



EXECUTIVE SUMMARY . 2025

OPPORTUNITIES FOR BRAZIL IN CARBON MARKETS

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SUMMARY

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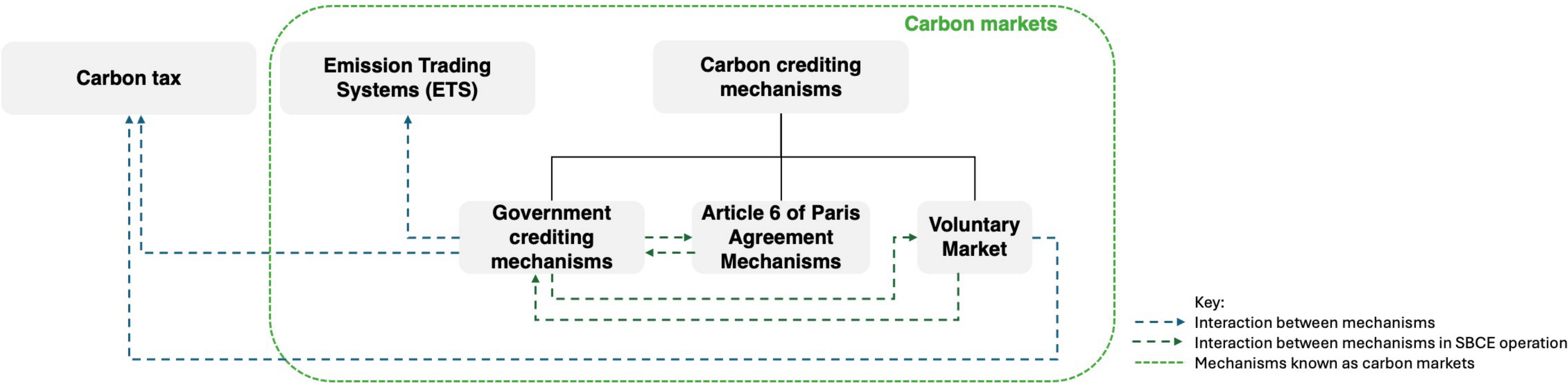


1. CONTEXT - GENERAL

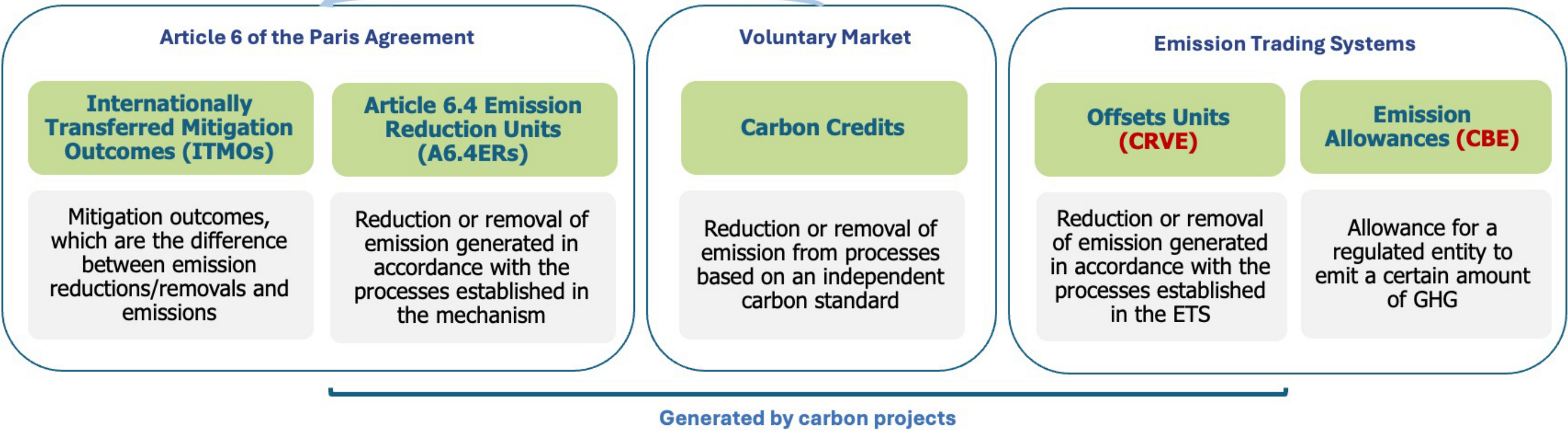


1. CONTEXT - GENERAL

Carbon pricing mechanisms and were treated as different market segments. These segments may eventually interact. It has become more common, but it is not the rule.



CORSIA - Carbon Offsetting and Reduction Scheme for International Aviation



Key:

- In red – Brazilian Emissions Trading System (SBCE) units
- CRVE – Verified Emission Reduction or Removal Certificate
- CBE – Brazilian Emissions Allowance
- Credits used for compliance with CORSIA are purchased on Voluntary Market, but their potential is configured as part of Article 6 Mechanisms.

1. CONTEXT - GENERAL

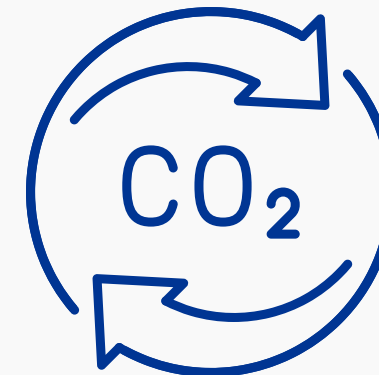
This study updates the potential of carbon market segments, focusing on the national potential for demand and supply for carbon credits.

Paris Agreement



- Registration rules in Article 6.2;
- Progress in the authorization and reporting process for international transfers of mitigation credits between countries (ITMOs);
- Operationalization of Article 6.4;
- For Article 6.4, processes were established for launching the first methodologies of Paris Agreement Crediting Mechanism (PACM).

Voluntary Market



- Reduction in credit emissions;
- Retirements practically stable in relation to 2021, which may indicate a certain resilience in the effective demand for carbon credits;
- Fall in prices and volumes traded in relation to 2023.

Brazilian Emissions Trading System



- Approval of SBCE (system, emission thresholds, and operationalization);
- Update of the transaction potential of Brazilian Emission Allowance (CBEs) and Verified Emission Reduction or Removal Certificates (CRVEs).

1. CONTEXT - GENERAL

The assumptions and analysis methodologies have been updated from previous editions of this study to reflect the greater institutional maturity of the markets, as well as regulatory advances and perspectives on opportunities in the carbon markets.

While previous estimates were based on assumptions about the global market and Brazilian credit emissions in the Voluntary Market, the current study seeks to update these assumptions, segmenting the market into three environments:

1. Mechanisms of the Paris Agreement;
2. Voluntary Carbon Market;
3. Brazilian Emissions Trading System (in Portuguese, *Sistema Brasileiro de Comércio de Emissões - SBCE*).

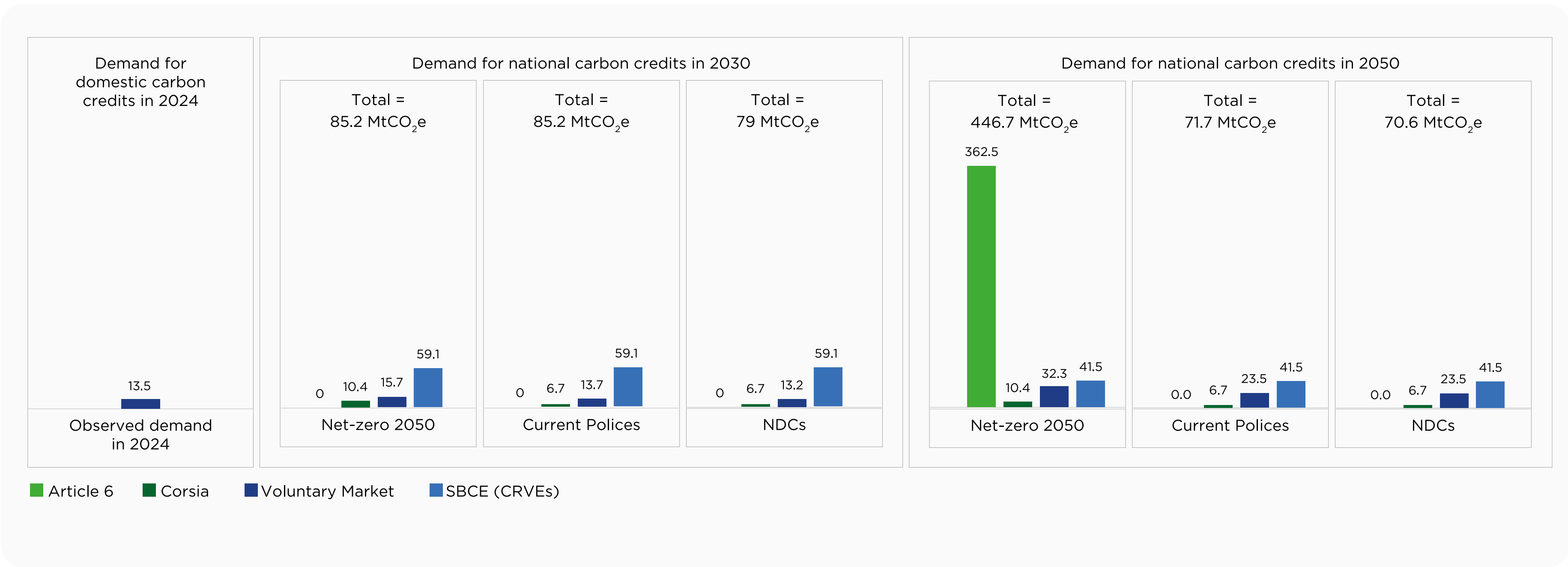
Additionally, **while previous editions of this study focused on the supply potential of Voluntary Market, this edition placed greater emphasis on demand factors.**

Unlike previous editions, this edition treated carbon credit prices, when analyzed, as endogenous, i.e., the result of the interaction between supply and demand, and no longer in comparison with the social cost of carbon.

