systemica

VCM Report

4Q - 2024

January 2025

About Systemica

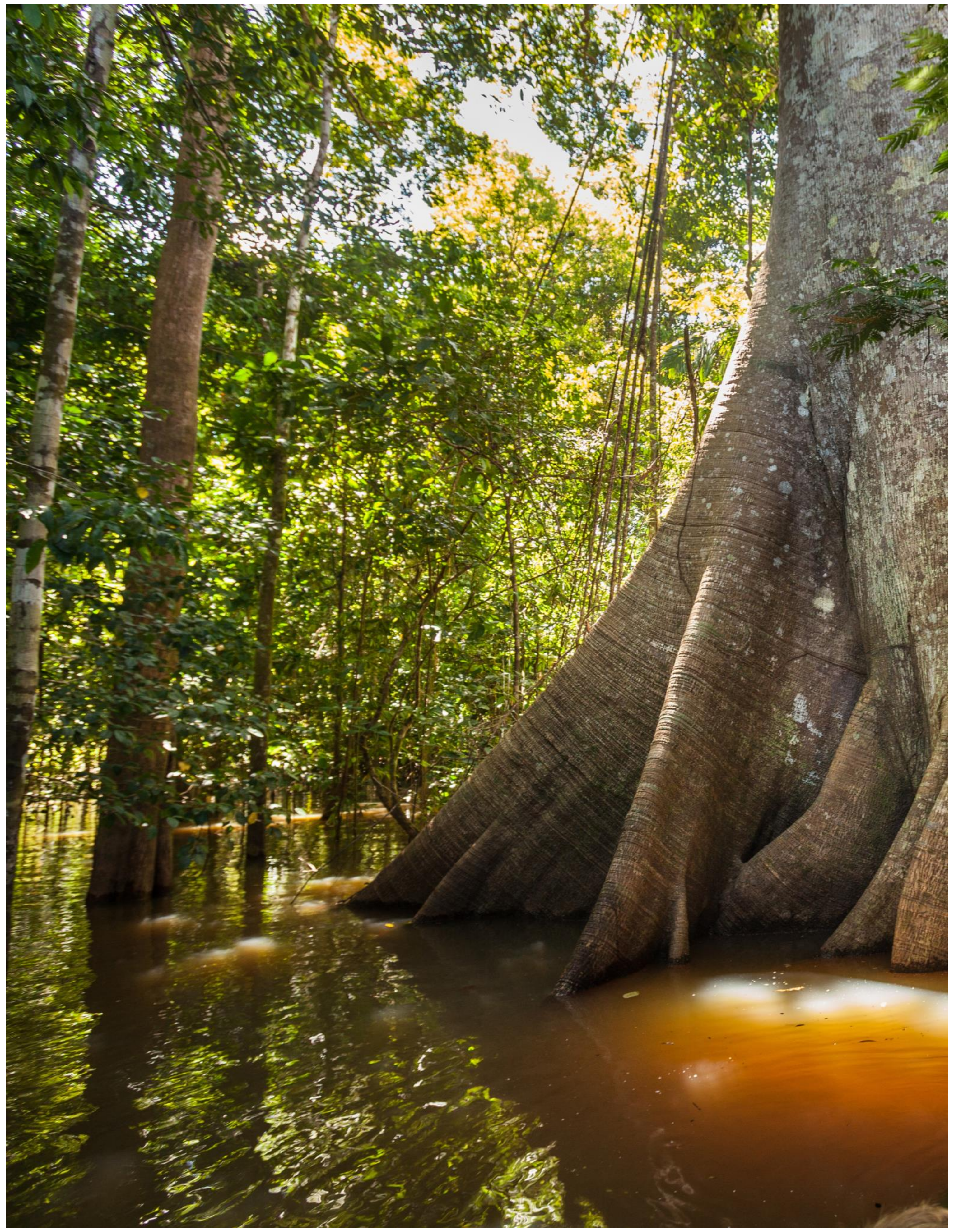
We are an ecosystem specialized in solutions for the generation and management of carbon credits and environmental assets. Our operations range from the financial structuring of the asset, through the development of projects that reduce and remove emissions, to the formulation of environmental public policies.

We create a continuous cycle of impact, ensuring that each action taken today becomes a legacy for the future, with effective and measurable results.

Our technical team delivers at a superior level. We combine experience, scientific knowledge, and a researcher's spirit to meet the strictest sustainability parameters.

As a result, our projects unfold into significant contributions in both environmental and social spheres.

Introduction



The voluntary carbon market stands as a crucial instrument in addressing climate change, deforestation, and biodiversity loss.

Despite a challenging year, the market's value reached an estimated $1.4 billion in 2024[1], accompanied by demand exceeding 180 $MtCO_2e$ for the third consecutive year. Forecasts from Bloomberg suggest a potential annual market value of $0.5 - $1 trillion[2], contingent upon high credit integrity.

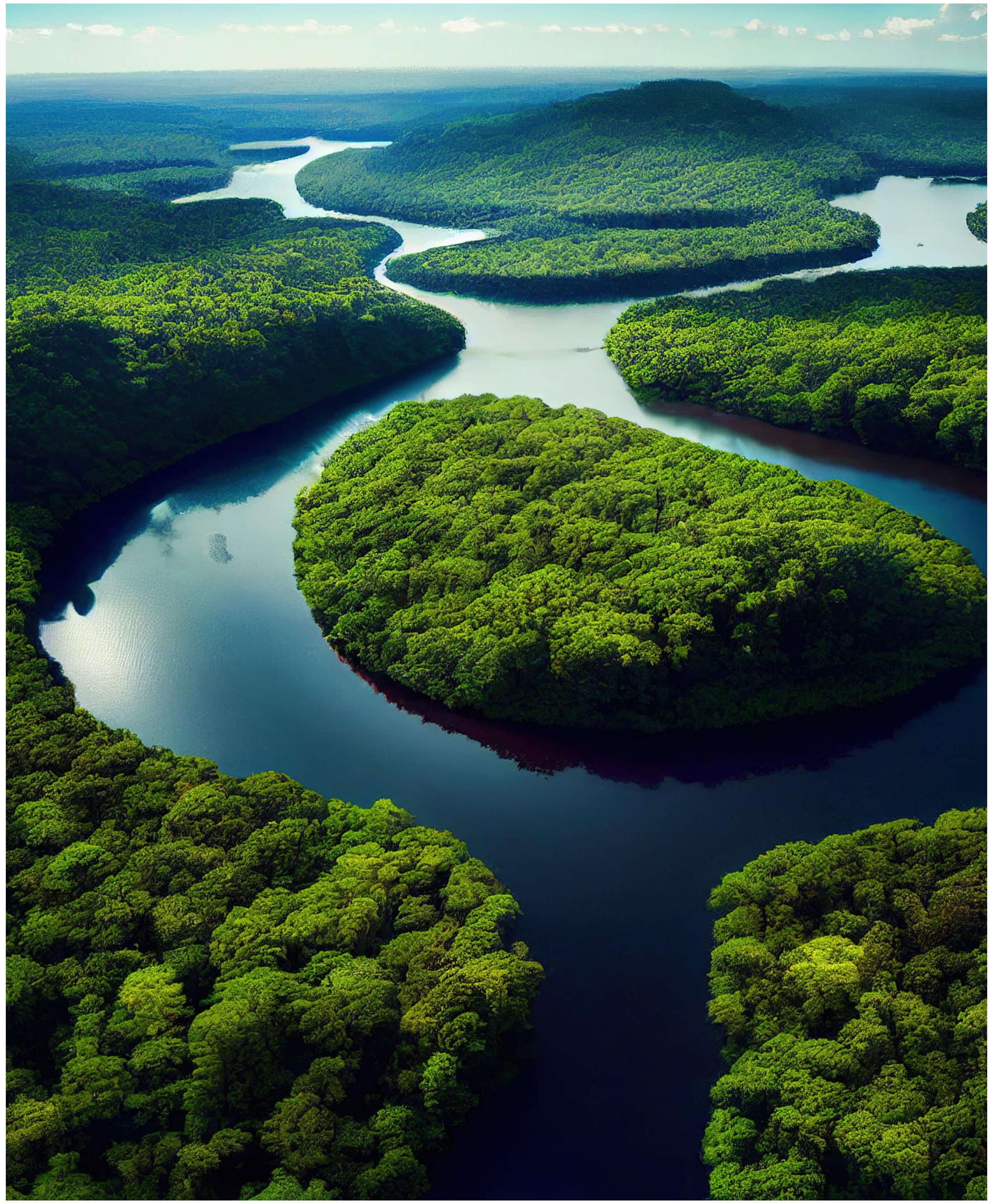
However, challenges persist regarding integrity and transparency, hindering the market's consolidation and effectiveness.

In response to these concerns, Systemica presents a comprehensive analysis of the market's performance in 2024 and offers insights into its outlook for the upcoming year.

[1]MSCI, 2025, Frozen Carbon Credit Market May Thaw as 2030 Gets Closer
[2]BloombergNEF, 2024. Mega Boost for Carbon Offsets Market Seen from SBTi Easing.

Key Insights

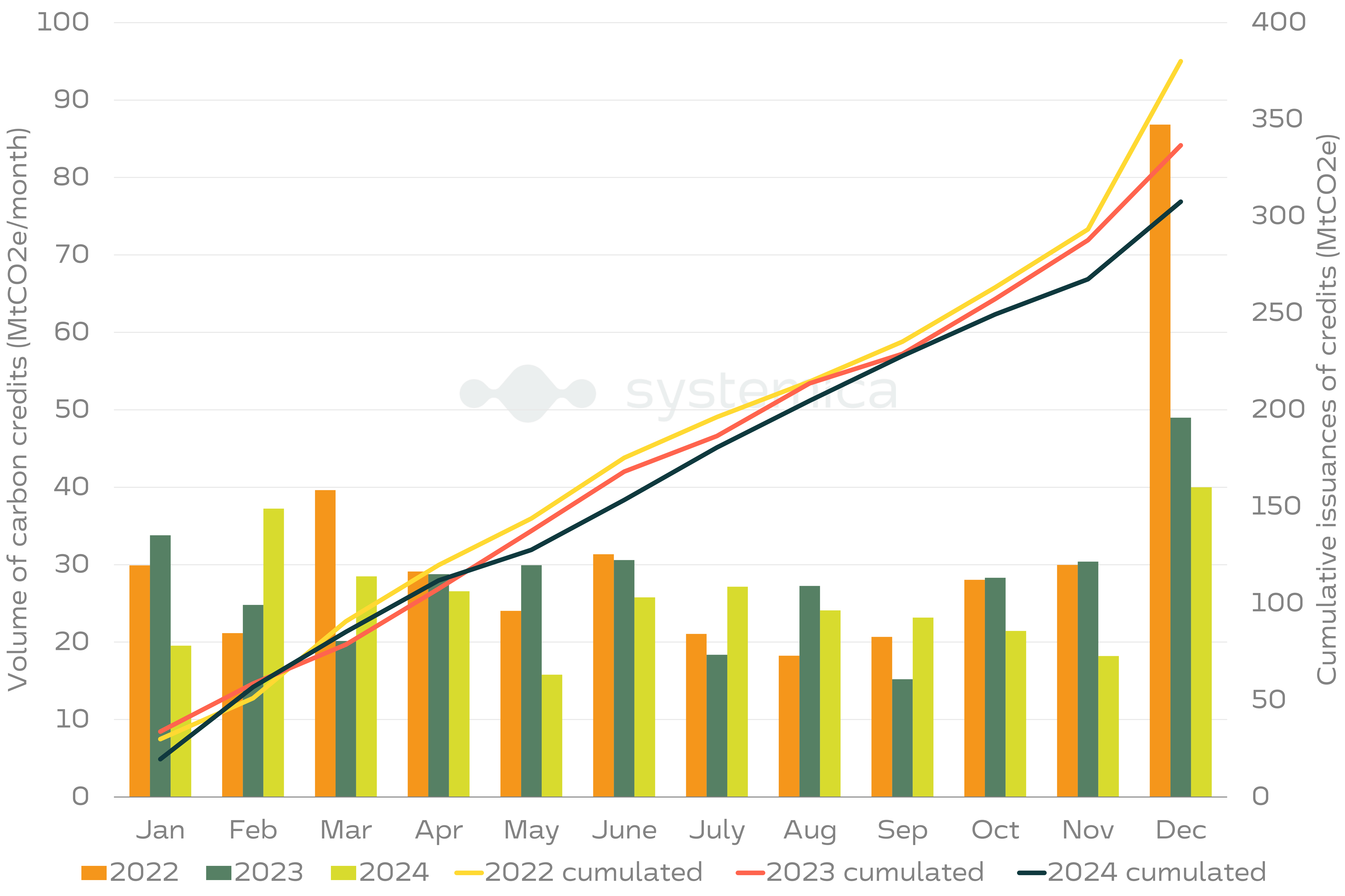
- ✓ 2024 saw the consolidation of quality benchmarks in the voluntary carbon market, with stable but lower prices as market participants awaited integrity progress.
- ✓ **Credit issuance decreased by 9% year-on-year**, primarily due to a decline in REDD+ credit issuance. **Retirements remained stable, exceeding 180 MtCO2e for the third consecutive year**, indicating consistent demand.
- ✓ The number of companies with **approved or improved SBTi commitments rose by 2,877**, reflecting recovery in commitment rates despite institutional disruptions in 2024.
- ✓ **Average credit prices dropped by 20%, closing at USD 4.80/tCO2e**, largely due to lower prices for Renewable Energy and REDD+ credits on the primary market (2,00 USD/tCO2e).
- ✓ **Nature Restoration credits**, however, maintained prices above USD 10/tCO2e throughout the year, **closing Q4 at USD 14.80/tCO2e.**



