2024

State and Trends of Carbon Pricing:

INTERNATIONAL CARBON MARKETS 2024

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List of Figures

List of Figures

List of Tables

List of Boxes

Table of Contents

Abbreviations and acronyms

ACR	American Carbon Registry
ART	Architecture for REDD+ Transactions
A6IP	Paris Agreement Article 6 Implementation Partnership
CAR	Climate Action Reserve
CAD Trust	Climate Action Data Trust
CCP	Core Carbon Principles
CFTC	Commodity Futures Trading Commission
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
DAIP	Department of Defense Aeronautical Information Portal
ETA	Energy Transition Accelerator
GDPR	General Data Protection Regulation
GtCO2e	Gigatonnes of carbon dioxide equivalent
ICVCM	Integrity Council of Voluntary Carbon Markets
IOSCO	International Organization of Securities Commissions
ISO	International Organization for Standardization
IT	Information technology
KYC	Know Your Customer
MIGA	Multilateral Investment Guarantee Agency
ML	Money Laundering
NDC	Nationally Determined Contribution
SBTi	Science Based Targets Initiative
SF6	Sulfur hexafluoride
UNFCCC	United Nations Framework Convention on Climate Change
UNIDROIT	International Institute for Unification of Private Law
VCMI	Voluntary Carbon Markets Integrity Initiative
VCS	Verified Carbon Standard

Foreword

Carbon markets are essential for accelerating climate action in developing countries, where climate finance needs far exceed available resources. By providing a channel to mobilize necessary funding and deliver real, additional emissions reductions and removals, carbon markets can help close substantial investment gaps. Moreover, they support broader economic development through associated co-benefits and the potential reinvestment of carbon revenues. As such, carbon markets can be a vital tool for achieving climate goals and supporting vulnerable communities.

These markets are at a pivotal moment, where the path forward is filled with both promise and challenges. On the one hand, efforts to enhance trust in the supply side of the market have shown encouraging progress, instilling a sense of optimism about the environmental integrity of carbon credits. However, the demand side of the market is still working towards overcoming inconsistent guidelines, regulations, and divergent priorities among stakeholders.

Addressing the climate crisis continues to be a critical priority for both countries and corporations. A clear, coherent framework and policies around supply and demand for carbon credits is therefore critical. While regulations are advancing, they vary in speed and scope, often lacking alignment, which complicates an already complex landscape. Companies, increasingly engaged in sustainability, urgently require clarity on how carbon credits can support their initiatives, including the regulation of environmental claims and guidance for corporate net-zero transitions.

Upcoming revisions to Nationally Determined Contributions (NDCs) present an opportunity for countries to articulate more clearly the role they see for international carbon markets, so that both sovereign and private buyers and sellers of carbon credits can understand how to leverage carbon markets to advance their climate goals.

Further, the recent United Nations climate change negotiations in Bonn (SB60) laid the groundwork to advance discussions on Article 6 at COP29 at Baku, and it signaled readiness among Parties to engage constructively on the outstanding issues. COP29 presents a crucial opportunity to reach a successful conclusion on outstanding issues, which will be vital to maintain momentum.

Acknowledging the crossroads of possibilities, this second edition of “State and Trends of International Carbon Markets” reviews the status of the carbon market and delves into the bottlenecks currently impeding growth. The urgency of addressing these issues cannot be overstated. The decisions made today will shape the future of our global climate efforts and unlock the potential of carbon markets to channel climate finance to developing countries and drive meaningful emission reductions. The time for increased action is now.

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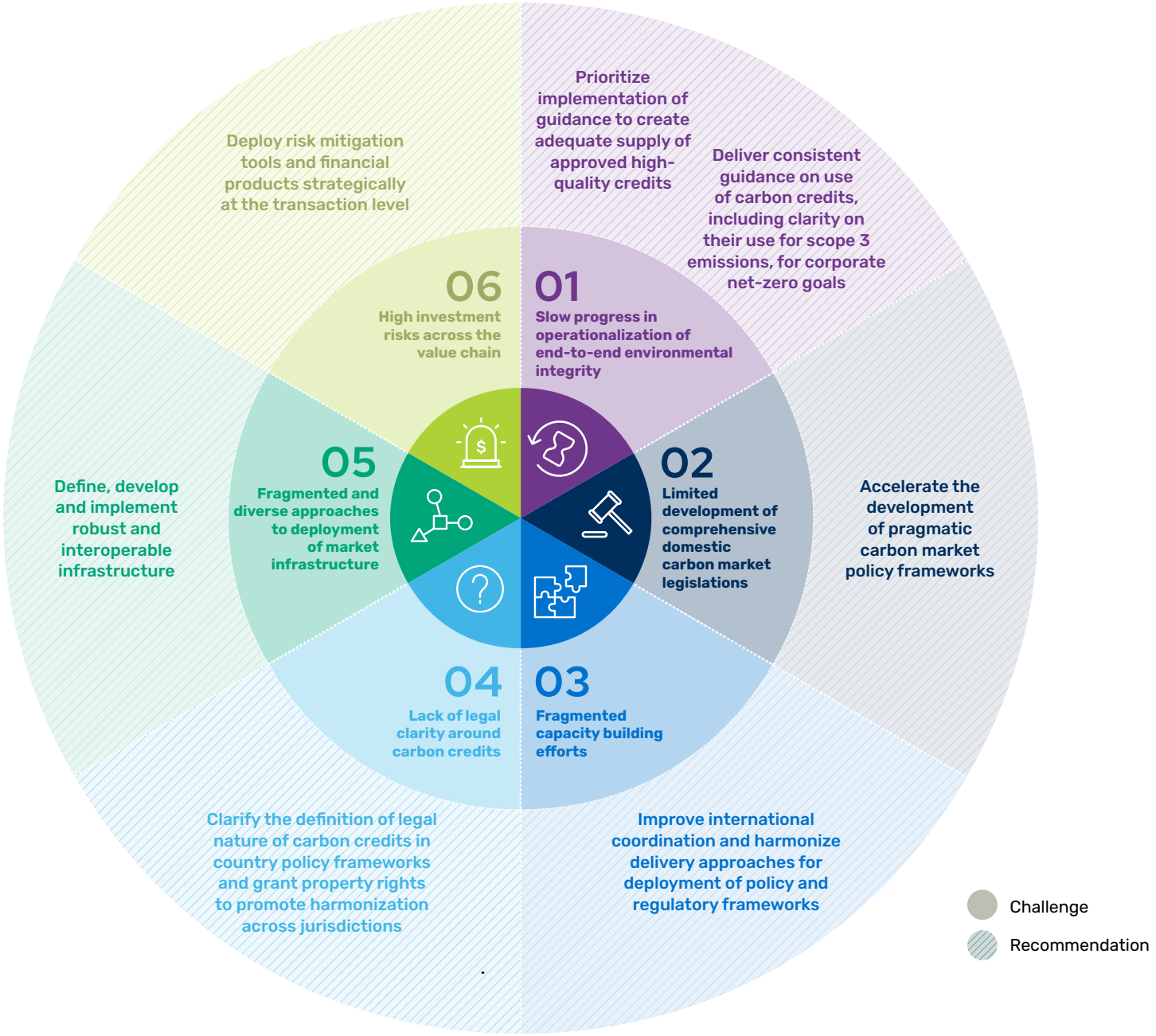
Summary

Well-designed, high integrity carbon markets can play a pivotal role in financing climate action in developing countries. However, several critical bottlenecks impede the growth of these markets. **The 2024 State and Trends of International Carbon Markets** report evaluates the progress made in addressing these bottlenecks, highlights the urgency of these issues, and proposes recommendations to ensure that carbon markets reach their full potential:



State of Play

Carbon markets, both international compliance and voluntary [1], are at an inflection point. More progress is needed on Article 6, and expectations are high for COP29 to resolve outstanding issues (Box 1). In voluntary markets, last year saw a significant drop in the market value of traded carbon credits, from USD1.87 billion to USD723 million[2], primarily attributed to environmental integrity concerns[3]. Several other challenges continue to undermine confidence. This is reflected in the low weighted average prices, which have remained below USD6/tCO_2e since July 2023[4]. Despite a decrease in the issuance of Reducing Emission from Deforestation and Forest Degradation (REDD+) credits, driven by increased scrutiny in the REDD+ space, overall issuance and retirement levels have remained generally stable in the first half of 2024 (Figure 1). There are ongoing efforts by a variety of stakeholders, such as the Integrity Council of Voluntary Carbon Markets (ICVCM) and the Voluntary Carbon Markets Integrity Initiative (VCMI), to restore trust and transparency in carbon markets. The progress in response to these initiatives is yet to have full impact but shows promise.