SUMMARY OF RESULTS

According to projections, it is noted that from 2030 onwards, SBCE will become the largest driver of demand in national carbon markets. From 2050 onwards, achieving global net-zero becomes the most influential factor for demand in carbon markets.

- From 2030 onwards, demand for national credits may grow by up to 530%, from 13.5 MtCO₂e in 2024 to 85.2 MtCO₂e, driven especially by demand for CRVEs from SBCE.
- The acceptance of corresponding adjustments for projects already established in the voluntary market may meet a demand generated by CORSIA.
- From 2050 onwards, international cooperation and compliance with nationally determined contributions (NDC) will be key factors in the demand for credits under the Paris Agreement.





2. ARTICLE 6 MECHANISMS OF THE PARIS AGREEMENT



CONTEXT - ARTICLE 6

ARTICLE 6.2

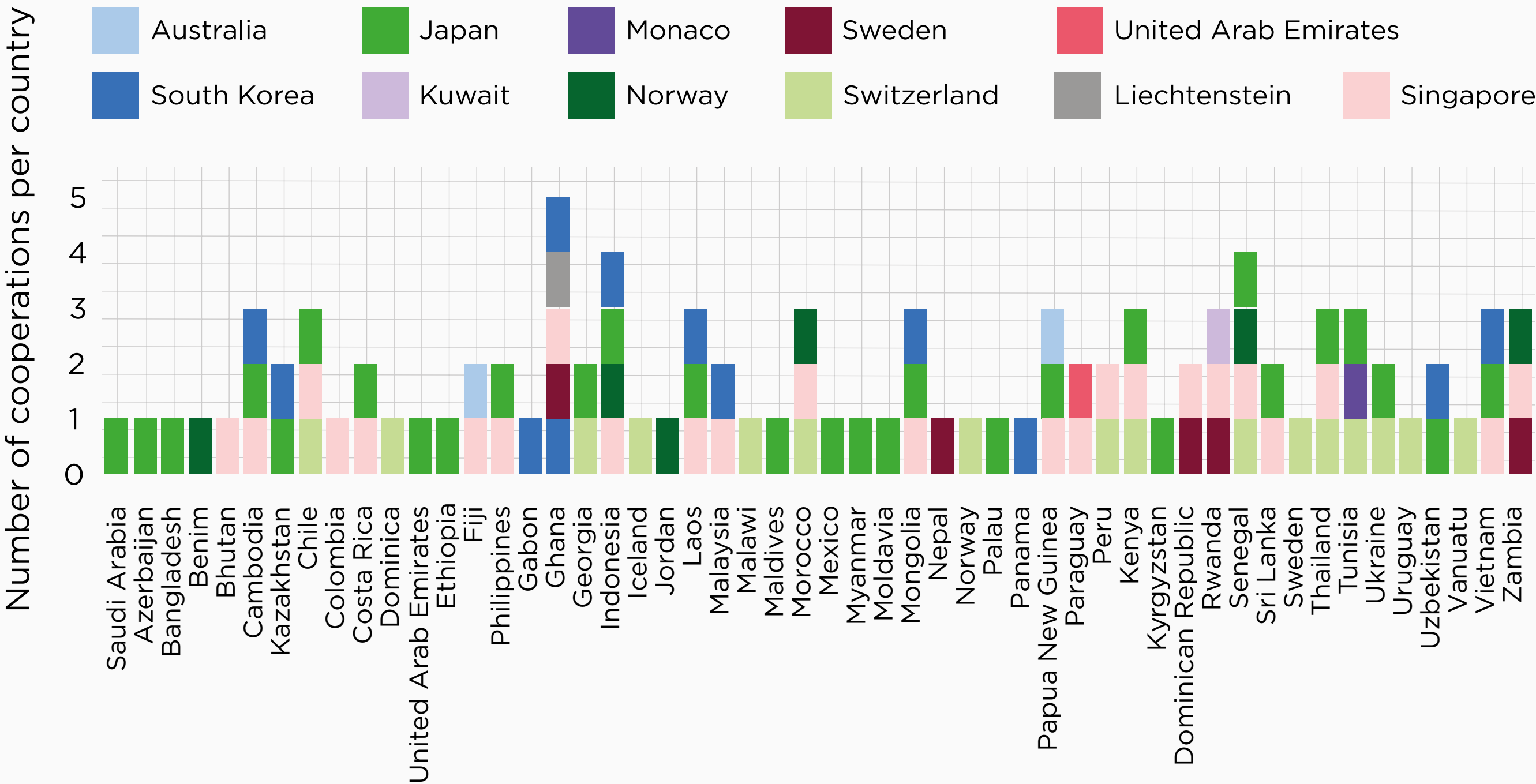
- **98 bilateral agreements between 60 different countries;**
- Main potential buyers: Asian countries (Japan, Singapore, and South Korea);
- Main suppliers: countries in Africa, Asia, and Latin America.

ARTICLE 6.4 - PACM

- 1,018 notifications of prior consideration for projects, covering 810 projects and 208 programs, were submitted and published in the context of PACM under Article 6.4;
- **Brazil registered 58 notifications, with an estimated reduction of more than 13 million tons of CO₂ equivalent per year.**

TRANSITION FROM CLEAN DEVELOPMENT MECHANISM (CDM) TO PACM

- **63 countries submitted transition requests, and 1,388 Project Activities were duly submitted;**
- Main countries: India (208 MtCO₂e), China (189 MtCO₂e), Bangladesh (117 MtCO₂e), and Brazil (98 MtCO₂e) estimated between 2021 and 2025 (UNEP-CCC, 2025).

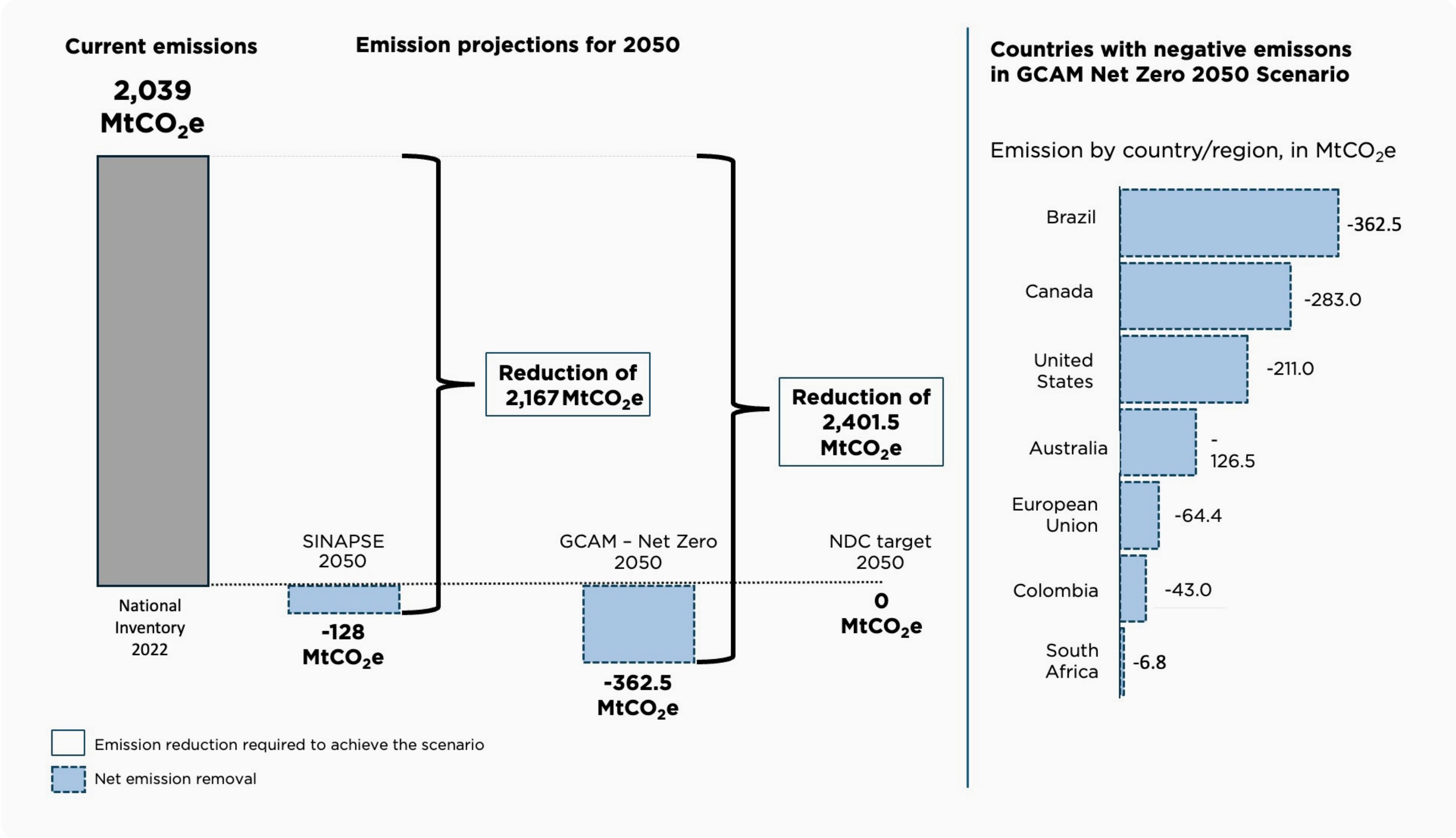


Source: WayCarbon based on UNEP-CCC (2025).

POTENTIAL OF ARTICLE 6

In a scenario of international cooperation to reduce global warming, Brazil would be a leader in the sale of ITMOs, offering around 33% of ITMOs traded.

