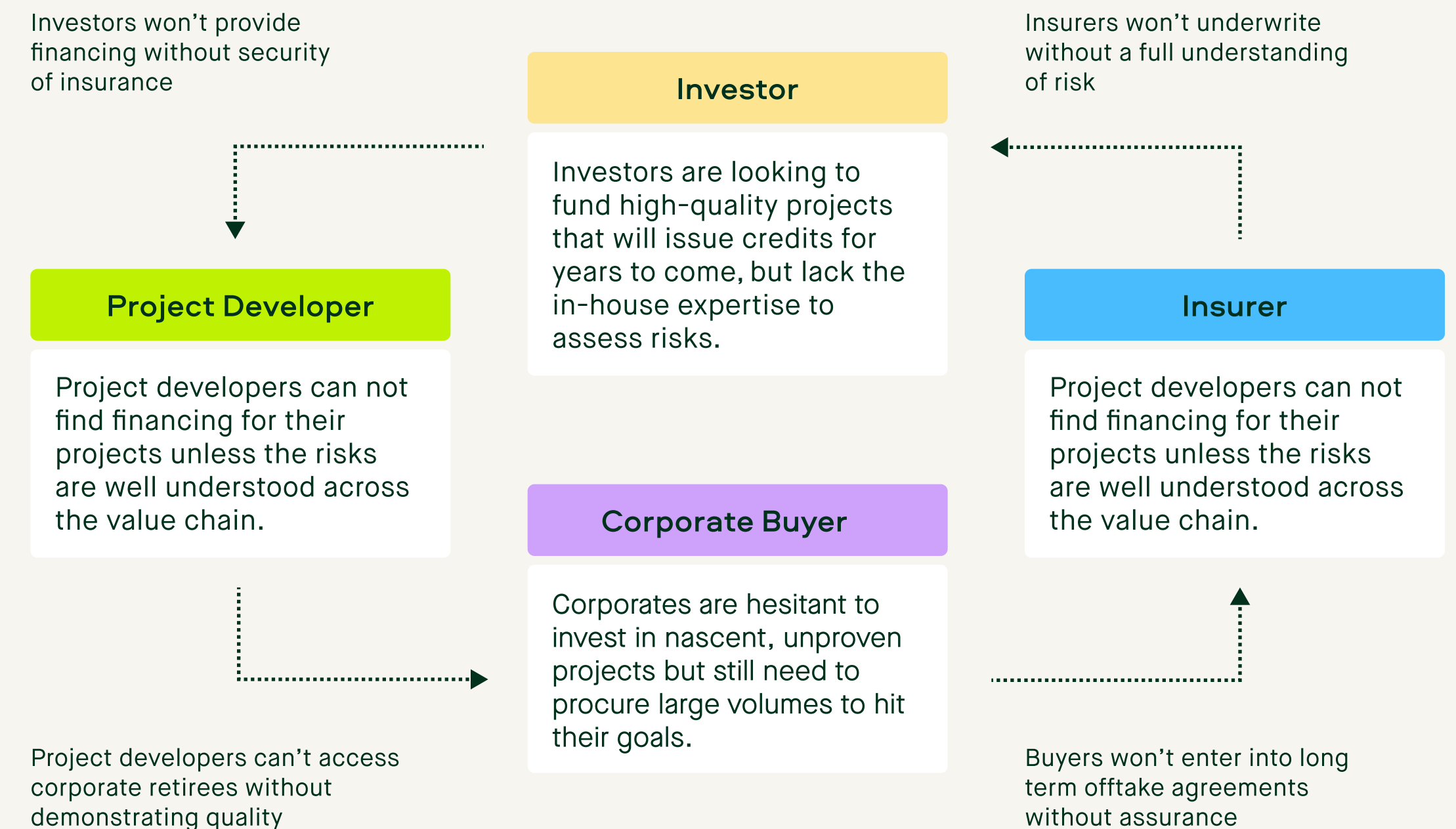
Silvera's Pre-Issuance Screenings & Assessments

We evaluate pre-issuance projects using our proprietary frameworks, machine learning models, geospatial analytics, and our extensive data stack. We use these sources to perform comparable analyses and assess pre-issuance projects at all stages (i.e. projects that are not yet listed on a registry as well as projects already listed on a registry, but not yet issuing credits).

Our pre-issuance screenings and detailed assessments help investors, off-takers, and insurers identify the merits and risks associated with these early-stage projects. We also advise on where there are opportunities to improve the project quality so our clients can work with developers to bolster the supply side of the market by bringing the highest quality credits to the market in the near future.

Last, we deduce the intrinsic value of the credits in advance of our clients' off-take agreement negotiations so that they control their costs.

The pre-issuance flywheel



The rise of carbon dioxide removals (CDR)

Direct Air Capture & Storage (DACs)

DACS projects have received continued positive [media coverage](#) and [investment](#) throughout 2023, and are often positioned as an antidote to “unreliable” nature-based solutions.

Currently, DACS projects span a mix of developmental stages, with most being in early phases in the VCM. To address this, Sylvera is currently working on a pre-issuance framework to assess projects during their development, aiming to ensure the issuance of high-quality carbon credits on the market.

Sylvera considers data transparency a fundamental element in building trust within the DACS industry. Given the increasing demand for carbon removal credits, transparency in sharing project data, including Measurement, Reporting, and Verification (MRV) information, is essential.

Up until now, we have had difficulty obtaining this data to assess project quality, and consequently have not been able to rate any DACS project yet. It is critical that the same rigor is applied to analyzing DACS projects so that the true risk and quality can be understood.

Comprehensive documentation that justifies the need for carbon finance and detailed calculations validating carbon removal quantities must be provided by the project developers. Sharing this data proactively fosters confidence and trust within the market, making DACS projects more appealing to potential buyers and investors.

