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The Law of Carbon Markets

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Abstract

Although carbon markets have their conceptual origin in economic theory, they are – like other markets – a social construct built on legal rights and obligations. Law becomes relevant on both a theoretical and a more practical level. Economic theory has long posited that enforceable property rights are necessary to address externalities with bargained outcomes. Predictability, transparency, and accountability, all of which are necessary conditions for market efficiency, likewise rely on a stable regulatory framework. In the case of carbon markets, even the transacted units – allowances and credits, as well as their derivatives – are the product of regulatory fiat or contractual arrangement, lacking fundamental or intrinsic value. On a more practical level, legal considerations also play a central role in the design and implementation of carbon markets. From the initial establishment through operationalisation of major design features, rules and procedures enshrined in normative acts of varying legal pedigree and drawn from different areas of law substantiate the carbon market. Even individual transactions are based on legal contracts, and can lead to disputes that require judicial settlement or arbitration. Tracing both the foregoing theoretical and practical dimensions, this chapter discusses the complex and diverse – yet also critically important – roles of law in governing carbon markets.

Keywords: carbon markets, contracts, dispute resolution, financial market regulation, governance, legal framework, market oversight, property rights

4. The law of carbon markets

Michael Mehling

4.1 INTRODUCTION

Carbon markets owe their conceptual origin to economic theory (see Böhringer and Rosendahl, Chapter 2 in this volume), yet like all markets they are quintessentially social constructs (Weber 1947). As such, they are subject to social institutions, including the legal frameworks applicable within a given jurisdiction or regulatory context (Beckert 2009). Legal rights and obligations are necessary for carbon markets to emerge, evolve, and function. Even the units traded in these markets – allowances, credits, or their derivatives – are not naturally occurring commodities but artefacts of law, endowed with value through statutory, regulatory, or contractual fiat. Without such underpinnings, there would be nothing to trade, and no assurance that the traded instruments carry the properties they purport to convey.

At a theoretical level, the role of law in carbon markets was already anticipated by Ronald Coase more than half a century ago (Coase 1960). His seminal insight that externalities can be addressed through negotiated outcomes – rather than purely by way of a corrective tax (Pigou 1932) – presupposed the prior delimitation of property rights, without which such bargains could not be struck. For carbon markets, where traded instruments represent the ability to emit or offset a specified amount of greenhouse gases (GHGs), predictability, transparency, and accountability are indispensable preconditions for market efficiency. Each of these conditions is, in turn, rooted in the stability of the legal framework (Lederer 2012).

On a more practical level, the centrality of law in carbon markets is manifest at every stage of their existence (Mehling 2022). The creation of a carbon market tends to require an explicit mandate, such as legislation authorising a regulator to establish an emissions trading system (ETS), or the adoption of private standards that parties voluntarily commit to through enforceable contracts. Elements of system design, such as the emissions cap, baseline and benchmark definitions, unit allocation procedures, or the rules governing monitoring, reporting, and verification (MRV) of emissions, are set out in normative documents of varying legal pedigree (van Asselt 2016). As they are implemented, these markets are further conditioned by a panoply of other legal regimes: financial market regulation, taxation and accounting rules, and administrative, contract, tort, and criminal law, to name but a few (Anttonen et al. 2007). Even the most routine market transactions are underpinned by contractual agreements that specify delivery obligations, remedies for non-performance, and avenues for dispute resolution (Wilder and Fitz-Gerald 2009).

Seen through this lens, law does not merely enable carbon markets, but profoundly shapes their nature. Because they are premised on an artificially constrained supply of emission units, carbon markets are particularly dependent on a robust governance framework and credible policy mandates (Bell 2003; Nordhaus 2005). Legally vested mitigation targets can help to generate a scarcity signal in the market, and sound rules and procedures are essential to address market vulnerabilities. Absent regulatory safeguards, carbon trading is susceptible to abuse, manipulation, and fraud, as a series of incidents involving value-added tax (VAT) fraud, phishing attacks, and cyber theft demonstrated early on in the European Union Emissions Trading System (EU ETS) (Kogels 2010; Guegan et al. 2011; Nield and Pereira 2011, 2016). Without law, the integrity and durability of carbon markets would be in doubt.

Carbon markets are thus essentially normative constructs, codifying tensions and compromises like the law itself. They exemplify the capacity of law to translate economic abstractions into rules and procedures, while at the same time shaping and constraining market outcomes through normative choices: choices that calibrate prescriptiveness and flexibility, ambition and cost, environmental integrity and economic efficiency. The ensuing equilibrium is, in turn, a reflection of the broader balance between market and state, and the extent of government intervention as measured by the degree of market liberalisation and regulatory density (Stewart 1992). As this balance shifts – for instance with the current rise of industrial policy and state capitalism – carbon markets are themselves undergoing a subtle evolution.

Emblematic of the ideological ascendance of neoliberal thought that preceded the end of the Cold War and its struggle between free market and centrally planned economies (Czarnezki and Fiedler 2016), carbon markets have faced legitimacy challenges that are increasing as incumbent economic models come under pressure and climate policy broadens its scope to advance social and economic objectives, but also has to contend with affordability concerns (cf. e.g. Klenert et al. 2018; Aklin and Mildenberger 2020). As policy instruments, they derive legitimacy from their capacity to contribute to emission reduction commitments, with law providing the mechanisms through which compliance is monitored, enforced, and sanctioned. Law also ensures accountability and public trust by embedding disclosure requirements, guaranteeing procedural rights, and balancing competing interests. Yet carbon markets have also faced persistent criticism (Wara 2007; Page 2012; Cullenward and Victor 2020; Calel et al. 2025; Romm et al. 2025), and legal reforms will be essential to sustain their legitimacy.