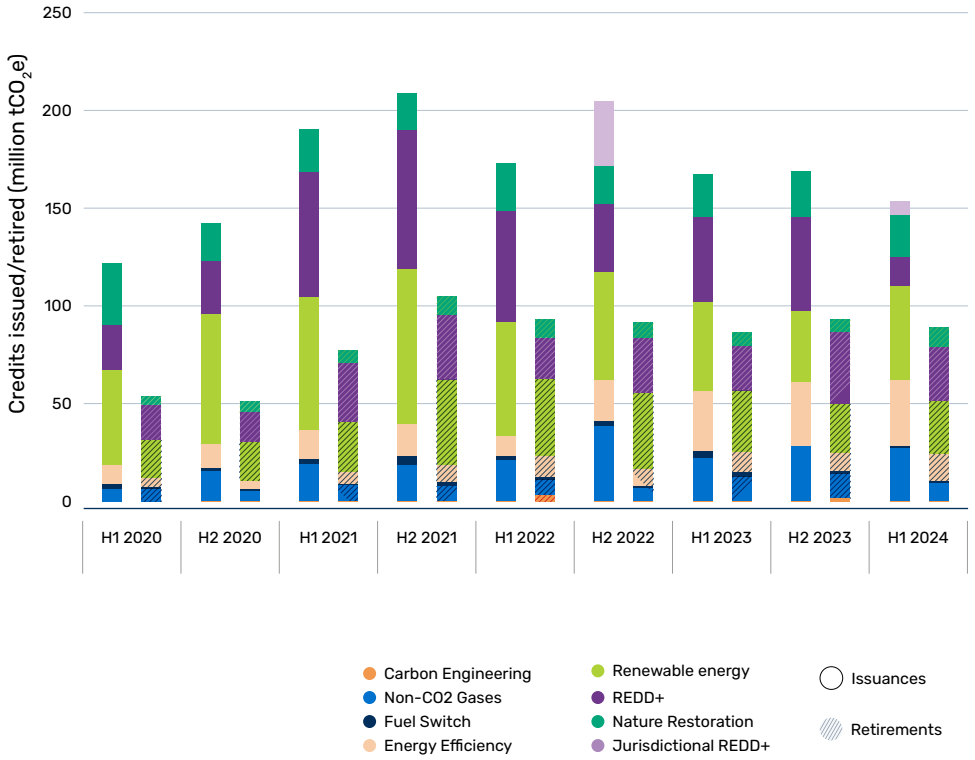
BOX 1

Article 6 negotiations on the road to Baku

Key operational issues related to transparency, environmental integrity and the avoidance of double counting are still being debated without consensus. The resolution of outstanding issues pertaining to Article 6, especially Article 6.4 (the successor of the Clean Development Mechanism), must be prioritized, as it will determine the operational details and governance structures essential for the practical implementation of the Article 6.4 mechanism and the use of units generated under it, including A6.4 mitigation contribution units for the appropriate claims by voluntary market participants.

FIGURE 1

Half-yearly issuance and retirements by project type (in $mtCO_2e$)



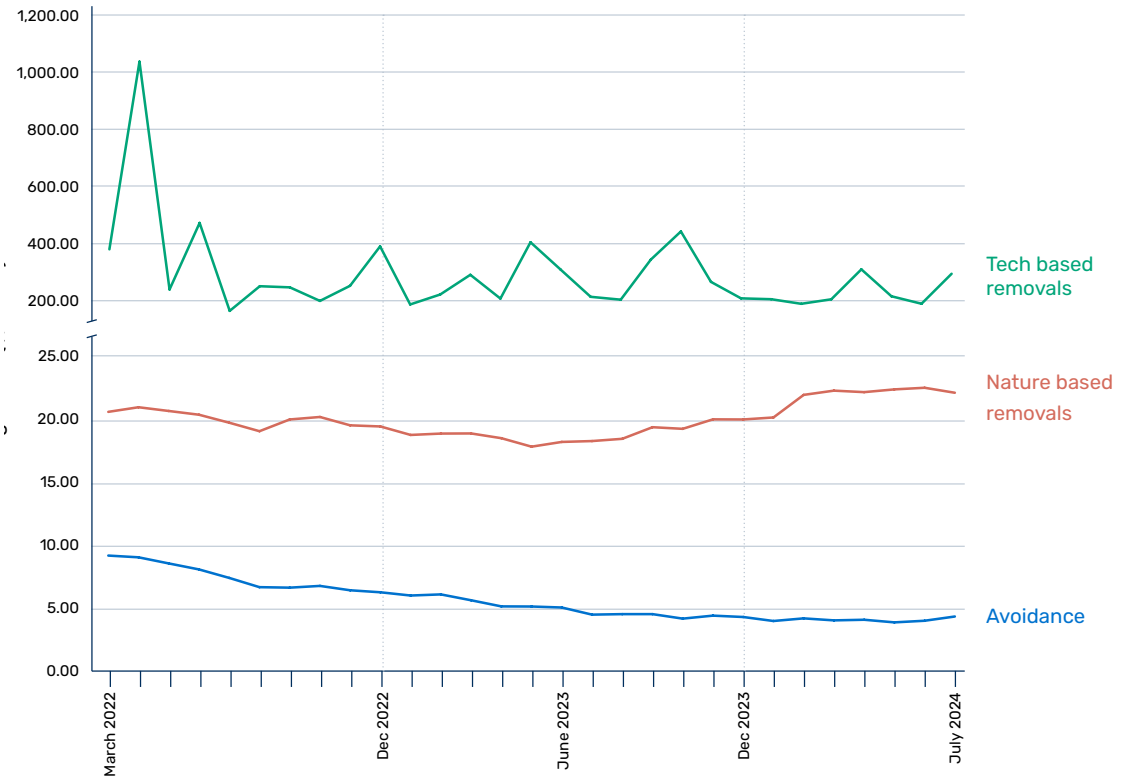
Source: MSCI Carbon Markets, as of June 30, 2024
Note: Includes transactions from Clean Development Mechanism (NDC eligible), EcoRegistry, Gold Standard, American Carbon Registry, Verra, Climate Action Reserve, Climate Forward, Puro Earth, Joint Crediting Mechanism, Global Carbon Council, BioCarbon, Architecture for REDD+ Transactions' The REDD+ Environmental Excellence Standard

Another indicator of progress is the increased sophistication of buyers, their direct involvement in project due diligence, and their preference for high-quality investments. Such buyers are willing to pay large premiums for credits with perceived higher quality and development impact. For example, in 2023, projects with certified co-benefits traded at an average price premium of 37% over other projects[5]. Projects with Letters of Authorization have also commanded higher prices [6, 7]. The higher price could be attributed to perceived integrity from alignment with the Paris Agreement as well as the increased costs associated with authorized climate actions. Finally, projects rated by independent entities are beginning to command higher prices (more in #6).

This year also showed removal credits trading at a premium compared with avoidance and reduction credits (Figure 2). Technology-based removals, such as direct air capture and storage and enhanced weathering and biochar trade at significantly higher prices. This is due to the perception of higher quality in technology-based removals, providing assurance of fewer baseline issues or concerns about over-crediting. Furthermore, the inconsistent guidance on the use of carbon credits for corporate net-zero goals, coupled with concerns about the quality of reduction credits (more in #1.2), has led buyers to prefer removal credits. Lastly, there has been a noticeable increase in demand from buyers for advanced market commitments related to carbon removal projects, both technology-based and nature-based.