Furthermore, life cycle assessment (LCA) is crucial in evaluating the carbon footprint of DACS geological storage projects. Sylvera conducts comprehensive LCAs that consider the entire project life cycle, including construction, operation, CO2 transport, and decommissioning. This holistic approach ensures that all relevant emissions sources are accounted for, covering scopes 1, 2, and 3 emissions.

By adhering to market-standard practices and transparency in LCA, Sylvera will enable clients to make informed decisions when assessing carbon credits for DACS projects, contributing to the establishment of a more resilient and trustworthy carbon market.

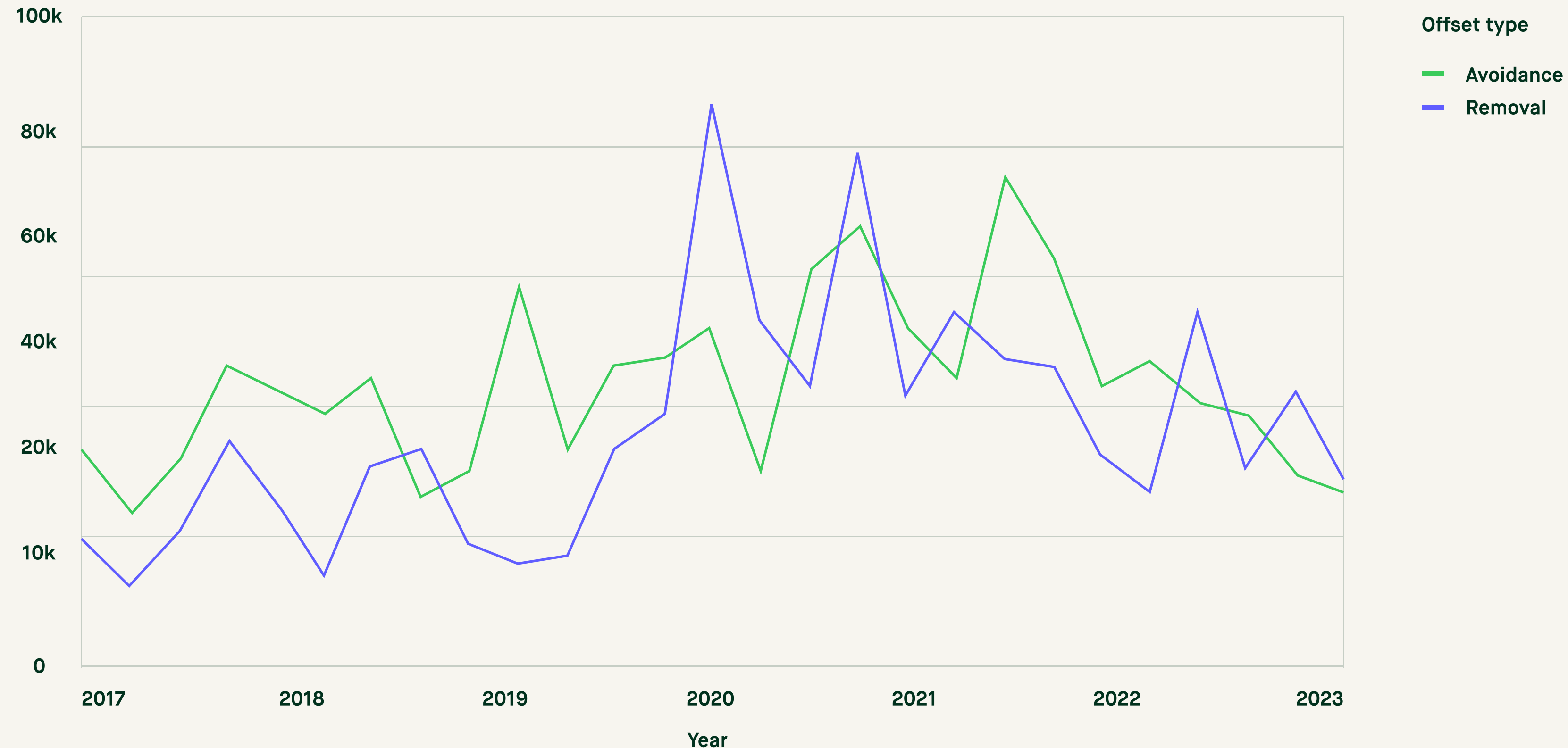
[Learn more about Sylvera's DACS Framework](#)

The rise of carbon dioxide removals (CDR)

CONTINUED

Retirement & Forward Investment Trends

Average retirement volume per project



Beyond DACS, we are observing a significant increase in the overall carbon dioxide removal (CDR) activity in the market, which is not entirely surprising as “removal” projects tend to be perceived as more reliable and haven’t been the target of long-term intense scrutiny (like REDD+ projects, for example). While avoidance projects (like REDD+) account for the majority of projects in the market, recent retirement data has shown that removals are becoming more popular among buyers, despite having less projects.

When comparing the average retirement volumes per project of removal and avoidance projects, we see that after 2020, removals have a large spike and retirement volumes become comparable to avoidance retirements. This means that companies are retiring removal project credits at very high rates, despite there being far fewer removal projects in the market in comparison to avoidance.

Put another way, if the market had as many removal projects as avoidance projects, then they would have similar volumes of credit retirement.