An exhaustive account of the legal questions raised by carbon markets would far exceed the scope of this chapter; the following sections therefore highlight and examine some of the central debates at the intersection of carbon markets and the law. Section 4.2 addresses the legal nature of carbon units, tracing debates over their classification and the implications for rights and obligations of market participants. Section 4.3 discusses the legal processes involved in the creation of carbon markets, focusing on the legislative, institutional, and normative foundations. Section 4.4 examines how law structures the operation of carbon markets, with particular attention to compliance, oversight, and interaction with related fields of law. Section 4.5 analyses the contractual frameworks that facilitate transactions in carbon markets. Section 4.6 concludes by reflecting on the complexities and ambivalence of carbon market law, and the challenges that lie ahead as these markets continue to evolve.

4.2 WHAT IS TRADED? THE LEGAL NATURE OF CARBON UNITS

Carbon markets presuppose the existence of tradable units, yet the legal nature of those units has remained surprisingly contested. Unlike physical commodities, allowances and credits are intangible instruments created in accordance with public or private norms; they possess no intrinsic value and derive meaning solely from the constitutive rules that define their attributes and confer entitlements on their holders. Questions about their legal classification and the rights and obligations they entail remain unsettled, despite their consequential implications.

For regulators, the designation of a tradable unit as property, a licence, a financial instrument, or a *sui generis* entitlement determines the extent of discretion retained over allocation, revocation, and market design. For market participants, it affects the stability of legitimate expectations, the enforceability of contractual rights, and the ability to treat units as collateral or assets within insolvency proceedings. And for courts and arbitral tribunals, it shapes the treatment of disputes involving unauthorised transfers, fraud, or restitution (Anttonen et al. 2007).

As the legal treatment of allowances and credits in different jurisdictions illustrates, these units are not natural objects awaiting legal recognition, but legal artefacts whose attributes reflect the design choices embedded in their constitutive regimes. Questions about the proper classification of tradable emission units have even arisen in international economic law, with scholars debating whether they constitute goods, services, or neither (Werksman 1999; Munro 2018). The following sections trace how such classifications have been articulated in statutory and regulatory frameworks, and interpreted in judicial and administrative practice, distinguishing between the treatment of allowances and of emission reduction credits.

4.2.1 Legal Treatment of Emission Allowances

A recurring debate concerns whether emission allowances issued under an ETS should be understood as property rights, administrative authorisations, or something in between. Because allowances are created *ex nihilo* by a regulatory Act, some jurisdictions emphasise their public law character and the need for government discretion to allocate, modify, or extinguish them.[1] At the same time, allowances exhibit several attributes of property: they are unique, transferable, and capable of conferring economic value. Australia expressly recognised this duality by defining Australian allowances as personal property under statute.[2]

In most jurisdictions, the legal status of allowances falls somewhere between these extremes, relying on contextual interpretation rather than explicit statutory designation. In the European Union (EU), for instance, the legislation establishing the EU ETS initially avoided an explicit classification given unclear rulemaking authority, but subsequent reforms led to EU ETS allowances (EUAs) being defined as financial instruments subject to financial market oversight.[3] At the level of individual Member States, meanwhile, EUAs have been variously considered administrative authorisations, *sui generis* administrative rights, or a form of regulatory hybrid with legal attributes of property (Ballesteros et al. 2019).

Judicial practice mirrors this diversity. In the United States, courts have held that sulphur dioxide allowances under the Acid Rain Program constitute revocable licences rather than protected property rights.[4] By contrast, in the United Kingdom, the High Court has ruled that EUAs could be treated as property under domestic law, opening the door to restitutionary claims in cases of fraudulent or unauthorised transfer.[5] Even where legislation disavows property status for allowances, judicial practice

[1] See, for example, the Regional Greenhouse Gas Initiative (RGGI), where the RGGI Model Rule guiding state implementation describes allowances as 'a limited authorization by the Regulatory Agency or a participating state to emit one ton of CO_2 in accordance with the CO_2 Budget Trading Program' and states that these do 'not constitute a property right'; see Regional Greenhouse Gas Initiative Model Rule of 15 August 2006, revised 3 July 2025, Part XX CO_2 Budget Trading Program, s. XX-1.5(c)(8)-(9). California has retained the language on 'limited authorization' and added unrestricted authority of the government to 'terminate or limit such authorization to emit' while affirming that an allowance 'does not constitute property or a property right'; see Regulation for the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms of 20 October 2011, revised 29 March 2019, Cal. Code Regs. tit. 17, § 95820(c).

[2] Although since repealed, the Carbon Pricing Mechanism expressly declared that '[a] carbon unit is personal property' and that the 'registered holder of a carbon unit … is the legal owner of the unit … and may … deal with the unit as its legal owner'; see Clean Energy Act 2011 of 18 November 2011, Act No. 131 of 2011 (Cth), ss. 103, 103A(1).

[3] Directive 2014/65/EU of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments (MiFID II), [2014] OJ L173/349.

[4] *Tennessee Valley Authority v. EPA*, 278 F.3d 1184 (11th Cir. 2002).

[5] *Armstrong DLW GmbH v. Winnington Networks Ltd* [2012] EWHC 10, [2013] Ch 156.

has still recognised their economic value[6] and the proprietary interests they may confer.[7] Questions related to the legal nature of emission allowances have continued to emerge in legal disputes,[8] and will arguably persist until their status is conclusively defined by binding precedent or statute.

This diversity of approaches has tangible implications for the treatment of insolvency, collateralisation, taxation, and the application of securities and financial conduct rules to allowances. Resulting ambiguities can generate market uncertainty and friction, prompting, for instance, the European Court of Auditors to call for a harmonised approach to the legal treatment of allowances under the EU ETS (European Court of Auditors 2015). From a market perspective, recognising allowances as property, or at least as transferable assets with proprietary features, could bolster investor confidence, facilitate securitisation, and expand access to credit. Yet complete harmonisation remains unlikely, as piecemeal case law continues to shape how such units are defined and protected.