Supply of carbon credits on the market

Carbon credit issuances remain below two-year averages amid market uncertainty

Evolution of issued credits (MtCO2e)



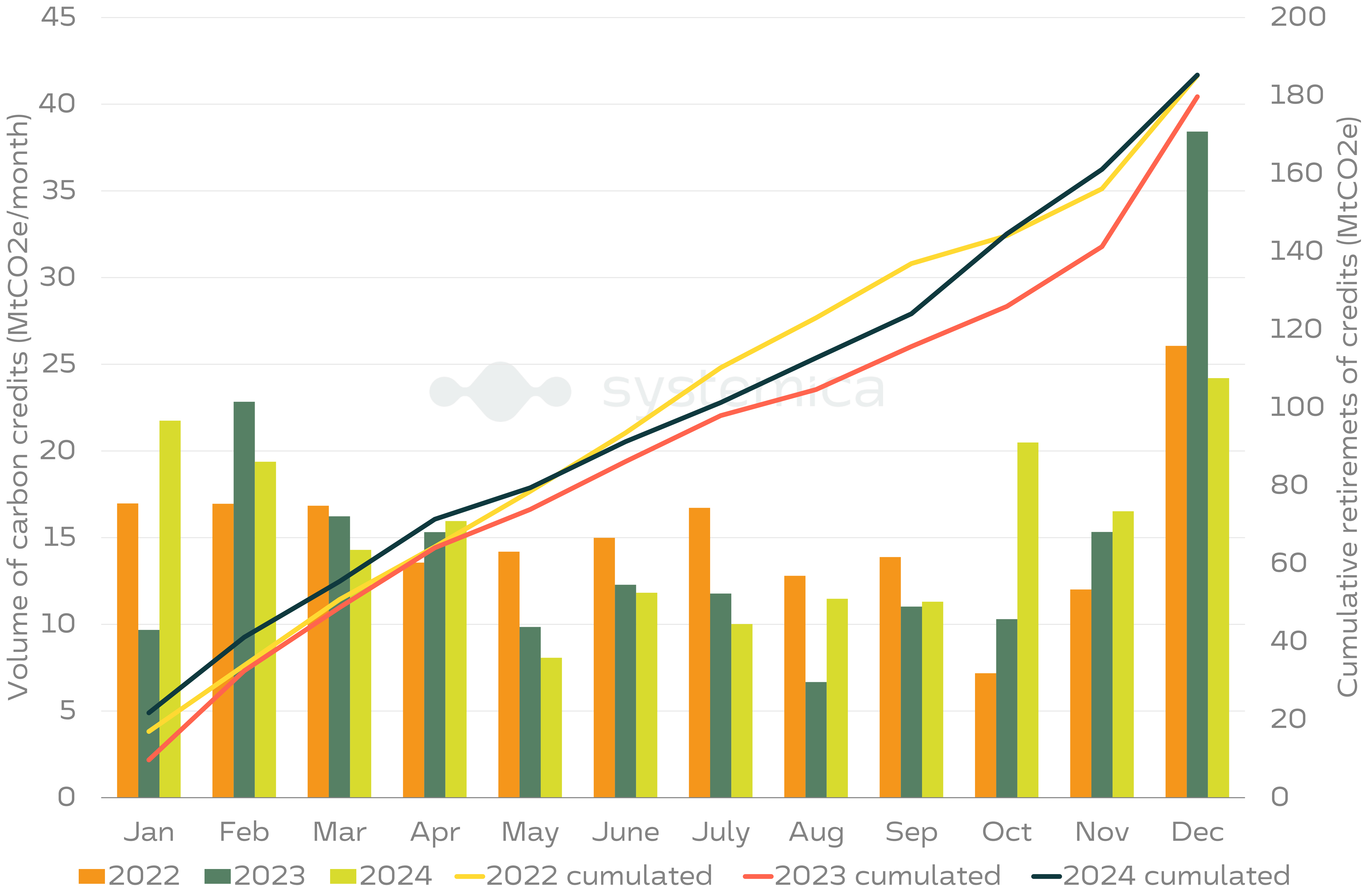
- The issuance of new carbon credits in 2024 maintained its downward trajectory, reflecting ongoing challenges in restoring positive price signals across the voluntary carbon market since 2023.
- Despite this trend, December saw a notable uptick in credit issuance, driven by the seasonality of the VCM and improvements in certification processes. Specifically, Verra's adoption of a risk-based system significantly reduced project review times.
- By year-end, the **total issuance of new credits reached 307 MtCO2e.**
- This volume marked **declines of 19% and 9% compared to the same periods in 2022 and 2023**
- Contributing factors to this decrease include lower market prices and delays in the verification in the primary registries throughout the year.

Source: Includes data from ACR, CAR, Gold Standard, EcoRegistry, Climate Forward, Verra, CDM-NDC Eligible, BioCarbon, Art Trees, Puro Earth, GCC. Data as of 31/12/2024

Supply of carbon credits on the market

Credit retirements remain stable over the past two years, with demand showing a gradual increase relative to 2023 levels

Evolution of retired credits (MtCO2e)



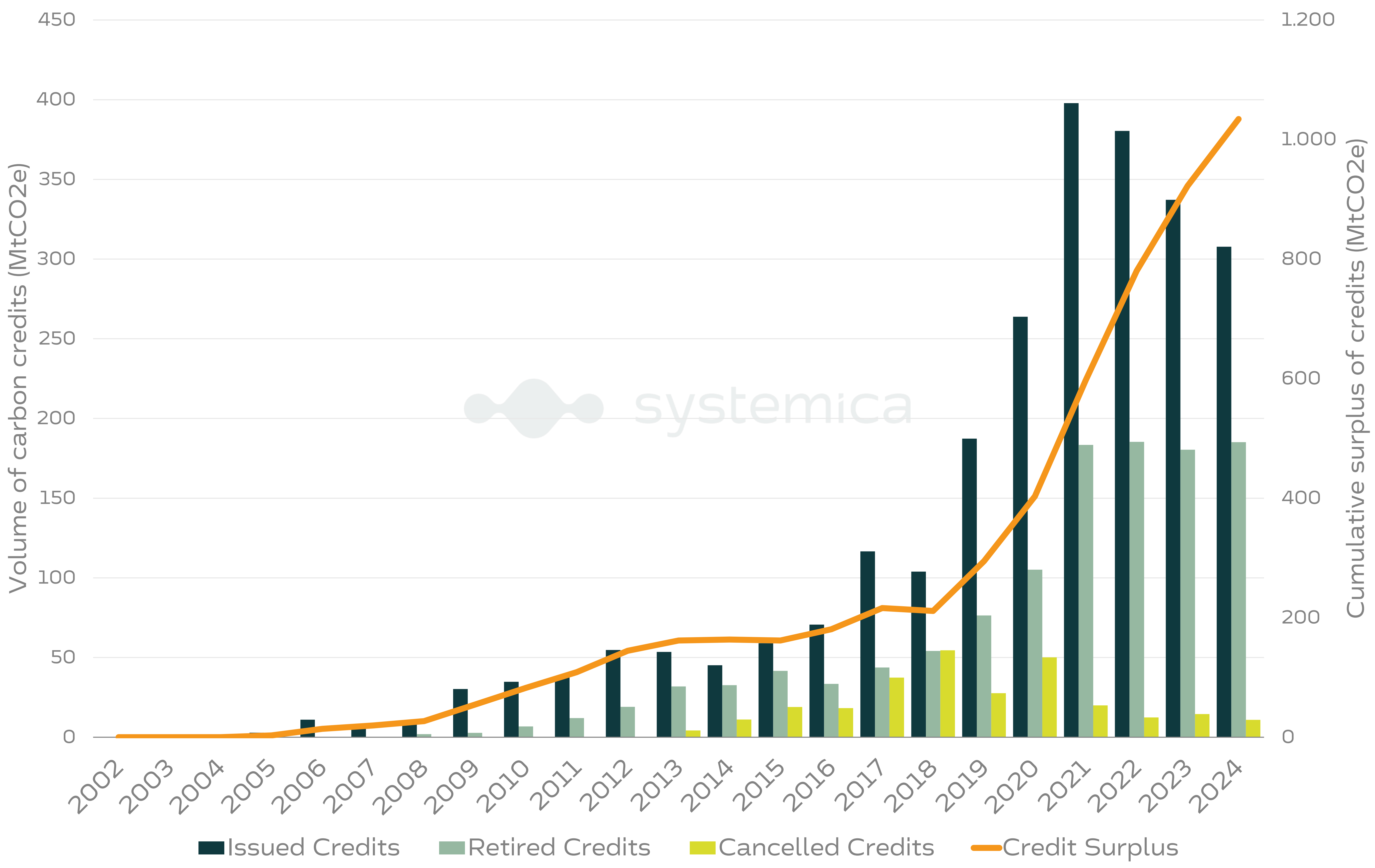
- Credit retirements in 4Q-2024 exceeded volumes from the previous two years, driven by a significant increase in October, where retirement volumes were double those of the same period in 2023.
- Annual credit retirements **surpassed 180 MtCO2e for the third consecutive year**, reaching 185 MtCO2e, a level last observed in 2022, **indicating steady demand despite broader market challenges.**
- Market demand showed **resilience in 2024**, supported by the introduction of new quality benchmarks, including the **approval of the first CCP-eligible standards and methodologies**, which provided positive signals to established investors.
- **CCP-eligible standards achieved record retirements of 168 MtCO2e**, reflecting growing market adoption of higher-quality credits. **This consolidation of quality benchmarks may position the market for renewed growth in demand for carbon credits in 2025.**

Source: Includes data from ACR, CAR, Gold Standard, EcoRegistry, Climate Forward, Verra, CDM-NDC Eligible, BioCarbon, Art Trees, Puro Earth, GCC. Data as of 30/09/2024

Supply of carbon credits on the market

Surplus of credits available on the market continues to grow even as the issuances rate fall compared to previous years

Evolution of credit surplus available on the market



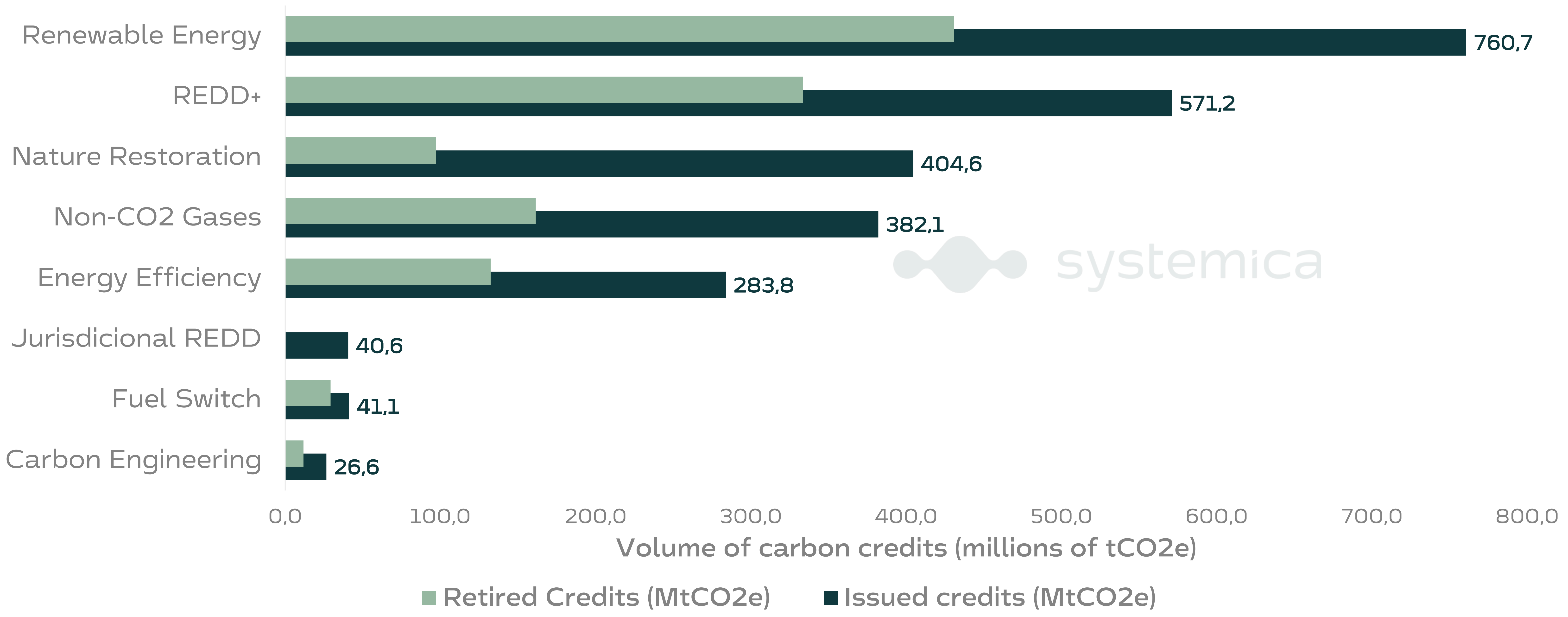
- Total supply of credits as of the end of the year reached approximately **1 billion tCO2e**
- The **surplus growth rate, however, has consistently declined** since 2021, **dropping from 48% to 18% in 2023**, with projections indicating a **further decrease to 12% in 2024.**
- An increase in the surplus of available credits is expected to continue in 2025, at a rate that follows the current downward trend
- Despite the surplus, quality remains a concern, with MSCI Carbon Markets **estimating that 50% of available credits are rated B or lower**, underscoring a persistent quality gap.
- Projections indicate that if the issuance downturn persists, the **market could shift from surplus to undersupply by mid-2029**, particularly for high-quality credits, potentially driving price adjustments and increased competition among buyers.

