Legal Foundations and Property Rights in China's Carbon Emissions Trading System

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Abstract: China's Carbon Emissions Trading System (ETS) represents a significant step in integrating market-based mechanisms into the country's climate governance framework. Launched nationally in 2021 after a decade of regional experimentation, the ETS is designed to help achieve China's dual carbon goals—peaking emissions before 2030 and reaching carbon neutrality by 2060. However, the system's long-term effectiveness is heavily contingent upon the clarity and maturity of its legal foundations, particularly the definition and protection of property rights related to carbon allowances. This paper explores the legal evolution of China's ETS, focusing on how administrative measures, environmental laws, and regulatory oversight collectively form its current operational base. It critically examines the legal status of emission allowances, the limits of administrative enforcement, and the implications for market liquidity, financial integration, and investor confidence. Ongoing challenges—such as the lack of a unified carbon trading law, underdeveloped dispute resolution mechanisms, and the ambiguous classification of allowances—are analyzed as part of a dynamic and transitional legal ecosystem. Drawing from both domestic policy discourse and international legal models, the paper offers targeted recommendations for future legal reform aimed at enhancing transparency, legal certainty, and systemic resilience. It concludes that while China's ETS is still in its formative stage, it is on a positive legal trajectory that could shape the development of carbon markets in other emerging economies.

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1. Introduction

China's official announcement in September 2020 of its "dual carbon" goals—to reach peak carbon emissions before 2030 and to achieve carbon neutrality by 2060—has significantly reshaped the trajectory of its national environmental and climate policy. This statement, made by President Xi Jinping at the 75th United Nations General Assembly, was not merely symbolic; it marked an inflection point in China's strategic outlook on energy, industrial transformation, and environmental regulation. It placed China at the center of global climate diplomacy, as well as domestic expectations for structural reform in emissions

governance. This commitment requires not only decarbonization of existing economic systems but also a deep institutional shift in how environmental obligations are defined, allocated, and enforced within a rule-based framework.

As the world's largest emitter of greenhouse gases, with emissions exceeding 10 billion metric tons of CO_2 annually, China faces a unique governance dilemma. On one hand, its economy remains structurally dependent on coal and carbon-intensive manufacturing. On the other, China now assumes a leadership role in the international climate regime, particularly after the withdrawal and re-entry of the United States into the Paris Agreement and growing demands for emerging economies to adopt binding mitigation strategies. Balancing national development priorities with international climate expectations has catalyzed the search for scalable, flexible, and economically efficient regulatory mechanisms. In this context, the creation of a national Carbon Emissions Trading System (ETS) has emerged as a central pillar in China's evolving approach to climate governance.

The ETS offers a market-based framework through which emission rights can be priced, allocated, and traded. It shifts the control of carbon emissions from purely administrative command-and-control mechanisms to an incentive-based structure that enables regulated entities to find the most cost-effective path to compliance. By placing an economic value on carbon emissions, the ETS internalizes environmental externalities into corporate decision-making, which ideally leads to innovation in energy efficiency, renewable integration, and process optimization. In practice, the ETS operates as a cap-and-trade system where enterprises receive or purchase a limited number of carbon allowances that they can use or trade based on actual emissions performance.

China's ETS was formally launched at the national level in July 2021, after more than seven years of pilot experimentation across key cities and provinces. These pilot programs, including those in Shenzhen, Beijing, Shanghai, and Guangdong, were authorized by the National Development and Reform Commission (NDRC) and served as regulatory laboratories. Each pilot featured a different allocation method, coverage scope, and legal framework, reflecting local policy preferences and administrative capacities. The experiences of these pilots informed the design of the national system, highlighting best practices and exposing institutional weaknesses, particularly in areas such as monitoring, reporting, and verification (MRV), market liquidity, and enforcement procedures.

