LIFE COASE

POLICY BRIEF

LIFE COASE – Collaborative Observatory for the Assessment of the EU ETS

State-of-play in international carbon markets 2025

Highlights

- Compliance markets remain at the forefront of climate change mitigation efforts, with 38 Emissions Trading Systems (ETSs) in operation as of March 2025. Together, they cover about 19% of global greenhouse gas (GHG) emissions and, in 2024, raised almost USD70 billion in auction revenues.
- Established ETSs keep evolving and two new systems have come into force in 2024, i.e., in the US States of Oregon and Colorado. Additionally, there are 20 prospective systems at various stages of development, for instance in Brazil, India, Türkiye, and Japan.
- Linkages exist between several compliance markets, including those in the ten US states participating in the Regional Greenhouse Gas Initiative (RGGI); in Tokyo and Saitama; in California and Québec; and between the EU and Switzerland. These linkages operated smoothly in 2024 without requiring ad hoc intervention.
- Over the next few years, negotiations on the potential linkage between Washington's Cap-and-Invest program and the al-

Issue 2025/07

Authors

Baran Doda, adelphi; Theresa Wildgrube, adelphi; Albert Ferrari, EUI; Simone Borghesi, EUI.

EUI FLORENCE SCHOOL OF REGULATION

ROBERT SCHUMAN CENTRE

ready-linked compliance markets of California and Québec are expected to make progress. Elsewhere, stakeholders have persistently called for linking the EU ETS with the UK ETS.

- More and more ETSs are featuring intensity-based rather than absolute caps. Intensity-based caps provide compliance entities with flexibility amid economic fluctuations, exchange rate changes, and shifts in trade conditions. Provided that the intensity benchmarks are sufficiently stringent and the overall policy framework is consistent, systems with an intensity-based cap can efficiently support ambitious climate targets.
- Differences in cap-setting approaches can pose obstacles to linking. For example, by law, the EU ETS can only be linked to absolute cap systems. Even without legal constraints, systems with intensity-based caps introduce greater uncertainty, which may hinder linking.
- In addition, differing rules for the use of an increasingly diverse set of offset credits can complicate linking negotiations. These rules range from allowing offsets to cover up to 100% of compliance obligations to restricting or banning their use altogether. Moreover, various crediting mechanisms issue offset credits of different types and quality. The resulting fragmentation poses a significant challenge to carbon market integration, as ETSs are more likely to link with systems that share similar designs.
- Agreements at COP29 substantially advanced the market mechanisms outlined in Article 6 of the Paris Agreement. Nevertheless, critical issues remain unresolved, such as ensuring the transparency and environmental integrity of internationally transferred mitigation outcomes (ITMOs) under Article 6.2 and the approval and use of new methodologies under the Paris Agreement Crediting Mechanism (PACM) of Article 6.4. Another key issue for the success of Article 6 market mechanisms is addressing the capacity-building needs of host countries.

1. Introduction

The international carbon market landscape continued to evolve rapidly in 2024, reflecting the growing urgency of addressing climate change and addressing it through cost-effective policy instruments. Compliance markets remain at the forefront of these efforts, serving as a cornerstone of climate change policy frameworks worldwide. This report examines the current state-of-play in international carbon markets, highlighting both the progress and challenges faced by key systems globally. From the expansion of established markets to the development of new initiatives, the report provides an analysis of the trends shaping carbon markets.

The report is organised in six sections. Section 2 begins with a review of Emissions Trading Systems (ETSs) in operation, focusing on major systems such as the EU ETS, China National ETS, and UK ETS. This section also explores upcoming systems in countries like Brazil, India, and Türkiye, as well as those in Japan and the EU. Section 3 examines the latest developments in ETS linkages, including potential new links between Washington, California, and Québec, as well as between the EU and UK ETSs. Section 4 reviews the progress made under Article 6 of the Paris Agreement, outlining advancements in mechanisms under Articles 6.2 and 6.4. Section 5 discusses emerging issues, such as the challenges of linking systems with differing cap-setting approaches and offset use, providing insights into the future trajectory of international carbon markets. Section 6 concludes by summarising the key findings and implications for policy and market developments.

2. Review ETSs internationally

ETSs continue to be a cornerstone of governments' climate change policy portfolios worldwide. As of March 2025, 38 ETSs are in operation, with alternative approaches to cap setting, including those with absolute or intensity-based caps and baseline and credit systems. Together, they cover about 19% of global greenhouse gas (GHG) emissions. In 2024, they raised almost USD70 billion in auction revenues.[1] Figure 1 from ICAP (2025) illustrates the growing reach of emissions trading.

1 Unless stated otherwise, the facts and figures in this section are taken from ICAP (2025). See: https://icapcarbonaction.com/en/publications/emissions-trading-worldwide-icap-status-report-2025