FIGURE 2

Weighted average prices of removal vs avoidance credits (in USD)



Source: Allied Offsets

Note: Tech-based removals are an emerging asset class and hence comprise of fewer transactions

For instance, in May 2024, major technology companies including Google, Microsoft, Meta and Salesforce, launched the Symbiosis Coalition[8] with a commitment to invest in nature restoration projects aiming to generate up to 20 $mtCO_2e$ by 2030. Similarly, the NextGen[9] consortium was launched to invest in a diversified portfolio of technological removal projects with the aim to purchase at least 1 $mtCO_2e$ of carbon removals by 2025, at an average price of USD200/tCO_2e2. These long-term offtake deals demonstrate a growing interest from corporates in exercising greater control over the projects from which they purchase credits to mitigate risks around quality. These long-term offtake agreements are a welcome development, as they also signal to projects greater cashflow certainty and potential for collateralization of carbon revenues.

The increase in market appetite for technological removal mitigation activities, which are predominantly concentrated in developed countries, is indeed encouraging and signals the potential for demand to be unlocked at a much larger scale across a wider set of decarbonization activities with development impact, importantly in developing countries.

Critical bottlenecks to scaling carbon markets identified and discussed in this report include:

- slow progress in adoption of end-to-end environmental integrity necessary for companies to decarbonize their operations and value chain emissions using high integrity carbon credits,
- lack of robust and comprehensive domestic carbon market legislation (that provides policy certainty around generation, transfer and use of carbon credits),
- lack of coordination in capacity building efforts,
- lack of legal clarity around carbon credits,
- fragmented and diverse approaches to deployment of market infrastructure, and
- high investment risks across the carbon market value chain.

This report aims to assess the progress made in tackling these bottlenecks and to outline recommendations so that carbon markets can achieve their full potential.

01

Further efforts are needed to fulfill the environmental integrity commitments made at COP28.

At COP28, six key organizations –ICVCM, VCMI, Science Based Targets Initiative (SBTi), GHG Protocol, We Mean Business Coalition, and CDP – announced their commitment to collaborate through an 'end-to end' integrity framework for carbon markets to deliver clear, cohesive guidance for corporate climate action. This collaboration was seen as a crucial step to give consistent guidelines and clarity on the use case of carbon credits by corporations, and to therefore unlock demand. Additionally, the announcement from major independent crediting standards that they will collaborate to put in place common principles for quantification and accounting of removals and emissions reductions and to seek assessment under the ICVCM's Core Carbon Principles (CCPs) created encouraging momentum. Despite the optimism created during COP28 by these initiatives, progress has been slower than desirable; on the supply side, market adoption remains muted, and on the demand side, consistent and actionable guidance on use case is not yet in place.

1.1 ICVCM's rulebook to assess the quality of program and methodology is in place; however, its impact on demand mobilization is yet to be seen.

The carbon market coalescing around ICVCM's CCP labels[10], which are emerging as the benchmark for evaluating the supply-side quality, is an important and welcome development. At the time of the publication of this report, ICVCM had approved five major independent crediting programs – American Carbon Registry (ACR), Architecture for REDD+ Transactions (ART), Climate Action Reserve (CAR), Gold Standard, and Verra's Verified Carbon Standard (VCS) – along with methodologies for activities involving landfill gas utilization, management of ozone depleting substances and leak detection/ repair in gas systems. Four additional carbon crediting programs and 27 categories of activities' methodologies are pending assessment by ICVCM. Cumulatively, as of August 6, these developments suggest that 3.6% of the market (27 million tCO_2e of unretired credits) has been approved to use the CCP label[11], while another 50% of the market is undergoing quality assessment under this single, harmonized benchmark[12].

CCP-eligible credits from landfill gas utilization and ozone depleting activities saw a significant increase in retirements this summer post approval[13], signaling the market readiness to use the CCP labels as a marker of quality. Additionally, this year saw the first CCP-labeled credits becoming available for trading on exchanges; Xpansiv launched trading of standardized contracts for CCP credits on its spot exchange on July 23 with almost 40,000 CO_2e traded during the first week[14].

In other developments, ICVCM has so far rejected granting CCP labels for methodologies covering around a third of the market[15], including sulfur-hexafluoride (SF6) avoidance, mini-grid and off-grid renewable energy[16]. ICVCM indicated these methodologies could be resubmitted for approval but would need to address shortcomings, including additionality-related elements. The impact of these developments on overall voluntary market activity and on market participants currently holding credits from these methodologies remains to be seen. This development, although consistent with the position of some independent standards[17], underscores the need for a more nuanced approach towards renewable energy projects in developing countries, where additionality is context-specific and tied to cost of capital, rate of returns, and technology barriers as well as the structure and governance of existing energy systems. It also highlights the need to consider sectoral and jurisdictional approaches, which can reduce transaction costs and limit leakage risks.

In sum, while the emergence of the ICVCM assessment process represents an important step towards harmonizing quality of supply, a key challenge that remains is the timeframe for market adoption. Six months in and noting that assessments are not yet finished, its impact to unlock demand mobilization and the price premiums associated with labeled credits remains to be seen. Over the next year, continued assessment of a broader set of methodologies and crediting programs could increase the availability of high-quality credits, enhance brand recognition, and facilitate market responsiveness.

While the emergence of ICVCM assessment process represents an important step towards harmonizing quality of supply, a key challenge that remains is the timeframe for market adoption.

1.2 Global efforts to clarify the use case of carbon credits for corporate net zero goals remain unclear and inconsistent.

According to a recent MSCI report, **84% of listed companies are not on track to meet their net-zero goals** (see Table 1). There is a significant gap when Scope 3 emissions are considered, amounting to 1.4Gigatons (G) tCO_2e/yr on current performance and reaching over $7GtCO_2e/yr$ in 2030. Additionally, this research suggests that companies are weakening their climate commitments, highlighting the challenges involved in reducing indirect (Scope 3) emissions. This underscores the need for strategies and tools to achieve ambitious climate goals, including the selective and strategic use of carbon credits.

TABLE 1

Summary of companies' emissions performance gap

Scope Coverage	Scenarios		Off-track		On-track	
			#of Companies	Emissions gap ($MtCO_2e/yr$)	#of Companies	Emissions gap ($MtCO_2e/yr$)
Scope 1 & 2	Current performance	Companies' own targets	1,337	-403	1,055	144
		1.5°C aligned targets	1,285	-378	1,059	171
	Projected performance in 2030	Companies' own targets	1,684	-1,953	569	0
		1.5°C aligned targets	1,729	-2,052	524	51
Scope 3	Current performance	Companies' own targets	931	-1,410	625	1,351
		1.5°C aligned targets	912	-1,416	615	1,055
	Projected performance in 2030	Companies' own targets	849	-7,394	606	0
		1.5°C aligned targets	857	-7,514	598	*246*

Source: MSCI Carbon Markets. Data as of September 2023. Adapted by authors

As Table 2 illustrates, **emerging guidance on use cases for carbon credits by corporates has been inconsistent, leading to confusion, hesitation, and delayed action.** Divergent views have emerged particularly on use of carbon credits to offset indirect (Scope 3) emissions.

TABLE 2

Comparison of guidance on use case of carbon credits

#	Use Case	International Emissions Trading Association (IETA)	SBTi	VCMI	Joint Statement by seven EU member countries
1	Compensate for unabated scope 1 and 2 emissions to help achieve interim targets and stay on track between interim target years	Yes	No	No	No
2	Compensate for unabated Scope 3 emissions, including in hard-to-abate sectors, to help achieve interim targets and stay on track between interim target years	Yes	No	Yes	No
3	Contribution claim / beyond value chain mitigation	Yes	Yes	Yes	Yes

*Source: IETA, Guidelines for High Integrity Use of Carbon Credits. Adapted by authors.