4.2.2 Legal Treatment of Emission Reduction Credits

Emission reduction credits – also known as offset or project credits – differ from allowances in origin and legal structure. Whereas allowances are issued *ex ante* by regulators, credits are typically created *ex post* once verified emission reductions or removals beyond a defined baseline have occurred. At the international level, the project mechanisms of the Kyoto Protocol – the Clean Development Mechanism (CDM) and Joint Implementation (JI) – provided the first major source of emission credits (Rodi et al. 2005; see also Michaelowa, Chapter 5 in this volume). Article 6 of the Paris Agreement has since established new modalities for international crediting (Mehling 2025). Domestic crediting systems have emerged in a number of jurisdictions, and in parallel, voluntary carbon markets have expanded under private standards such as the Verified Carbon Standard and the Gold Standard (Streck 2021; Procton 2025; see also Kreibich and Ahonen, Chapter 7 in this volume).

Credits from these sources can be used towards compliance with a variety of mandatory and voluntary mitigation frameworks. Article 6 practice is now sharpening the distinction between non-authorised credits, whose underlying mitigation outcomes remain available to the host country for accounting towards its own Nationally Determined Contribution (NDC), and authorised credits or Internationally Transferred Mitigation Outcomes (ITMOs), which require host-country authorisation and corresponding adjustments before they can support stronger buyer claims (World Bank 2026). Unless domestic law accords them statutory recognition,[9] they are generally treated as contractual entitlements, and their legal foundation rests on private law. Such privately constituted units carry heightened uncertainty regarding enforceability, title, and remedies, especially in cases of invalidation, double counting, or project underperformance. In the case of voluntary markets, where the stringency and governance of standards vary widely, recent evaluations have identified persistent integrity risks,

[6] In *California Chamber of Commerce et al. v. California Air Resources Board et al.*, 10 Cal. App. 5th 604, 216 Cal. Rptr. 3d 694 (2017), at 4, the Californian Court of Appeal acknowledged that allowances are 'valuable, tradable commodities, conferring on the holder the privilege to pollute'.

[7] Thus, for instance, the US Court of Appeals acknowledged that the Clean Air Act 'creates proprietary interests in emission allowances and provides for their transferability'; see *Ormet Primary Aluminium Corp. v. Ohio Power Co.* 98 F. 3d 799 (4th Cir. 1996) at 802, 805–806.

[8] See, for instance, *Koch Industries, Inc. and Koch Supply & Trading, LP v. Canada* (ICSID Case No. ARB/20/52); for discussion, see Sarvarian (2024).

[9] See, for instance, Australian Carbon Credit Units under the Carbon Farming Initiative Act 2011 of 15 September 2011, Act No. 101 of 2011 (Cth).

such as inconsistent assessments of additionality, limited permanence safeguards, variable registry quality, and susceptibility to fraud and double counting (Romm et al. 2025).

This uncertainty has prompted efforts at harmonisation, including a working group initiated by the United Nations Commission on International Trade Law (UNCITRAL) and the International Institute for the Unification of Private Law (UNIDROIT) to clarify the treatment of verified carbon credits (VCCs) under private law (UNCITRAL 2024). Counter to the fragmented treatment of allowances in the larger and more important compliance carbon market, a set of draft principles elaborated by this working group proposes defining VCCs as intangible assets that can be the subject of proprietary rights, including rights with effectiveness towards third parties, influencing issues of transfer, security, and insolvency (UNIDROIT Working Group on the Legal Nature of Verified Carbon Credits 2025).[10] Complex legal questions also arise regarding entitlement to the benefits associated with emission reduction credits, including overlapping claims to land, resources, and carbon, with significant implications for community rights (Streck 2020). Brazil's recent carbon market legislation offers a concrete example, addressing ownership of credits generated by traditional communities and requiring contractual arrangements for fair and equitable benefit-sharing (see Trennepohl, Chapter 15 in this volume).

As demand for emission reduction credits has grown, private initiatives such as the Integrity Council for the Voluntary Carbon Market, the Carbon Credit Quality Initiative, and the Voluntary Carbon Markets Integrity Initiative have sought to introduce impartial platforms to standardise integrity (Chagas et al. 2025), a trend likely to accelerate as the boundaries between voluntary and compliance markets continue to blur, for instance with the EU considering use of international carbon credits to meet up to 5 per cent of its 2040 mitigation target and potentially allowing an additional 5 per cent to be used by Member States to reach their own national targets (European Council 2025), or with international initiatives such as the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) recognising certain credits issued under private standards. National authorities are beginning to respond, increasing their efforts to shape markets for emission reduction credits (Wetterberg et al. 2025): Singapore now regulates the use of eligible voluntary credits for compliance purposes,[11] and the EU has adopted a certification framework for carbon removals (see also Torvanger, Chapter 17 in this volume).[12]

4.3 LAW IN THE CREATION OF CARBON MARKETS

The establishment of a carbon market is never a spontaneous event. It presupposes a deliberate act of legal creation, through which authority is vested in institutions to generate tradable units, prescribe the rules of participation, and define the rights and obligations of market actors. The creation of carbon markets is thus not only a political and economic undertaking, but also a legal one, shaped by rules, principles, procedures, and normative traditions.

[10] An updated draft instrument considered by the UNIDROIT Governing Council in May 2026 elaborates 25 principles addressing, *inter alia*, applicable law, transfer, retirement and cancellation, registry duties, custody, secured transactions, insolvency, and tokenisation (UNIDROIT 2026).