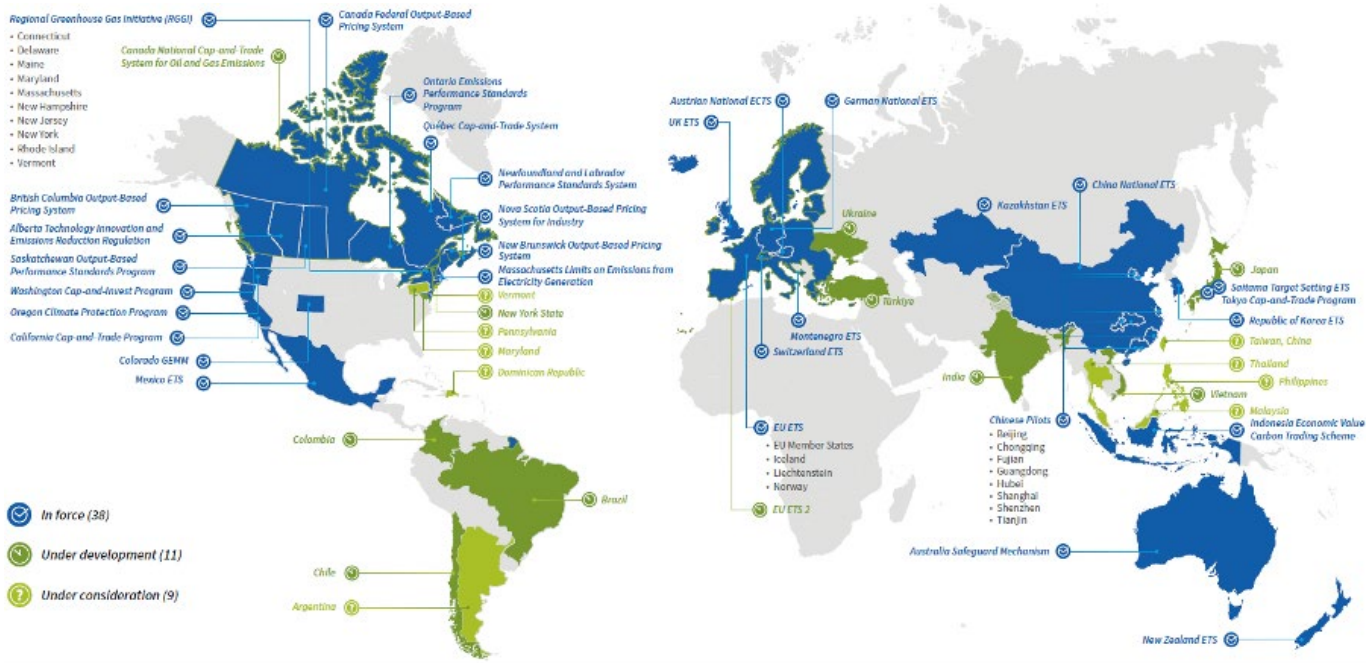

Figure 1: Status of ETSs worldwide, ICAP (2025)

Two new systems came into force in 2024 in the US States of Oregon and Colorado. While they cover a relatively small share of global GHG emissions, and in the case of Oregon, the Climate Protection Program is a reinstatement of an earlier version which was successfully challenged in courts, these programs are notable for expanding the foundation of state-level climate action in the US in 2024. ICAP (2025) also identifies 20 prospective systems at various stages of development. These include not only additional systems in the US (i.e. New York, Maryland, Pennsylvania, and Vermont) but also much larger systems in Brazil, India, and Türkiye, as well as in the EU and Japan. The rest of this section first highlights the most salient news in the systems in operation, focusing on the EU ETS, China National ETS and UK ETS before reviewing the advances in the latter group towards system launch.

Systems in operation:

The **EU ETS**, the world's oldest and largest ETS by value and trading volume, underwent significant reforms in 2024 to align with the EU's enhanced climate ambitions. Following the adoption of the 2023 European Green Deal reform package, important changes to the system's ambition and scope came into force, including a downward adjustment to **its absolute cap** and increased annual cap reductions from 2024 onwards. The scope expanded to include emissions from maritime transport and from most flights to and from the EU's nine outermost regions. **Offset credits have not been allowed for compliance** in the EU ETS since the beginning of Phase 4. However, by July 2026 the European Commission must assess how removals could be accounted for and covered as part of the ongoing EU ETS review process, potentially creating a role for domestic removal offset credits in the system.

China's national ETS is the world's largest in terms of covered emissions at around 5.2 billion tCO2. The system operates as **an intensity-based ETS**, with allowances freely allocated based on production benchmarks. In September, the Ministry of Ecology and Environment published a draft work plan for extending the sectoral coverage beyond the power sector to include cement, steel, and aluminium industries in two phases, potentially increasing the system's emissions coverage by an additional 3 billion tCO2e. In January 2024, the Chinese Certified Emissions Reduction scheme (CCER) was relaunched after a six-year suspension. This reformed **domestic offset scheme allows covered entities to use CCER credits** for compliance, with new projects being submitted for consideration and around 10 million new credits being issued in March 2025. If the new sectors are included in the scope before the end of the decade and the existing offset provisions are maintained (i.e. up to 5% of compliance obligations), China's national ETS could gen-

erate demand for 400 million credits per annum in the 2030s.[2]

The **UK ETS** Authority announced significant reforms in 2023 to align with the country's 2050 net-zero target, with many elements implemented from 2024 onwards. The system's **absolute cap** was reset, reducing available allowances by 30% between 2021 and 2030, and the annual cap is set to decrease from 156 MtCO2e in 2021 to around 50 MtCO2e by 2030. Consultations were launched on expanding the system to include waste incineration and energy from waste by 2028, domestic maritime emissions from 2026, as well as integrating engineered greenhouse gas removals. Like the EU, the **UK does not allow offset credits for compliance**. The government will likely maintain this approach even if engineered removals are eventually included in the UK ETS.[3]

Upcoming systems:

In the lead-up to COP30, which **Brazil** will host in Belém in November 2025, the country approved the law underpinning its Greenhouse Gas Emissions Trading System (SBCE) in December 2024, formally establishing the national carbon market. The SBCE is expected to feature **an absolute cap** and broad sectoral coverage across the economy, with the notable exemption of agricultural activities. The forestry sector is positioned to generate carbon credits. The system incorporates **a domestic offset mechanism** to generate Verified Emissions Reduction or Removal Certificates (CRVEs) from the agriculture, land-use change and forestry sectors, which are responsible for over 60% of Brazil's emissions. The CRVEs may also be eligible for international transfer under Article 6 of the Paris Agreement. The implementation follows a five-phase approach, beginning with regulatory development over the next two years, followed by monitoring and reporting operationalisation, mandatory reporting obligations, initial free allowance allocation, and finally, full operationalisation. The first compliance obligations under the SBCE are expected in the next five to six years.