- The long-term supply of ITMOs depends unconditionally on compliance with the national NDC;
- In the short term, the sale of ITMOs must be aligned with the NDC and enable further emissions reductions;
- Compliance with Brazil’s NDC depends more on the consistency and effectiveness of domestic policies than on the international carbon market, which reinforces the need for a solid and predictable regulatory framework;
- The National Mitigation Strategy plays a key role not only in establishing new mitigation instruments and policies, but also in consolidating existing policies, drawing on lessons learned from successful and unsuccessful experiences.

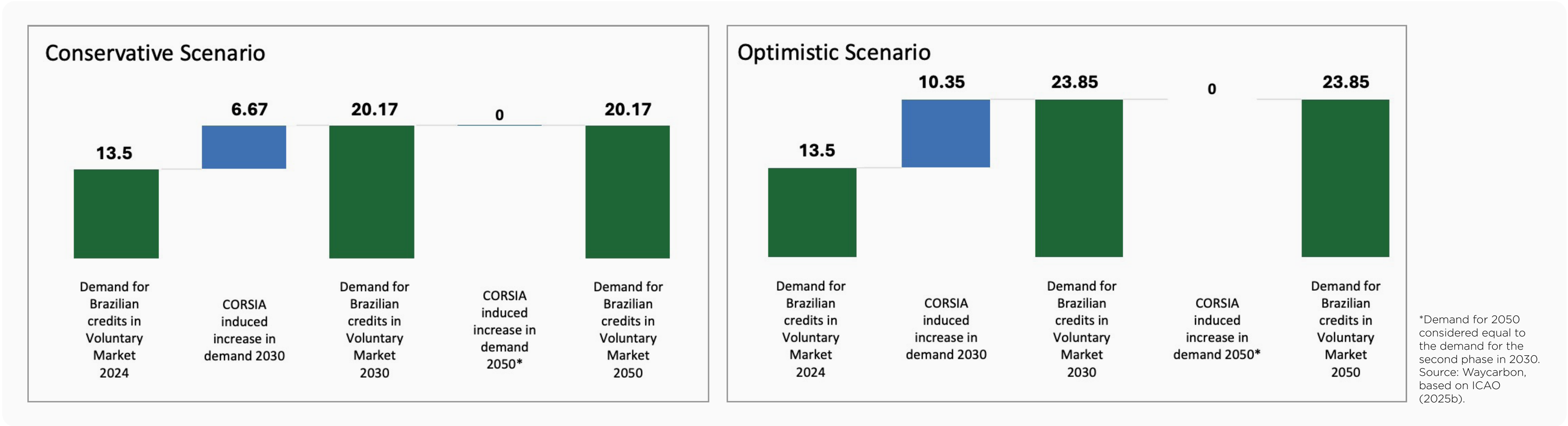


CORSIA POTENTIAL

Credits traded for CORSIA must contain the corresponding adjustment authorization from the host country, so that credits traded for use in CORSIA would be equivalent to ITMOs.

Brazil has been part of the initiative since 2022. However, there is still no procedure for the corresponding adjustment of credits generated in the country, so Brazil is currently a demander of credits for CORSIA, given that the country is committed to offsetting civil aviation emissions but does not offer credits to the system.

Considering a potential demand for Brazilian project credits eligible for CORSIA in the same magnitude as the demand for credits in the voluntary market, at 6.08% of global retirements (historical average), **the potential for CORSIA-eligible domestic credits would be around 6.67 to 10.35 MtCO₂e in carbon credits per year, which would represent an increase of up to 76.6% of the credits demanded in 2024.**



Source: WayCarbon, based on ICAO (2024).

KEY MESSAGES

- ▶ Demand for ITMOs and A6.4ER is still in its infancy, as is the signaling of intent to use the Paris Agreement market mechanisms in NDCs, given the gaps in how the mechanisms will operate.
- ▶ The sale of ITMOs is possible given a consistent reduction in emissions that exceeds the targets set in the NDC. The country will be able to trade its surplus mitigation results in relation to its annual emissions reduction target.
- ▶ Compliance with Brazil's NDC therefore still depends more on the consistency and effectiveness of domestic policies than on the international carbon market, which reinforces the need for a solid and predictable regulatory framework.
- ▶ In the long term, with Brazil's NDC for 2050 targeting net-zero emissions, the potential for ITMO transactions will represent the country's net removals.
- ▶ In a scenario of international cooperation to reduce global warming, Brazil would be a leader in the sale of ITMOs, offering around 33% of the ITMOs traded.
- ▶ The National Mitigation Strategy plays a key role not only in establishing new mitigation instruments and policies, but also in consolidating existing policies, drawing on lessons learned from successful and unsuccessful experiences.
- ▶ CORSIA may increase global demand for carbon credits from Voluntary Market that are subject to corresponding adjustments.
- ▶ For Brazil, CORSIA could represent a potential increase of up to 76.6% in demand for carbon credits compared to 2024, provided that corresponding adjustment mechanisms are accepted.