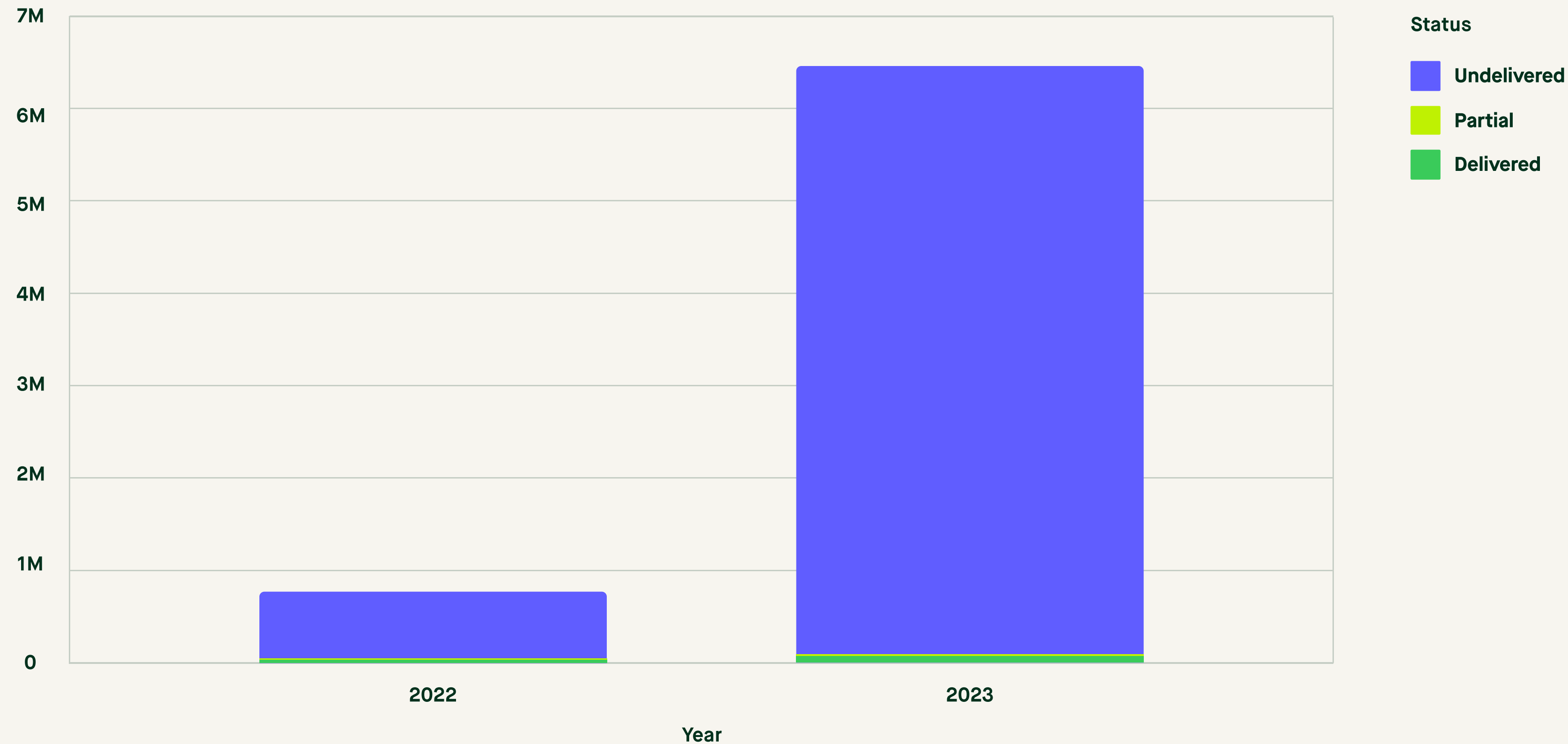
[DATA SOURCE: SYLVERA CARBON CREDIT ANALYTICS]

The rise of carbon dioxide removals (CDR)

CONTINUED

Tonnes Purchased by Year and Delivery Status

Tonnes purchased



Moreover, when looking at CDR purchase and delivery data from 2022 to 2023, we see an enormous increase in undelivered purchases year over year. This means that buyers have invested in CDR projects upfront without the completion of carbon removal.

In 2022, there were 600,000 tonnes purchased that were undelivered. In 2023, it jumped by more than 10x to 6.5 million tonnes purchased that are yet to be delivered.

Once delivered, we will see a huge increase in CDR retirement volumes.

[DATA SOURCE: [CDR.FYI](#)]

The jurisdictional opportunity & risk

In the past few years, support for jurisdictional approaches has emerged in the carbon market. Instead of being implemented individually – for example, in a patch of forest – carbon projects are implemented at a national (i.e. a country) or subnational (i.e. a province or a state) scale. This transition to jurisdictional approaches can result in both risks and opportunities for carbon market players.

Not all carbon project types are suitable to be implemented at a jurisdictional level and, for now, REDD+ activities are the only ones implemented at this scale. Under a Jurisdictional REDD+ (JREDD+) program accounting, such as baselining and deforestation monitoring, is done at the national or sub-national scale.

JREDD+ programs gained attention in 2021 with the creation of the LEAF Coalition— a coalition of governments and corporations committed to mobilizing \$1.5 billion to support JREDD+ activities through the purchase of ART TREES credits. But it was not until the end of 2022 when we saw the first JREDD+ credits issuance, done by Guyana in December under the ART TREES standard.

Jurisdictional carbon projects have the potential to deliver future large-scale, high-quality issuances, and proactive buyers are already preparing to secure this supply. In fact, BCG's recent survey found that most respondents “preferred and were willing to pay for JREDD+ credits, a sign of the potential that programs using jurisdictional-level approaches and impact quantification may have to attract buyers and elevate quality.”

As these programs ramp up, however, the transition can affect existing carbon project investments and procurement strategies, so it is essential to understand, evaluate and monitor portfolio exposures.

Jurisdictional programs introduce ‘nesting’ risk, which means a stand-alone project is ‘integrated’ into a jurisdictional program accounting framework or merges entirely into the national or subnational program. This affects the stand-alone project’s capacity to issue credits or its general viability; in fact, it could cease to operate if it blends into the jurisdictional program.