[11] Carbon Pricing (Amendment) Act 2022 of 24 November 2022, Act No. 37 of 2022, [2023] Government Gazette Acts Supplement No. 9.

[12] Regulation (EU) 2024/3012 of the European Parliament and of the Council of 27 November 2024 establishing a Union certification framework for permanent carbon removals, carbon farming and carbon storage in products [2024] OJ L2024/3012.

4.3.1 Legal Basis and Rulemaking Process

The legal basis for carbon markets varies across jurisdictions, but invariably requires some form of legislative or regulatory authorisation. The principle of legality, deeply rooted in most systems of public law, demands that administrative action – such as the establishment of an ETS – can only be taken if, and to the extent that, it rests on a legal mandate.

Relevant norms emanate from a multiplicity of sources. At the international level, treaties and decisions adopted under the climate regime have long provided an institutional umbrella for carbon trading (Mehling 2021). Notably, the Kyoto Protocol created the first global market for transferable units through its flexibility mechanisms, underpinned by an extensive array of operational decisions – the 'Marrakech Accords' (see Dessai and Schipper 2003) – administered through dedicated institutions and procedures (Rodi et al. 2005; Biedenkopf and Wettestad 2018). As a successor to these mechanisms, Article 6 of the Paris Agreement enshrines cooperative approaches that allow the international transfer of mitigation outcomes, with its own body of emerging rules, modalities, and procedures contained in a series of decisions known as the 'Paris Rulebook' (Mehling 2025).

At the supranational level, the EU overcame initial opposition to market approaches (Wettestad 2005; van Asselt 2010) and crafted detailed legislation establishing the EU ETS (Delbeke 2006; Meadows et al. 2015; see also Wettestad and Moore, Chapter 9 in this volume). Law already influenced the decision to adopt an ETS, when the procedural requirement of unanimity in the Council for measures of a primarily fiscal nature[13] rendered an ETS a politically more viable alternative. Its legal centrepiece, the EU ETS Directive,[14] is complemented by further legislative and regulatory Acts, many of which are technical rules and guidelines adopted by the European Commission on the basis of delegated powers. This regulatory architecture and its implementation have faced judicial challenges before EU and Member State courts,[15] but have also seen active diffusion through technical assistance and diplomatic outreach efforts, becoming a model for other jurisdictions (Biedenkopf et al. 2017).

While international and supranational law have provided some of the earliest normative frameworks for carbon trading (Stewart and Sands 2001), national law is the cornerstone of the majority of markets, enabled through changes to existing legislation, such as the Climate Change Response Act in New Zealand[16] or the General Law on Climate Change in Mexico,[17] or through entirely new regulatory frameworks, such as the Greenhouse Gas Emissions Trading Scheme Order in the United Kingdom.[18] At the regional and local level, subnational jurisdictions such as California, Québec, or Tokyo have established their own carbon markets, drawing either on delegated authority or on regulatory powers retained by subnational entities under federal or decentralised constitutional systems. Alongside these

[13] Consolidated Version of the Treaty on the Functioning of the European Union (TFEU) [2012] OJ C326/47, Art. 192(2).

[14] Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC [2003] OJ L275/32.

[15] See, for instance, Case C-321/15, *ArcelorMittal Rodange et Schifflange SA v. État du Grand-Duché de Luxembourg* EU:C:2017:179; German Federal Administrative Court (Bundesverwaltungsgericht), Case 7 C 26.04, 30 June 2005 (ECLI:DE:BVerwG:2005:300605U7C26.04.0).

[16] Climate Change Response Act of 18 November 2002, Public Act 2002 No 40.

[17] Ley General de Cambio Climático of 6 June 2012, [2012] Diario Oficial de la Federación.

[18] The Greenhouse Gas Emissions Trading Scheme Order 2020 of 11 November 2020, SI 2020/1265.

compliance regimes, voluntary carbon markets have proliferated, governed by standards elaborated by private actors, and operationalised through contractual commitments of market participants.

In some cases, the legal Act establishing a market is explicit and detailed, as with the EU ETS Directive, which lays down core design features and has been amended repeatedly to expand its scope and tighten ambition. In others, it is more general, sometimes – as in Mexico – consisting of a single provision mandating the establishment of a carbon market and delegating authority to the executive branch to operationalise that mandate through more detailed regulations. Voluntary carbon markets, by contrast, rely on contractual instruments such as the standards promulgated by a private entity, which acquire force through the consent of market participants. These examples illustrate the diversity of pathways by which legal systems translate the political decision to deploy carbon trading into a functioning market.

Legal processes surrounding the creation of carbon markets also reflect broader traditions of administrative law. Regulatory impact assessments, stakeholder consultations, and cost–benefit analyses often precede the adoption of market rules. Multilevel governance adds further complexity, especially in federations or supranational entities where authority is divided among different levels of government. The EU ETS, for instance, represents an experiment in supranational governance, where Member States have progressively ceded greater regulatory competence to the EU while retaining roles in implementation (Bausch et al. 2017). By contrast, subnational carbon markets such as the one in California emerged within decentralised legal systems, leveraging constitutionally allocated regulatory space for local experimentation while remaining subject to higher-level constraints including limits under the federal constitution, as illustrated by the unsuccessful challenge to that system and its linkage with the system in Québec.[19]

4.3.2 Regulatory Framework and Institutional Functions

The creation of a carbon market does not end with the adoption of enabling legislation. A regulatory framework must also be elaborated to give effect to statutory mandates and ensure the integrity of the market. At a minimum, this requires the allocation of institutional functions across a range of actors, including regulators, system administrators, registry and other infrastructure operators, third-party independent verifiers, and private market intermediaries and facilitators (PMR and ICAP 2021). Each plays a role in defining the operation of the market.