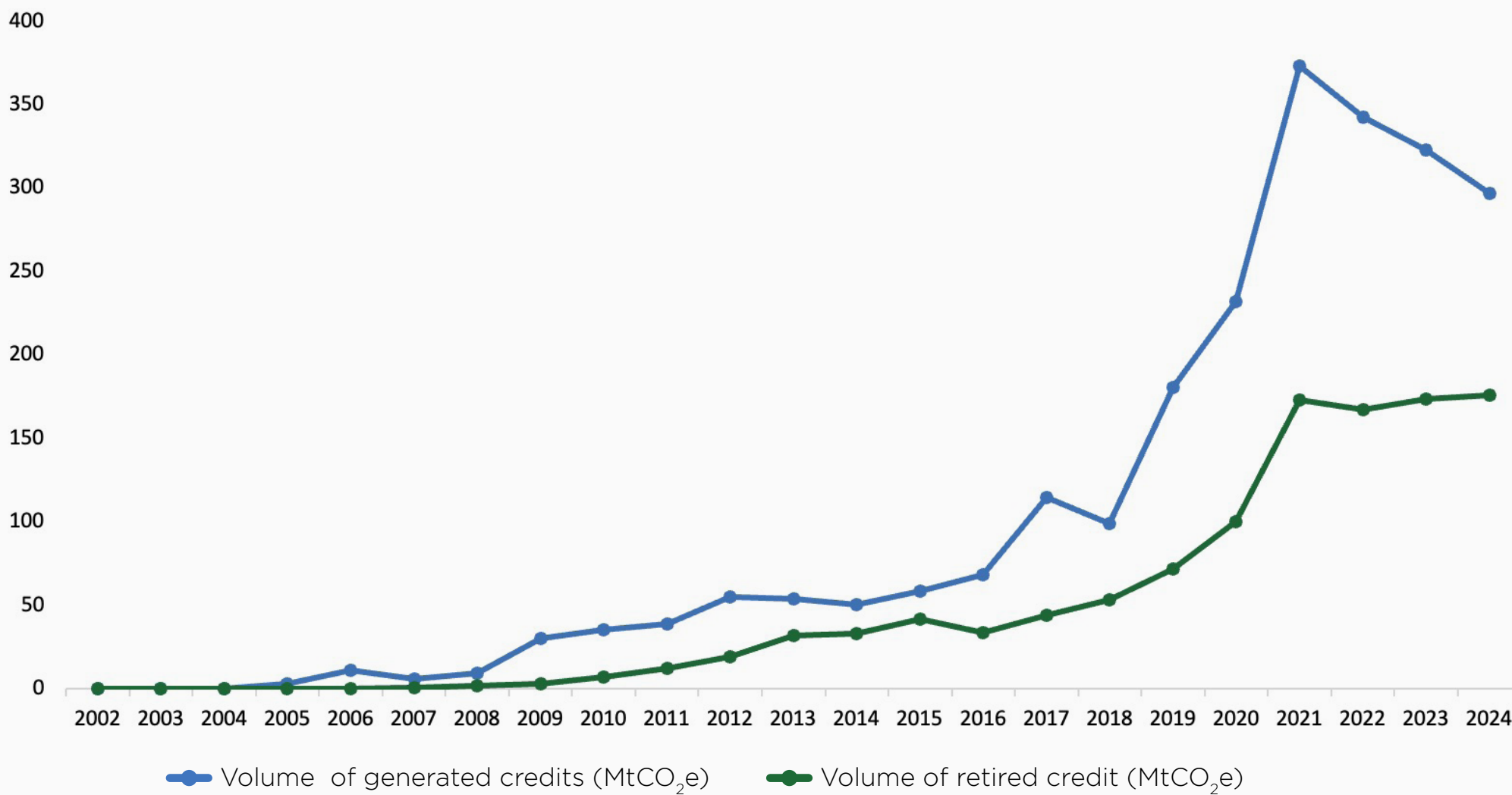
3. VOLUNTARY MARKET



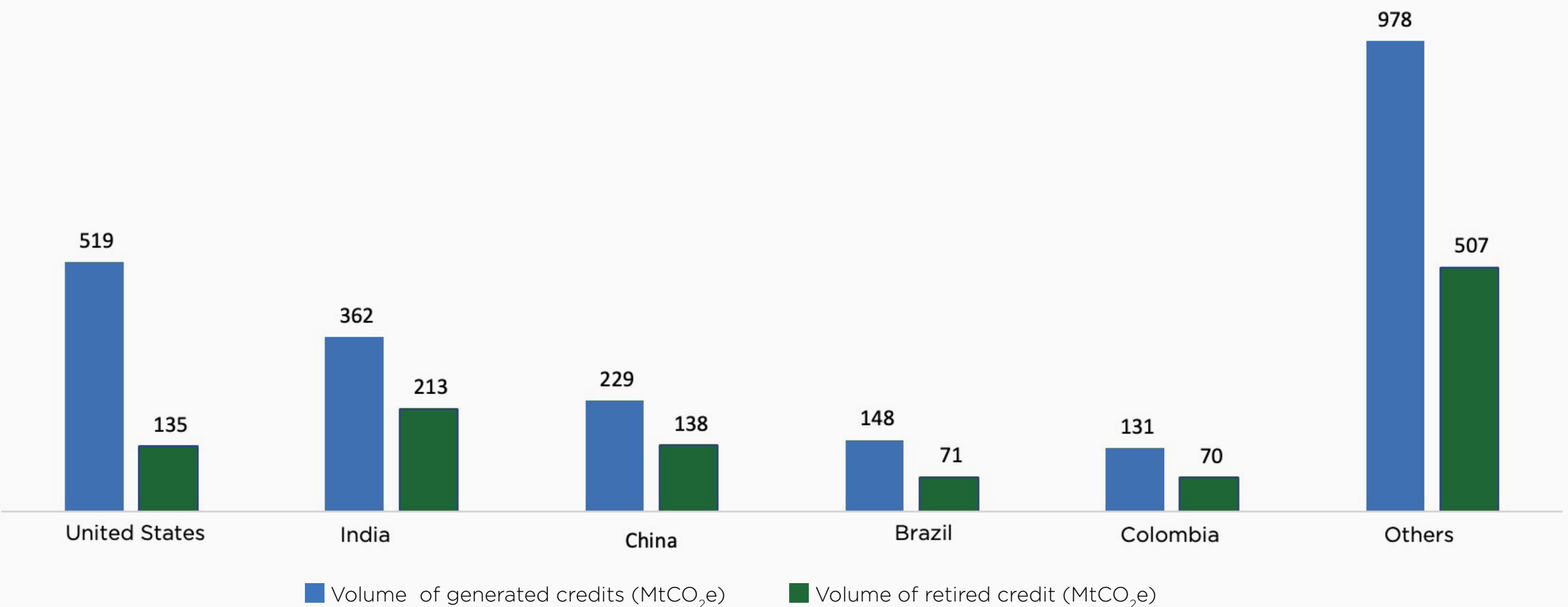
CONTEXT - VOLUNTARY MARKET - WORLDWIDE

- After peaking in 2021, credit emissions were lower in volume but still exceeded retirements. **The volume of credits generated in the voluntary market reached 2,381 million in the historical series.**
- The total volume of retired credits across the entire historical series amounts to **1,143 MtCO₂e**. This means a **surplus of 1,238 million** carbon credits on the market.
- Since 2021, the volume of retired credits has remained relatively constant, ranging between 167-176 million per year, which demonstrates **resilience in demand.**
- The top 5 credit-generating countries account for approximately 59% of the volume of credits generated and 55% of the volume of retired credits.

History of carbon credits generated and retired worldwide



Main countries generating carbon credits in the voluntary market (in MtCO₂e) - cumulative generation and retirement from 2002 to 2024

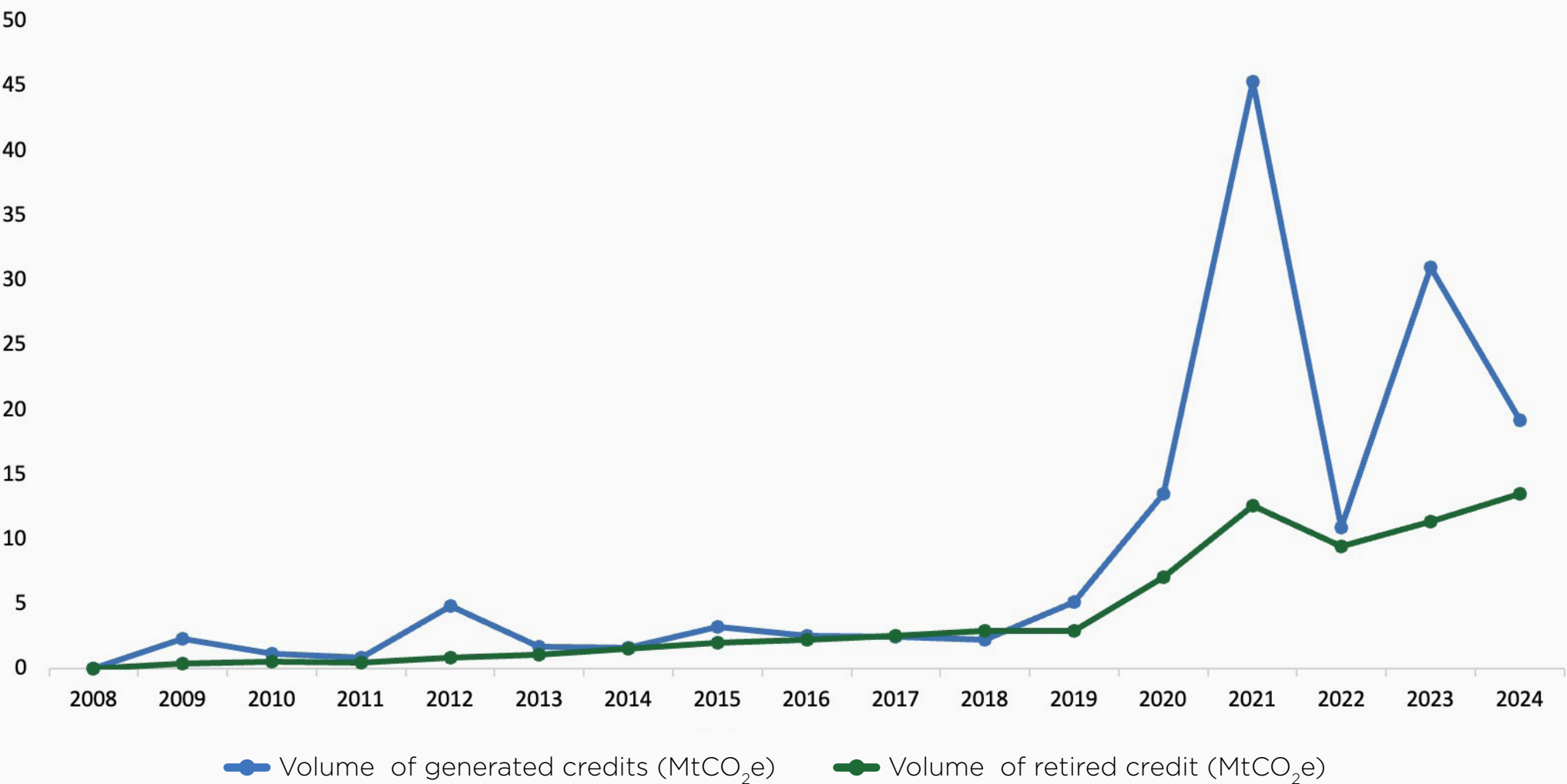


Source: WayCarbon based on the independent certification standards analyzed.

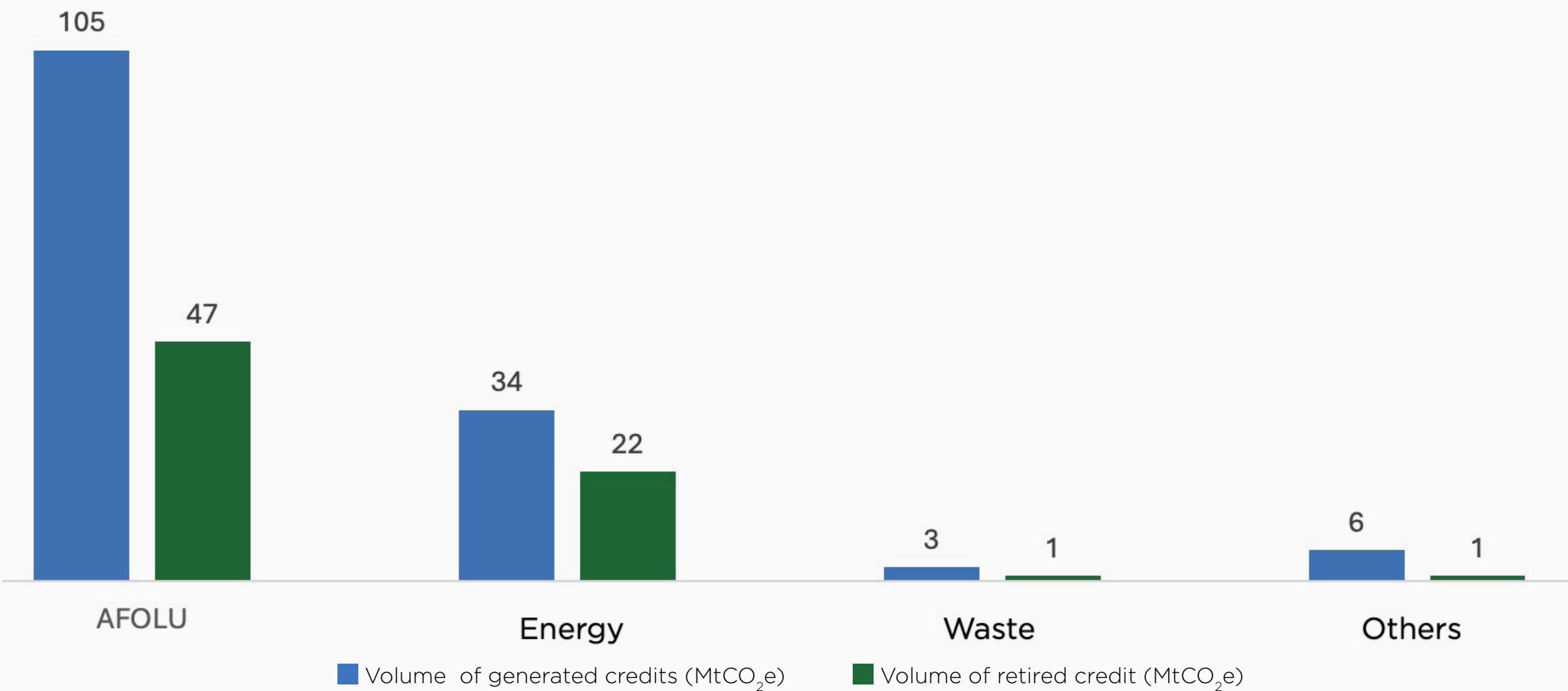
CONTEXT – VOLUNTARY MARKET – BRAZIL

- **The voluntary carbon market in Brazil has accumulated a total volume of 148 MtCO₂e of credits generated in the historical series.** The first Brazilian credit record in the standards analyzed dates to 2009.
- Since 2021, retirements have remained in the **range of 9 to 13 MtCO₂e** per year. In the historical series, a total of **71 million** credits were retired.
- Verified Carbon Standard (VCS) remains the preferred choice among credit consumers, accounting for **over 90%** of the total volume of retired credits in Brazil.
- **AFOLU (Agriculture, Forestry, and Other Land Use)** and **Energy** are the sectors responsible for the largest volume of credits generated and retired in Brazil.
- The most common sectors of Brazilian carbon credit beneficiaries are Logistics (24%); Oil and Gas (20%); and Consumer goods and services (15%).