Jurisdictional nesting case study

CASE STUDY

Take the Mai-Ndombe Verra Carbon Standard individual project for example. This is one of the largest REDD+ projects in the world and occupies 30% of the Mai Ndombe province in the Democratic Republic of the Congo.

This individual project coexists with a JREDD+ program implemented across the whole province under the World Bank FCPF (Forest Carbon Partnership Facility) Carbon fund scheme. To align with the World Bank FCPF's regional baseline, the individual VCS project decided to voluntarily lower its own baseline.

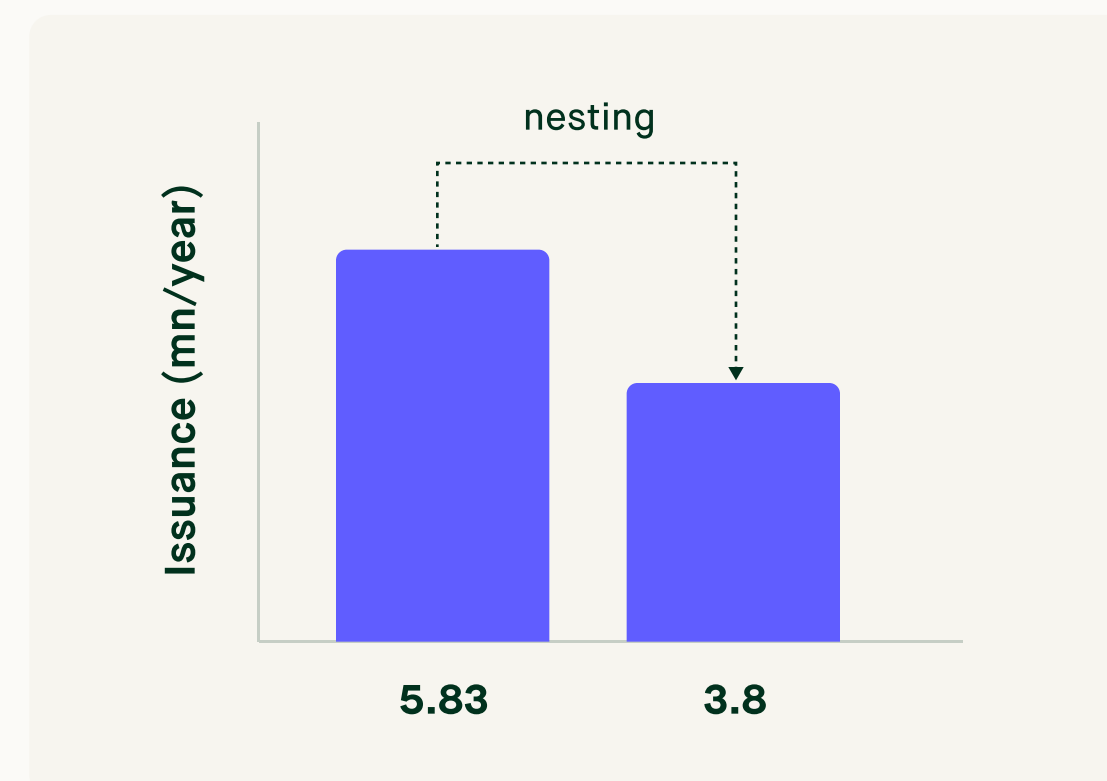
As a result, the individual project issuance will be reduced by more than 30% a year, from 5.83 million credits per year to 3.8 million, presenting a significant delivery risk for a credit off-taker.

The Mai Ndombe VCS Individual Project



- One of the largest individual REDD+ projects in the world; occupying 30% of the Mai Ndombe province through a private REDD+ concession
- A REDD+ jurisdictional program for the whole province exists under the World Bank FCPF Carbon Fund scheme

The Consequences of Nesting



- The individual project intends to voluntarily re-baseline to align with the FCPF baseline - which is lower - set for the full region
- As a result, project issuance will be reduced from 5.83 to 3.8 mn/year presenting significant delivery risk for an offtaker