Source: Includes data from ACR, CAR, Gold Standard, EcoRegistry, Climate Forward, Verra, CDM-NDC Eligible, BioCarbon, Art Trees, Puro Earth, GCC. Data as of 30/09/2024

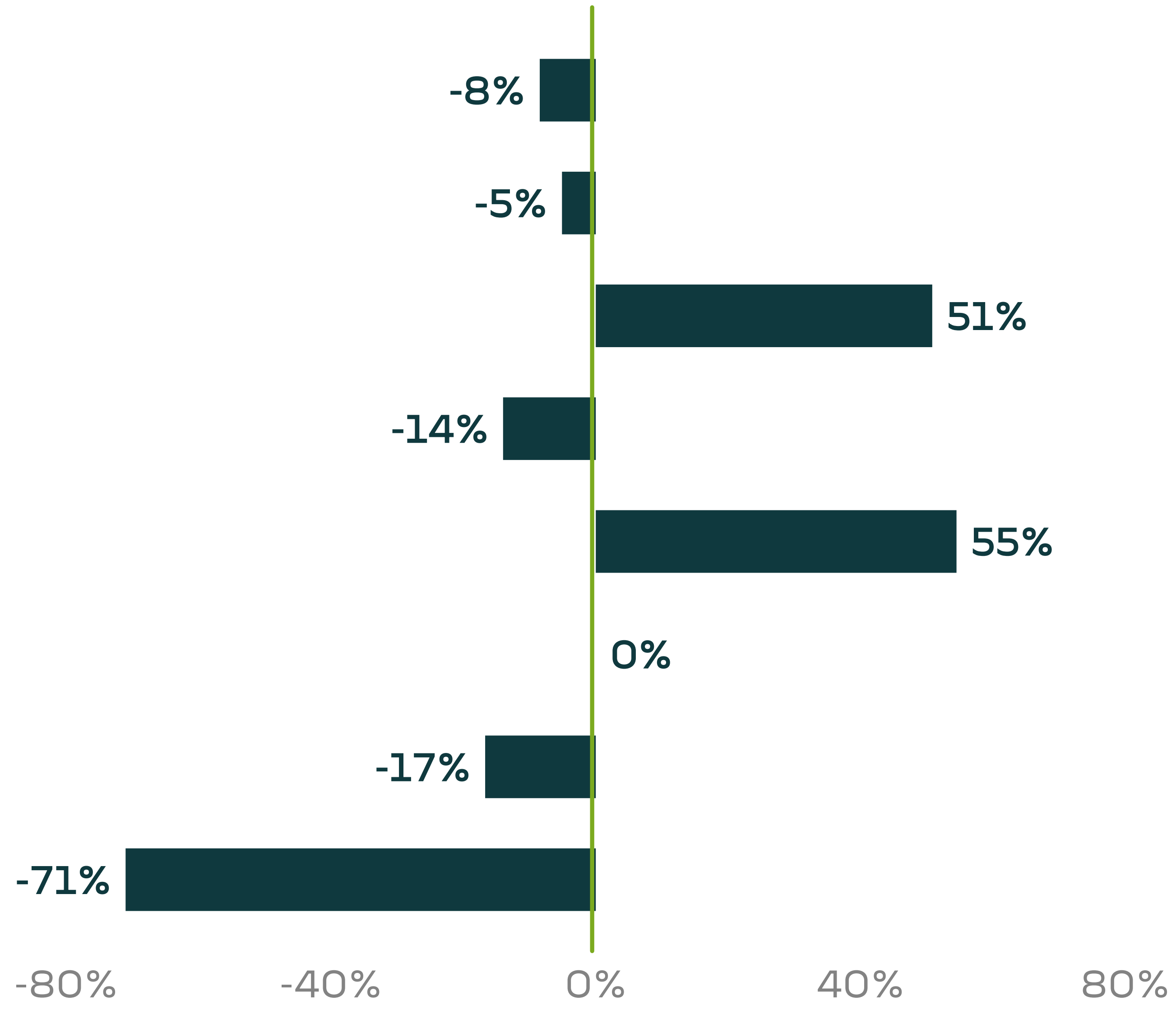
Supply of carbon credits on the market

Although retirement volumes remained stable in 2024, market dynamics indicated a notable shift in credit preferences, with increased demand for NBS removal projects and CCP-labeled credits, driven by quality and integrity concerns.

Comparative table of historical issuance volumes among project types



Variation in retirements 2024 vs 2023



- Renewable Energy, REDD+ and Nature Restoration credits represent the biggest share of credits available in the market
- **Nature Restoration and Energy Efficiency credits experienced increased retirements** compared to the previous year, driven by rising demand from key market players, **particularly for ARR, IFM, and Clean Cooking credits**.
- In contrast, **Carbon Engineering, Fuel Switching, Renewable Energy, and Non-CO2 Gases credits saw significant declines in volumes**. However, **specific CCP-eligible methodologies within these categories recorded increased demand and secured price premiums**, reflecting market preferences for high-quality credits.

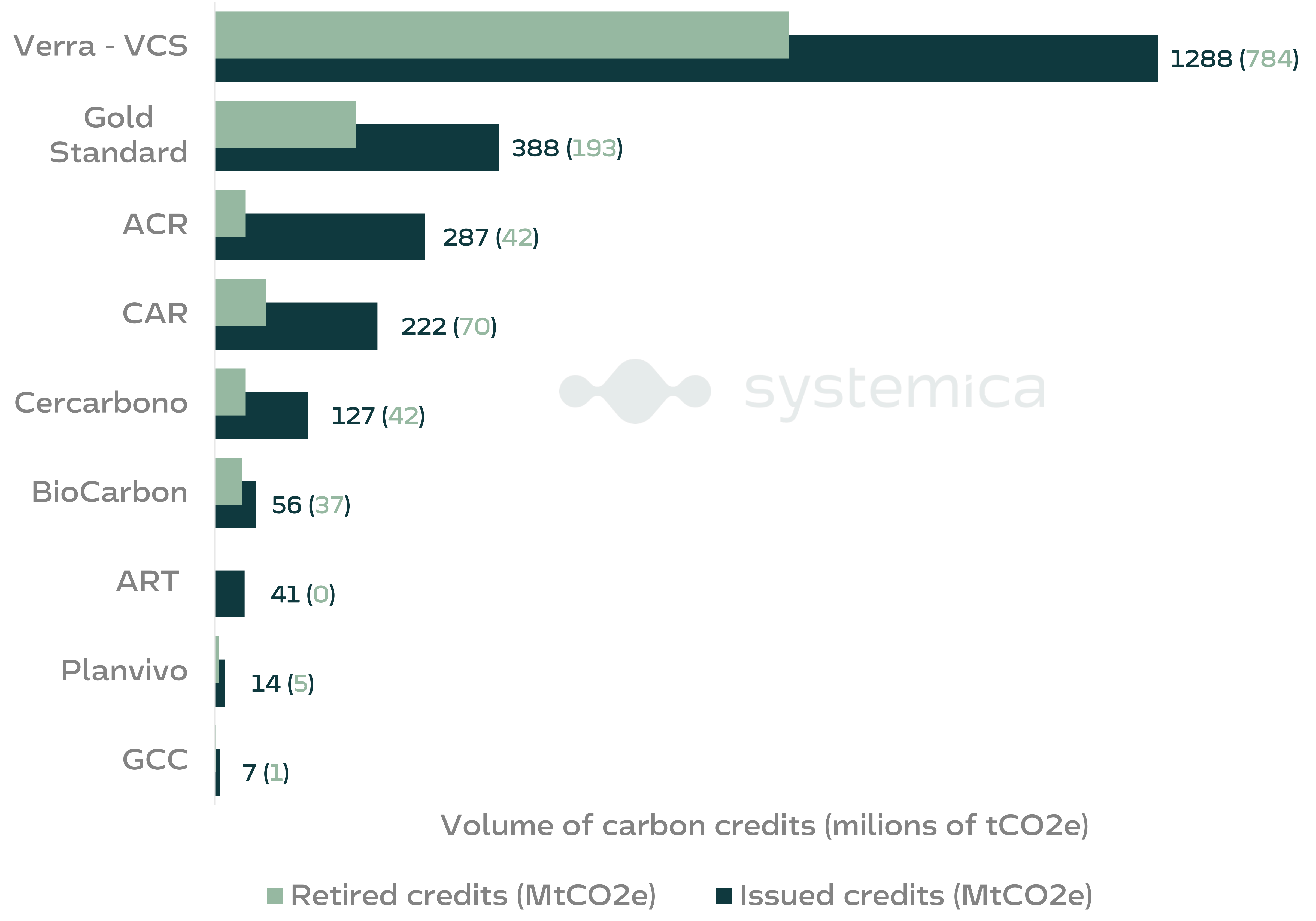
Source: Adapted from MSCI Carbon Markets. Data as of 31/12/2024

Supply of carbon credits on the market

Major players consolidate their participation in the carbon market

Comparative table of the volume of emissions between the types of carbon credit certification

- **Verra and Gold Standard together represent around 83% of the market by retirements.**
- In 2024, **Verra issued 105 MtCO2e in new credits, a 29% decline from the previous year**, primarily driven by a **67% reduction in new issuances of REDD+ credits.**
- **Retirements under Verra remained stable at 116 MtCO2e**, consistent with 2023 levels.
- The **Gold Standard, by contrast, reported growth in both issuances and retirements in 2024**, with increases of 35% and 21%, respectively, compared to 2023
- **Credits under ICVCM's CCP-labeled standards reached record retirement volumes of 168 MtCO2e in 2024**, signaling a market shift toward high-quality benchmarks. This growing preference for CCP-approved standards suggests potential for increased demand in 2025 as methodologies under these benchmarks gain further consolidation.

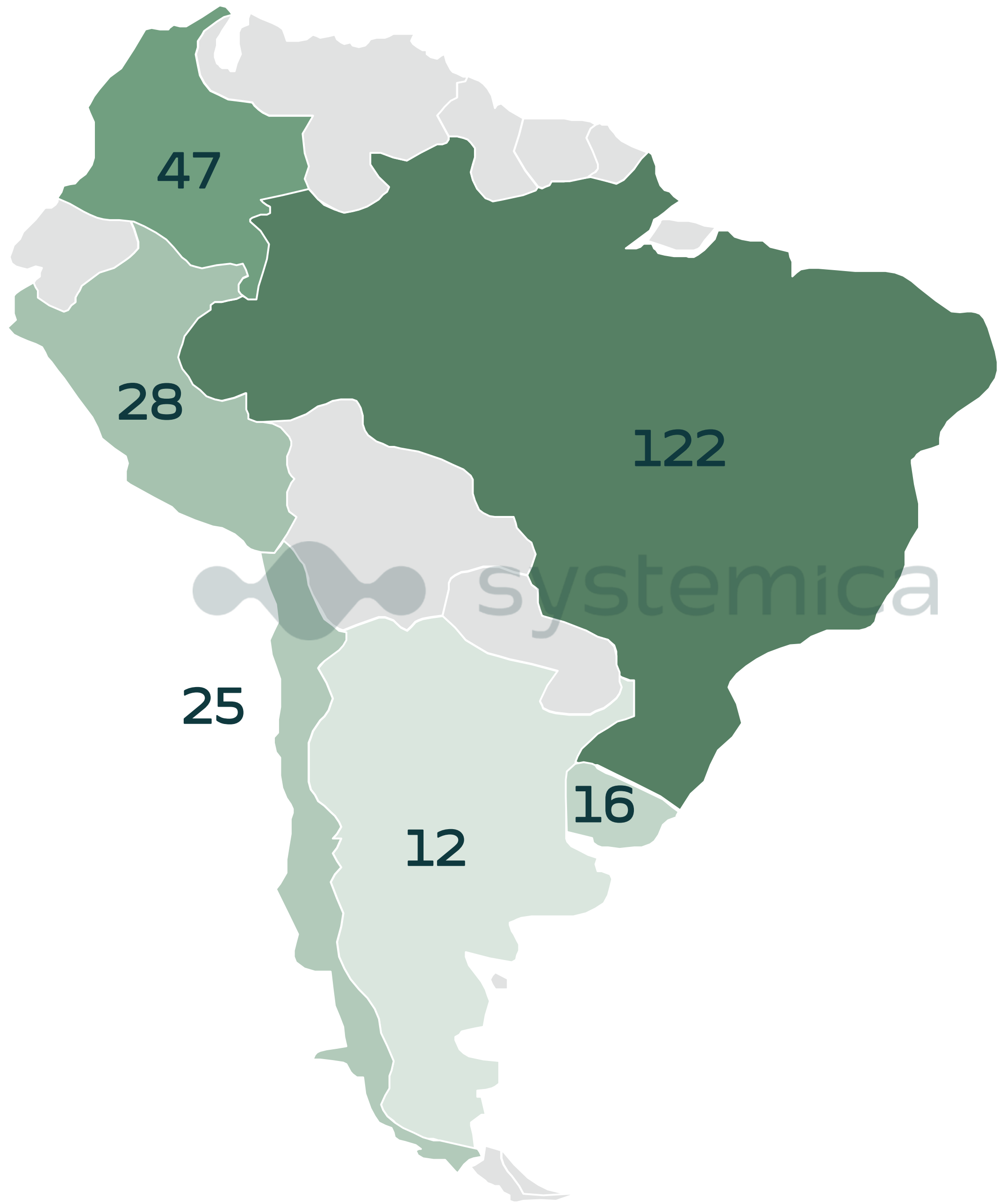


Source: Includes data from ACR, CAR, Gold Standard, EcoRegistry, Verra, CDM-NDC Eligible, BioCarbon, Art Trees, Puro Earth, GCC. Data as of 31/12/2024