Design choices are central at this stage: the scope of covered entities and gases, the point of regulation, the stringency of the cap or baseline, the method of allocation, and the recognition of offsets. Decisions on registry design and unit tracking are particularly significant, as registries not only record ownership but also provide the legal infrastructure for transfers, cancellations, and compliance (PMR 2016). Registries effectively constitute the backbone of any carbon market, without which unit transfers cannot be validated, and ownership rights remain insecure. The initial vulnerability of national registries in the EU ETS, which enabled large-scale fraud and theft, illustrates the importance of robust legal and technical safeguards.

In baseline-and-crediting systems, this institutional architecture increasingly also includes procedures for endorsement, authorisation, first transfer, and corresponding adjustments, because Article 6 transactions depend on public law decisions that determine whether credits may be used outside the host country's own NDC accounting (World Bank 2026).

[19] *United States v. California*, 932 F.3d 916 (9th Cir. 2021) at 921.

Institutional functions extend to MRV, which establishes the basis for compliance. Legal frameworks must define reporting obligations, accredit independent verifiers, and stipulate penalties for misreporting (PMR 2019; Candlin and Oudenes 2020). Enforcement provisions are equally crucial: without credible sanctions, compliance incentives erode and market integrity falters. Most systems combine financial penalties, make-good obligations, and reputational deterrents such as public disclosure of non-compliance.

Voluntary standards face analogous challenges, albeit with different tools. Their legitimacy depends on rigorous certification procedures, transparent governance, and credible enforcement of rules. The competitive landscape of voluntary standards has given rise to a form of private legal pluralism, where multiple rulebooks coexist and compete for recognition by corporate buyers, investors, and regulators (Dawes et al. 2023; Wetterberg et al. 2025). Although these standards lack statutory force, their contractual nature and reliance on arbitration clauses mean that private law performs many of the functions that public law fulfils in compliance markets.

4.3.3 Embedding Carbon Trading in the Existing Legal Framework

Carbon markets are not created in a vacuum; they must be embedded in the broader legal order of the jurisdictions they operate in. This involves reconciling the new instrument with constitutional principles, administrative traditions, and sectoral laws. Constitutional considerations can be particularly salient at the initial stage of carbon market development. In Germany, for instance, constitutional challenges to the ETS invoked principles of legality, proportionality, and property rights.[20] In the United States, questions of federal authority over emissions trading have sparked debate, especially in the wake of the Supreme Court's shifting jurisprudence on administrative discretion.[21]

Integration with existing legal regimes also raises practical issues. Tax law should ideally clarify the treatment of allowances and credits, including whether their transfer is subject to VAT, capital gains, or other levies. Accounting standards should likewise specify how units are reflected on balance sheets, whether as intangible assets, inventory, or financial instruments. Competition and state aid law may come into play when free allocation favours certain sectors or firms. Financial regulation is increasingly relevant, as the designation of allowances as financial instruments subjects them to oversight by securities regulators and brings them under rules designed to prevent market abuse (see Section 4.4.2 below) (FASB 2026).

Embedding an ETS in the legal framework thus requires careful cross-referencing with a wide range of legal domains, each with its own traditions, doctrines, and enforcement mechanisms (Anttonen et al. 2007). Ensuring consistency across all these areas of law from the outset is desirable for improved legal certainty, but tends to strain available capacities of regulators as they seek to simultaneously develop and implement the many normative and institutional structures of the new regime.

The experience of existing systems underscores the importance of legal alignment and integration. In the EU, successive reforms have progressively aligned the ETS with financial market law, culminating in the classification of allowances as financial instruments under MiFID II (Betz et al. 2022). In New Zealand, early difficulties in embedding the ETS within forestry law and land-use

[20] German Federal Administrative Court (Bundesverwaltungsgericht), Case 7 C 26.04, 30 June 2005 (ECLI:DE:BVerwG:2005:300605U7C26.04.0).

[21] *West Virginia v. Environmental Protection Agency* 597 US 697 (2022); *Loper Bright Enterprises v. Raimondo* 603 US ___ (2024).

regulation highlighted the need for sectoral coherence. California's integration of its carbon market with broader state climate legislation demonstrates how embedding can enhance resilience and political legitimacy. Voluntary standards, too, have sought to embed themselves within existing frameworks by aligning with international certification norms and sustainability reporting standards.

4.4 LAW IN THE OPERATION OF CARBON MARKETS

While legislation and regulatory Acts establish the foundations of a carbon market, its credibility and efficiency are ultimately determined by day-to-day operation. Carbon trading is technically and administratively complex, and the intangible nature of its units means that the entire market architecture is dependent on the robustness of the rules and institutions that govern it. Operational law governs the allocation of units, the tracking of ownership, the monitoring and reporting of emissions, and the oversight of market activity. It also determines how the carbon market interacts with surrounding legal regimes, from financial regulation to taxation and contract law. The following sections shed light on the legal operationalisation of carbon markets by first surveying rules established within the carbon trading regime itself, and then discussing the role of flanking areas of law, such as financial markets regulation and further regulatory frameworks.

4.4.1 Operationalising the Compliance Cycle

The *raison d'être* of carbon markets is the reduction of GHG emissions. To achieve this, compliance infrastructure must provide assurance that reported emissions are accurate and obligations are enforced. MRV rules thus lie at the heart of any carbon market, constituting the 'compliance cycle' that ensures environmental integrity (McAllister 2010). Monitoring requirements vary by jurisdiction but generally oblige covered entities to measure emissions according to prescribed methodologies, ranging from continuous monitoring to calculation based on fuel inputs (Candlin and Oudenes 2020). Reporting rules define the frequency, format, and scope of disclosure, while verification relies on accredited third-party auditors (PMR 2019). Together, these elements establish the factual foundation upon which legal compliance is assessed.