India adopted detailed regulations for its Carbon Credit Trading Scheme (CCTS) in 2024, establishing the framework for a domestic carbon market. The CCTS will take the form of **an intensity-based baseline-and-credit system**, with mandatory GHG emissions intensity targets set for regulated entities annually. The system will initially cover nine energy-intensive industrial sectors. Entities that overachieve their intensity targets will earn Carbon Credit Certificates (CCCs), while underperforming entities must surrender equivalent CCCs to ensure compliance. The compliance mechanism will be complemented by **a voluntary domestic crediting mechanism** allowing non-covered entities to register eligible projects for GHG emission reduction, removal, or avoidance credits. The first compliance period under CCTS is scheduled to begin in fiscal year 2026.

Türkiye is advancing preparations to launch its national ETS. In 2024, the government completed the technical analysis underpinning the climate law, which was submitted to parliament in February 2025 and is expected to become law soon. The draft law provides the legal foundation for the ETS and outlines its broad features. Sub-legislation that pins down the detailed design and operational features of the system is at an advanced draft stage. The ETS is expected to cover the direct emissions of large emitters in the power and industry sectors. The draft law allows for the potential use of offsets and empowers the government to set up **a domestic crediting mechanism**. It is not yet known whether the ETS **will feature an absolute or an intensity-based cap**, which will be determined in sub-legislation. The government expects to launch the ETS as a pilot in 2026 and is considering the development of a Turkish CBAM to safeguard against loss of competitiveness and carbon leakage.

Not all progress regarding compliance market development towards launch has been taking place in developing countries. The **EU** is on track to launch a new, separate ETS, the so-called **EU ETS2**. The system, which will cover buildings, road transport,

2 To put this figure into context, consider that the annual GHG emissions of the UK from all sources is approximately 400 MtCO2e according to ICAP (2025).

3 In its public consultation on removals, the government proposes that removals enter the system as new allowances issued to GGR operators "after the removal has taken place and been verified (ex-post)." For further details see: https://assets.publishing.service.gov.uk/media/664df92b993111924d9d39f8/integrating-ggrs-in-the-ukets-consultation.pdf

and additional sectors (mainly small industry not covered by the existing EU ETS), is scheduled to become fully operational in 2027.[4] The system features an **absolute cap** and will operate upstream, placing compliance obligations on fuel suppliers rather than end-consumers. **Offset credit use will not be permitted,** and allowances will be distributed exclusively via auctioning.

Japan is transitioning from its voluntary GX-ETS to a mandatory ETS from fiscal year 2026.[5] In February 2025, the government approved and proposed significant regulatory revisions to legalise the planned ETS, making participation mandatory for companies with annual emissions greater than 100 ktCO2. The GX-ETS started as a voluntary baseline-and-credit system during its first phase covering 2024 to 2025. The **approach to cap setting has not yet been decided**. Credits from Japan's domestic **J-Credit scheme** and its international **Joint Crediting Mechanism (JCM)**, which operates with 28 partner countries, **will likely be allowed as offsets,** although no further details are currently available.[6]

3. Review of latest ETS linking developments

There are several compliance markets that are currently linked, including those in the ten US states participating in the Regional Greenhouse Gas Initiative (RGGI) since 2009;[7] in Tokyo and Saitama since 2011; in California and Québec since 2014; and between the EU and Switzerland since 2020. There were no significant linking related news regarding the operation of these linked markets in 2024. Indeed, the absence of major news suggests that when designed and implemented well, linkages can operate smoothly without requiring *ad hoc* intervention. This contributes to their economic and political objectives while enhancing international and interjurisdictional climate cooperation.

A scan of the horizon for potential new carbon market linkages over the next decade reveals at least two possibilities. The first is the linkage between Washington's Cap-and-Invest program and the already-linked compliance markets of California and Québec. As noted[8] Washington's intention to link was announced in November 2023 after the Cap-and-Invest program was launched at the beginning of the year. However, the program was put at risk when the citizen-led Initiative 2117, aiming to repeal Washington's Climate Change Act (CCA) underpinning the program, was certified for vote in November 2024.

In the lead up to the vote, joint statements from the governments of Washington, California and Québec in March and September 2024 affirmed their commitment to continue exploring this linkage.[9] The uncertainty regarding the future of Washington's program was resolved when Initiative 2117 was defeated by a margin of almost 24 percentage points in the November 2024 ballot. This secured the program's future and set the stage for further progress on the linkage. In January 2025, the State Senate Bill 6058 (SB6058), which explicitly aims to

4 In the event of exceptionally high energy prices, the system start may be postponed by one year to 2028.

5 The GX in the name of the system refers to green transformation.

6 The J-Credit scheme is a Japanese governmental mechanism that issues emissions reduction and removal credits through the application of domestic energy-saving measures and forest management techniques in Japan. For details see: https://japancredit.go.jp/english/ . The JCM is a system that facilitates cooperation between Japan and developing countries to reduce greenhouse gas emissions. Emissions reductions achieved under the system are shared and can be used towards NDC compliance in partner countries and Japan. See: http://carbon-markets.env.go.jp/eng/jcm/index.html

7 The group currently includes Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont, see https://www.rggi.org/program-overview-and-design/new-participation.