The national ETS currently covers the power generation sector, which contributes more than 40 percent of China's annual carbon dioxide emissions. This sectoral focus was chosen for its centralized structure, data availability, and relative ease of emissions measurement. Over time, the system is expected to expand to include other emission-intensive sectors such as cement, steel, petrochemicals, and non-ferrous metals. This progressive expansion reflects the phased logic of policy scaling in China, where initial implementation is deliberately narrow to minimize risk and allow for institutional adaptation.

Unlike its counterparts in the European Union or California, China's ETS is not founded on a comprehensive legislative statute. Instead, it is governed by administrative regulations, primarily the Interim Measures for the Administration of Carbon Emissions Trading, issued by the Ministry of Ecology and Environment (MEE) in January 2021. These Measures establish procedural rules on allowance allocation, registration, trading platforms, MRV protocols, and non-compliance penalties. While they constitute an important step toward national coordination, they do not possess the legal status of national law enacted by the Standing Committee of the National People's Congress. This administrative basis creates uncertainty about the legal durability of the system, the enforceability of market rules, and the protection of participant rights.

At the heart of these institutional challenges lie complex legal questions about the status and nature of carbon allowances. In jurisdictions such as the EU and California, carbon allowances are recognized as

tradable property interests or financial instruments that can be held, traded, and used in structured financial products. These classifications grant legal certainty to market participants and enable integration with broader capital markets. In China, by contrast, allowances are generally treated as **administrative licenses**, issued at the discretion of the state and subject to unilateral modification or revocation. This classification reflects the administrative logic of Chinese regulatory governance, in which the state remains the ultimate authority over the use of public resources, including the right to emit pollutants.

The classification of carbon allowances as administrative permissions rather than property rights has significant legal and economic implications. It limits the scope of ownership claims that entities can assert over their allowances, restricts the use of allowances as collateral or investment assets, and creates legal ambiguity in the event of market disputes. Enterprises face difficulties in asserting rights to consistent treatment under the system, particularly when allocation methods change or when administrative errors occur in emissions verification. The lack of clear legal protection may deter investment in abatement technology and reduce long-term market engagement.

China's legal system does not currently provide a singular statutory definition of carbon allowances, nor does it incorporate them into its Civil Code as property-like assets. Although some legal scholars have proposed recognizing emission rights as **usufruct rights** under civil law—a model that allows the use and benefit of a resource without transferring ownership—this proposal remains theoretical. Without legislative clarification, carbon allowances occupy a legal grey zone, shaped more by policy discretion than by enforceable legal principles. This has profound implications for market confidence and stability, particularly as China moves to scale the ETS across sectors and link it with financial instruments such as futures, options, and green asset-backed securities.

The absence of a comprehensive Carbon Emissions Trading Law further complicates the situation. While there have been repeated mentions in legislative planning documents and political speeches of a future carbon market statute, no such law has yet been introduced for public consultation or parliamentary review. This delay reflects both the technical complexity of carbon trading and the institutional difficulty of coordinating across ministries, particularly between the MEE, the Ministry of Finance, and the National Development and Reform Commission. The lack of a legislative foundation weakens regulatory predictability and reduces the scope for judicial interpretation or legal remedy in the event of disputes.

Legal enforceability is also limited by the absence of specialized judicial or quasi-judicial institutions to handle carbon market cases. Most disputes over allocation errors, non-compliance penalties, or fraudulent MRV practices must be resolved within administrative channels or under general administrative law, which lacks carbon-specific provisions. This legal vacuum may inhibit regulated entities from pursuing formal remedies and reduce accountability for regulatory oversight.

Despite these limitations, the creation and expansion of the ETS in China represent a significant institutional innovation. It reflects a transition from rule-by-policy to rule-based governance, albeit one that remains administratively anchored. The introduction of market mechanisms into environmental regulation marks a departure from earlier reliance on direct command-and-control tools such as emissions quotas, sectoral targets, and pollution levies. The ETS requires a more sophisticated legal infrastructure, one that supports property rights, contractual freedom, and procedural fairness, while also allowing for administrative flexibility in a rapidly evolving policy context.