SBTi, widely recognized for its guidance to corporates on net-zero target setting and climate strategies, increased confusion in the market by sending mixed signals. In April 2024, the organization announced that it was exploring pathways through which carbon credits - among other Environmental Attribute Certificates - could be used against Scope 3 emissions[18]. However, in its recent preliminary study on Scope 3 emissions published in July[19], SBTi only endorsed use of removal credits for limited purposes such as abatement of residual emissions and beyond value chain mitigation. It also only endorsed the use of carbon credits against upstream Scope 3 emissions if they represent actual emission reductions from traceable sources within that value chain and can be integrated with the company's greenhouse gas emissions inventory (i.e., insetting). Consistent with this approach, initiatives such as the Energy Transition Accelerator (ETA) are exploring the use of 'ETA credits', generated using sectoral or jurisdictional approaches to energy transition, as one possible use case for addressing Scope 3 emissions related to electricity use by a company's suppliers[20].

Conversely, VCMI, which focuses on demand side integrity, offers an alternative approach through their Scope 3 Flexibility Claim. The Flexibility Claim provides companies with an option to make climate claims for use of carbon credits against Scope 3 emissions[21]. This approach is expected to be available for public consultation in Q3 2024.

In sum, the lack of harmonization and decisive guidance on the role of carbon credits in corporate climate strategies has made it challenging for companies to develop strategies on when and how to use carbon credits to meet climate commitments. This has significantly weakened demand for carbon credits and diminished the market's potential as a tool for advancing corporate decarbonization goals (see Box 2) and scaling climate finance to developing countries. Therefore, there is an urgent need for clear and consistent guidance on the appropriate use cases of carbon credits in relation to corporate climate targets.

The lack of harmonization and decisive guidance on the role of carbon credits in corporate climate strategies has made it challenging for companies to develop strategies on when and how to use carbon credits to meet climate commitments.

BOX 2

Role of carbon credits in voluntary corporate climate action

Corporate net-zero commitments can catalyze ambitious action by accelerating emission reductions across value chains. Where Scope 3 emissions cannot be reduced in the immediate term, mitigating through selective use of carbon credits can offer a pathway for companies to still address these emissions while also directing much-needed finance to developing countries. However, if companies rely excessively on carbon credits without taking sufficient steps to reduce emissions at the source, greenwashing emerges as a serious risk. To address this, companies should create transparent decarbonization plans, with clear strategies for use of carbon credits, both reduction and removal, aligned with market guidance. This could include, for example, a use case where carbon credits are used to make contribution claims, i.e., claims of financing emission reductions / removals instead of offsetting. This is also the rationale behind the proposed "Mitigation Contribution ERs" under Article 6.4 which will allow for climate finance to flow to developing countries without impacting the NDC of these countries. The finalization of Article 6.4 rules is needed to provide more clarity on this use case.

02

Host countries are beginning to establish policy frameworks for Article 6 carbon markets, with some also incorporating voluntary carbon markets.

For credibility and trust, carbon market activity needs to be governed by a clear and robust institutional framework. A starting point for countries is clarifying the role of carbon markets in their NDCs and establishing a domestic national framework that governs market activity for buyers and sellers. A clear carbon market policy framework is crucial for guiding decisions around the role of carbon credits in achieving NDC targets, eligible sectors, credit usage, reporting modalities, and market infrastructure to track and report carbon credits, among others. It is imperative for countries to expedite the development of pragmatic carbon market frameworks and tailor them to fit national contexts.

Several jurisdictions have started to establish country policy frameworks in the form of regulations, decrees, by-laws, or guidance documents (16 in public domain analyzed in this report). These policy frameworks differ in scope and clarity provided on policy elements outlined in Table 3. For example, most frameworks comprehensively address the issuance, process and institutional and governance arrangements, such as specifying the ministry responsible for approving projects and reporting requirements. However, most only focus on Article 6 markets, with few, like Ghana and Rwanda, addressing other eligible uses/ mitigation purposes (i.e., for voluntary purposes or CORSIA).

Policy frameworks governing carbon market activity have been emerging with varying degrees of market coverage and policy breadth.

TABLE 3

Key elements in carbon market policy frameworks

(please refer to WB Article 6 approach paper on Country Policy framework for more detail)

Element	Description	Policy Approaches	Country Examples
Activities	Activities eligible to generate carbon credits (countries may also specify which sectors are eligible to receive Authorization to generate Internationally Transferred Mitigation Outcomes (ITMOs))	Whitelist/positive list to be included in the country policy framework	Ghana, Thailand, Rwanda, Kenya, South Africa*, India, Zambia**, Cambodia, Indonesia, Malaysia, Paraguay, Tanzania, and Zimbabwe
Methodologies & Mechanisms	Eligible methodologies and crediting mechanisms to quantify and generate carbon credits	Eligibility of methodology(ies) specified in the policy framework, for instance use of Gold Standard/Verra etc.	Ghana, Rwanda, South Africa, Singapore, Indonesia, Malaysia, and Zambia
Issuance	Processes for credit issuance, including the country process and relevant overseeing institutions. This element may also specify the registry to be used.	Institutional arrangements, processes and responsibilities to be included in the policy framework.	Ghana, Kenya, Indonesia, Cambodia, Zambia, Paraguay, Peru, Tanzania and Malaysia, Bhutan
Authorization Procedures	Process by which authorization is granted; this element may include the Letter of Authorization template to be used/its content and specify the relevant institutions that manage and grant authorization.	Publishing the process for securing authorization; identifying relevant institutions and specifying conditions, if any. Include revocation conditions, if applicable.	Ghana, Rwanda, Zambia, Peru, Bhutan and Cambodi
Reporting Process	Outlining how the country will follow and meet reporting requirements under Article 6	Reporting template consistent with the UNFCCC guidance, and identification of relevant institutional arrangement	Ghana, Tanzania, Thailand, Kenya, Singapore, Cambodia, Zambia, Indonesia, Peru, South Africa and Malaysia
Pricing Strategy	Country's approach to pricing credits that come with corresponding adjustment and/or its plan to use the carbon revenues collected from a corresponding adjustment fee or levy, if any.	Linked to priority investment areas for decarbonization, transaction costs and reflect the opportunity costs for meeting NDC for adjusted credits	Ghana, Bhutan
Eligible Uses	Mitigation purposes for which generated credits can be used	Specifying criteria and eligibility for approvals and Authorization. Eligibility of use of the credits determined by the buyer.	Ghana, Rwanda, and South Africa

Note: The table was developed based on analysis of domestic carbon market regulation in 16 countries that were in public domain; *in South Africa, regulations on carbon credits are linked to the Carbon Tax Act and limited to their use against compliance obligations in the domestic market (i.e., regulations have not yet been specified for trading these credits in international compliance and voluntary markets); **analysis on Zambia is limited to Part 1 of the carbon market framework that has been published

Countries must aim to develop policy frameworks that enable the broader use of carbon credits and address policy elements that support such usage (Box 3). Country policy frameworks need to improve clarity around Authorization (for corresponding adjustment) and the associated pricing strategies. Ghana's country policy framework[22] stands out as particularly advanced, offering comprehensive guidance for carbon market participants in the country. It is also essential for country policy frameworks to provide clarity on legal aspects, as elaborated further in #4.1.

In sum, policy frameworks governing carbon market activity have been emerging with varying degrees of market coverage and policy breadth. These developments are welcome and necessary to ensure that market activity is governed by robust and clear regulations. As we note in the next key message, countries require capacity building to set up these frameworks and learn from best practices for consistency and coherence.

BOX 3

Considerations for National Carbon Market Framework

Should a country choose to broaden the eligible uses for credits generated in the country for different international mitigation purposes beyond Article 6 (i.e., for voluntary purposes / CORSIA), then the following elements should be clearly specified in country policy frameworks and associated technical documents:

1. Recognition of the role of different eligible uses in NDC achievement and national climate strategy.
2. Legal framework defining ownerships and rights of different stakeholders and their ability to enforce cross-border contractual arrangements.
3. Requirements for credits generated by independent standards, if any, including eligible crediting programs, standards, methodology, and contribution to sustainable development benefits.
4. Processes and requirements for obtaining approval/authorization for credits, if any.
5. Data protocols for information and infrastructure for tracking and reporting
6. Reporting requirements related to non-Article 6 transactions, if any.