8 See Doda, Wildgrube, Borghesi, Ferrari & Heinrich (2024). State-of-play in international carbon markets in 2024 (Policy Brief No. 2024/15). Florence School of Regulation, LIFE COASE, Florence: European University Institute. https://hdl.handle.net/1814/77086

9 See, respectively: Washington State Department of Ecology (2024a). California, Québec and Washington agree to explore linkage. News release of the 20th of March 2024. https://ecology.wa.gov/about-us/who-we-are/news/2024/mar-20-shared-carbon-market ; Washington State Department of Ecology (2024b). California, Québec and Washington to begin linkage agreement discussions. News release of the 23rd of September 2024. https://ecology.wa.gov/about-us/who-we-are/news/2024/california-quebec-and-washington-to-begin-linkage-agreement-discussions

facilitate linkage with California and Québec, became law in Washington.[10,11]

Each of the three jurisdictions is currently in the process of amending its individual program regulations. Depending on the timing of the completion of these amendments and other required steps, the link could become operational in 2026 or 2027.

The second possibility regarding a new potential carbon market linkage over the next decade is one between the EU ETS and UK ETS. In theory, this linkage is straightforward to negotiate, agree upon and implement. The regulators in each jurisdiction operate similar systems in terms of scope, ambition, approach to auctions and free allocations, leakage protection, offsets, etc., which are underpinned by compatible legal and institutional frameworks as well as market and MRV infrastructures. The jurisdictions share a long track record in emissions trading having worked together in setting up and operating the EU ETS. The upheaval in the lead up to Brexit notwithstanding, the EU-UK Trade and Cooperation Agreement of December 2020 commits the jurisdictions to cooperation on carbon pricing.[12] The regulated entities under both systems have been calling for a closer relationship between the two systems not least because it may exempt them from each other's CBAMs scheduled to impose compliance obligations starting 2026 in the EU and 2027 in the UK.[13]

Despite these conducive factors, there are significant political obstacles around issues like the process for dynamic regulatory alignment and the agreement on the arbiter of last resort in case of disputes. Moreover, there is growing divergence in the systems' design that has developed since the start of the UK ETS in 2021. Two examples of this divergence are the differences between the two systems' approaches to market stability and to sector coverage.[14] In the context of the ongoing review of the EU ETS and consultations in the UK ETS, this divergence is likely to grow wider, for example regarding whether, when and how to integrate removals into the systems.

The EU and UK are preparing for an international summit on the 19th of May 2025.[15] There have been several news items in the media suggesting that substantive linking discussions may be on the agenda. Analysts and market participants have argued that rumours around this possibility triggered speculation and caused short-term volatility in the UK allowance prices during the first quarter of 2025.[16] While the recent price volatility of UK allowances may subside when more clarity on the two sides' positions emerges, the significant and persistent price premium of the EU allowances that has emerged since 2023 in Figure 2 is unlikely to make negotiations around linking easier to conclude swiftly.

10 For details on CCA and SB6058, see: https://content.govdelivery.com/accounts/WAECY/bulletins/3c29129

11 See Roy, Russo and Burtraw (2025). Considerations for Washington's linkage negotiations with California and Québec. Resources for the Future (RFF) Report 25-05 of March 2025. https://www.rff.org/publications/reports/considerations-for-washingtons-linkage-negotiations-with-california-and-quebec/

Roy, Russo and Burtraw (2025) provide a comprehensive assessment of this linkage from Washington's perspective. While such a linkage "would lead to greater regional emissions reductions, more regional environmental benefits, and a more affordable program because of the expanded emissions reduction opportunities across the linked jurisdictions," it would also imply "lower revenue and a slower rate of emissions decline in Washington compared to an unlinked scenario." The paper also assesses various policy mechanisms to address these and other concerns.

12 See Article 392.6 of the EU-UK Trade and Cooperation Agreement of December 2020: https://commission.europa.eu/strategy-and-policy/relations-non-eu-countries/relations-united-kingdom/eu-uk-trade-and-cooperation-agreement_en

13 Industry associations in both jurisdictions have urged their governments to pursue linking since the publication of an open letter titled "The importance of linking the UK ETS with the EU ETS ahead of COP26" in April 2021. For a copy of the letter, see: https://www.europex.org/press-releases/joint-industry-letter-on-the-importance-of-linking-the-uk-ets-with-the-eu-ets/

14 EU ETS has a quantity-triggered market stability instrument, i.e. the Market Stability Reserve, while the UK ETS uses two price-triggered measures, namely the Cost Containment Mechanism and the Auction Reserve Price. Regarding sector coverage, the main difference between the two systems is the inclusion of Maritime emissions in the EU ETS but not in the UK ETS. For further details, see ICAP (2025).