This paper explores the legal foundations of China's ETS by examining the statutory, regulatory, and administrative structures that currently govern carbon trading. It pays particular attention to the property rights implications of carbon allowances, analyzing

whether and to what extent these allowances can be understood as tradable legal interests under Chinese law. The analysis draws on doctrinal legal interpretation, comparative institutional analysis, and the evolving literature on carbon market regulation. The paper argues that while China's ETS has made considerable technical and operational progress, its legal architecture remains provisional and fragmented, thereby limiting its ability to deliver long-term environmental and economic outcomes.

The central contention of the paper is that the development of a legally coherent carbon market in China requires more than improved regulatory design or market efficiency. It demands a fundamental rethinking of the legal status of emission rights, a recalibration of institutional authority between administrative agencies and courts, and the enactment of statutory protections that can anchor the market in a rule-based legal order. Without these reforms, the ETS risks remaining a technocratic mechanism whose performance is constrained by legal ambiguity, weak enforcement, and low stakeholder confidence.

China's incrementalist policy tradition allows for gradual adaptation, and the ETS is likely to evolve through continued experimentation, consultation, and policy refinement. This evolutionary process mirrors earlier phases of Chinese regulatory reform, including in environmental protection, energy pricing, and financial regulation. Over time, the ETS may acquire the legal features that define mature carbon markets in other jurisdictions. Until then, its performance will depend not only on the stringency of emissions caps or the sophistication of trading platforms, but on the strength of the legal foundations upon which the system rests.

2. Evolution of the Legal Framework

The development of China's legal framework for its national carbon emissions trading system (ETS) reflects a path-dependent process shaped by regulatory decentralization, institutional experimentation, and evolving central authority. The early phase of China's ETS development was not built upon statutory law but emerged from a series of local-level policy trials encouraged by national authorities. Between 2013 and 2016, seven regional pilot carbon trading programs were launched in major cities and provinces, including Beijing, Shanghai, Shenzhen, Chongqing, Tianjin, Guangdong, and Hubei. These pilots were designed to test different institutional configurations, allowing local governments to develop their own rules for allocation, verification, registry, and market operation within a controlled administrative sandbox. They operated under soft law frameworks, primarily administrative measures and municipal regulations, rather than legally binding national statutes.

Each pilot system reflected distinct regulatory philosophies and legal interpretations. Guangdong, for instance, employed a hybrid allocation system that combined free allocation with auctioning and relied on more transparent MRV protocols. Shenzhen developed a comparatively liberal trading platform with a greater degree of private-sector engagement, but its legal enforcement mechanisms remained weak and discretionary. Across the pilot regions, gaps emerged in data quality, allocation transparency, market oversight, and the legal enforceability of compliance penalties. As Dai and Pollitt (2024) observe, the coexistence of multiple local carbon markets without standardized legal infrastructure led to inconsistent enforcement and investor confusion regarding the scope and durability of rights conferred by emission allowances. These limitations underscored the difficulty of implementing market-based instruments without a unified legal foundation.

A pivotal shift occurred in 2018 when administrative oversight of climate policy was transferred from the National Development and Reform Commission (NDRC) to the Ministry of Ecology and Environment (MEE). This realignment marked not only a bureaucratic consolidation but also a redefinition of legal authority in emissions governance. Under the NDRC, carbon trading had been treated largely as an economic and industrial adjustment tool, often integrated into broader macroeconomic planning. Under the MEE, the ETS has become more deeply embedded in environmental law and administrative regulatory mechanisms. This transfer allowed for a more coordinated approach to environmental

regulation, but it also highlighted institutional tensions regarding regulatory priorities and the degree of legal formalism to be applied to emissions trading.