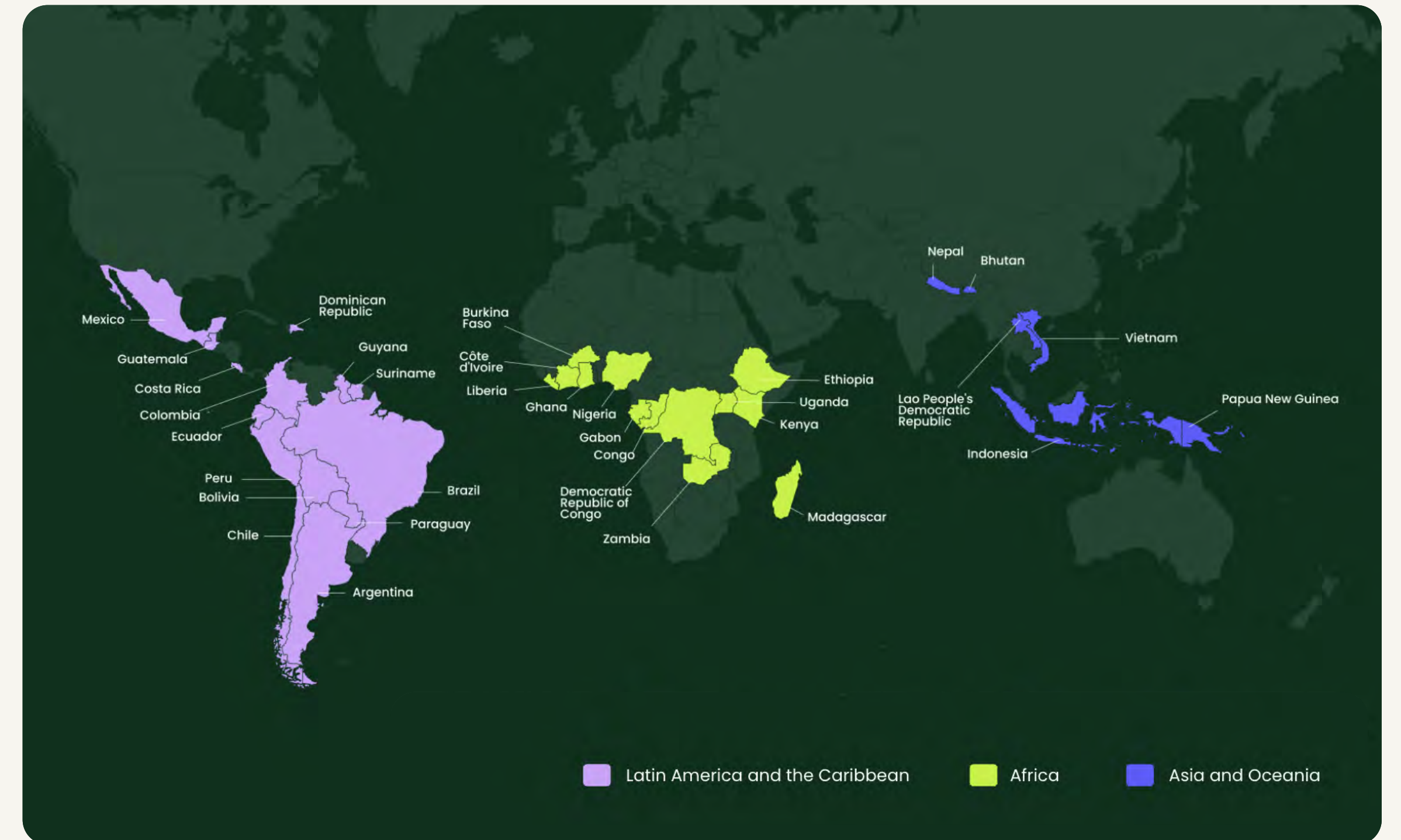
Sylvera's Jurisdictional Intel

Sylvera's Jurisdictional Intel combines 20+ years of carbon market and jurisdictional program experience. It synthesizes 100+ data sources; this number climbs as we stay abreast of developments in the JREDD+ landscape.

Jurisdictional Intel is composed of 3 core offerings:

- Country Assessment
- Programs Tracker
- Methodology Comparison

This set of solutions enables customers to save valuable time and resources by accessing a synthesis of disperse sources, stay ahead of market trends and peers by leveraging best-in-class JREDD+ data and expertise, and make the most informed decisions based on the most up-to-date information and future projections.



[JURISDICTIONAL INTEL 'S COUNTRY ASSESSMENT]

Expectations for the Jurisdictional REDD+ space

The coming months will be indicative for JREDD+ market adoption and progress. We are watching 3 main signals: LEAF Coalition agreements, ART TREES issuances and the number of participating jurisdictions.

While no LEAF Coalition agreements have been signed to date, we expect to see the first agreement signed by the end of 2023. Countries participating in the LEAF Coalition have set emission reduction targets that add up to more than 1,000 MtCO₂e between 2022 to 2030. To meet these goals, we expect these early movers to take more action soon.

As of now, Guyana is the only country to have issued credits under the ART TREES standard. The Guyana issuance represents 33.47 MtCO₂e for emission reductions between 2016 to 2020. We expect other countries, such as Costa Rica, to issue credits next year.

Last, the number of jurisdictions interested in implementing a JREDD+ program is increasing. We have seen more jurisdictions starting their ART TREES process, along with more jurisdictions committing to the LEAF Coalition. As more jurisdictions commit and participate in this approach, the jurisdictional opportunity and market will continue to grow.

The policy download & outlook

1. Industry self-regulation

● 2023 recap

With the integrity of the VCM coming under increasing scrutiny, this year saw major progress from industry initiatives seeking to address issues on both the supply- and demand-side of the market.

Setting a threshold for credit quality, the [ICVCM](#) published its Core Carbon Principles for both programs and credit categories. The market has already begun to react to the ICVCM's guidance, such as Verra revising its VCS Program to ensure compatibility. Meanwhile the ICVCM is working hard to define credit categories and assess them against its framework, with the help of advisory groups, which are currently being assembled.

The VCM's [Claims Code of Practice](#) outlines how credit buyers should be using credits alongside science-based net zero targets such as from the SBTi. The SBTi progressed its own work on [guidance for carbon credit usage](#) by conducting market consultation on [BVCM](#) (beyond value chain mitigation). We hope for full BVCM guidance by the end of this year.

For companies seeking clarity on how to engage with VCMs, these pieces of guidance are broadly compatible. Recent [guidance](#) from the World Economic Forum provides a clear playbook for how corporations can best navigate this ecosystem to maximize commercial and climate impact.

● Forward Look

As the ICVCM starts to approve and exclude programs and categories, market demand will shift, impacting both prices and upstream project development. Full implementation will take some time, but as the market seeks certainty, programs and categories that are approved quickly are expected to see a boost in demand.

The SBTi has become a leading voice in the space, and its BVCM guidance has the potential to boost confidence and stimulate demand. However, in its consultations so far it has strongly signaled that it is unlikely to introduce any big changes such as mandating BVCM or validating claims. On balance, the new guidance is not expected to have a significant effect on the market in the short term.

2. Regulation

● 2023 recap

Regulators in many jurisdictions are also showing increasing interest in VCMs and integrity. One leading the way is the USA financial regulator, the Commodity Futures Trading Commission (CFTC), which held a [public convening on VCMs](#) and put out a call for [whistleblowers on carbon market misconduct](#).