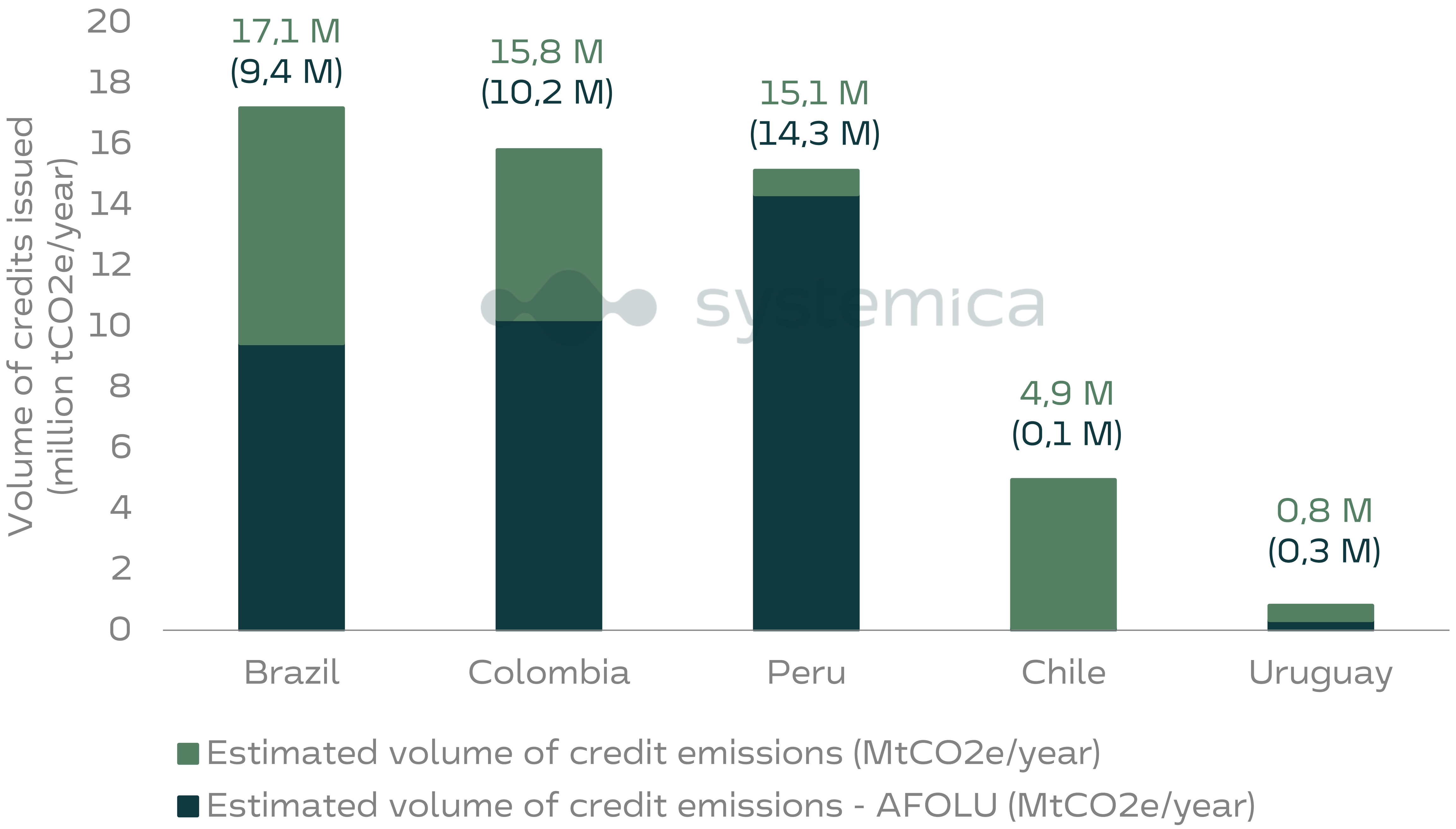
VCS Projects Registered in South America

Brazil stands as regional leader followed by Colombia and Peru as powerhouses of AFOLU projects

Projects Registered in the Main Countries of South America



LATAM Countries with the Highest Volume of Annual Credit Issues



- The Latin American market is led by Brazil, which contributes 40% of total projects and 26.6% of annual emissions reductions in terms of volume.

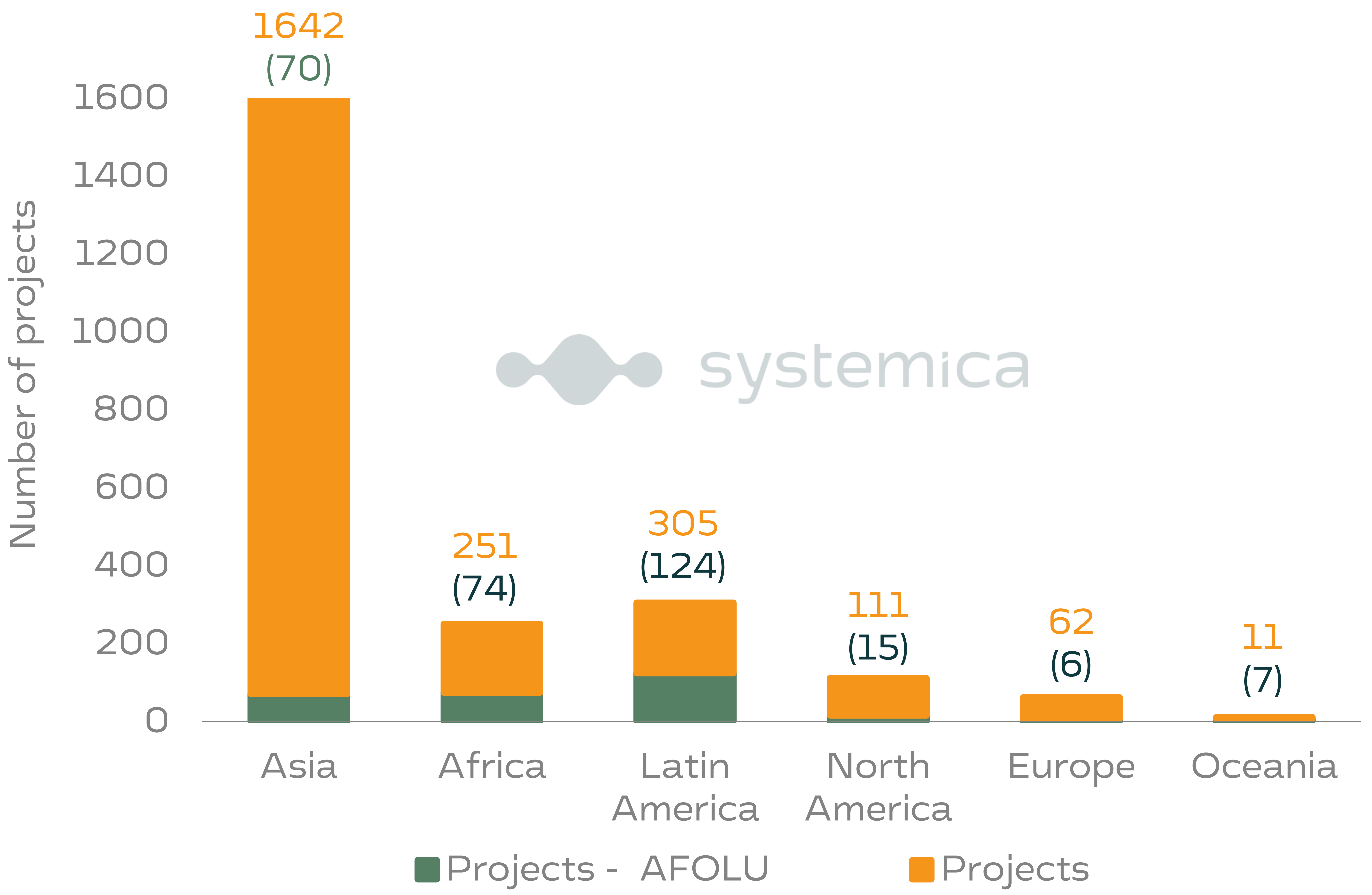
- 4Q2024 saw the addition of three Latin American projects to Verra's registry, bringing the total to 305 projects registered on the platform. Brazil, Colombia and Peru continue to lead Latin America in both project registrations and projected credit issuances.

Source: Verra Data – VCS Standard. Data as of 30/10/2024

VCS Projects Registered Worldwide

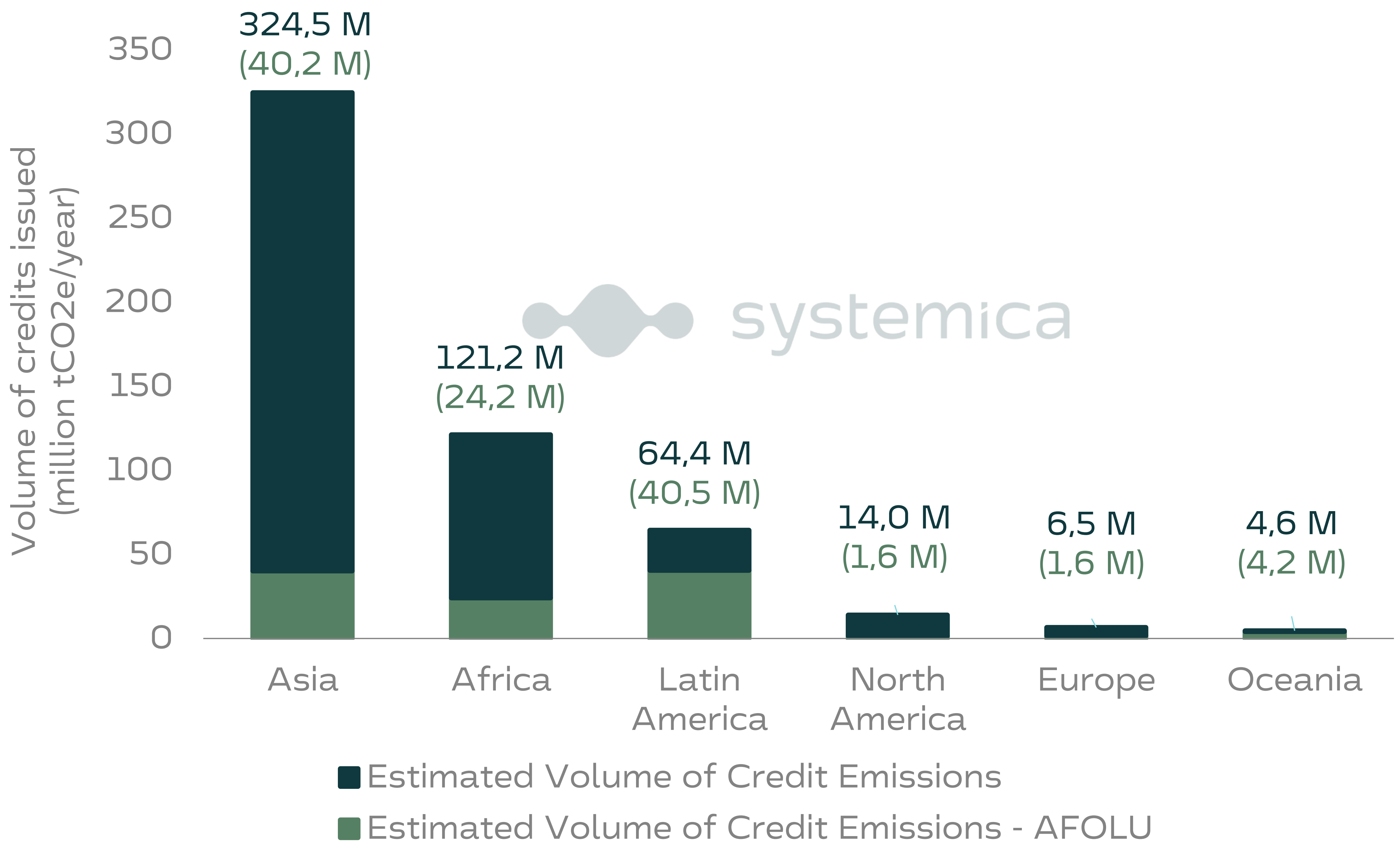
Asia remain leader in the number of emissions as LATAM countries consolidates its strategic position on AFOLU projects

Number of VCS Registered Projects



- Asia holds the largest share of global projects at 69%, accounting for 61% of total emission volumes, predominantly in renewable energy.
- In 4Q2024, Verra registered 47 new projects, with 38 concentrated in Asia and Africa.