In January 2021, the MEE issued the Interim Measures for the Administration of Carbon Emissions Trading, which for the first time provided a nationwide administrative framework for ETS implementation. These Measures detailed procedures for allowance allocation, account registration, MRV requirements, compliance timelines, and penalties for noncompliance. Although these rules established procedural uniformity, they were issued as an internal ministerial document rather than through national legislative channels. As such, they lack the binding legal status and interpretative clarity typically associated with statutory law. Zhang (2015) notes that without a national law, the ETS relies heavily on administrative discretion, raising questions about the stability of rights granted through allocation and the predictability of enforcement decisions.

The reliance on administrative regulations reflects a broader pattern within Chinese governance, where policy precedes law and where ministries exercise broad discretion in implementing reform agendas. While the Interim Measures represent a meaningful step toward national harmonization, their legal force is limited to the domain of administrative enforcement. Courts in China have no statutory basis for adjudicating disputes related to carbon trading, and regulated entities have no guaranteed recourse to independent judicial review in the event of regulatory misapplication. This lack of judicialization reduces legal certainty and may hinder the development of complex carbon financial products, which require clear definitions of ownership, transferability, and contract enforceability.

China's ETS also operates within a fragmented legal landscape that includes several environmental and administrative statutes but no dedicated carbon trading law. Existing laws, such as the Environmental Protection Law (2014 revision) and the Air Pollution Prevention and Control Law (2015 revision), provide overarching principles regarding environmental accountability, emission monitoring, and governmental responsibility. However, they make no explicit provision for emissions trading or the legal nature of carbon allowances. Similarly, the Administrative Measures for the Reporting of Greenhouse Gas Emissions by Enterprises provide a basis for data collection but fall short of establishing legal rights or obligations in a market context. In practice, this means the ETS is governed by a patchwork of policy documents and departmental notices, none of which have been integrated into a single legislative text capable of guiding judicial interpretation or legislative scrutiny.

Efforts to draft a comprehensive Carbon Emissions Trading Law have been intermittently discussed since 2015, with renewed urgency following the national ETS launch. Legislative planning documents have included references to carbon market legislation, and multiple stakeholders, including the MEE, the People's Bank of China, and legal scholars, have called for codification of the system. Yet no official draft has been released to date, and legislative progress remains slow. Duan and Zhou (2017) attribute this delay to conflicting institutional interests, overlapping jurisdictional mandates, and uncertainty about how carbon allowances should be treated under property and financial law. These unresolved questions have direct implications for market liquidity, investor confidence, and the compatibility of the ETS with China's civil law framework.

A national carbon law would clarify the legal status of emission allowances, establish standardized allocation principles, define compliance liabilities, and delineate the jurisdiction of administrative and judicial bodies in enforcement. It would also create the legal basis for integrating the ETS with financial markets, allowing for the securitization of allowances and the development of derivatives. Lo (2016) emphasizes that without such legislation, China's carbon market will remain vulnerable to institutional inertia, policy reversals, and inconsistent enforcement. In the absence of legal guarantees, market participants may hesitate to make long-term investments or to treat carbon allowances as reliable financial assets.

Comparatively, China's ETS legal structure diverges significantly from other major jurisdictions. The European Union Emissions Trading System (EU ETS) is anchored in the EU ETS Directive, a legally binding framework that defines allowances as marketable instruments with full legal protection under EU law. Disputes are adjudicated by the European Court of Justice, and national courts must interpret domestic provisions in accordance with the Directive. California's Cap-and-Trade Program operates under the California Global Warming Solutions Act (AB 32), a state-level statute enacted in 2006, which explicitly authorizes carbon trading and mandates transparency, public participation, and judicial review. These legal regimes provide a sharp contrast to China's administratively constructed ETS, which is primarily governed through executive fiat and lacks meaningful legislative or judicial anchoring.

The contrast does not necessarily suggest that China's approach is flawed. It reflects a governance model that prioritizes incrementalism, policy experimentation, and administrative flexibility. In this model, legislation often follows successful implementation rather than preceding it. Yet as the national ETS grows in scale, begins to cover additional sectors, and engages more deeply with financial and international markets, the need for robust legal underpinnings becomes increasingly urgent. Regulatory adaptation alone will not be sufficient to support the system's maturation into a stable and credible market mechanism.