This year has seen a focus on increasing transparency through climate-related disclosure regimes expanding to include requirements to report on carbon credit use. Most notably, this includes new [ISSB Standards](#), which have been [incorporated into CDP reporting](#) and which countries like [Singapore](#) are considering adopting, and new rules have also been proposed in the [EU](#) and USA (both nationally through the [SEC](#) and in [California](#)).

A particular innovation of [California's AB1305](#) is that it requires disclosures not just from credit buyers, but also from sellers. This is an essential first step towards implementing quality guardrails at the project level.

Many jurisdictions are also cracking down on corporate sustainability claims, such as the use of "carbon neutral". There has been a lot of coverage of proposed legislation in the [EU](#) seeking to ban or limit carbon neutral claims, as well as updates to advertising guidance in the [USA](#) and [UK](#). Nevertheless, well-known brands like [Apple](#) are continuing to promote carbon neutral products.

The policy download & outlook

CONTINUED

● Forward Look

Direct regulation of VCMs might still be a while off, but regulators are likely to start taking steps in that direction. One area to watch is the UK, where the government is preparing to launch a consultation on VCMs and potentially endorsing or adopting self-regulatory standards, on the recommendation of the [Skidmore Review](#).

In the USA, a revised disclosure rule from the SEC is expected imminently. While this is likely to be less comprehensive than initially proposed, it will nonetheless hugely progress climate-related reporting in the world's biggest economy.

3. Article 6

● 2023 recap

Under [Article 6.2](#), a number of countries have continued to sign bilateral agreements, and 63 pilot projects have been agreed. We also saw the [first transfer](#) of credits under the mechanism, between Ghana and Switzerland, in late 2022.

As agreed at COP27, going forward countries need to submit Initial Reports in which they detail their plans for cooperation, before transactions can take place. Ghana and Switzerland are the only countries to have done so to date, but we expect many more in 2024.

Article 6.4 has not yet been implemented, as parties negotiate the exact terms of the mechanism, including what kind of activities are eligible. Discussions this year, including at the [Bonn Intersessional](#), have been slow-moving.

Recent talks hoped to agree on a position on removals and on approved methodologies, and although consensus was not reached, the chair of the supervisory body [announced](#) a 'quantum leap' in the discussions.

● Forward Look

A number of countries who have already signed agreements are expected to submit Initial Reports and progress their Article 6.2 cooperation in the coming year.

Following the recent breakthrough in discussions, there is hope for good progress on Article 6.4 implementation at COP28. Key issues include approved methodologies, removals, activity cycle procedure and validation and verification. However, the current expectation is that Article 6.4 is unlikely to be implemented before 2025.

The policy download & outlook

CONTINUED

4. Market convergence

● 2023 recap

The VCM was only ever intended to be a stop-gap while compliance mechanisms for carbon pricing were developed. While this has taken a lot longer than hoped, the convergence between voluntary and compliance markets is a long-term trend that is expected to continue.

Already a number of compliance carbon pricing schemes accept limited use of voluntary credits, including in Mexico, California, Australia, Korea and South Africa.

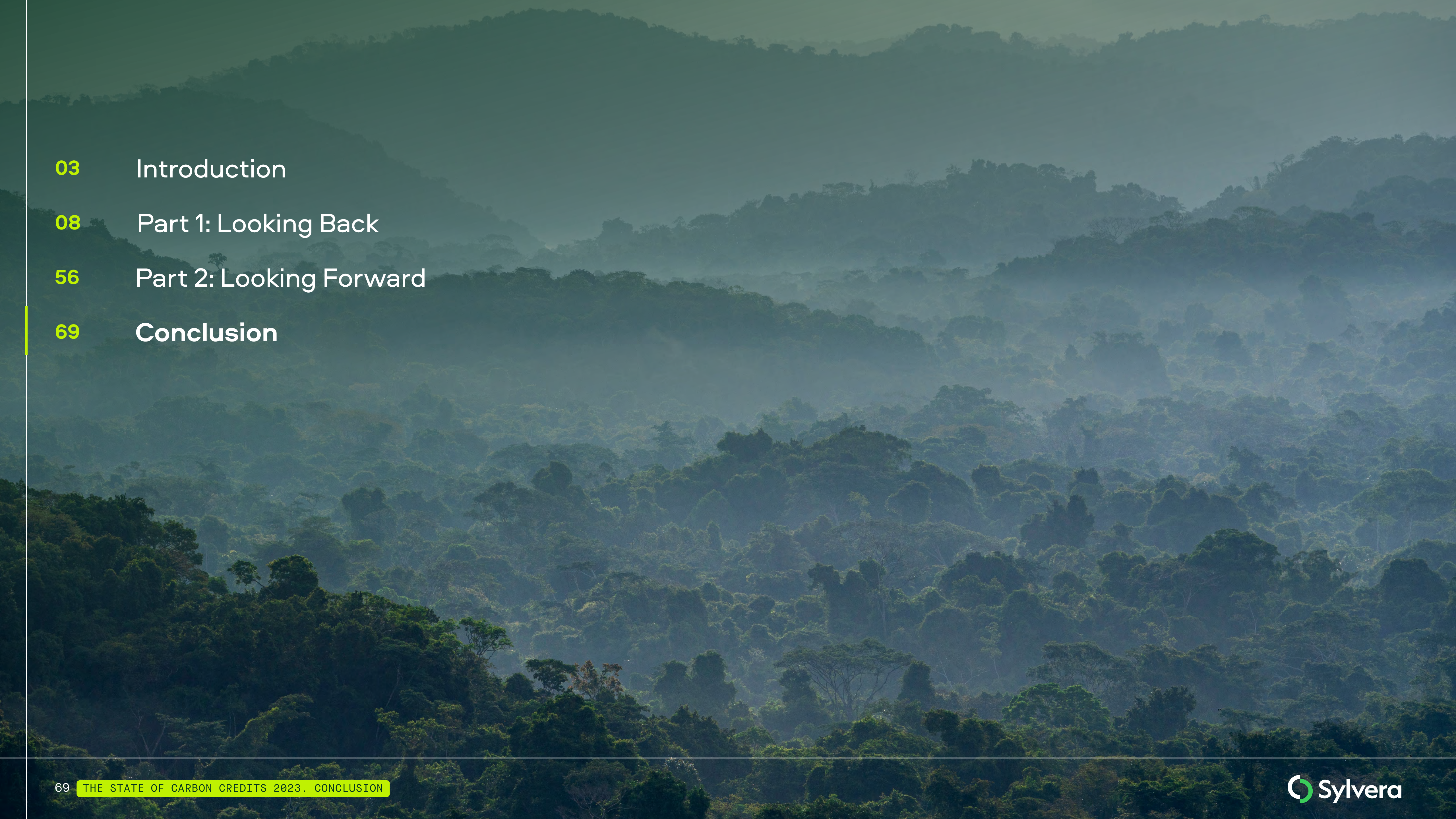
The rules and norms developed under Article 6 also have an impact on the VCMs. One key issue is corresponding adjustments (CAs). There are several live debates, such as when and if CAs will be required in VCMs, and how credits without CAs can be used. This is also driving a spate of regulation in host countries, including Indonesia and Zimbabwe, as they seek to gain more control over carbon projects and emissions reductions that could contribute towards their Paris Agreement targets.