15 For further details on the summit agenda and results, see: https://www.consilium.europa.eu/en/meetings/international-summit/2025/05/19/

16 See a recent article by Carbon Pulse for an overview: https://carbon-pulse.com/380168/

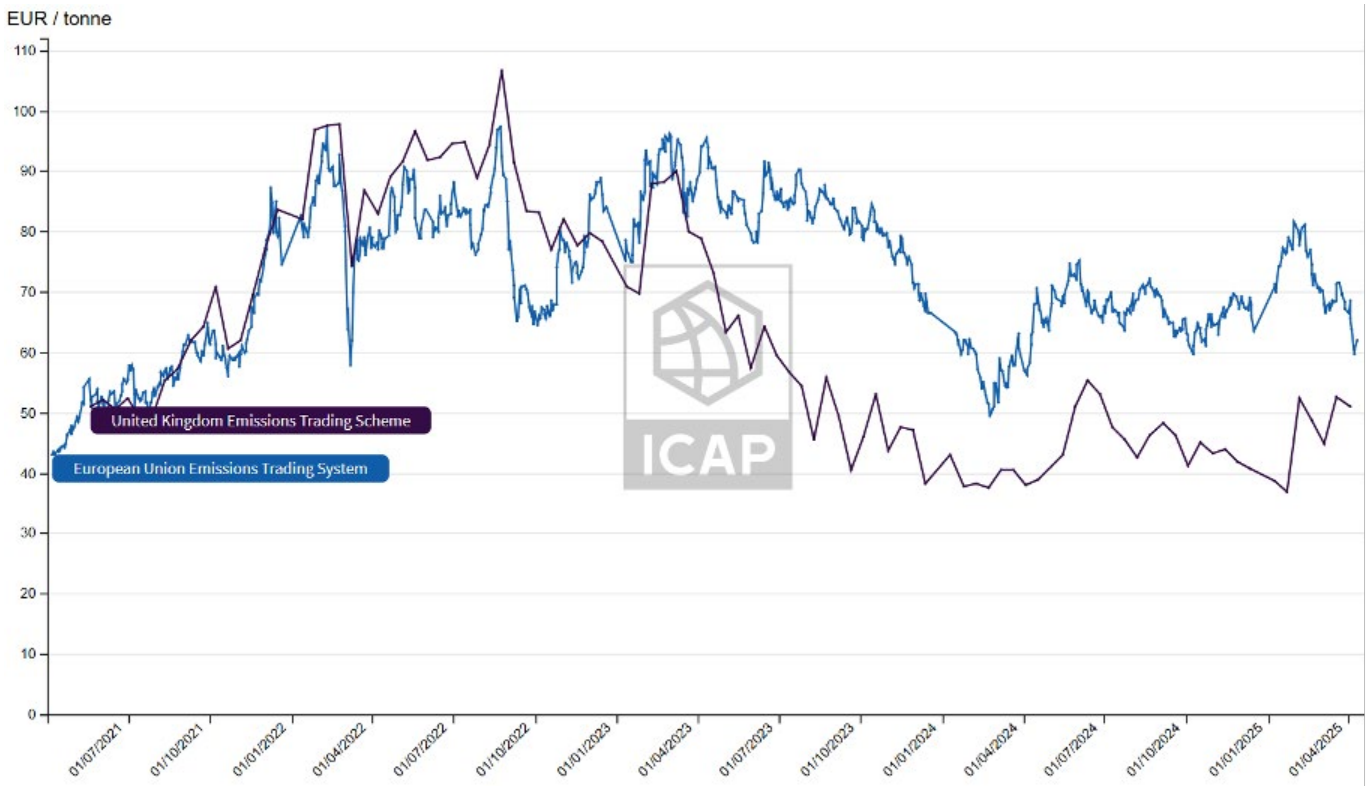

Figure 2: Allowance prices in the EU and UK ETSs (ICAP Allowance Price Explorer)

4. Review of Article 6 developments

This year marks the 10th anniversary of the Paris Agreement, the landmark accord that has formed the backbone of international climate cooperation since 2015. Articles 6.2 and 6.4 of the Agreement establish two distinct market mechanisms to facilitate this cooperation. Article 6.2 makes cooperative approaches that involve the international transfer of mitigation outcomes (ITMOs) possible between participating countries, allowing nations to voluntarily cooperate to achieve their nationally determined contributions (NDCs). This approach is decentralised, with countries determining their own accounting and reporting standards, subject to guidance on authorisations, environmental integrity and transparency.

In contrast, Article 6.4 establishes a centralised mechanism supervised by a UN body, enabling both public and private entities to generate emission reductions that can be used for compliance with NDCs or other international mitigation purposes. This mechanism aims to ensure environmental integrity and generate overall mitigation in global emissions. While Article 6.2 relies on bilateral or multilateral agreements and national frameworks for international transactions, Article 6.4 provides for a standardised, internationally governed framework for generating and transacting carbon credits. The UNEP Copenhagen Climate Centre provides a helpful database for keeping track of the status of the project pipeline under both Article 6.2 and 6.4 mechanisms.[17]

COP29 advanced the operational framework for Article 6.2.[18] The Parties clarified existing guidance and enhanced flexibility in implementing cooperative approaches. Countries now have greater autonomy in determining their sequencing for authorising ITMOs and establishing reporting processes, with-

17 For further details see: https://unepccc.org/article-6-pipeline/

18 The review of the COP29 decisions on Article 6 Mechanisms and the outlook for COP30 in Belém draws on the summaries provided by the UNFCCC, Nature Conservancy and the Smith School of Enterprise and Environment. For further details see, respectively: https://unfccc.int/sites/default/files/resource/COP29%20outcomes_A6.2_6.4_6.8.pdf
https://www.nature.org/content/dam/tnc/nature/en/documents/COP29-Article-6-Key-Outcomes.pdf
https://www.smithschool.ox.ac.uk/news/article-6-focus-outcomes-cop29

out requiring a mandatory standardised template for authorisation. However, a voluntary template will be developed by the UNFCCC.