Estimated volume of credit emissions (MtCO2 per year)

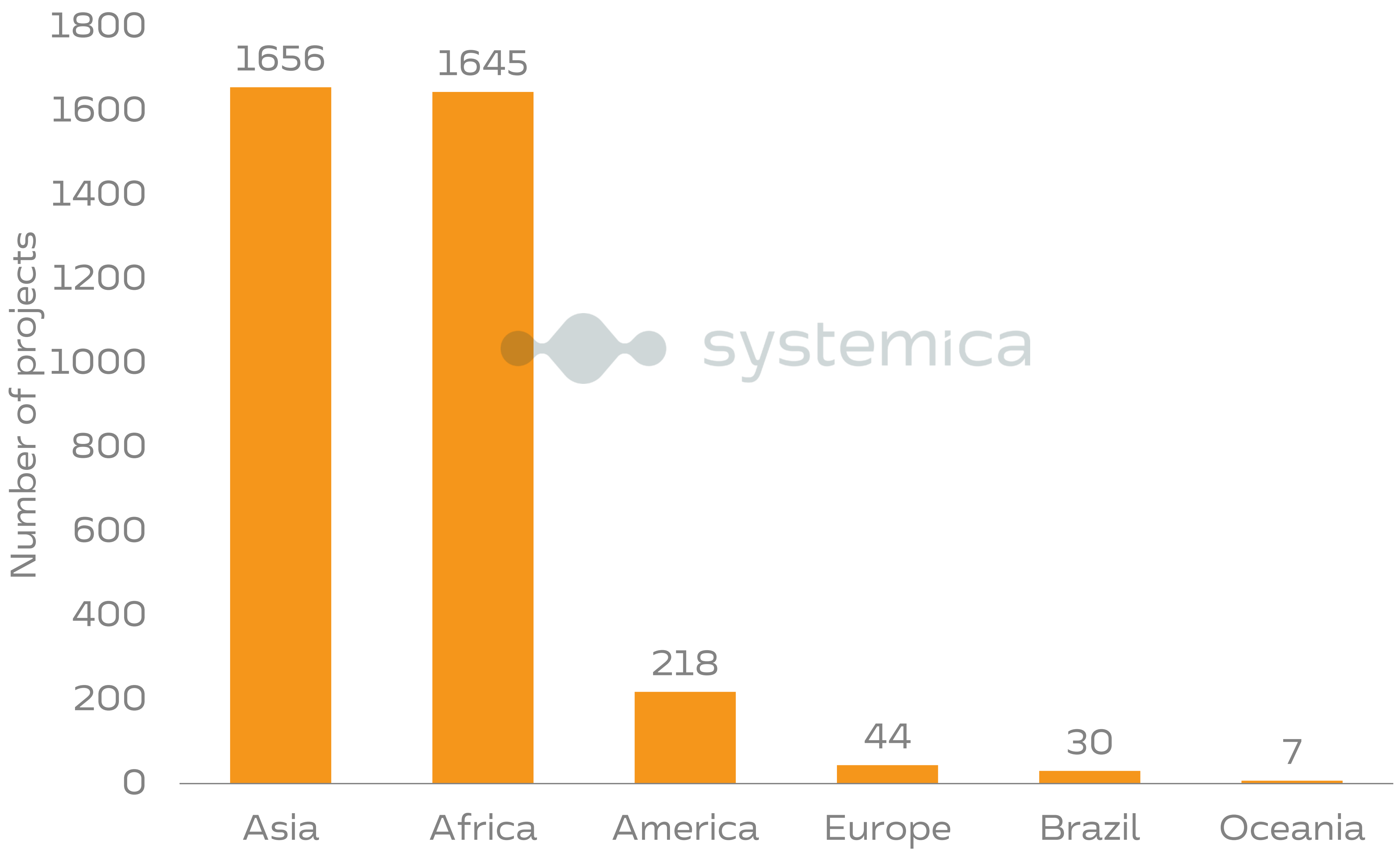


- Africa is the is the second largest source of carbon credits, hosting a substantial number of cookstove projects and remaining the third-largest supplier of AFOLU credits.
- Meanwhile, Latin America ranks third in estimated credit generation, contributing 37% of global AFOLU credits

Gold Standard Projects Registered Worldwide

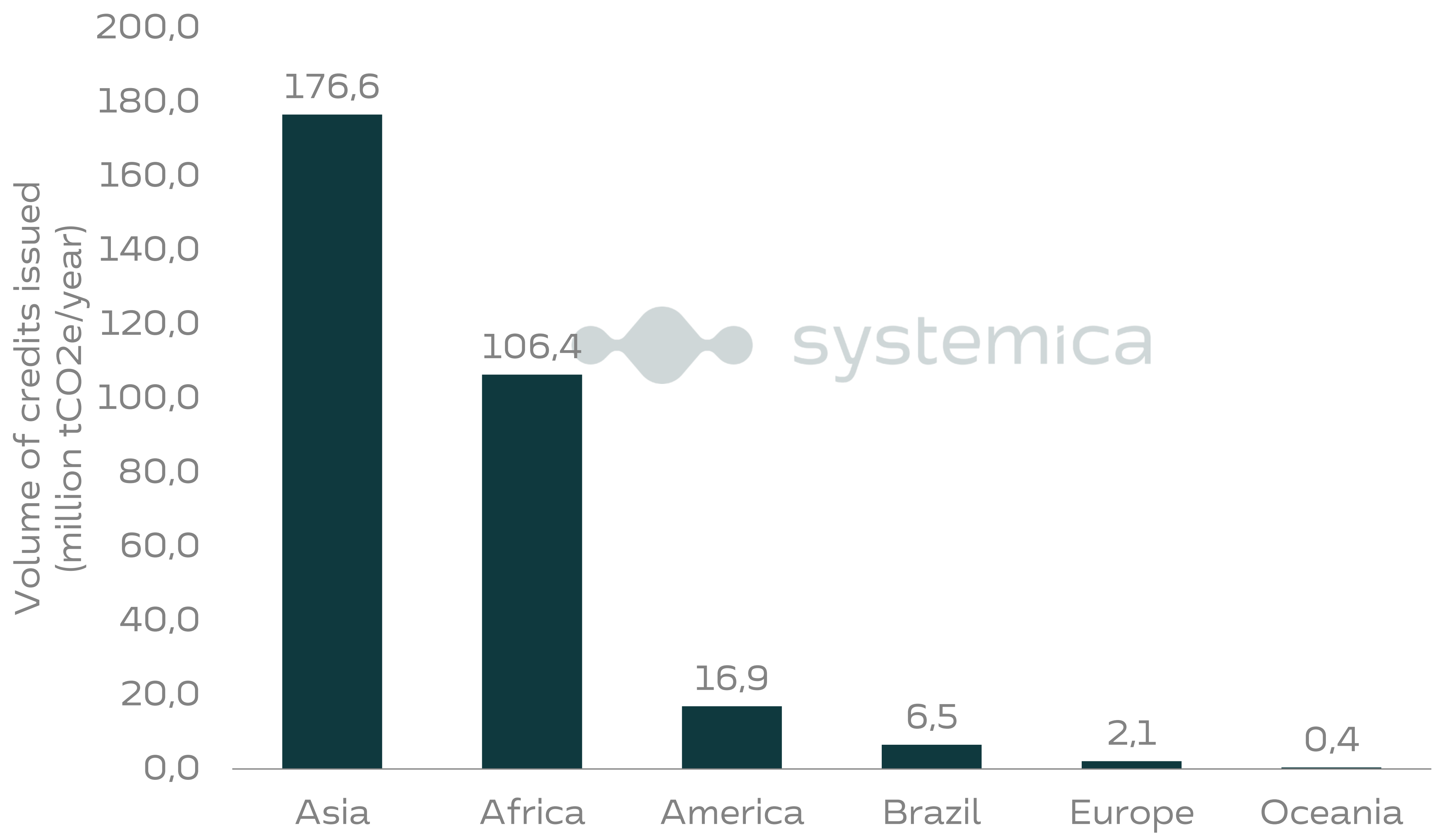
Gold Standard credits consolidates its strong presence in Asia and Africa

Number of registered Gold Standard projects



- Africa and Asia account for around 93% of all projects registered on the Gold Standard.
- Brazil has 30 registered projects, 20 projects linked to energy, biomass and biogas, 9 projects classified as "other" and 1 reforestation project.

Estimated volume of credit emissions (MtCO2 per year)



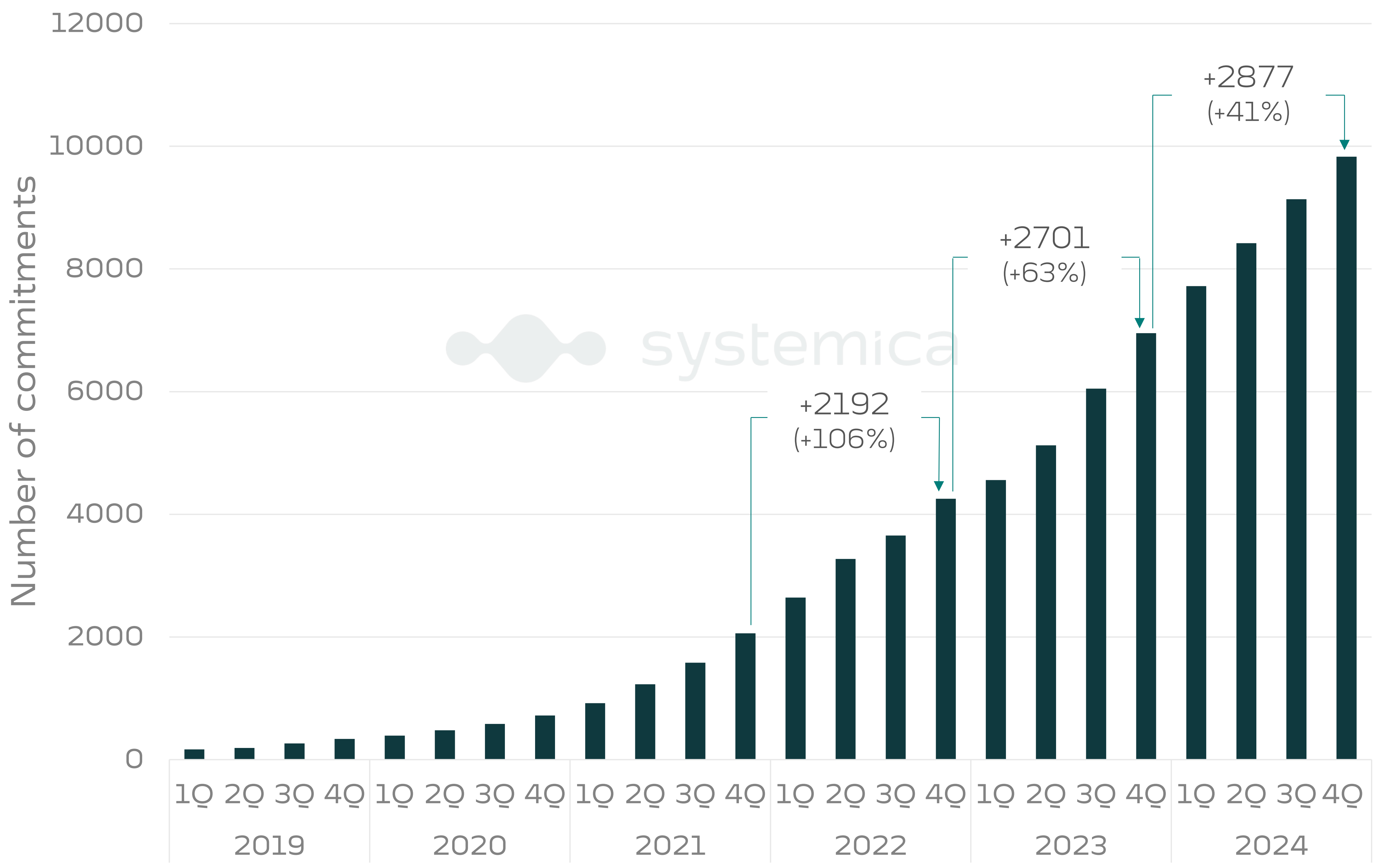
- Projects in Asia account for 58% of the total estimated credit issuance, while Africa is responsible for 35%.
- Brazil has estimated emissions of around 6,5 million tCO_2e/year from Gold Standard projects.