● Forward Look

In 2024 more countries are expected to introduce compliance schemes, which allow use of carbon credits, such as Singapore's carbon tax.

A particular area of interest is the potential for compliance markets to drive considerable demand for carbon dioxide removals. The UK and EU Emissions Trading Schemes (ETs) currently do not allow the use of any voluntary credits.

However, there is an expectation that both may allow limited use of removals in the near future: in the EU a report is expected on this is 2026 and recent UK consultations have raised the issue. The EU ETS is currently due to result in net negative emissions by 2045 thanks to removals.



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Conclusion

As we approach the end of a year that surfaced criticism and doubt in the market, it is essential that VCM participants take meaningful and impactful action now to prepare for and make progress in 2024.

This report highlighted where quality exists today and where scrutiny is deserved; to date, REDD+ projects are the only Sylvera-rated projects that have received a AA rating—the highest quality rating available currently in the market—while RES credits have the most additionality uncertainty and have not been rated above a C. We provided case studies across all rated project types to shed light on the depth of assessments needed to identify quality.

As buyers gain more transparency about credit quality, they can navigate the market with confidence and move quickly to seize advantageous investment opportunities. Across all project types, prices have dropped this year, with nature-based projects having a price premium compared to technology-based projects. Discerning buyers have the opportunity to move now and purchase higher-quality credits while the market is down.

We are also focused on what is on the market's horizon and are observing real traction in developing areas of the VCM for greater investment and improved quality. The opportunities include early-stage or “pre-issuance” projects, jurisdictional approaches and carbon dioxide removal (CDR) activities. Like anything with great potential, there are also risks that buyers must become aware of and assess portfolio exposure.

Lastly, four key policy trends made an impact in 2023: industry self-regulation fueled by the various integrity initiatives, international regulation and disclosure requirements, Article 6 developments, and the convergence between voluntary and compliance markets. We expect them to continue to influence the market in 2024 and are monitoring closely.