History of carbon credits generated and retired worldwide



History of carbon credits generated and retired worldwide (2002–2024) by carbon credit supplier sector (in MtCO₂e)



Source: WayCarbon based on the independent certification standards analyzed.

VOLUNTARY MARKET TRANSACTIONS

Between 2023 and 2024, the volume and price of credits generated in Global Voluntary Market fell in all sectors, except for Waste for volume and Agriculture for price.

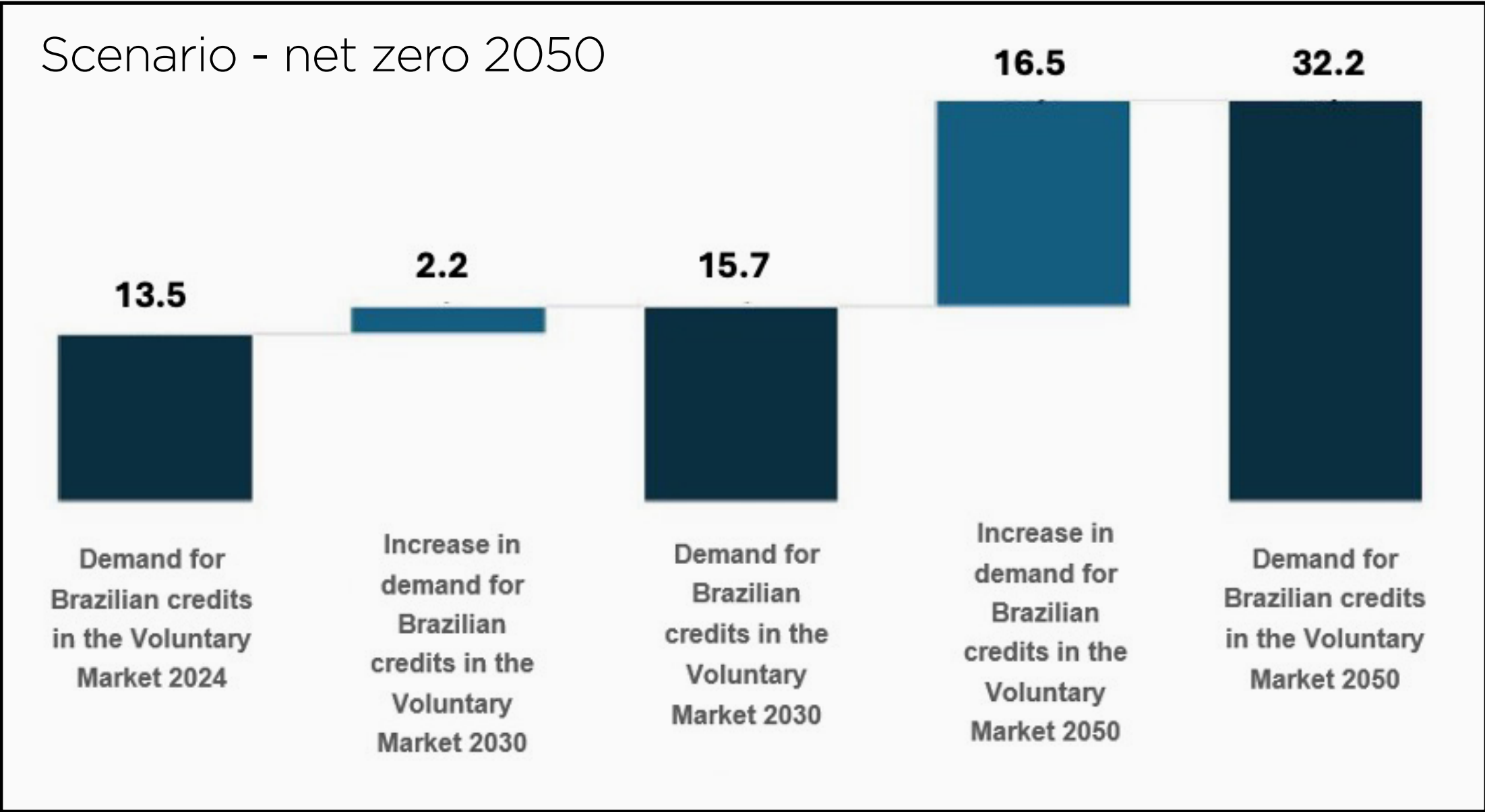
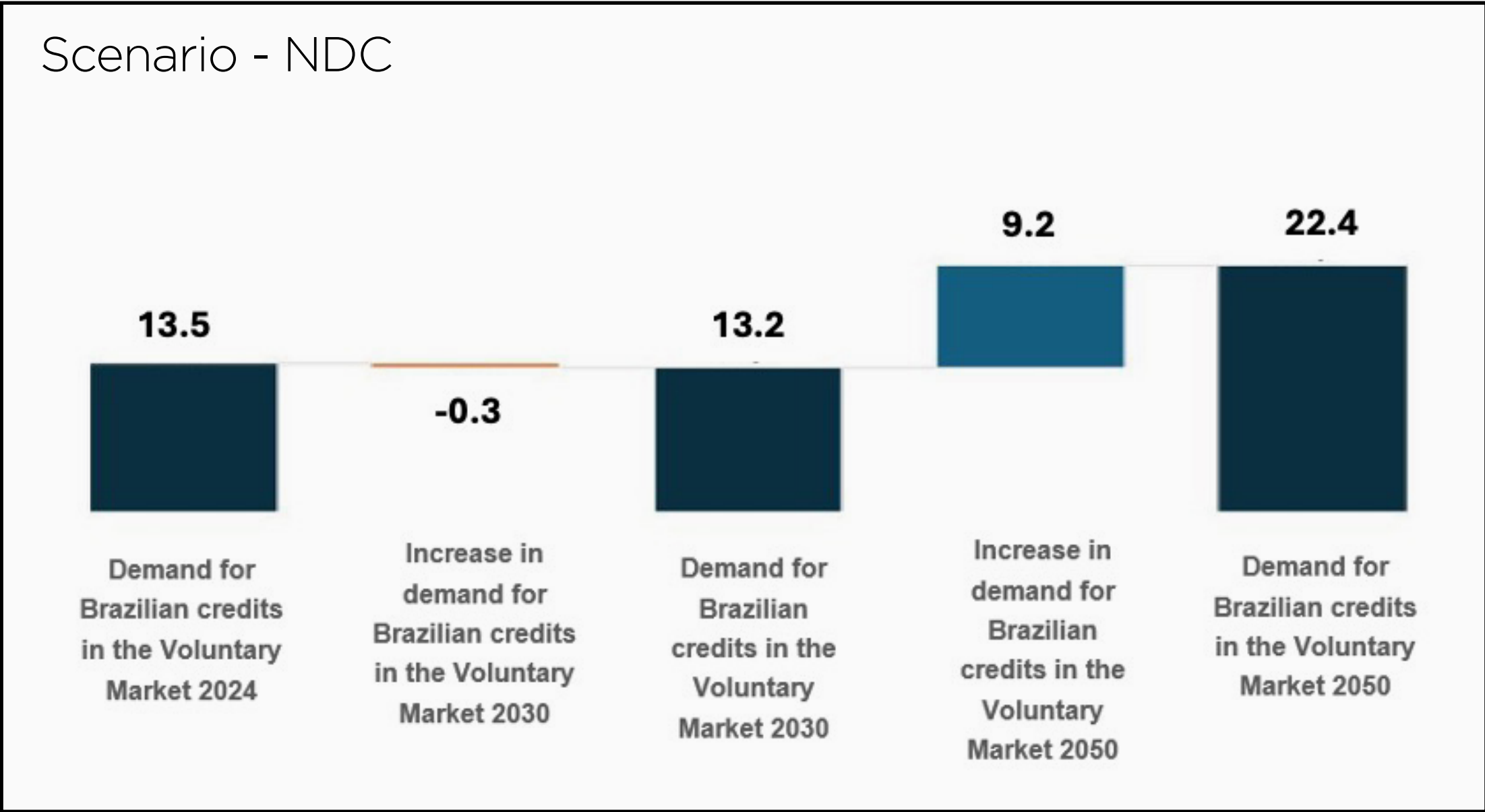
	2023		2024		Variação	
	Volume (MtCO ₂ e)	Price (USD)	Volume (MtCO ₂ e)	Price (USD)	Volume (MtCO ₂ e)	Price (USD)
Forest and Land Use	37.1	\$ 10.04	37.0	\$ 9.27	0%	-8%
Renewable Energy	29.0	\$ 3.92	22.3	\$ 2.67	-23%	-32%
Industry	12.2	\$ 4.10	5.7	\$ 3.66	-53%	-11%
Domestic/Community Devices	10.2	\$ 7.71	5.1	\$ 7.30	-50%	-5%
Waste	1.5	\$ 7.46	4.8	\$ 6.72	226%	-10%
Agriculture	4.7	\$ 6.51	0.6	\$ 7.66	-87%	18%
Energy Efficiency	9.4	\$ 3.65	0.6	\$ 3.05	-93%	-16%
Transportation	-	-	0.2	\$ 3.24	-	-

Source: Forest Trend's Ecosystem Marketplace (2025).