Source: Gold Standard. Data as of 31/12/2024

Corporate Emissions Reduction Commitments

Increase of SBTI commitments with +2877 companies with approved/improved targets

Evolution of SBTi commitments



- Despite institutional challenges, including leadership changes and debates over the use of Scope 3 carbon credits, SBTi recorded a 41% increase in participating companies in 2024.
- This growth reinforces SBTi's position as a leading framework for corporate climate targets, although emerging competition from initiatives like ISO's Net Zero standard signals an evolving market landscape

Companies with new or improved SBTi commitments

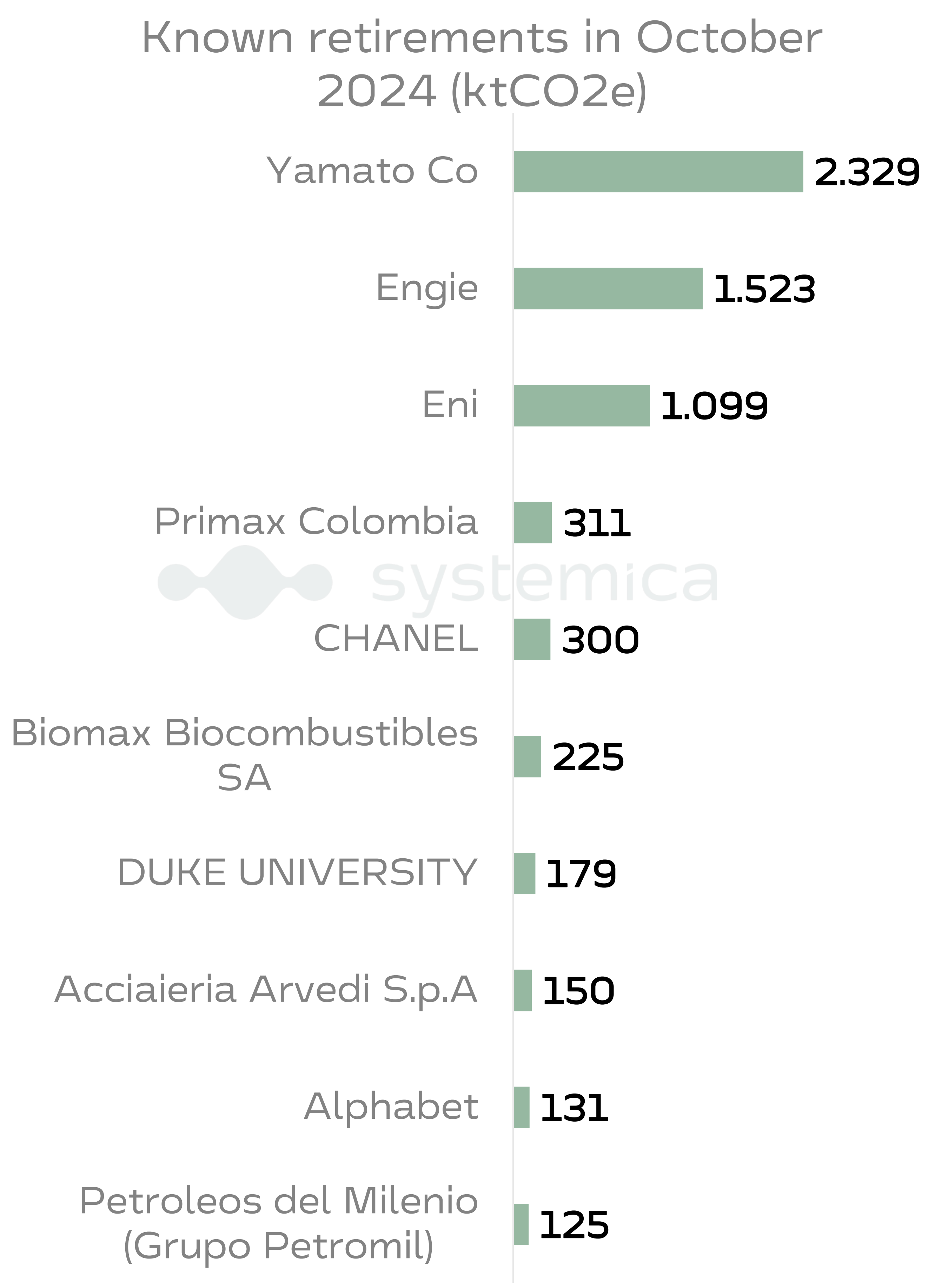
- In 2024, 2877 companies had their Science-Based Targets initiative (SBTi) commitments approved or updated.
- Commitments approved or under evaluation by SBTi encompass approximately 23 GtCO2e across Scope 1, 2, and 3 emissions, representing around 24% of listed companies with established climate targets.

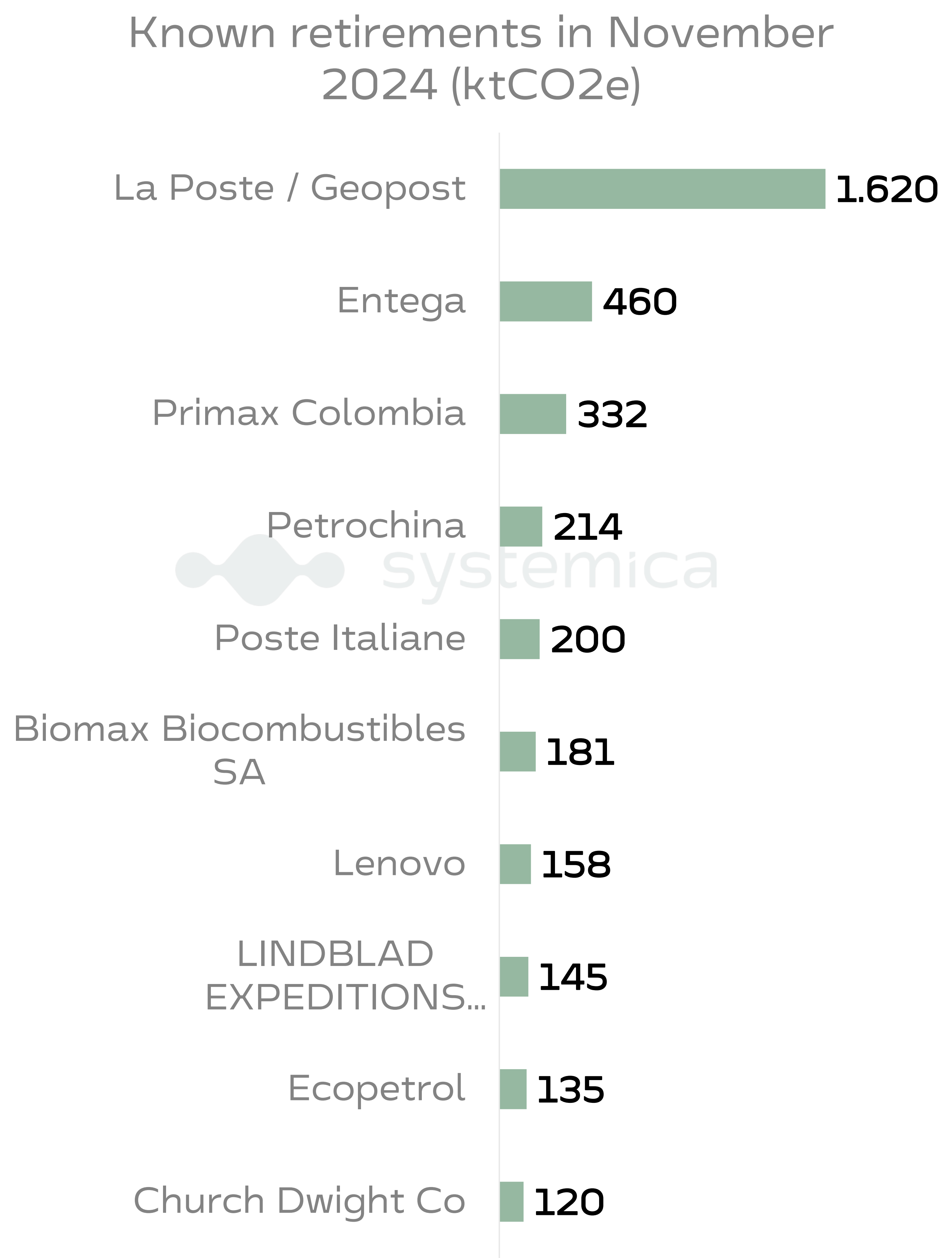
Source: Science Based Targets Initiative. Data as of 31/12/2024