Notes on the data

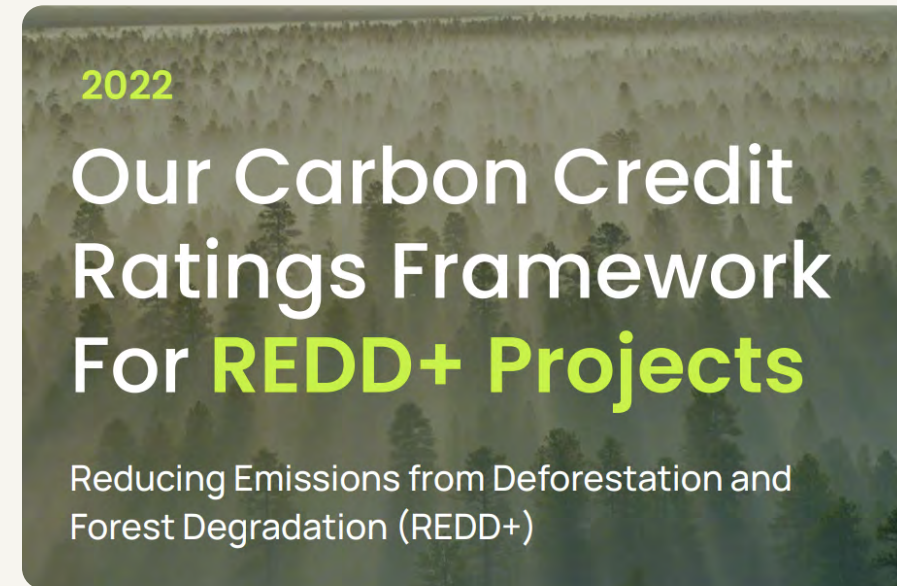
APPENDIX

- All data comes from the Verra Registry. Issuance and retirement data cover the years 2021, 2022 and 2023.
- Retirement data is specifically from projects that are registered with Verra and the retirement volumes come from an amalgamation of Verra registry disclosures and Carbon Disclosure Project (CDP) disclosures.
- Retirement data that is used for the CDR (ARR) average retirements per project time-series analysis comes from all registries.
- All pricing data comes from [Viridios AI](#), spanning from 2021 through Q3 of 2023, and only includes 2020 vintage credits.
- Data on Companies and Industries come from the Carbon Disclosure Project (CDP).
- Data for the Average Retirement Volume per Avoidance and Removal Projects analysis only included ARR projects.
- Data from [CDR.fyi](#)
 - The categories were collapsed to 3: delivered, undelivered, partial.
 - The (Inferred) delivered category was merged with delivered.
 - LOI/MOU was merged with undelivered. LOI/MOU means that the deal has been announced but not finalized, and thus carry some risk that they may not move forward.
 - Numbers of tonnes purchases were rounded to the nearest integer.
- In all leading industry retirement charts, the "Services" industry encompasses:
 - Oil & Gas
 - Manufacturing
 - Services
 - Transportation services
 - Infrastructure
 - Food, beverage & agriculture
 - Materials
 - Apparel
 - Biotech, health care & pharma
 - Retail
 - Power generation
 - Hospitality
- In all leading industry retirement charts, the "Services" industry encompasses:
 - Financial Services
 - Professional Services
 - Media & Telecommunication Services
 - Web & IT Services

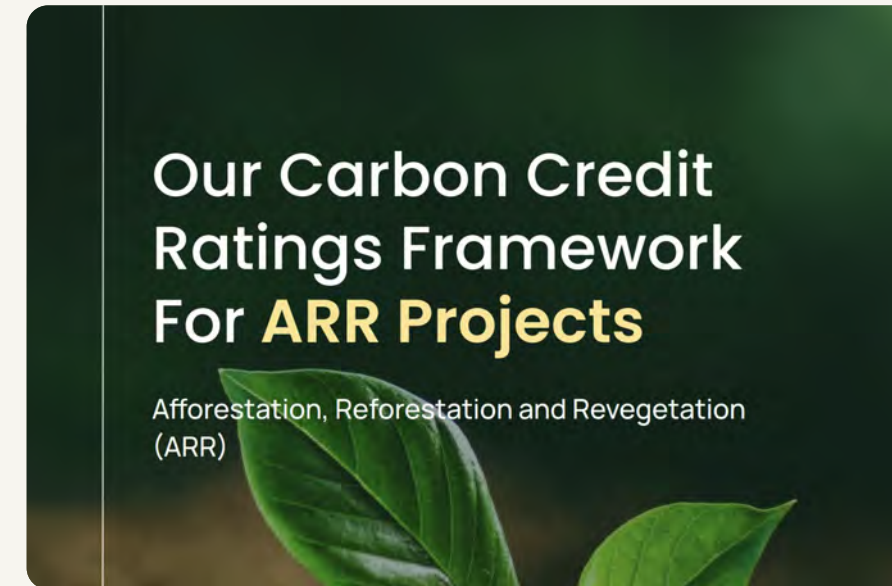
Our Rating Frameworks APPENDIX



[Sylvera's Carbon Credit Ratings: Frameworks and Processes \(Updated\)](#)



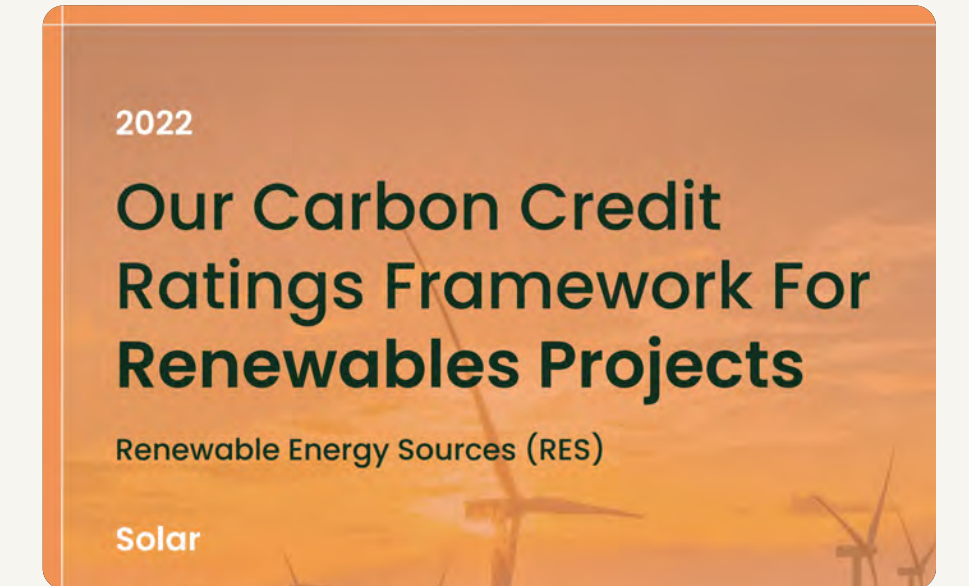
[REDD+](#)



[ARR](#)



[IFM](#)



[Solar](#)



[ICS](#)



[CCUS- EOR](#)



[Biochar](#)



[Regenerative Ag](#)



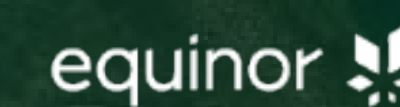
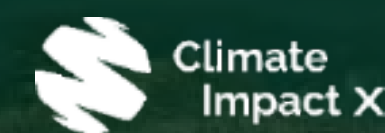
[DACs](#)



Who relies on the Sylvera platform?

Contact us to learn more.

Customers & Partners:



Sylvera is a leading carbon data provider. Our mission is to incentivize investment in real climate action. To help organizations ensure they're making the most effective investments toward net zero, we build software that independently and accurately automates the evaluation of carbon projects that capture, remove, or avoid emissions. With Sylvera's data and tools, businesses and governments can confidently invest in, benchmark, deliver, and report real climate impact. We're backed by renowned investors like Balderton Capital, Index Ventures, Insight Partners, LocalGlobe, and Salesforce Ventures.

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