Enforcement provisions must complement MRV. Without credible sanctions, compliance incentives erode and market participants risk losing confidence in the system, influencing market behaviour and potentially destabilising carbon prices. Most systems employ a combination of financial penalties, make-good obligations, and reputational deterrents through public disclosure. The EU ETS, for instance, imposes a penalty of €100 per missing allowance (indexed to inflation) in addition to the obligation to surrender allowances in the following year. California's system similarly imposes automatic make-up requirements and allows the California Air Resources Board (CARB) to pursue administrative or criminal penalties. Comparative practice reveals different approaches to proportionality and deterrence. Some jurisdictions prefer relatively modest penalties supplemented by reputational sanctions, while others impose significant financial or criminal penalties. Where penalties are comparatively low, they can serve as an alternative compliance option, becoming a de facto price ceiling. These various choices reflect not only legal traditions but also trade-offs between alternative policy objectives.

4.4.2 Financial Market Regulation and Market Oversight

Carbon markets are not isolated from the broader financial system. In most carbon markets, the use of trading platforms for conventional securities, emergence of derivative products, and involvement of financial intermediaries have underscored the need for financial regulation and market oversight. Sooner

or later, this gives rise to the question whether carbon markets and related transactions are – or should be – subject to existing financial market oversight regimes. These comprise the body of rules, institutions, and supervisory procedures governing the issuance, trading, clearing, settlement, and disclosure of financial instruments, typically with the aim of protecting investors, safeguarding market integrity, and ensuring financial stability. The treatment of allowances and credits as financial instruments enables the applicability of securities law, market abuse rules, and prudential oversight, with far-reaching implications for market integrity (Mehling 2022).

The EU has been at the forefront of this development. After early experiences with VAT fraud and cyber theft (Kogels 2010; Guegan et al. 2011; Nield and Pereira 2011, 2016), reforms progressively classified EUAs as financial instruments under the Markets in Financial Instruments Directive II (MiFID II). This brought spot and derivatives trading within the scope of the Market Abuse Regulation and the European Market Infrastructure Regulation, empowering the European Securities and Markets Authority and national regulators to monitor insider trading, spoofing, and wash trades. This reclassification not only extended financial oversight to the carbon market, but also enabled cross-market monitoring by integrating registry and trading data with financial conduct supervision.

Other jurisdictions have followed similar paths. The United Kingdom (UK) has treated UK allowances as financial instruments under the Financial Services and Markets Act, subjecting trading to Financial Conduct Authority oversight. California and Québec rely on the Commodity Futures Trading Commission and securities regulators where derivatives are involved. Not all jurisdictions have subjected carbon trading to financial market rules, however. New Zealand, for instance, has kept New Zealand Units outside the scope of financial markets law, although recent reforms contemplate enhanced conduct rules. In some existing and emerging systems in Asia, including China, concern about financial speculation and unpredictable market behaviour has seen a more restrictive approach to intermediaries and derivatives in the carbon market, also limiting the role of financial market regulators in overseeing trading activity.

Even where carbon trading does not fall within the remit of existing financial market regulation, its surveillance tools and procedures might still find application if they are adopted as part of the legal framework of the carbon market. In either case, oversight mechanisms include mandatory registration of traders, reporting requirements for large positions, suspicious transaction and order reports, and surveillance of order books. Although often private actors, exchanges and clearinghouses – given their greater proximity to actual trading and technical capabilities – tend to disclose clearing prices and order book activities for enhanced market transparency, and operate delegated risk controls such as margin requirements, position limits, and default funds.

These measures, though borrowed from conventional financial markets, acquire particular relevance in carbon trading because of the artificially constrained supply of units and the potential for manipulation. Technological innovations also increasingly affect carbon market oversight. Distributed ledger technology, advanced analytics, and real-time surveillance offer new opportunities for regulators to detect suspicious patterns and intervene promptly. Yet their deployment raises legal questions about data protection, jurisdiction, and accountability, all of which must in turn be addressed within the legal framework.

4.4.3 Further Areas of Law

While the compliance cycle and subsequent rules governing trading activities tend to be the most relevant areas of law, carbon markets also intersect with a range of other legal domains, including the following.

Taxation and financial accounting law

As already mentioned in Section 4.3.3, the treatment of allowances for tax purposes varies across jurisdictions. In the EU, transfers of allowances were subject to VAT, leading to large-scale carousel fraud until corrective measures were introduced (Guegan et al. 2011). Some jurisdictions exempt transfers, while others apply capital gains or income tax depending on the classification of units. Accounting practices have been equally inconsistent, with debates on whether allowances should be accounted for as intangible assets or inventory, and how related liabilities, grants, and derivatives should be recognised. The lack of harmonisation complicates cross-border trading and creates uncertainty for market participants. In the absence of clear legislative or regulatory guidance, practice has often evolved through analogies to existing accounting categories and interpretive guidance by professional standard-setters, particularly under International Financial Reporting Standards (IFRS) following the withdrawal of dedicated guidance on emission rights.[22] Recent efforts at the national level suggest a gradual move toward more tailored accounting treatment (FASB 2026).

State aid and competition law

Free allocation of allowances and related forms of compensation, rebates or support can raise issues under state aid and competition law. In the EU, for instance, national measures compensating undertakings for indirect carbon costs require notification to, and approval by, the European Commission under the ETS State Aid Guidelines. Output-based allocation, in particular, may function economically as an implicit production subsidy, which helps explain why allocation rules and compensation mechanisms can attract scrutiny under state aid and competition law (see Böhringer and Rosendahl, Chapter 2 in this volume). Indeed, legal questions raised by the allocation and withdrawal of allowances have generated a significant body of litigation; in the EU, the Court of Justice has scrutinised both the methodology for calculating free allocation and the circumstances in which wrongly allocated allowances may be reclaimed without compensation.[23] Allocation methods and market rules should therefore avoid conferring undue advantages that distort competition. Finally, antitrust considerations may also arise if trading platforms or intermediaries engage in collusive practices.