POTENTIAL OF THE VOLUNTARY MARKET

- For the demand for Brazilian credits, as most credit retirements come from international demand, it was considered that the market share of Brazilian credit retirements will remain constant at the average of the last 10 years, equal to 6.08% of global retirements.
- Following the same trend as the global scenario, demand for Brazilian credits would vary between 13.2 and 15.7 MtCO₂e in 2030 and 22.4 to 32.2 MtCO₂e in 2050.**

Increased demand for Brazilian Carbon Credits in the Voluntary Market (in MtCO₂e)



Source: WayCarbon, based on SBTi (2025) and NGFS (2025).

KEY MESSAGES

- ▶ Voluntary Market is experiencing an oversupply of credits in relation to the number of retired credits.
- ▶ Despite recent questions about the quality of carbon credits, demand for credits has remained relatively stable in recent years.
- ▶ Signals from demand regarding co-benefits are still ambiguous: although credits with more co-benefits are more expensive, the volume of retirements of these credits is not higher than the volume of retirements of credits without co-benefit specifications. On the other hand, there has been an upward trend in the retirement of VCS AFOLU credits with CCB (Climate, Community & Biodiversity) Standards.
- ▶ Demand for Voluntary Market credits remains significantly dispersed.
- ▶ The growth of Voluntary Market depends significantly on the private sector fulfilling its climate commitments, especially companies with targets of Science Based Targets initiative (SBTi).
- ▶ The potential of the Brazilian market tends to grow at the same rate as the international market, given that most of the demand for Brazilian credits comes from foreign companies.

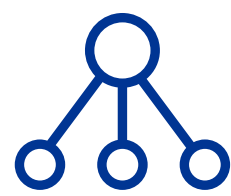


4. BRAZILIAN EMISSIONS TRADING SYSTEM (SBCE)



CONTEXT - SBCE

At the national level, the main foundations for establishing the Brazilian regulated carbon market were laid down in Law 15042/2024. It has been established:



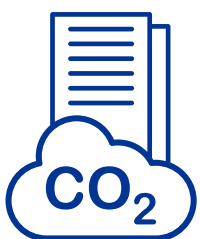
- **SBCE governance structure**, composed of three different bodies: Interministerial Committee on Climate Change (CIM), Management Body, and Permanent Technical Advisory Committee;



- **Regulatory thresholds in SBCE**, of 10,000 tCO₂e for reporting emissions and 25,000 tCO₂e for periodic reconciliation of emissions from regulated entities;



- This reconciliation of emissions will take place with the Brazilian Allowances (**CBEs**), which must be distributed to regulated entities.



- In addition to the CBEs, offset units will also be accepted for emission reconciliation — the **CRVEs**.

However, important definitions for the functioning of the market are still lacking, such as:

- **Regulated sectors**
- **The cap**
- **Percentages of free allocations**
- **Methodologies that will be accepted for CRVEs**
- **Maximum acceptable limit for CRVEs**

Based on the aspects still undefined, the estimation of potential transactions was conducted using assumptions regarding:

1. Elements of the market microstructure;
2. Emissions from the regulated sectors; and
3. Abatement potentials derived from marginal abatement cost curves available for Brazil.

BENCHMARK OF OTHER ETS



European Union (EU ETS)

Start of operation: 2005

Regulated sectors

- Energy
- Industry
- Shipping
- Domestic aviation

Cap

27 MtCO₂e (aviation)
e 1.386,1 MtCO₂e (others sectors)

Offsets and credits

No longer allowed



Califórnia (California Cap and Trade)

Start of operation: 2012

Regulated sectors

- Energy
- Industry
- Mining and extractive industries
- Construction
- Transportation
- Agriculture
- Forest

Cap

267,4 MtCO₂e

Offsets and credits

Domestic offsets
or from a linked
system, up to 4%



Mercado chinês (China National ETS)

Start of operation: 2021

Regulated sectors

- Energy
- Industry

Cap

~8.000 MtCO₂
(2024)

Offsets and credits

Domestic offsets
(CCER) with limited
quantity

POTENTIAL OF THE NATIONAL REGULATED MARKET (SBCE)

The establishment of may not be sufficient to achieve the NDC targets, especially if the implementation of the trading system is not accompanied by other public policies.

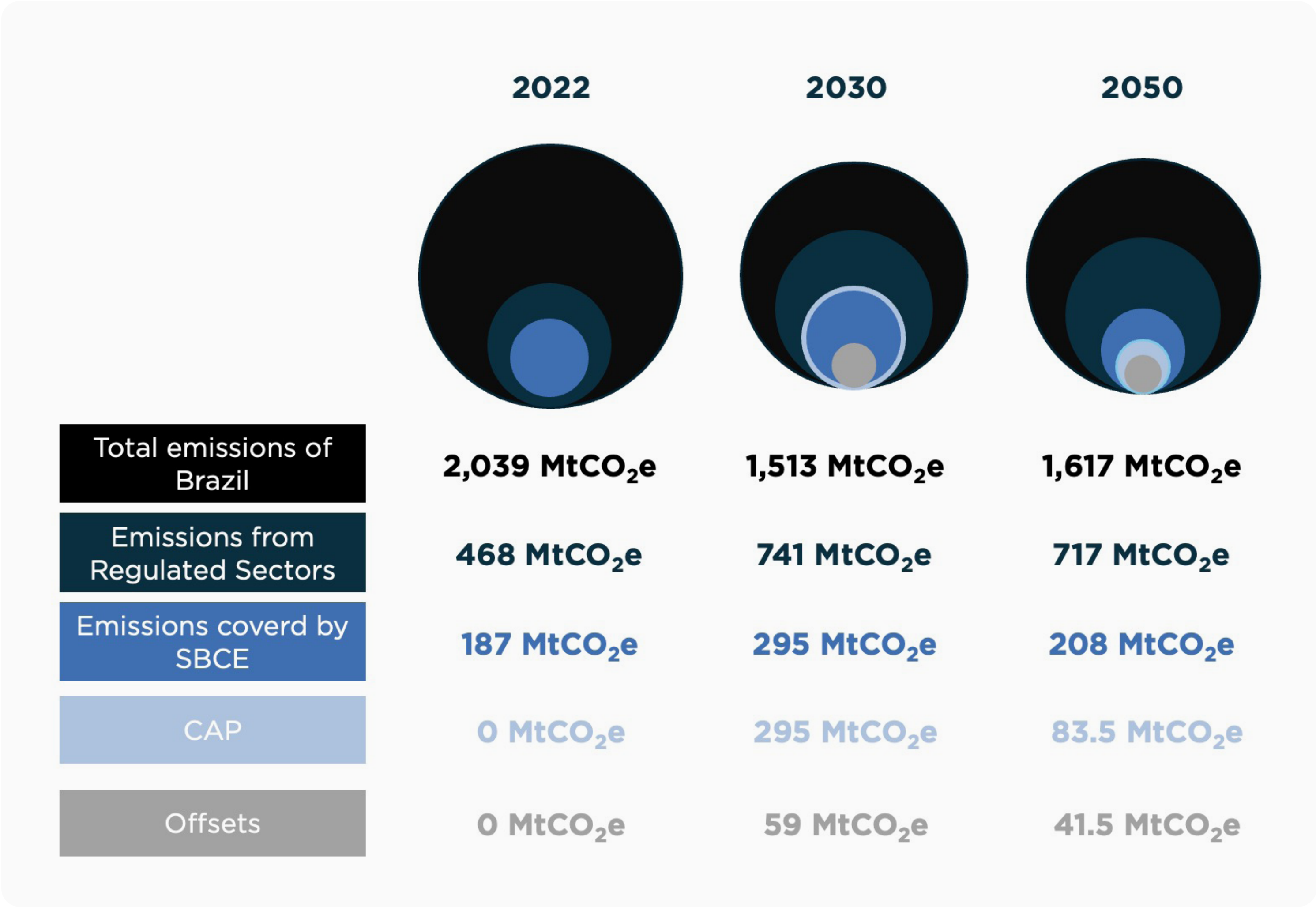
The figure on the side presents a summary of SBCE potentials, based on the adopted assumptions, compared to Brazil's observed national emissions in 2022 and the business as usual (BAU) scenario projections from National Simulator of Sectoral Policies and Emissions (SINAPSE) for 2030 and 2050, excluding emissions associated with land use.