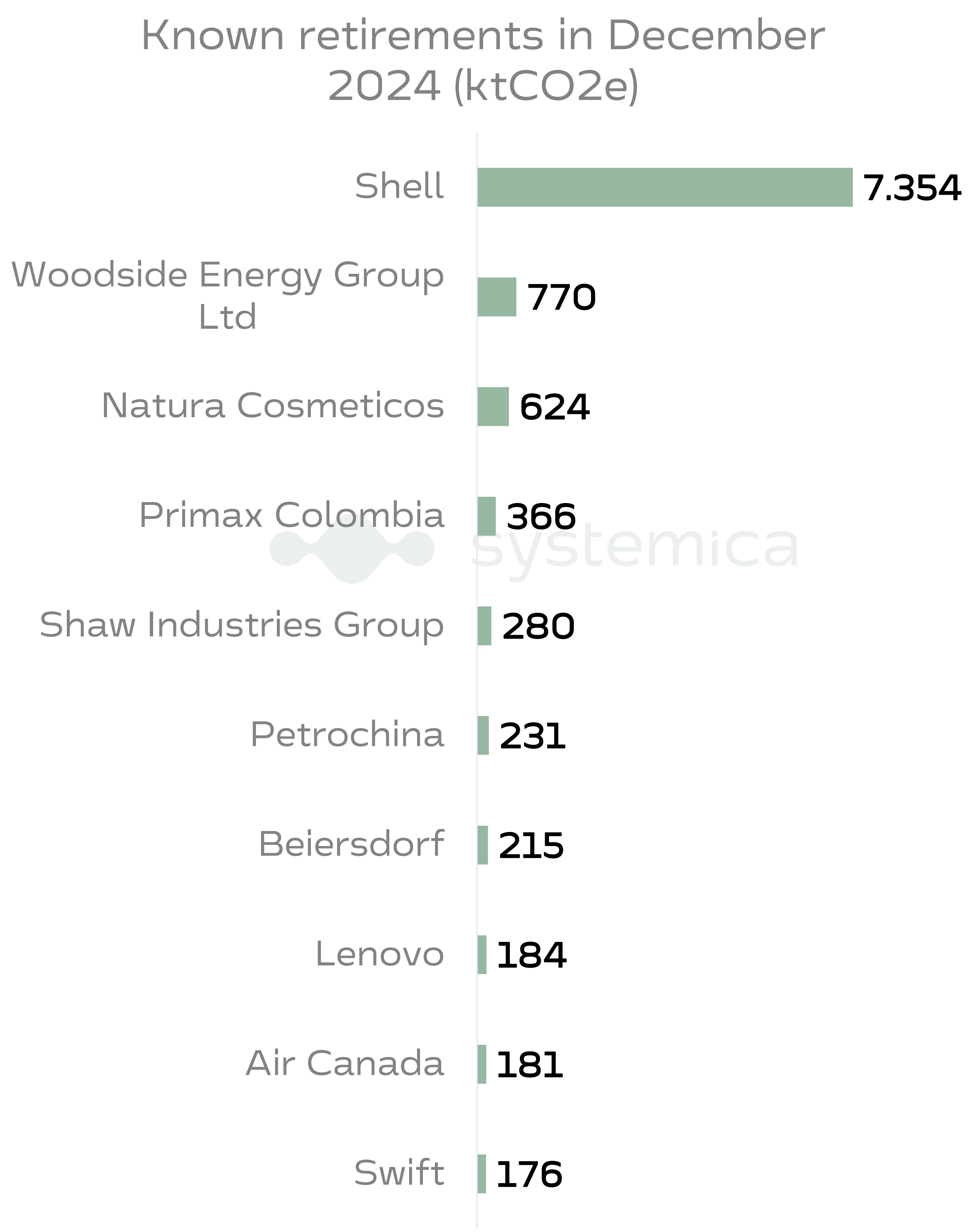
Corporate credit retirements

Top buyers contributed to 33% of total credits retirements in 4Q 2024

Top ten corporate buyers of carbon credits in the 4Q-2024







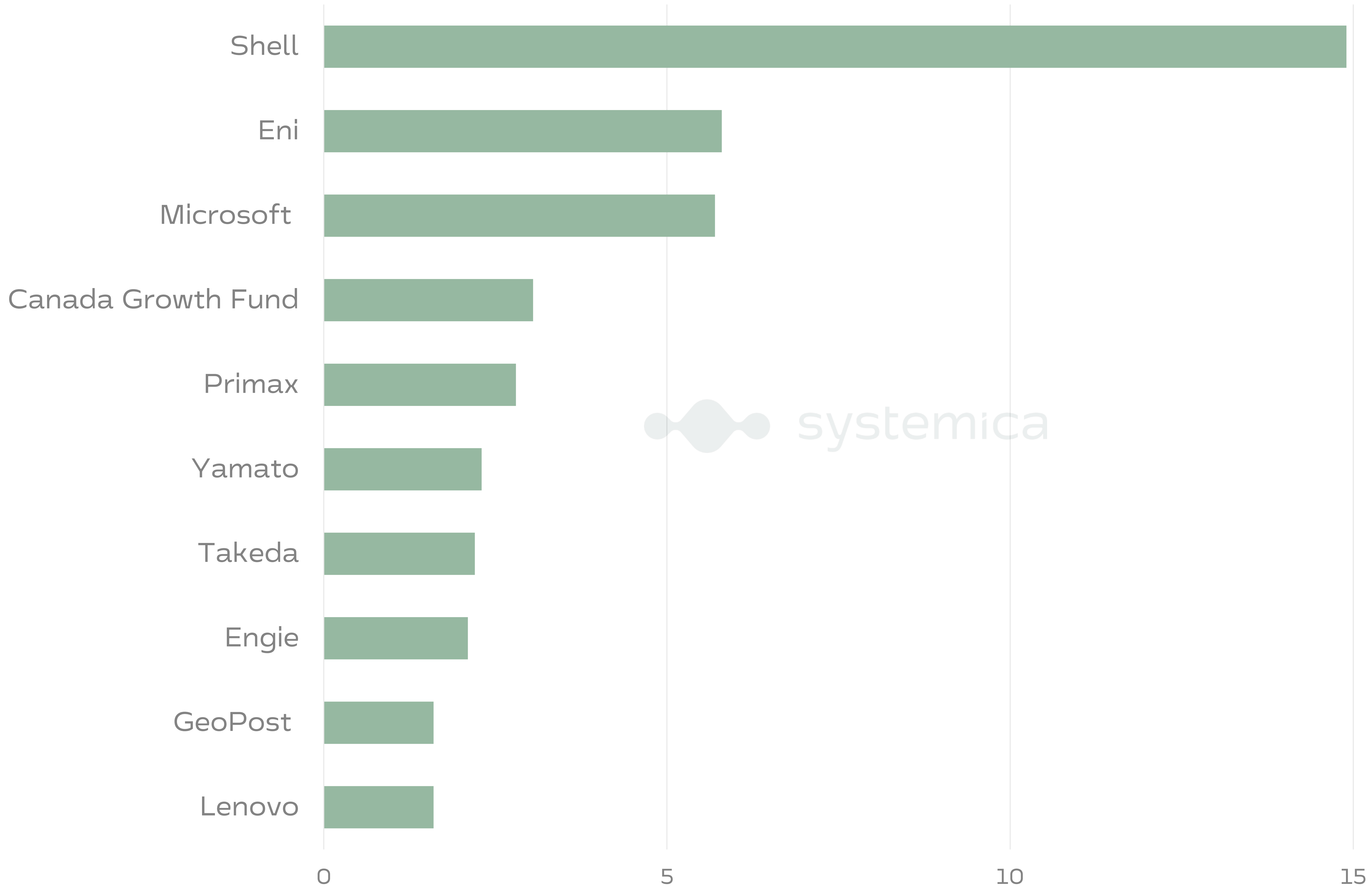
Source: Analysis based on publicly available data (ACR, CAR, EcoRegistry, Gold Standard, Verra). Credit retirements may be carried out anonymously and therefore there may be higher volumes not included in the analysis. Data as of 31/12/2024

Corporate credit retirements

Top buyers contributed to 21% of total credits retirements in 2024

Top ten corporate buyers of carbon credits in the 2024 (MtCO2e)

- **The ten largest corporate retirements represented 21% of total demand in 2024**, down from 23% in 2023 and 28% in 2022. This declining concentration indicates a diversification of demand, enhancing market resilience by reducing reliance on a few dominant players.
- **Shell alone accounted for 8% of total retirements in 2024, with 14.9 MtCO2e retired** — three times more than the second-largest buyer. **Its portfolio was heavily weighted towards REDD+ projects (51%)**, underscoring the company's focus on nature-based solutions despite broader market trends of declining REDD+ prices.
- **The number of active buyers in the VCM surpassed 6,500 in 2024 (+8% year-on-year)** reflecting ongoing expansion of market participation. However, the 16% slowdown in growth compared to 2023 suggests persistent hesitation among companies not yet active in the market as they await the consolidation of integrity benchmarks.

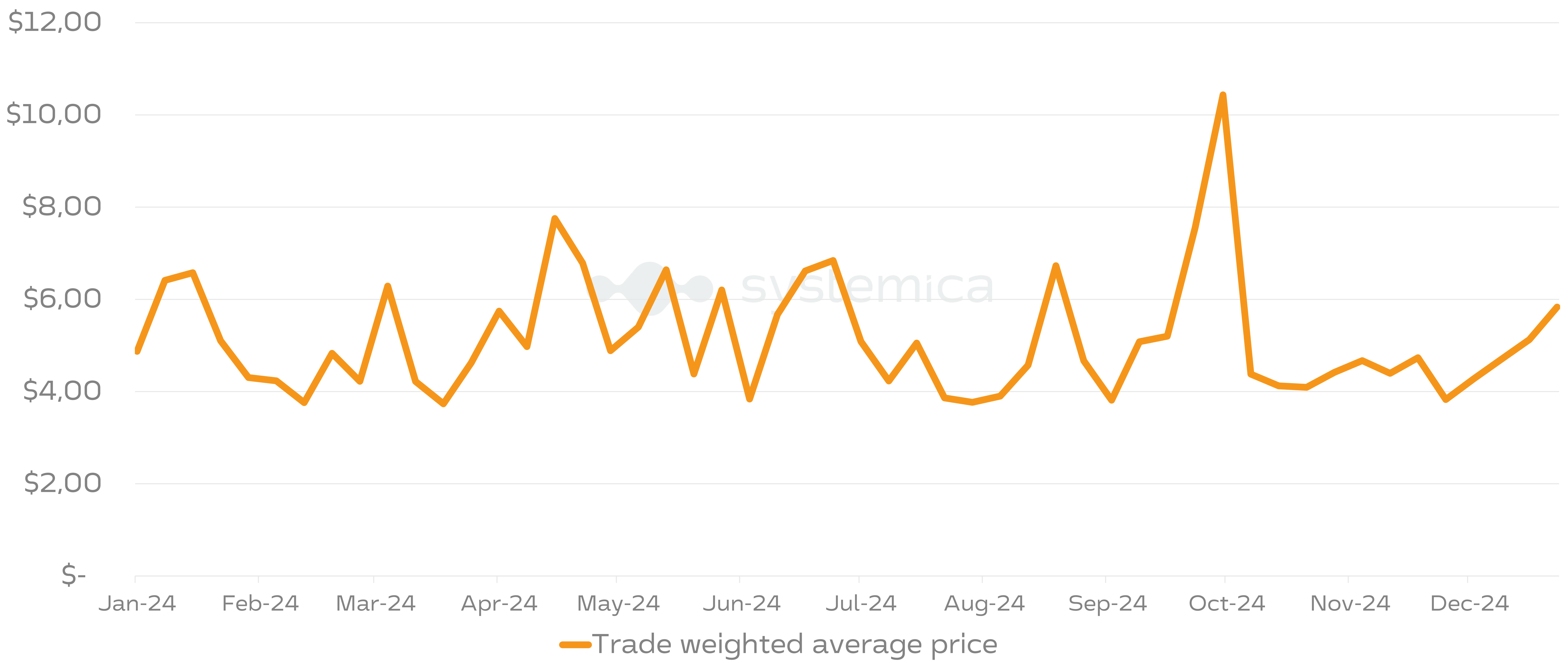


Source: Analysis based on publicly available data (ACR, CAR, EcoRegistry, Gold Standard, Verra) and adapted from Allied Offsets. Credit retirements may be carried out anonymously and therefore there may be higher volumes not included in the analysis. Data as of 31/12/2024

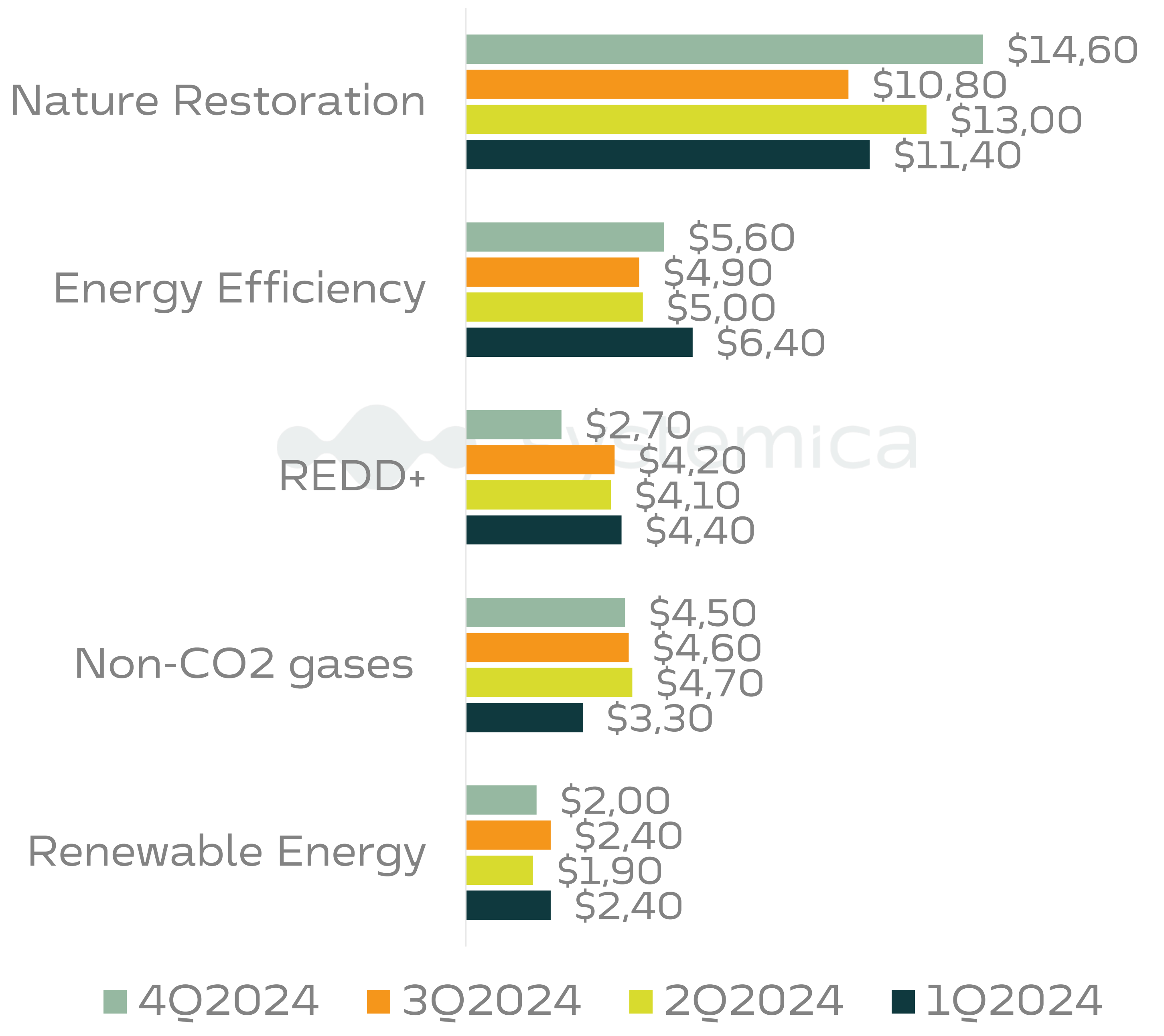
Prices on the Voluntary Carbon Market

Spot prices in the Carbon Market maintain stability within the lower range over the year, while market participants await enhanced clarity on Integrity Standards

Weighted weekly average carbon credit price for all project types and vintages (USD /tCO2e)



Variation in prices in 2024



- Spot prices for carbon credits remained under pressure in 2024, averaging USD 4.8/tCO_2e, reflecting a 20% decline from 2023 levels and a 32% decrease compared to 2022.
- Nature Restoration credits defied the broader market trend, consistently trading above USD 10/tCO_2e and ending the year with a fourth-quarter price of USD 14.60/tCO_2e, driven by strong demand for removal projects.
- Non-CO_2 gas credits, including landfill gas and energy efficiency projects (e.g., clean cooking), maintained price stability throughout the year, averaging between USD 4 and 5/tCO_2e.
- REDD+ and Renewable Energy credits faced significant depreciation, with prices declining by 38% and 17%, respectively, closing the year in the USD 2-3/tCO_2e range, reflecting weaker demand and oversupply in these categories.