Contract, tort, and other areas of private law

Private law supplies additional backstops for carbon market transactions. Contract law governs the validity and enforceability of trades, including delivery obligations, warranties, force majeure,

[22] IFRIC 3 *Emission Rights*, issued in December 2004 by the International Financial Reporting Interpretations Committee (IFRIC) to clarify the accounting treatment of emission allowances under cap-and-trade schemes, had specified that allowances were to be treated as intangible assets, freely allocated allowances as government grants, and surrender obligations as liabilities; it was withdrawn in June 2005 because it produced unsatisfactory accounting mismatches between assets, grants, and surrender liabilities.

[23] See Joined Cases C-191/14, C-192/14, C-295/14, C-389/14 and C-391/14 to C-393/14, *Borealis Polyolefine GmbH and Others v. Bundesminister für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft and Others*, EU:C:2016:311, invalidating aspects of the European Commission's calculation of the cross-sectoral correction factor determining allowance allocation; Case C-321/15, *ArcelorMittal Rodange et Schifflange SA v État du Grand-duché de Luxembourg*, EU:C:2017:179, confirming that Member States may require surrender of allowances issued after an installation has ceased operations.

termination, and remedies for non-performance, while also allocating market-specific risks such as regulatory change, non-issuance or invalidation of credits, reversal of stored carbon, double counting, or registry failure. Tort law may become relevant where negligent conduct by verifiers, registries, intermediaries, project developers, or professional advisers causes economic loss or undermines the integrity of traded units, for instance through erroneous verification statements, deficient registry administration, misleading representations about credit quality, or inadequate project validation and monitoring. Depending on the jurisdiction, doctrines of misrepresentation, unjust enrichment, restitution, fiduciary duty, or professional liability may also be implicated. These bodies of law are not specific to carbon markets, yet they provide important residual safeguards where public regulation or market rules leave gaps, reinforcing transactional certainty, participant confidence, and accountability across increasingly complex chains of market actors.

Security and insolvency law

The classification of allowances as property or assets determines whether they can be pledged as collateral or seized in insolvency. Divergent approaches across jurisdictions complicate cross-border transactions and securitisation, particularly where market participants hold accounts, counterparties, or assets in different legal systems. Case law such as *Winnington* in the UK has clarified that allowances can be treated as property for restitution claims,[24] while other jurisdictions remain reluctant to extend full proprietary protection. Similar questions arise for carbon credits, especially where contractual rights, registry rules, and proprietary claims intersect in ways that determine priority among buyers, creditors, custodians, and insolvency administrators. Contemporary private law reform efforts seek to clarify these and further question, for instance third-party effectiveness of security rights, or the treatment of credits held through custodians if the custodian becomes insolvent (UNIDROIT 2026). Greater legal certainty in this area is important not only for private enforcement and recovery, but also for the use of carbon units in collateral arrangements and structured finance.

4.5 FACILITATING CARBON TRADING: CONTRACTING TRANSACTIONS

Even where carbon markets are created by statute or regulation, individual transactions take place under private law. Contracts structure trading activity by defining delivery obligations, allocating risk, and establishing remedies in cases of default (Wilder and Fitz-Gerald 2009). As with other intangible assets, standardised contractual documentation plays a central role in securing liquidity, reducing transaction costs, and supporting confidence in market operations. Such contracts also allow for more sophisticated pricing methodologies and valuation techniques (Labre and Atkinson 2010).

4.5.1 Contractual Architecture and Remedies

Early carbon transactions – especially under the CDM – were dominated by bespoke Emission Reduction Purchase Agreements (ERPAs), typically structured as forward contracts that allocated project risks such as regulatory change, verification failure, or non-delivery (Baker & McKenzie 2004). Because many transactions occurred before issuance and delivery, ERPAs and related agreements also performed a financing function, with prepayment and forward-delivery structures helping to mobilise upfront capital while allocating issuance, authorisation, verification, and delivery risks. As markets

[24] *Armstrong DLW GmbH v. Winnington Networks Ltd* [2012] EWHC 10, [2013] Ch 156.

matured, secondary ERPAs emerged for spot or forward sales of already issued credits, offering simpler terms and clearer allocation of delivery obligations.

With the growth of allowance trading in compliance markets, contractual practice shifted toward standardisation. Documentation developed by the International Emissions Trading Association and the International Swaps and Derivatives Association (ISDA) now provides a common contractual architecture, enabling the use of annexes, schedules, and confirmations to tailor terms to specific transactions. The ISDA framework has been particularly important in embedding carbon trading into the broader ecosystem of financial markets, supporting netting, collateralisation, and clearing (ISDA 2021).

These instruments raise a series of legal questions familiar from other markets in intangible or dematerialised assets. Central among these is the moment at which title passes – whether at execution, payment, or registry transfer – and the consequences for remedies in the event of non-performance. Contracts commonly provide for specific performance, cash settlement, or procurement of replacement units, mirroring remedies in established commodity markets and reinforcing the perception of carbon units as tradable assets notwithstanding their regulatory origins. *Force majeure* and hardship clauses also play a prominent role, given the exposure of carbon markets to regulatory intervention.