Regulated Sectors in SBCE

 Energy

 Industry

 Transportation

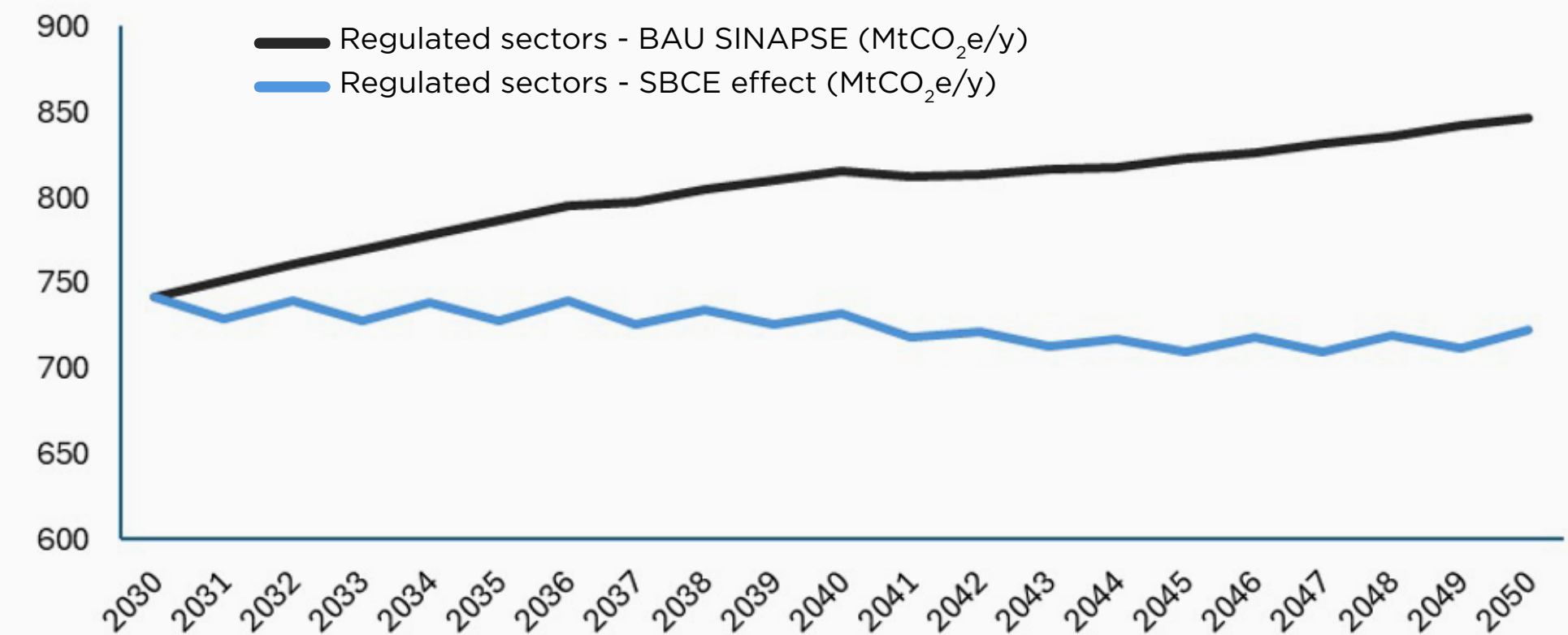


Source: WayCarbon, based on MCTI (2025); MCTI (2024); World Bank (2017)

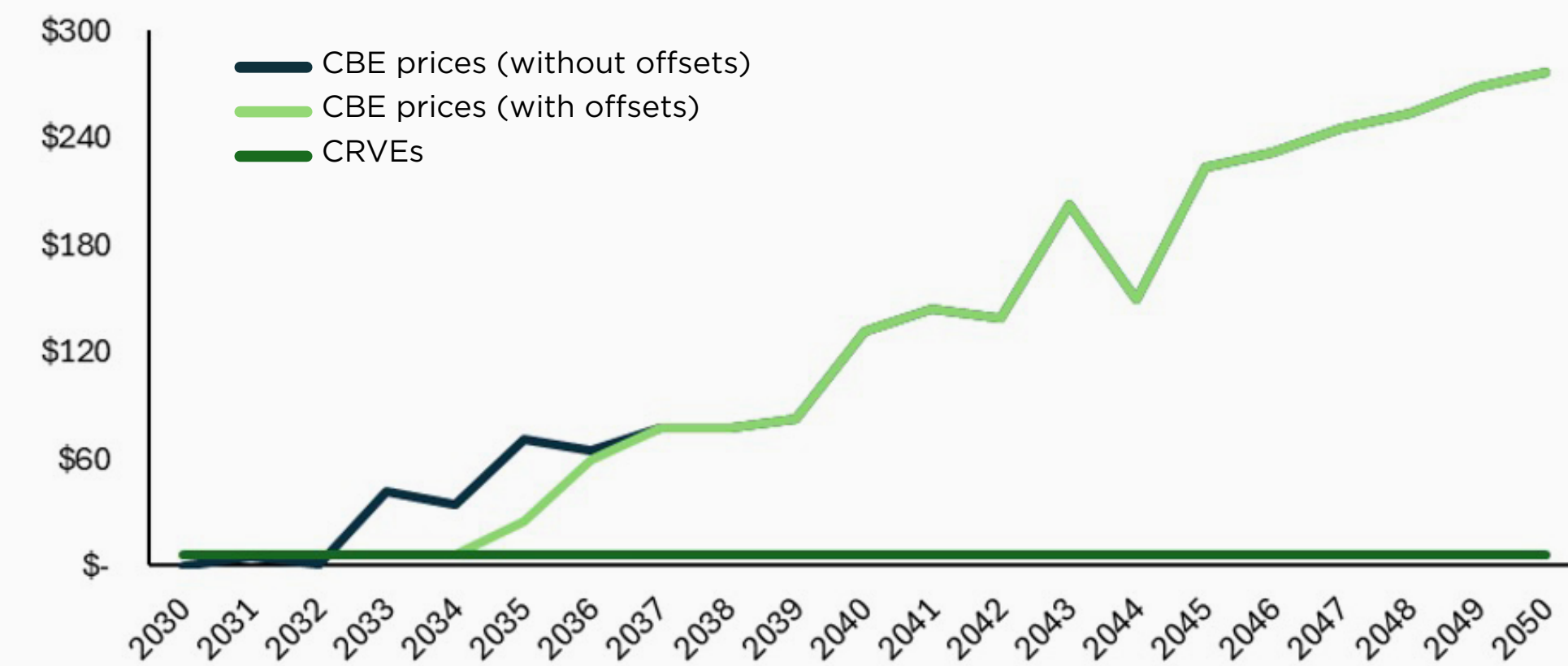
SBCE POTENTIAL

- **The price of emission allowances tends to rise significantly under the adopted scenario.**
- Initially, due to the higher cap and the larger share of free allocations in the first phase, allowances would cost approximately US\$ 5 in 2030.
- As the cap and the number of free allocations decrease, this value would reach US\$ 279 in 2050, considering the mitigation technologies available in Mitigation Options (MCTI, 2018).
- **The total maximum demand is estimated at approximately 59.1 million CRVEs during the initial period of SBCE (2030) and 41.5 million in 2050, considering the maximum limit of 20% offsets.**
- Given that the use of offsets is limited, as emissions from regulated sectors decline, the demand for offsets decreases proportionally.
- The marginal abatement costs for non-regulated sectors range between US\$ 0.22 and US\$ 0.45, excluding registration, auditing, and other certification costs for the CRVE.
- Considering the high price of CBEs, CRVEs prices are expected to converge with those observed in Voluntary Carbon Market, reflecting the opportunity cost.

Regulated sectors GHG emissions



CBE prices



KEY MESSAGES

- ▶ The establishment of SBCE represents a milestone in Brazil's national climate policy, creating economic incentives for both regulated and non-regulated sectors.
- ▶ Given that the operational launch of SBCE coincides with the timeline of Brazil's intermediate NDC target, the required emission cap reduction tends to be steeper than in other ETS, so that regulated sectors can achieve their share of the NDC commitment.
- ▶ Due to the high abatement costs of the regulated sectors, CRVEs play a key role in reducing the compliance costs for regulated entities.
- ▶ The potential market for CRVEs in 2030 is estimated at 59 million credits, representing an increase of approximately 337% compared to the demand for credits in Voluntary Carbon Market in 2024. As emissions from regulated sectors decrease, the demand for CRVEs is expected to decline over time, reaching 41 million credits by 2050.
- ▶ Due to the expected increase in compliance costs for regulated entities, it is essential that the regulation of the national carbon market be accompanied by other cost-reduction measures for regulated sectors, particularly through Brazil Cost Reduction Agenda (ARCB) (MDIC, 2025), to prevent loss of competitiveness for domestic industry.
- ▶ Innovation policies must also be strengthened to enable the development of low-carbon technologies.
- ▶ It should be noted that the establishment of SBCE alone may not be sufficient to meet Brazil's NDC targets, particularly if the implementation of the trading system is not accompanied by complementary public policies.



5. CHALLENGES AND OPPORTUNITIES



CHALLENGES

Market environment challenges persist, particularly on the demand side and in the market structure.

ARTICLE 6

- Fragmented infrastructure.
- Lack of consolidated national frameworks.
- Inconsistent credit standardization and quality.
- Political risk.
- Acceptance process for credit sales with corresponding adjustments.

VOLUNTARY MARKET

- Complex methodologies.
- Quality of issued credits.
- Credit additionality and traceability.
- Fragmented market.
- Information asymmetry and lack of transparency.
- Complex scalability.
- Uncertainty regarding future demand.
- Fragmented market demand.