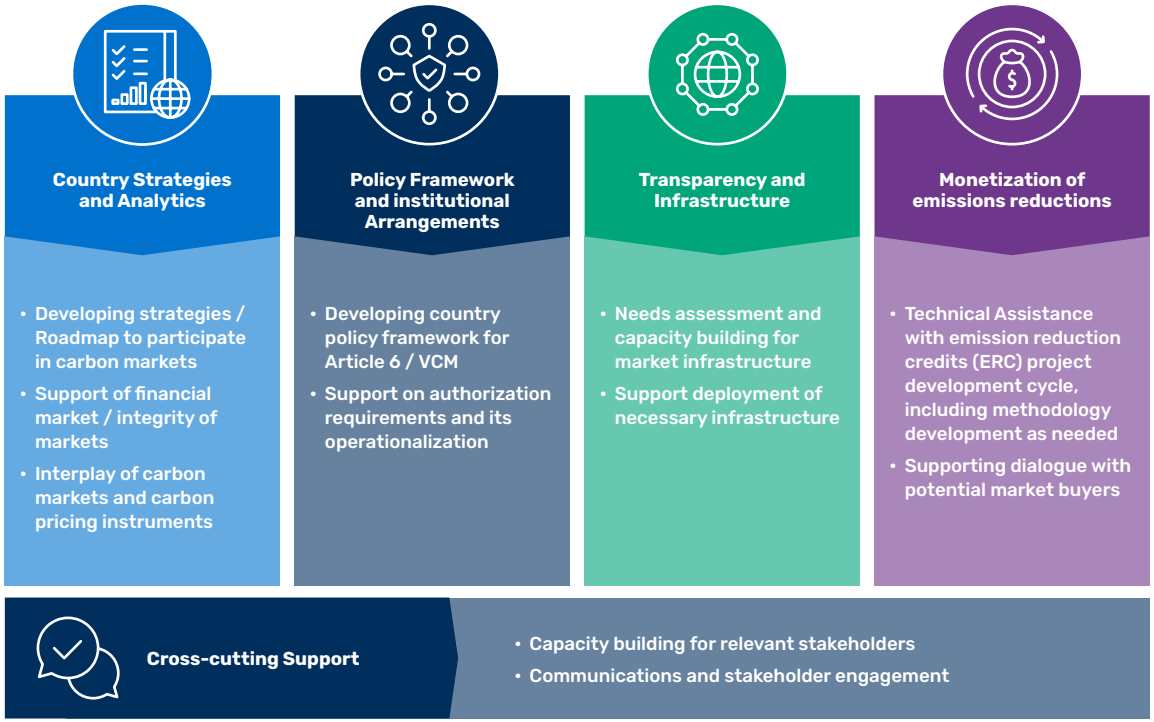
03

Improved coordination on global capacity building efforts is needed to better support countries to participate in carbon markets.

The development of country policy frameworks and market infrastructure (more in #5) requires building domestic capacity. However, with over 50 programs[23] - through numerous international organizations, countries and agencies - actively providing capacity building support across various aspects of carbon markets (see Figure 3), the current landscape is fragmented, sometimes with inconsistent messaging on key options and with duplication of efforts and gaps in support. A cohesive, coherent and coordinated strategy is needed.

FIGURE 3

Range of capacity building services



Harmonizing and standardizing capacity building approaches, for instance around gap and readiness assessments and minimum common elements, would ensure that countries receive consistent support, that can be tailored as relevant to their specific contexts.

Coordinating capacity building efforts, particularly among initiatives with similar mandates, can facilitate knowledge exchange, identify challenges and gaps, and align the roles of different organizations involved to avoid duplication and ensure impactful outcomes. The UNFCCC Secretariat, the World Bank and other UN Organizations, in partnership with initiatives with similar mandates, such as the Paris Agreement Article 6 Implementation Partnership (A6IP), can facilitate such urgently needed coordination.

04

Clarity on the legal nature of carbon credits is critical to boost market confidence and scale effectively.

Clearly defining the legal nature of carbon credits is essential for financiers. Legal clarity builds trust and predictability for investors and ensures that carbon credits can be credibly and reliably created, traded, used, and retired. This clarity also enables the development of financial instruments that can securitize or be linked with carbon credits and investments in carbon projects. A clear legal framework also helps define the broader regulatory, tax, and accounting treatment of carbon credits, which is crucial for fostering deep and liquid secondary markets and facilitating cross-border trading of credits. It is therefore critical that such clarity is embedded in national carbon market policy frameworks and supported by capacity building efforts.

Some jurisdictions have begun to clarify the legal status of carbon credits, though with varied approaches. For instance, countries like the United States[24] and Canada[25] have classified carbon credits as commodities (non-financial intangible), while others, such as Brazil[26] and Egypt[27] have recognized them as securities. There is broad consensus among market and legal experts that while each jurisdiction has the autonomy to regulate carbon credits domestically as they see fit, establishing common understanding around few fundamental aspects is essential to foster some degree of harmonization across jurisdictions with diverse legal systems. According to ongoing work led by the International Institute for Unification of Private Law (UNIDROIT Working Group)[28], recognizing or granting property rights to carbon credits can help facilitate a more harmonized, transaction and market-based approach towards the legal treatment of carbon credits, as such legal concepts are broadly recognized in most jurisdictions. The Working Group aims to issue soft law guidance in the form of general principles regarding the treatment of carbon credits to guide legislators and legal practitioners on how to provide improved and more harmonized legal clarity.

Recognizing or granting property rights to carbon credits can help facilitate a more harmonized, transaction and market-based approach towards the legal treatment of carbon credits.

Bestowing carbon credits with property rights elevates them from mere contractual promises to assets with intrinsic value and legal protections like any other kind of property (Figure 4). These protections grant the holder the exclusive right to own, control and defend such property against third parties. While the precise meaning of this approach may vary depending on national property laws, it generally implies that carbon credits can be traded, used, collateralized, and integrated into financial systems with greater assurance. Furthermore, these rights can facilitate the inheritance of carbon credits, allowing them to be transferred through succession, and thus may retain their value and utility beyond the lifetime of the initial holder.

The ability to transfer and secure these rights is essential for mobilizing capital for climate action, as it allows for the use of carbon credits as leverage in financial transactions, thereby unlocking new streams of funding for carbon projects. Affirming and codifying as international best practice that carbon credits are capable of property rights expressly empowers market infrastructure to be built to service the asset class and mitigates the risk of disputes over ownership and control, which is crucial for international trade in carbon credits.

FIGURE 4

Legal protections that holders of carbon credits will have if they are recognized or granted proprietary rights

Affirming and codifying as international legal best practice that carbon credits are capable of property rights expressly empowers market infrastructure to be built to service the asset class and mitigates the risk of disputes over ownership and control, which is crucial for international trade in carbon credits.
While the nature of these rights may differ based on national property laws, in general, property rights will allow the holder of the carbon credit to exercise the following legal protections:

Exclusive Right
Entitle the holder to exclusively own and control such property

Right to Credit Against Third Parties
The holder of the carbon credit can assert and defend such property rights against third parties

Cause of Action and Remedies
The holder of the carbon credit has the right to take legal action and seek compensation from any party that takes the credit from them

Transfer and Security Rights
The holder of the carbon credit can transfer their proprietary right in that credit to someone else and grant security rights over it (such as collateral/ leverage for financial transactions)

Part of Estate in Insolvency
If the carbon credit holder becomes insolvent, the credits held forms part of the holder's estate available for distribution to the holder's creditors

Law of Succession
If the carbon credit holder dies, these rights can facilitate the inheritance of carbon credits, allowing them to pass through succession, thereby maintaining their value and utility beyond the lifetime of the initial holder

05

Developing robust and interoperable carbon market infrastructure is essential for market integrity.