Changes in eligibility rules, withdrawal of recognition for certain unit types, or administrative delays can frustrate performance or trigger termination rights. Questions of frustration, reliance, and legitimate expectations have therefore featured in several disputes, with doctrines such as good faith and estoppel invoked to temper abrupt administrative action. In civil law jurisdictions, the abstraction principle introduces additional complexity by distinguishing between the validity of the underlying contract and the effectiveness of the transfer of title, requiring careful drafting to manage residual risks.

4.5.2 Voluntary Market Contracting and the Role of Private Law

Contracting dynamics differ in voluntary carbon markets, where credits are created under private standards such as the Verified Carbon Standard or the Gold Standard. Here, contractual relationships span multiple tiers – from project developers and standard setters to intermediaries, aggregators, and end buyers – and the legal nature of the credit is defined primarily by the rules of the standard. In the absence of statutory enforcement, warranties addressing integrity, permanence, double counting, and exclusivity are of heightened importance. Many voluntary market contracts include provisions for replacement credits in cases of reversal or invalidation, and arbitration clauses are frequently used to ensure neutral dispute settlement in cross-border transactions. Where credits are marketed for Article 6, CORSIA, or other international uses, contracts increasingly need to specify whether host-country authorisation and corresponding adjustments operate as conditions precedent, warranties, covenants, or termination events, and who bears the risk if such approvals are delayed, qualified, revoked, or withheld (World Bank 2026).

Voluntary markets have also generated contractual innovations. Aggregation agreements allow multiple smaller projects to pool credits, while forward contracts and options help to manage delivery risks for both buyers and sellers. Online platforms and exchanges have begun to offer standardised documentation to reduce transaction costs and promote uniformity, although enforceability ultimately depends on domestic contract law and the willingness of counterparties to submit to arbitration. In voluntary markets, contracts additionally establish the very existence and credibility of the units traded. This contractual layer underscores the hybrid character of carbon market law more generally: even in the voluntary market, public law typically creates an overarching framework – for instance through

targets set out in international treaties and domestic legislation – while private law sustains day-to-day trading, with principles of good faith, estoppel, and proportionality coexisting alongside doctrines of administrative discretion and statutory interpretation. It is in this interplay that carbon trading remains anchored in the rule of law while adapting to evolving market and regulatory conditions.

4.6 NAVIGATING THE COMPLEXITIES OF CARBON MARKET LAW

Carbon markets illustrate both the promise and the complexity of law as a tool for addressing climate change. They are quintessential legal artefacts, created by legislative or regulatory fiat, embedded in a dense web of public and private norms, and sustained through a hybrid mix of statutory and contractual arrangements. Their very existence thus depends on law, even as they in turn shape the evolution of legal doctrine in climate law and across multiple other legal domains.

One of the central insights from this chapter is the hybrid character of carbon market law. Public law establishes the authority to issue and regulate units, defines compliance obligations, and ensures enforcement; private law provides the infrastructure for transactions, contractual standardisation, and remedies in case of breach. That hybridity is reflected in the diversity of normative sources on which carbon markets depend, ranging from international, supranational, national, and subnational law to private standards and contractual commitments, and varying in legal force from voluntary guidance to binding obligation. Together, these sources form a varied and overlapping legal landscape. Voluntary carbon markets illustrate this dynamic especially clearly: long governed through private standards and contractual arrangements, they are increasingly being drawn into statutory and regulatory frameworks across all levels of governance.

In practice, these diverse sources of law and normativity interact in complex ways, with international frameworks shaping domestic design choices and *vice versa* through processes of vertical borrowing (Wiener 2001), horizontal diffusion evident as domestic systems influence each other through policy learning, harmonisation and linkage (Wettestad et al. 2018; Linsenmeier et al. 2023), and voluntary standards informing or drawing on compliance regimes. That said, law is perhaps the epitome of a context-dependent system (Legrand 1997), and many of the variations in design and operation across carbon markets reflect the distinctive constitutional structures, administrative traditions, and regulatory cultures in which they are embedded. Despite pursuing shared policy objectives, the translation of carbon markets into law is shaped by domestic interpretive traditions, institutional capacities, and political interests, so that their global diffusion becomes less an exercise in replication than one of strategic translation and hybridisation.

Looking ahead, several challenges stand out. The operationalisation of Article 6 of the Paris Agreement will test the ability of international law to reconcile divergent national interests while ensuring environmental integrity. The practical challenge is no longer whether operational rules on Article 6 exist, but whether domestic authorisation procedures, registry infrastructure, and contractual allocation of corresponding-adjustment risk can provide sufficient certainty for investment (World Bank 2026). At the same time, Article 6.4 marks a procedural advance over the CDM, with appeals and grievance processes for affected communities and other stakeholders that reflect the growing importance of procedural justice in carbon market governance (see Akanle, Chapter 16 in this volume). Similarly, the credibility of voluntary markets hinges on strengthening legal recognition, harmonising standards, and clarifying liability in cases of reversal or fraud. The convergence of carbon trading with financial markets will continue to raise questions of oversight, systemic risk, and accountability. And emerging

technologies, from distributed ledgers to artificial intelligence, will require adaptation of existing legal frameworks to secure both efficiency and trust.

Principles of law provide guidance in this uncertain terrain. Proportionality, legality, effectiveness, and good faith offer interpretative touchstones when rules are contested, incomplete, or in conflict, and help anchor carbon markets in broader commitments to accountability, integrity, and the rule of law. They also underscore that carbon market law is not a static body of rules, but an evolving field responsive to changing circumstances, institutional capacities, and political priorities. The law of carbon markets thus exemplifies the interplay of normative creativity and institutional constraint: it shows how legal imagination can transform an economic concept into a functioning governance instrument, while also revealing the limits of law in the face of political compromise, administrative capacity, and contested legitimacy. Rather than a finished architecture, carbon market law remains dynamic and unsettled, and its future trajectory will reflect the broader evolution of climate governance itself.

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