SBCE

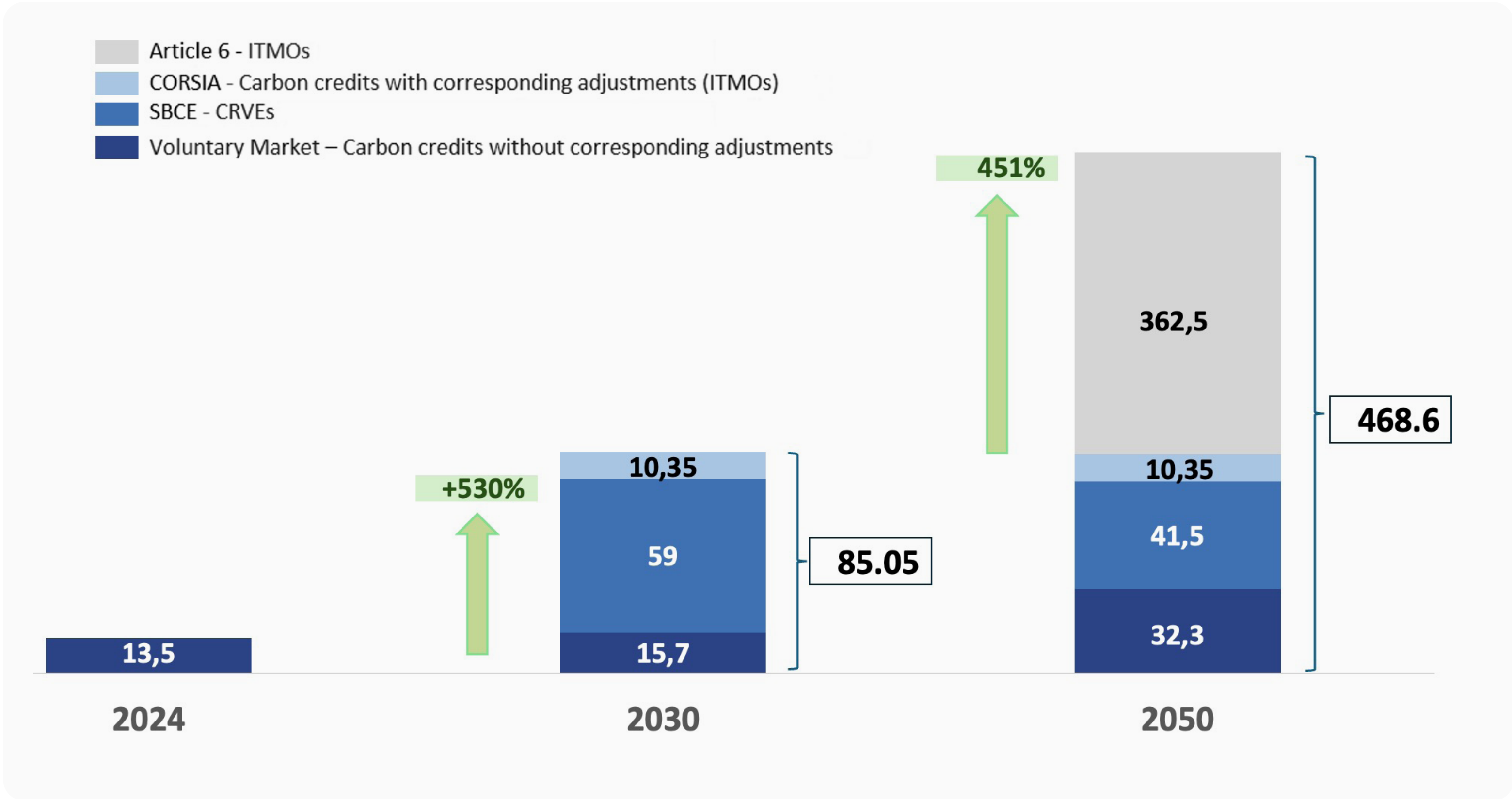
- Need for a robust infrastructure for transparency and technical oversight.
- Efficient governance mechanisms.
- Potential planning delays leading to uncertainty among stakeholders.
- Interoperability with the voluntary market.
- Selection of certification standards with robust procedures for the acceptance of credits as CRVEs.
- Integration between regulated and non-regulated sectors.
- Delayed legislation.
- Clear legal definition of the nature of credits regulated under SBCE.
- Mitigation of speculative movements over CBEs.

OPPORTUNITIES FOR BRAZIL

Compared to the Voluntary Carbon Market, the demand for credits originating from mitigation projects could grow by up to 530% by 2030, with acting as the main driver of this increased demand.

In the long term, Brazil’s primary opportunity lies in the full implementation of Paris Agreement. In this context, increasing the ambition of NDCs is essential to create demand for national ITMOs, while the fulfillment of Brazil’s NDC is crucial to enable the supply of these ITMOs.

The establishment of SBCE is another factor that can enhance the credibility and transparency of Brazil’s emission mitigation policies, extending decarbonization incentives to both regulated and non-regulated sectors under the national carbon market. Its structuring can strengthen Brazilian credits by establishing a minimum quality standard for the methodologies to be accepted within the national regulated market.



OPPORTUNITIES – ARTICLE 6

Article 6 may offer greater opportunities in terms of transaction volumes, given Brazil’s high potential to supply mitigation outcomes, reaching net negative emissions by 2050.



Potential of the global and national carbon markets



n/a in 2024
n/a in 2030
1,097 MtCO₂e in 2050

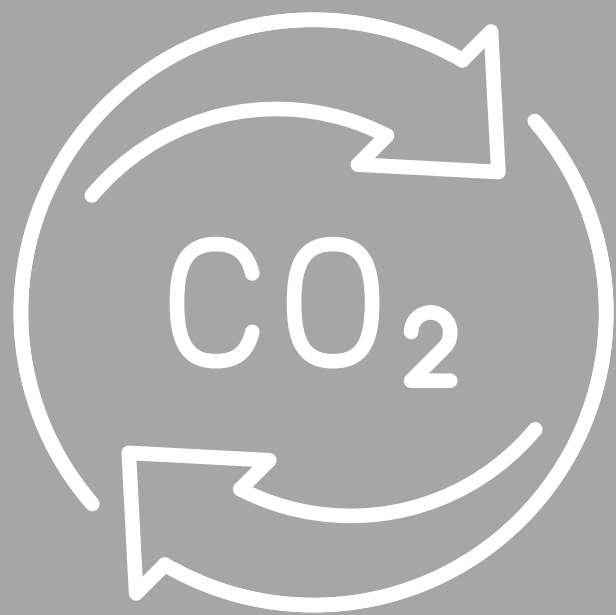


0 in 2024
0 for 2030
362.5 MtCO₂e in 2050

- Increased ambition of NDC targets
- New European Union proposal allowing the acquisition of projects from developing countries
- Progress of National Mitigation Strategy
- Easier participation enabled by the structuring of the regulated carbon market

OPPORTUNITIES – VOLUNTARY MARKET

In the voluntary market, opportunities are linked to market maturation and the growing demand for higher-quality credits.



Voluntary Market

Potential of the global and national carbon markets



175.8 MtCO₂e in 2024
Up to 258 MtCO₂e in 2030
Up to 530 MtCO₂e in 2050



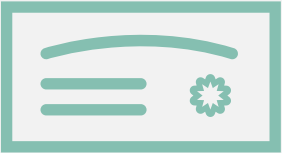
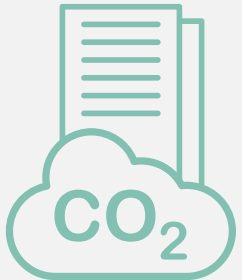
13.5 MtCO₂e in 2024
Up to 15.7 MtCO₂e in 2030
Up to 32.3 MtCO₂e in 2050

- Growing demand and increasing valuation of removal and nature-based solutions (NBS) projects
- Greater maturity of the financial system regarding project business models
- Accumulation of national experience with off-taker contracts
- Strengthening of Brazilian credits through the structuring of the regulated market

OPPORTUNITIES – SBCE

SBCE creates demand for project-based credits and enhances price signaling for the entire economy.



SBCE Potentials in CBEs and CRVEs	
CBEs	0 in 2024
	295 MtCO ₂ e in 2030
	207.5 MtCO ₂ e in 2050
CRVEs	0 in 2024
	57.1 MtCO ₂ e in 2030
	41.5 MtCO ₂ e in 2050

- Difusion of price signals and mitigation costs across the economy.
- Promotion of improved trading infrastructure for SBCE assets.
- Opportunity to review voluntary-market methodologies and adapt them to the national context, making them more robust.
- Creation of mechanisms for the acceptance and sale of ITMOs.



6. RECOMMENDATIONS



RECOMMENDATIONS FOR THE GOVERNMENT

The recommendations for the Government are aimed at fulfilling expectations surrounding the creation of SBCE and establishing the country's relevance in the transition to a low-carbon

- 1. Establish climate governance capable of acting in the strategic planning of the joint implementation of climate policies, in harmony with existing policies.**
- 2. Consider in National Mitigation Strategy not only the launch of new sectoral policies and plans, but also the reassessment and improvement of the effectiveness and alignment between existing policies and plans.**
- 3. Establish a monitoring, verification, and reporting (MRV) process on compliance with the NDC, including the means necessary to achieve the established goals.**
- 4. Establish an ITMO commercialization strategy, considering the opportunity cost of using revenues from ITMO sales toward compliance with Brazil's NDC.**
- 5. Commit to meeting SBCE implementation schedule.**
- 6. Establish adjustment rules for projects already operating in Voluntary Carbon Market, ensuring their alignment with the new requirements for generating CRVEs and enabling the integration of pioneering initiatives.**
- 7. Consider, together with SBCE, agendas for reducing Brazil's costs and promoting technological innovation to maintain the competitiveness of Brazilian industry in international trade.**

RECOMMENDATIONS FOR THE PRIVATE SECTOR

The recommendations for supply-side players aim to expand Brazil's participation in carbon markets through high-quality socio-environmental projects.

For demand-side players, the recommendations provide guidance on best practices for decarbonization and emission-neutralization strategies in the context of the emerging regulated market in Brazil.

- 1. Identify economic agents willing to commit to long-term purchase agreements.**
- 2. Invest in the development of carbon projects that deliver emission removals.**
- 3. Given the publication of methodologies to be accepted under PACM and SBCE, explore opportunities to develop carbon projects in alignment with these methodologies.**

- 1. For companies that have voluntary emissions offset commitments, establishing predictable purchase commitments is essential to direct long-term investments in decarbonization projects.**
- 2. Understand the implications of the establishment of the regulated market to enable informed dialogue with the federal government regarding emission allocations that preserve the international competitiveness of regulated sectors.**
- 3. Assess decarbonization opportunities and structure processes while the guidelines for allocating permits in SBCE are being established.**



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SUPPORT



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