Building robust and interoperable carbon market infrastructure is critical for ensuring market integrity and scalability. The Paris Agreement puts significantly more responsibility on participating countries compared with the Kyoto Protocol, requiring strong national frameworks and infrastructure for both the pre-issuance and post-issuance stages. This shift has resulted in a fragmented ecosystem with increased complexity and diversity in verification, issuance, transaction, and reporting approaches —including independent, international, and governmental—feeding into various end markets such as voluntary, compliance, domestic, and international. As the number of players increases, so do the risks of errors and fraud, emphasizing the growing need for transparent and reliable infrastructure and the importance of ensuring safe and standardized digital systems to support the functioning of carbon markets.

There are significant challenges in the development and deployment of carbon market infrastructure. These include, among others, unclear terminologies, roles, functionalities, and liabilities within the market infrastructure ecosystem at both the pre- and post-issuance stages. There is also an absence of clear documentation and limited knowledge regarding security and regulatory standards and good practices related to information technology (IT) security and transaction integrity in carbon markets to prevent fraud, ensure transparency, and maintain market trust. Regulatory frameworks such as the ISO/IEC 27001 for information security management systems and the EU General Data Protection Regulation (GDPR) guide the protection of sensitive data, ensuring robust encryption, access controls, and secure data storage. Good practices in IT security for carbon markets can include, for example, regular security audits and using multi-factor authentication to safeguard user identities. For transaction integrity, continuous monitoring helps detect and respond to any irregularities in real-time. A further challenge is that multiple tracking and transaction platforms often operate with incompatible data formats and inconsistent standards, leading to difficulties in data exchange, reporting, and aggregation. This fragmentation hinders seamless tracking of carbon credits, increases the risk of double counting, and undermines trust among market participants (see Table 4).

In the post-issuance stage, countries can choose from several different market infrastructure options for meeting tracking and reporting requirements, as reported in the 2023 State and Trends of International Carbon Markets. Firstly, countries that intend to implement carbon pricing instruments and have sufficient capacity and resources can develop their own registry. This is the case for many countries, such as Bhutan, Ghana, Japan, Suriname, Switzerland, Thailand and Vanuatu. Secondly, countries wishing to reduce cost in operating the system and use a registry for multiple functions in addition to Article 6, can use available registry services, for example, from Art TREES (e.g., Guyana), Verra (e.g., Colombia, Philippines), Gold Standard (e.g., Peru, Vietnam), S&P (e.g., Kenya, Chile), Xpansiv (e.g., Viet Nam, Indonesia),and Ecoregistry (e.g., Mexican States of Querétaro and Guanajuato), among others.[29] Thirdly, countries with limited capacity and resources, intending to use the registry for the sole purpose of Article 6, can use the international registry (under development) operated by the UNFCCC Secretariat. The most appropriate solution varies between countries, depending on factors such as level of carbon market activities, preference of using more than one service for different purposes, available resources and capacity, or whether the country plans on operating a domestic carbon pricing instrument[30].

To build a robust carbon market infrastructure ecosystem, it is essential to harmonize and standardize minimum service standards, governance structures, and frameworks across the various entities involved, such as integrity initiatives, independent standards, verification bodies, registers, transaction registries, exchanges, meta-registries, banks, among others[31]. Emerging guidelines from entities, such as International Organization of Securities Comissions (IOSCO), ISO, United States Commodities Futures Trading Commission (CFTC), and regulatory bodies in different countries highlight the importance of the role of market infrastructure in ensuring efficient transactions, while ensuring minimum security and regulatory standards, such as those related to data privacy and financial transactions. Furthermore, there is a need to enhance market connectivity through strengthening the interoperability of data and systems, for example adopting common standards and standardized protocols, developing robust APIs that allow different platforms, such as tracking and trading platforms, and data repositories, to exchange information easily. Further, convening key stakeholders to agree on and enforce technical standards, common definitions and data taxonomies, and best practices; and implement rigorous testing and validation to ensure that integrated systems communicate correctly and securely. The Climate Action Data Trust, ICVCM (through the DAIP Network), the World Bank (as a part of the Climate Warehouse program and the Engagement Roadmap for the carbon markets) are among the convenings to address these challenges.

To build a robust carbon market infrastructure ecosystem, it is essential to harmonize and standardize minimum service standards, governance structures, and frameworks.

TABLE 4

Key challenges to developing robust market infrastructure and potential solutions to address them

Challenge	Potential Solution
Ambiguity in roles, liabilities, and governance structures, leading to confusion and inefficiencies.	Comprehensive mapping of terminologies, technical definitions, roles of ecosystem players, functionalities, and governance gaps to clearly define and distinguish these elements within the ecosystem.
Poor documentation and inadequate knowledge of current practices and standards related to IT security and transaction integrity measures are undermining the trust.	Document and promote good practices and standards related to IT security (e.g. Multi-Factor Authentication) and transaction integrity (e.g. KYC/ML) measures to build trust and enhance standardization and robustness of trading processes.
Insufficient interoperability between systems and data structures, combined with the absence of a well-defined integrated marketplace architecture, hinders seamless collaboration and efficient exchange of information	Strengthen data and systems interoperability by leveraging digital public goods initiatives (e.g. data model of the Climate Action Data Trust (CAD Trust), opensource prototypes, etc.) and implementing international guidelines.
Insufficient capacity and resources in emerging economies to develop and deploy needed infrastructure, hindering effective participation in carbon markets.	Targeted capacity-building and resource development to enhance countries' capabilities to manage the market infrastructure and participate in and benefit from carbon markets.

Overall, while progress is being made, the fragmented nature of the emerging carbon market architecture demands careful attention to interoperability, governance, and technological innovation to ensure market integrity and effectiveness.

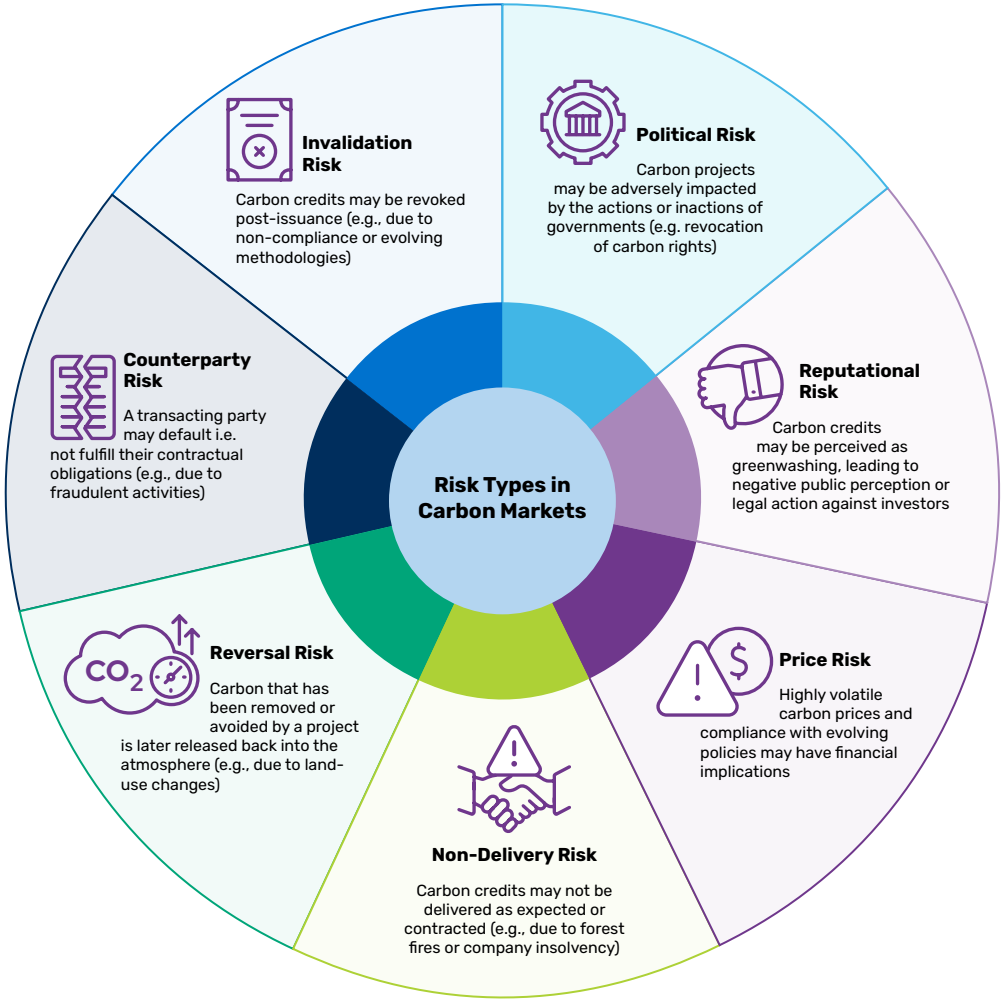
06

Emerging products could help identify and de-risk carbon market transactions and incentivize investment.