This framework further enables unilateral, bilateral, or multilateral initiatives, facilitating voluntary development of cooperative approaches and ITMO trading. However, this increased flexibility has raised transparency concerns, as the COP29 decision only "requests" rather than "requires" countries to refrain from using ITMOs with significant inconsistencies in reporting.

Article 6.4, now officially named the Paris Agreement Crediting Mechanism (PACM), made significant progress at COP29 with the adoption of standards for methodologies and removals. The mechanism is expected to become fully operational with the issuance of Article 6.4 Emission Reductions (A6.4ERs) by mid-2025, as the Supervisory Body begins approving methodologies.

Key decisions on Article 6.4 during COP29 included provisions for downward adjustments across baseline approaches (to encourage the adoption of novel, more efficient and less emissions-intensive technologies) and procedures for addressing both avoidable and unavoidable reversals (through the establishment of a "Reversal Risk Buffer Pool" and the requirement to hold insurance against reversals). Notably, afforestation and reforestation projects registered under the Clean Development Mechanism (CDM) can transition to the PACM if they submit requests by the end of 2025, without requiring new additionality assessments beyond those already agreed in Glasgow. The environmental integrity of these units will ultimately depend on the Supervisory Body's thorough review of CDM methodologies and broader market integrity considerations.

While COP29 made substantial progress on both mechanisms, several issues remain unresolved for COP30 in Belém. For Article 6.2, ensuring robust transparency and environmental integrity in ITMOs remains a key challenge despite the enhanced reporting framework. Critical technical issues still to be addressed include how to apply corresponding adjustments for single-year versus multi-year targets to prevent countries from overselling their mitigation outcomes.

For Article 6.4, the Supervisory Body will continue refining rules for nature-based methodologies, particularly those related to post-crediting monitoring and baseline adjustments. While discussions on emissions avoidance were deferred until 2028, this postponement doesn't exclude nature-based solutions that result in emission reductions or removals, which remain eligible under both Article 6.2 and 6.4. Addressing these outstanding issues will be crucial for Article 6 mechanisms to effectively contribute to global climate goals.

5. Emerging issues for linking

A growing number of ETSs featuring an intensity-based cap have entered the compliance market landscape in recent years. These include the systems currently operating in China, Indonesia, Canada (both at federal and provincial levels) and Australia.[19] They will soon be joined by India's CCTS, expected to launch in 2025. Türkiye's decision on cap setting for its ETS, which is expected to be launched in 2026, is pending at the time of writing. Initially planned as a system with an absolute cap, Türkiye's ETS is likely to join the group of systems with an intensity-based cap. Moreover, as the scope of the China national ETS expands to cover industrial sectors, the volume of emissions regulated by systems with an intensity-based cap, which already exceeds that under an absolute cap, will grow even further.[20]

Many jurisdictions choose an intensity-based cap because it provides flexibility to compliance entities in response to economic fluctuations, exchange rate changes, and shifts in domestic and international trade conditions. Some, like China, intend to move to an absolute cap in due course. Systems with intensity-based caps are not inherently

19 This classification is based on ICAP (2025). Certain elements of the systems in Colorado, Tokyo and Saitama also resemble an intensity-based approach to cap setting.

20 See the infographic titled "Global Expansion of Emissions Trading" in ICAP (2025) for an overview of balance between the emissions covered under the two approaches to cap setting. Currently, just over 55% of emissions covered by ETS are in systems with an intensity-based cap.

less ambitious or efficient than those with absolute caps, provided the intensity benchmarks are set sufficiently stringently and the design of the ETS and other climate policies in the jurisdiction are well coordinated.[21]

There are, however, challenges to linking systems that do not share the same approach to cap setting. For example, Article 25 of the EU ETS directive limits the EU to link only with systems that feature an absolute cap.[22] This is understandable because the ex-ante uncertainty in the level of the linking partner's cap introduces additional risks to economic and environmental outcomes under linking.[23] Even though absolute-cap systems other than the EU may have less demanding legal requirements, it is likely that establishing linkages between systems featuring different approaches to cap setting will be more challenging. Consequently, one should expect fewer linkages in a world where systems differ in cap-setting approaches than in one where all systems have absolute caps.

Another aspect that may make it more difficult to link is the diversity of approaches to offset use. As mentioned in Section 2 and in Doda et al (2024), there is a wide range of approaches in the current and upcoming compliance markets. While some markets do not allow offset use at all (e.g. EU ETS), others place strict quantitative limits on the use of authorised offset credits for compliance (e.g. RGGI), and still others allow their use for up to 100% of compliance obligations (e.g. Indonesia Economic Value of Carbon Trading Scheme). Currently, only Korea ETS allows the use of international credits, although there have been recent proposals to include Article 6 credits in the EU ETS.[24]

The types of offset credits that are allowed in existing compliance markets themselves also differ widely. First, offset credits are certified by crediting mechanisms that can be grouped under three broad categories: governmental, international and independent crediting mechanisms. Second, offset credits are generated based on emissions reductions relative to a baseline, or by removing GHGs from the atmosphere, either using nature-based or engineered methods. These differences are indicated in the right panel of Figure 3, which focuses on the market for credits where demand can be driven by voluntary or compliance reasons.