Source: Adapted from MSCI Carbon Price Index[4]. Data as of 31/12/2024

Size of the Voluntary Carbon Market

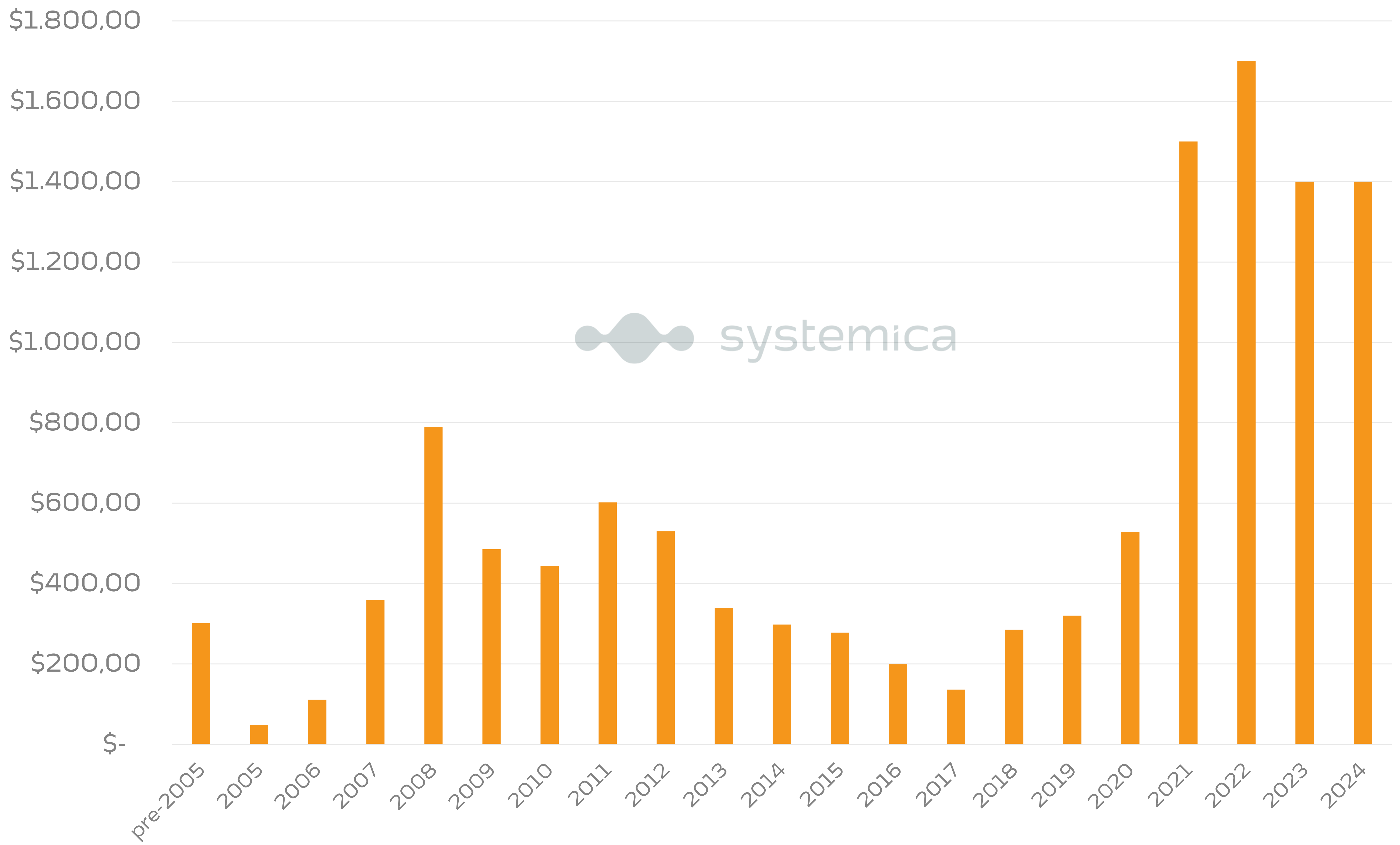
The estimated value of the primary market in 2024 ranged from USD 1.4 to 1.5 billion, showing stability compared to 2023 but remaining below the peak of USD 1.7 to 2 billion recorded in 2022.

Evolution of VCM market size and perspectives (USD millions, 2024 prices)

- The **voluntary carbon market in 2024 was valued between USD 1.4 and 1.5 billion**, consistent with 2023 levels, according to MSCI Carbon Markets and Allied Offsets.

- While the market has struggled to regain the rapid growth observed from 2018 to 2022—a period of sixfold expansion—the last four years have recorded the highest values in its history, underscoring resilience despite reputational challenges.

- MSCI research highlights a **record level of capital raised for new projects and investments**, surpassing 2023's total by Q3 2024 and reaching more than USD 14 billion. This signals growing investor interest and sets the stage for scaling the market in alignment with emerging integrity benchmarks.



Source: Historical data from Ecosystem Marketplace, State of the Voluntary Carbon Market and MSCI Carbon Markets.

Systemica's Market Outlook for 2025

Voluntary Carbon Market in Transition: Integrity Gains and Demand Mechanisms Signal Emerging Growth Potential

Trends for Carbon Markets in 2025

The finalization of key provisions for the operationalization **of Article 6 of the Paris Agreement was achieved at COP29 in Baku**, concluding a decade of negotiations. This milestone establishes the framework for the mechanism's implementation, with operational rollout anticipated by 2025. Clear definitions of accepted methodologies and the creation of a transaction registry are expected to underpin the infrastructure necessary to facilitate global carbon trading and ensure policy coherence.

Despite a year marked by controversy and institutional shifts, **SBTi maintained its relevance, closing the year with growth in participant numbers**. However, competition is intensifying as other entities, such as **ISO, advance their own Net Zero standards**, aiming to capture a share of the corporate climate commitments landscape. SBTi faces ongoing pressure to **clarify its position on the use of offsets for Scope 3 emissions abatement**—a central point of contention in 2024. In an evolving market shaped by Article 6 frameworks and CCP benchmarks, competitors may adopt a more flexible stance on carbon credits, leveraging improved integrity to gain a strategic advantage.

The Brazilian government has enacted Law 15.042, establishing the **Brazilian Greenhouse Gas Emissions Trading System (SBCE)**, a key legislative step ahead of COP30 in the country. Interoperable with the voluntary carbon market, the **SBCE aims to reduce GHG emissions and could help scale conservation and restoration efforts**. Set for implementation in 2029, the system faces critical steps in 2025, including additional regulations on quota allocation, land regulation issues, defining clear roles for supervisory bodies (such as CONAREDD+), etc.. Meanwhile, **Brazil is advancing public land restoration concessions in Pará and Rondônia**, highlighting biodiversity conservation through nature-based solutions—a central theme expected at COP30 in Belém.

The ICVCM's approval of the first CCP-labeled methodologies has established critical quality benchmarks, driving a 40% increase in average prices for approved projects. Notably, **the approval of three REDD+ methodologies, including VM0048, and new reforestation methodologies such as VM0047 signal a potential resurgence of stronger price signals in the voluntary carbon market**. In 2025, significant progress is anticipated in the supply of credits under these methodologies, with the first validated projects in VM0047 already in development and Verra's release of risk maps for REDD+ projects in VM0048 advancing steadily. These developments underscore the market's prioritization of integrity and the capacity to deliver high-quality credits.

Market Updates

Corporate Climate Activity

Major US banks exit net-zero alliance, reaffirm climate goals

Morgan Stanley, Citigroup, and Bank of America left the Net-Zero Banking Alliance but reaffirmed their commitment to climate goals. The departures are the latest in a series of exits from the alliance amid a shifting political landscape. GFANZ, which unites climate finance initiatives, announced separately that it will no longer require members to commit to net-zero, and will now refocus on scaling capital for climate solutions.

Google strikes deals for biochar carbon removal credits

Google has agreed to purchase 100,000 tonnes of carbon removals apiece from Varaha and Charm, marking the largest biochar carbon removal deals to date. The agreements, which are set to be delivered by 2030, are designed to help Google meet its net-zero goals while scaling biochar as a carbon removal solution.

Symbiosis Coalition issues first request for proposals, focusing on nature

The Symbiosis Coalition, an advance market commitment by Google, Meta, Microsoft and Salesforce, launched its first RFP for reforestation and agroforestry projects. Aiming to contract 20 MtCO2e of carbon removals by 2030, it will give priority to projects removing 500,000+ tonnes by 2035. Applications are due by 31-Jan-25.

Japanese firms form joint venture for carbon credits

Shipping conglomerate Mitsui OSK Lines and Marubeni, the Japanese trading and investment business, have teamed up to create, trade and retire nature-based carbon removal credits. For its initial project, the joint venture will develop new forests on 10,000 hectares in India, with the first credits expected by 2028.

New York City lawsuit against oil companies dismissed

Exxon, BP and Shell did not mislead consumers in statements about clean energy, a New York judge ruled in dismissing a lawsuit by New York City. The court said it found no evidence of greenwashing or claims by the companies suggesting their products were unrelated to climate change, as alleged by the city.

Market Updates

Carbon Markets

ICVCM approves three REDD+ methodologies

The Integrity Council for the Voluntary Carbon Market announced the third round of credit category assessments against its Core Carbon Principles (CCPs). It has approved three REDD+ methodologies: i) ART TREES v2.0, TREES Crediting Level, ii) Verra's consolidated REDD methodology (VM0048) v1.0, and iii) Verra's Jurisdictional and Nested REDD+ (JNR) Framework v4.1.

Verra issues provisional deforestation risk maps for REDD+

Verra released provisional deforestation risk maps for Pará, Rondônia, and Mato Grosso in Brazil. The risk maps will be used by Verra to allocate fractions of the jurisdictional baseline for emissions from unplanned deforestation to projects, enabling them to transition to its VM0048 methodology.

ICVCM thumbs up for Isometric registry and Verra's ARR methodology

The Integrity Council for the Voluntary Carbon Market announced Isometric as the sixth carbon crediting program to be approved against its Core Carbon Principles. It also approved Verra's VM0047 methodology for afforestation, reforestation and revegetation (ARR). No credits have yet been issued using this methodology.

First wave of projects validated under Verra's VM0047 ARR methodology

The first projects have been validated under Verra's new afforestation, reforestation and revegetation (ARR) methodology, VM0047. Validation of these projects, which happened on 7 January 2025, marks a critical stage in the development and deployment of VM0047 and signifies a step towards the greater quality and integrity of ARR projects.

Verra's new 'risk-based' system speeding up project review times

Verra has slashed the time taken to review projects by 35% after streamlining and improving the process with its new risk-based approach that categorises projects into high, medium, or low bands, the standard body said Wednesday.

Market Updates

Policy Developments

Trump pulls US from Paris Agreement amid overhaul of energy policy

President Trump withdrew the U.S. from the Paris Agreement in a flurry of executive actions on his first day in office. Trump also ordered the repeal of rules requiring carmakers to halve emissions in new vehicles starting in 2027, paused federal leasing of offshore wind farms, and declared a national energy emergency to speed permitting of fossil- and bio-fuel projects.

Brazil adopts law on national emissions trading scheme

Brazil's President Luiz Inácio Lula da Silva has signed a law establishing a national emissions trading scheme, set for full implementation by 2029 or 2030. Companies emitting over 25,000 tCO2e/year – about 4,000 entities – will face compliance obligations. Use of carbon credits will be permitted for compliance.

UNFCCC introduces templates for Article 6 carbon projects.

The United Nations Framework Convention on Climate Change has published a set of templates to guide project developers wishing to engage with the Crediting Mechanism under Article 6.4 of the Paris Agreement. The forms cover aspects of project design, monitoring, validation and verification.

UK aviation faces penalties for CORSIA non-compliance

The UK is proposing penalties of USD 127 per tCO2e for airlines that fail to cap international emissions at 2019 levels under the UN's CORSIA framework. The government, which is integrating CORSIA alongside its domestic emissions trading scheme, is targeting net-zero aviation by 2050.

Indonesia opens first international carbon credit trading since 2021

Indonesia officially launched international carbon trading through the Indonesia Carbon Exchange's platform IDX Carbon on Jan. 20, according to a statement from the Ministry of Environment. However the country's announcement gives little detail on the direction of travel and potential reintegration with the VCM.

References

[1]**MSCI Carbon Markets**, 2025. Frozen Carbon Credit Market May Thaw as 2030 Gets Closer
Available at: <https://www.msci.com/www/blog-posts/frozen-carbon-credit-market-may/05232727859>. Accessed on January 11, 2025.

[2]**BloombergNEF**, 2024. Mega Boost for Carbon Offsets Market Seen from SBTi Easing.
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[3]Values taken from **MSCI Carbon Markets**, January 2025 – Public information assessment for the MSCI Carbon Price Index.
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[4]**MSCI Carbon Markets**, Investment Trends and Outcomes in the Global Carbon-Credit Market
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[5]Values taken from **Verra – Verified Carbon Standard** database considering registered projects.
Available at : <https://registry.verra.org/app/search/VCS/Registered>. Accessed on January 7, 2025.

[6]Values taken from **The Gold Standard** database considering registered projects.
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[7]Values taken from **Sciencebasedtargets.org** and **zerotracker.net**

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