Carbon market transactions present a diverse spectrum of risks, from non-delivery and reversal of credits to counterparty, political, reputational, and invalidation risks (Figures 5A and 5B). These risks can arise at various stages of a project's lifecycle, impacting project developers, buyers, and intermediaries. The extent of these risks varies based on factors such as project type and location. In the absence of consistent and clear regulation, market participants are increasingly utilizing emerging approaches like carbon credit ratings and insurance products to address many of these risks. Rating providers could play an important role in evaluating and characterizing the risks associated with quality of projects and the credits they generate. Renewable energy and nature-based solutions (particularly forestry-related projects) are the most covered project types, but ratings are now starting to emerge for a broader range of projects including technology-based removals. Some ratings providers have noted a strong correlation between the price and ratings of projects[32], highlighting the added value and quality assurance these ratings can provide. As the market grows, it is essential to ensure a degree of harmonization among different rating providers to prevent inconsistencies in ratings for the same project and increased transparency around methodologies and due diligence approaches.

FIGURE 5A

Spectrum of risks in carbon markets



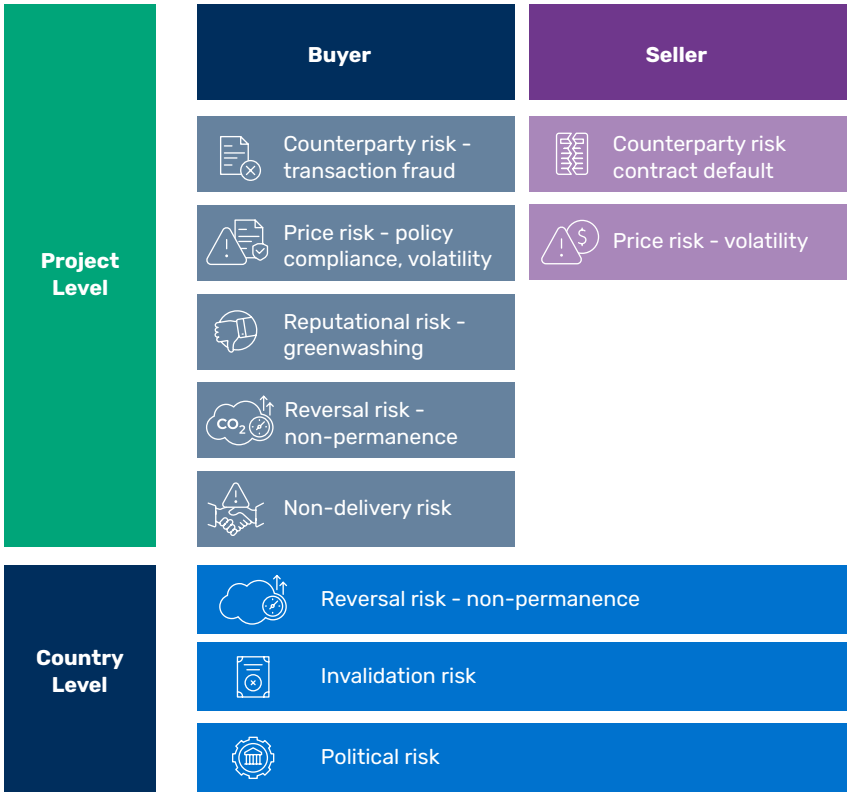
As reported in the State and Trends of Carbon Pricing 2024, **various insurance providers are emerging to address different high-severity, low-frequency risks.** For instance, the Multilateral Investment Guarantee Agency (MIGA) offers political risk insurance to protect against losses due to trade bans, governmental breaches of contract, and reversals of binding commitments related to carbon credits and corresponding adjustments. Private insurers such as Kita and Oka, are offering coverage against potential reversals, non-delivery, and invalidation risks, offering protection at both the point of issuance and credit sale for project developers and buyers. In addition, independent crediting standards are considering the approval of insurance certificates[33,34] to address non-permanence (reversal risk) and political risks for project developers participating in the CORSIA scheme. There is also an increasing interest from insurance companies in providing parametric insurance coverage[35] for project developers, protecting against the loss of carbon credit revenue due to physical risks from extreme weather events like droughts, floods, and hurricanes.

There is growing recognition among market participants of the critical role these instruments play in scaling carbon markets. Ratings are perceived as being essential to identify risks and insurance for managing risks, securing better financing terms for projects, and attracting a broader range of investors. However, overreliance on these instruments could increase the transaction costs and reduce the final flow of revenue to underlying projects. Hence, strategic deployment of these instruments is critical as these markets scale.

Strategic deployment of these instruments is key since overreliance can increase transaction costs and reduce final flow to projects.

FIGURE 5B

Risk mapping for market players



Endnotes

1 Carbon markets in this report refer to carbon credits generated from emission reduction or removal activities through the following types of crediting mechanisms:

- **International:** Includes mechanisms established under international treaties and administered by international organizations (such as Article 6 under the Paris Agreement)
- **Independent:** Includes standards and crediting mechanisms administered by independent, non-governmental entities (such as Verified Carbon Standard, Gold Standard, etc)
- **Governmental:** Includes mechanisms administered by one or several regional, national, or subnational governments (such as the Thailand Voluntary Emission Reduction Program)

Credits generated through these mechanisms can be used for a variety of purposes such as compliance (against Nationally Determined Contributions targets; Carbon Offsetting and Reduction Scheme for International Aviation [CORSIA] targets; use against carbon taxes / emissions trading systems) or voluntary (against corporate net-zero targets; climate finance contributions). For this report's purposes, the segment of the market driven by compliance demand will be called "international compliance markets" while the segment driven by voluntary demand will be called "voluntary carbon markets". Together, they will be referred to as simply "carbon markets".
For more, please visit https://carbonpricingdashboard.worldbank.org/credits/instrument-detail

2 Ecosystem Marketplace (EM). 2024 State of the Voluntary Carbon Market (SOVCM). https://www.ecosystemmarketplace.com/publications/2024-state-of-the-voluntary-carbon-markets-sovcm/

3 World Bank. 2023. State and Trends of Carbon Pricing: International Carbon Markets. https://openknowledge.worldbank.org/entities/publication/2958244e-0e36-4eec-91cb-e48536a35d2c

4 This reflects volume weighted average spot prices for carbon credits based on data provided to the WB by MSCI carbon markets for 2023-24.

5 Ecosystem Marketplace (EM). 2024 State of the Voluntary Carbon Market (SOVCM). https://www.ecosystemmarketplace.com/publications/2024-state-of-the-voluntary-carbon-markets-sovcm/

6 Authorization of carbon credits commits the host country to an accounting mechanism under the Paris Agreement to prevent double counting of emission reductions / removals against the NDCs of both host country and buyer country.

7 According to data shared by Allied Offsets with WB, the price of credits from projects such as the DelAgua Clean Cooking Grouped Project (VCS 2749) and Jurisdictional REDD+ project (ART102) increased by over 37% and 94% respectively, following the issuance of the Letter of Authorization from their respective host countries.