21 For a detailed analysis in the context of China, see Fischer, Qu and Goulder (2024). Rate-based emissions trading with overlapping policies: Insights from theory and an application to China (NBER Working Paper No. 33197). National Bureau of Economic Research. https://www.nber.org/papers/w33197

22 Paragraph 1a of the Article 25 states "Agreements may be made to provide for the recognition of allowances between the EU ETS and compatible mandatory greenhouse gas emissions trading systems with absolute emissions caps established in any other country or in sub-federal or regional entities."

23 For an analysis in the context of power sector where both allowance and power markets may be linked, see Fischer, Mao, & Shawhan (2018). Trade between mass- and rate-based regulatory regimes: Bad for emissions? Energy Economics, 73, 326–336. https://doi.org/10.1016/j.eneco.2018.04.031

24 See the info graphic titled "Offset use in emissions trading worldwide" in ICAP (2025) for an overview of offset use in all ETSs currently in operation. For an overview of the proposals for the inclusion Article 6 credits, see https://carbon-pulse.com/385874/.

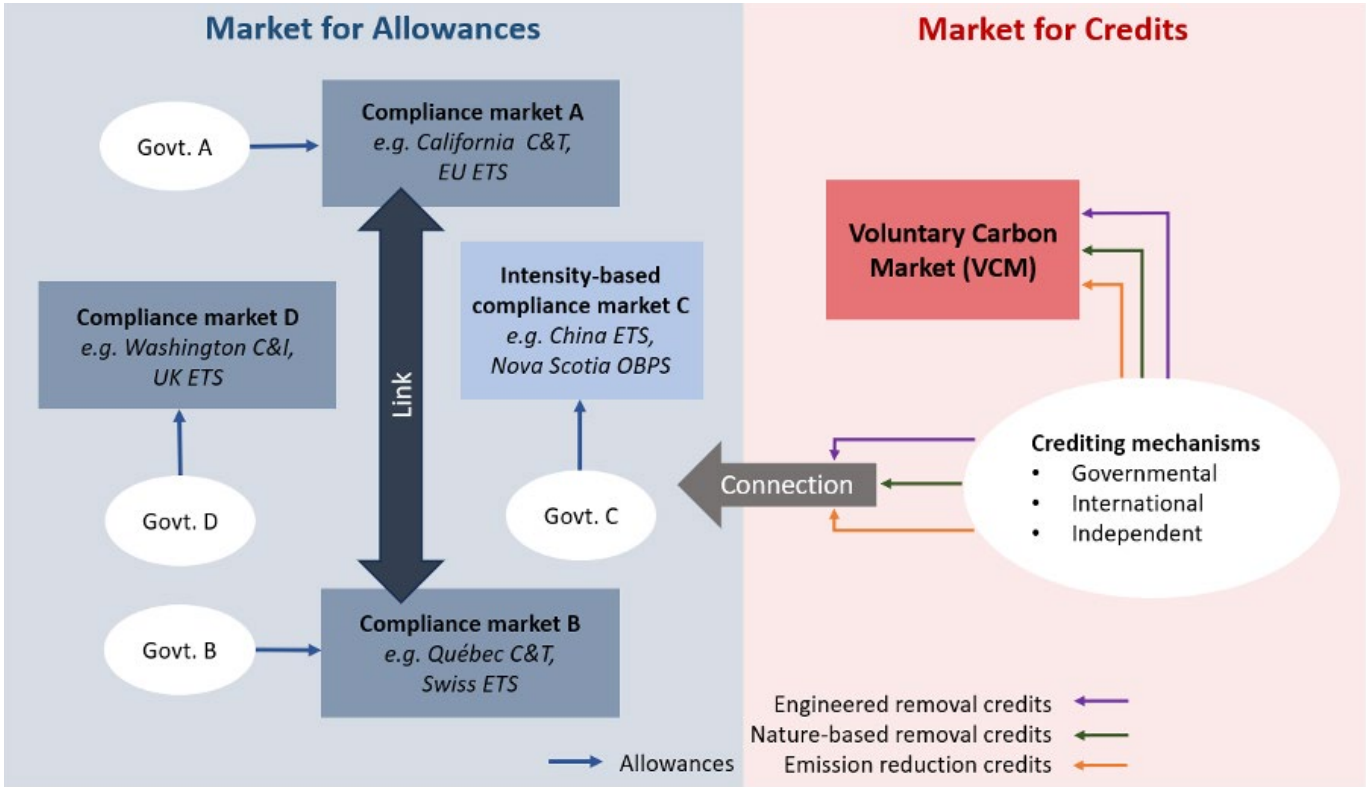

Figure 3: Overview of carbon market concepts[25]

In principle, each credit represents there being one fewer tonne of GHG in the atmosphere relative to the case where the project which generated the credit had not existed. This is true regardless of the mechanism that certifies the credit and of the credit type. In practice, credits differ along several dimensions like permanence, reversal and leakage risks, additionality, co-benefits, etc., ultimately resulting in real or perceived differences in credit quality. Moreover, the additionality of projects generating emissions reduction credits is coming under increasing scrutiny (Doda et al, 2024).

The variation in credit quality has led some governments to develop and administer their own domestic crediting mechanisms, and for better or for worse, others to disallow offset credits altogether. Still others have used credits issued under international and independent mechanisms. The resulting fragmentation of markets for credits and approaches to offset use is a significant challenge to linking. This is because even if a jurisdiction does not allow offsets issued in the linking partner for compliance in its own market, the logic of linking dictates that every time an offset credit is used for compliance in the partner, one additional allowance becomes available for compliance in all linked markets.