8 https://www.symbiosiscoalition.org/meet-the-coalition

9 https://www.nextgencdr.com/

10 The assessment for issuance of Core Carbon Principle (CCP) labels is a two-step process. Only credits issued by an approved program and under an approved methodology will be designated with the CCP label.

11 https://icvcm.org/carbon-credits-from-current-renewable-energy-methodologies-will-not-receive-high-integrity-ccp-label/

12 https://icvcm.org/integrity-council-announces-first-high-integrity-ccp-labelled-carbon-credits-as-assessments-continue/

13 https://carbon-pulse.com/312054/?utm_source=CP+Daily&utm_campaign=7ce71c1882-CPdaily12082024&utm_medium=email&utm_term=0_a9d883%E2%80%A6

14 https://xpansiv.com/first-icvcm-ccp-standardized-contracts-begin-trading-on-xpansivs-cbl-spot-exchange/

15 https://icvcm.org/carbon-credits-from-current-renewable-energy-methodologies-will-not-receive-high-integrity-ccp-label/

Most of these are Clean Development Mechanism (CDM) methodologies that Verra and Gold Standard accepted for use in their respective crediting programs.

16 The rejection of the renewable energy methodologies by the ICVCM has resulted in interest on how these methodologies will be treated by the Supervisory Body of Article 6.4.

17 Verra and Gold Standard only accept project registrations of new renewable energy projects in Least Developed Countries (LDCs).

18 https://sciencebasedtargets.org/news/statement-from-the-sbti-board-of-trustees-on-use-of-environmental-attribute-certificates-including-but-not-limited-to-voluntary-carbon-markets-for-abatement-purposes-limited-to-scope-3

19 https://sciencebasedtargets.org/resources/files/Aligning-corporate-value-chains-to-global-climate-goals-SBTi-Research-Scope-3-Discussion-Paper.pdf

20 https://www.etaccelerator.org/post/brief-exploring-how-energy-transition-accelerator-credits-could-help-decarbonize-value-chains

21 https://vcmintegrity.org/scope-3-claim-upcoming-public-consultation/

22 https://cmo.epa.gov.gh/wp-content/uploads/2022/12/Ghana-Carbon-Market-Framework-For-Public-Release_15122022.pdf

23 Based on the Paris Agreement Article 6 Implementation Partnership (A6IP) database on capacity-building activities.

24 https://www.cftc.gov/sites/default/files/2023/12/2023-28532a.pdf

25 https://www.asc.ca/-/media/ASC-Documents-part-1/Regulatory-Instruments/2023/06/6103549-Amendments-to-MI-25-102-and-Changes-to-CP.ashx

26 https://www.unidroit.org/wp-content/uploads/2024/04/Study-LXXXVI-W.G.2-Doc.-2-Revised-Issues-Paper.pdf

27 https://fra.gov.eg/en/vcm/

28 https://www.unidroit.org/work-in-progress/verified-carbon-credits/#1637156948432-1d04168e-7a08 UNIDROIT working group is developing a set of guiding legal principles to recognize / grant proprietary rights to "verified" carbon credits

29 While independent standards and programs such as ACR, Gold Standard, Verra and others operate registries, the underlying infrastructure is often provided by entities such as EcoRegistry, S&P Global, XPansiv and others.

30 A6IP, https://a6partnership.org/wp-content/uploads/2024/03/3_Final_Session_3_a6ip_cb_tools_compilation.pdf

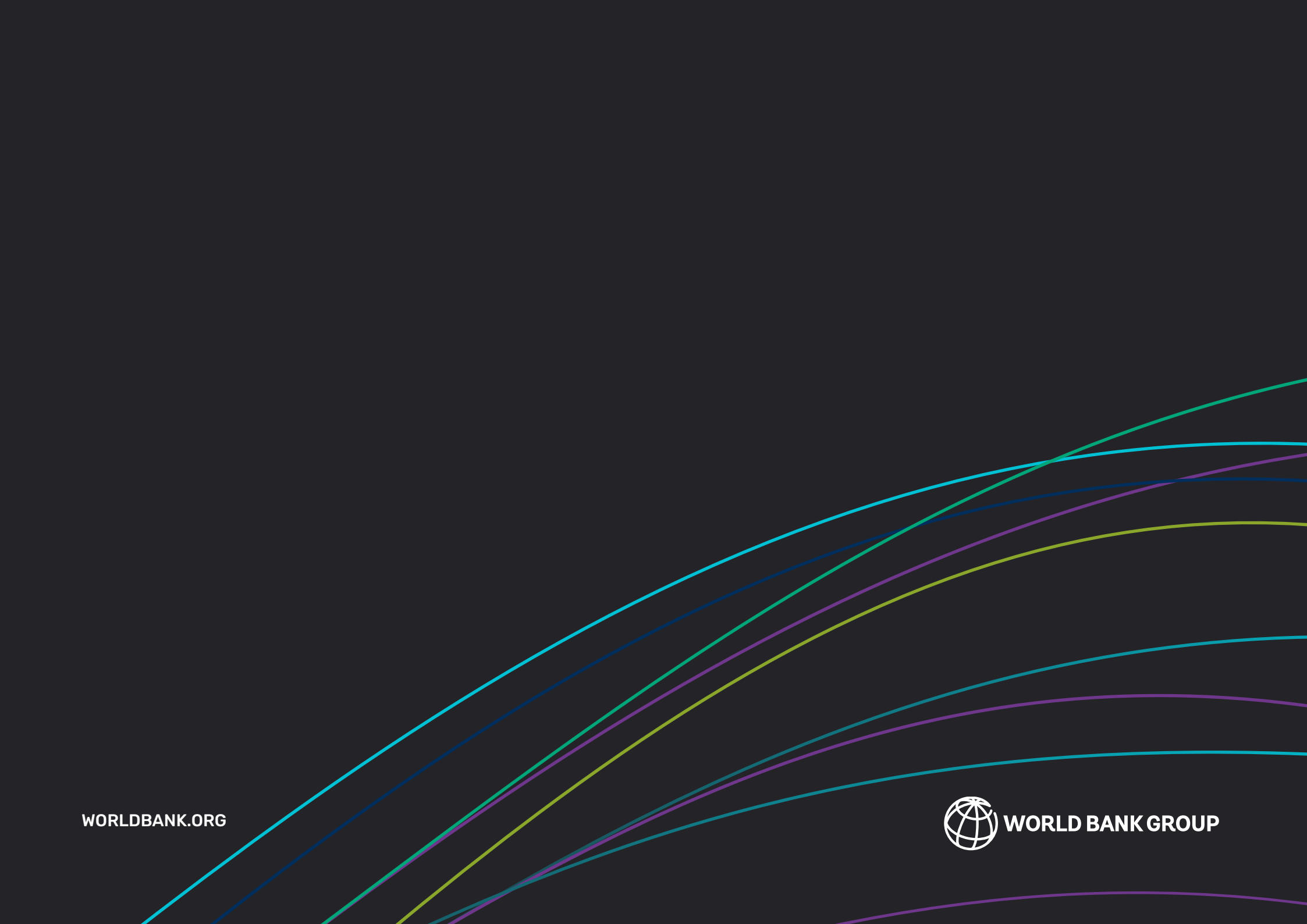
31 https://www.theclimatewarehouse.org/knowledge/papers/infrastructure-to-meet-reporting-requirements-under-article-6

32 https://bezerocarbon.com/insights/towards-efficiency-carbon-credit-pricing-and-risk-part-ii

33 https://www.icao.int/environmental-protection/CORSIA/Documents/TAB/TAB2024/call%20for%20public%20comments_April%202024/VCS_MCAform_2024.pdf

34 https://www.goldstandard.org/careers/guarantees-for-the-replacement-of-corsia-eligible-credits

35 Parametric insurance is a type of insurance that pays out benefits based on specific, pre-defined parameters or triggers rather than the traditional method of assessing actual losses or damages.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