The challenges of linking systems that feature different approaches to cap setting and offset use are illustrated in Figure 3. The left panel includes Compliance Markets A-D. Markets A, B and D use an absolute cap, while compliance market C has an intensity-based cap. The figure illustrates a link between markets A and B, while markets C and D are not linked to other systems. Additionally, using the examples from the real world, the figure shows that some markets are *connected* to the market for credits (i.e. those in California, Québec, Washing-

25 The figure illustrates key carbon market concepts featured in this year's report. It elaborates on Figure 1 in Doda et al (2024) by including a new type of compliance market (i.e., compliance market C with an intensity-based cap in contrast to other compliance markets which have absolute caps) and three types of credits (i.e. emissions reductions, nature-based removals and engineered removals). Note the distinction between a "*link*" (i.e., the trade of compliance units between two compliance markets) and a "*connection*" (i.e., the purchases of offset credits for use in compliance markets). Governments are the primary issuers of allowances. Credits are issued by governmental (e.g., China Certified Emissions Reduction program), international (e.g., PACM), and independent (e.g., Verra's Verified Carbon Standard) crediting mechanisms. Demand for credits comes from the VCMs and, when there is a *connection*, the compliance markets. Note that the compliance markets in California, Quebec, Washington and China are connected to the market for credits but those in EU, UK, Switzerland and Nova Scotia are not.

ton and China) while others are *not connected* (i.e. those in the EU, Switzerland, UK and Nova Scotia).

The challenge that different approaches to cap setting poses to linking can be observed in the figure by noting that currently links only exist between jurisdictions that feature absolute caps but not between those that feature intensity-based caps, or between jurisdictions that adopt different approaches to cap setting. This reflects the current state-of-play in the international carbon markets which is unlikely to change considering that the links which are most likely to materialise in the future are between markets that feature absolute caps (see Section 3).

Distinct approaches to offset use pose similar challenges to linking, which can also be observed in the figure. Links exist between jurisdictions that are *not connected* to markets for credits, such as the EU and Swiss ETSs, or those that are *connected* but coordinate their approach to offsets, such as California and Québec. The challenge associated with different approaches to offset use then suggests it will be more difficult to link markets which are *connected* than to link markets that are *not connected* or, to a lesser extent, connected but coordinate on offset use. This also reflects the current state-of-play in the international carbon markets. There are no existing links between a system that allows offset use and one that does not. Moreover, the links that are most likely to materialise in the future are among markets which are *connected* but coordinate their offset provisions (e.g. Washington linking with California and Québec) or those which are *not connected* (e.g. the EU and the UK).

6. Conclusion

The developments in international carbon markets over the past year demonstrate both progress and persistent challenges in addressing climate change through compliance carbon pricing. ETSs continue to play a pivotal role in global climate policy, with existing systems such as the EU ETS, China National ETS, and UK ETS undergoing significant reforms mainly to align with enhanced climate ambitions. Simultaneously, the emergence of new systems in countries like Brazil, India, and Türkiye reflects the growing adoption of market-based approaches across diverse economic contexts.

Efforts to extend market linkages may yet bear fruit soon, as seen in the potential links between Washington, California, and Québec or the EU and UK ETSs. However, these efforts may be tempered by institutional and technical barriers to linking systems with distinct features, as well as recent geopolitical tensions, including the realignment of policy priorities towards defence and the potential trade wars triggered by US tariffs. Similarly, advancements under Article 6 of the Paris Agreement, particularly in mechanisms under Articles 6.2 and 6.4, signal progress in international cooperation, although unresolved issues such as transparency and baseline adjustments remain.

Emerging challenges include the growing diversity in cap-setting approaches as well as in the certification, types, and use of offset credits across compliance markets. These challenges pose barriers to further carbon market integration and underscore the need for careful coordination and robust governance to ensure the effectiveness and credibility of carbon markets. While the trajectory of these markets points towards continued expansion and innovation, the pace and scale of progress will depend on how effectively, pragmatically and collaboratively policymakers and stakeholders address these challenges.

The Florence School of Regulation

The Florence School of Regulation (FSR) was founded in 2004 as a partnership between the Council of the European Energy Regulators (CEER) and the European University Institute (EUI), and it works closely with the European Commission. The Florence School of Regulation, dealing with the main network industries, has developed a strong core of general regulatory topics and concepts as well as inter-sectoral discussion of regulatory practices and policies.
Complete information on our activities can be found online at: fsr.eui.eu

Robert Schuman Centre for Advanced Studies

The Robert Schuman Centre for Advanced Studies (RSCAS), created in 1992 and directed by Professor Erik Jones, aims to develop inter-disciplinary and comparative research on the major issues facing the process of European integration, European societies and Europe's place in 21st century global politics. The Centre is home to a large post-doctoral programme and hosts major research programmes, projects and data sets, in addition to a range of working groups and ad hoc initiatives. The research agenda is organised around a set of core themes and is continuously evolving, reflecting the changing agenda of European integration, the expanding membership of the European Union, developments in Europe's neighbourhood and the wider world.

LIFE COASE

The LIFE COASE project is co-financed by the LIFE Programme of the European Union. The publication reflects the authors' views, and the European Commission is not responsible for any use that may be made of the information this document contains.

www.eui/rsc
www.lifecoase.eui.eu

Published by
European University Institute (EUI)
Via dei Roccettini 9, I-50014
San Domenico di Fiesole (FI)
Italy

doi:10.2870/4604104
ISBN:978-92-9466-660-4
ISSN:2467-4540
QM-01-25-041-EN-N