China's 14th Five-Year Plan (2021–2025) includes language affirming the government's commitment to strengthening climate governance, improving carbon accounting, and promoting market-based environmental tools. While these policy statements suggest future legislative activity, they offer little clarity about the timeline, content, or institutional form that such laws will take. In the interim, the ETS remains governed by a layered hierarchy of administrative guidance, none of which has full legal effect beyond the regulatory remit of the MEE.

In summary, the evolution of the legal framework for China's ETS has progressed from local experimentation to national administrative harmonization. Despite significant technical advances and growing institutional capacity, the absence of a dedicated carbon trading statute, the reliance on ministerial regulations, and the lack of judicial engagement leave the legal system fragmented and provisional. Addressing these limitations through legislative codification, judicial integration, and inter-ministerial coordination will be essential for ensuring that China's ETS can serve as an effective, credible, and durable tool for carbon mitigation.

3. Carbon Allowances and Property Rights

The legal characterization of carbon allowances sits at the heart of the functionality and legitimacy of China's national emissions trading system (ETS). Unlike many financial instruments or commodities in mature markets, carbon allowances in China are not currently classified as private property under statutory law. They are instead defined by administrative regulation as state-issued emission quotas, conferring upon the holder the conditional right to emit a specific volume of CO_2 within a prescribed compliance cycle. These allowances are non-perpetual, allocated without direct cost in most cases, and are subject to revocation or modification at the discretion of the Ministry of Ecology and Environment (MEE), which maintains regulatory authority over the national ETS.

This treatment follows the logic of state ownership over natural resources, including the atmosphere, which remains a collective good managed on behalf of the public interest. Scholars such as Jiang (2013) have argued that the Chinese approach reflects a regulatory tradition in which administrative licensing dominates over individualized property rights, particularly in environmental governance domains (Jiang, 2013). This orientation prioritizes state oversight, environmental risk control, and compliance assurance over the economic monetization of emissions allowances.

The Interim Measures for the Administration of Carbon Emissions Trading (2021), which currently guide the operation of the national ETS, do not define allowances as property. Instead, they refer to them as administrative indicators of compliance

responsibility, capable of transfer within regulated parameters. Although these allowances can be traded on designated exchanges such as the Shanghai Environment and Energy Exchange (SEEE), their legal structure excludes the rights typically associated with property: the rights to possess, use, dispose, and derive value autonomously. In effect, allowances function more as temporary compliance obligations than as durable financial assets, making them difficult to integrate into corporate finance practices or risk management frameworks.

There are significant economic implications to this administrative conceptualization. Regulated enterprises are unable to carry unused allowances into future compliance periods in many cases, limiting their ability to strategize long-term emissions reductions. Banking and borrowing of allowances remain subject to central regulatory control. Because allowances lack formal recognition as transferable assets in civil or commercial law, they cannot be used as collateral for loans, securitized into financial products, or easily valued on corporate balance sheets. This restricts the market's depth and liquidity. As Liu et al. (2015) note, the constrained legal identity of allowances suppresses financial innovation and limits participation from private capital, including banks and carbon investment funds (Liu et al., 2015).

Institutional investors, particularly foreign ones, tend to demand legal certainty regarding the assets they hold or transact. The lack of clarity over whether emission allowances can be legally owned or protected through civil litigation deters deeper market engagement. In the absence of well-defined property rights, firms remain hesitant to make abatement investments that depend on allowance value appreciation or monetization. This risk aversion undermines the market's intended incentive function and slows progress toward the national carbon peaking and neutrality goals.

In contrast, international systems offer more robust legal treatment of emission allowances. The European Union Emissions Trading System (EU ETS) treats allowances as fungible assets that can be held, transferred, and counted as financial positions. Although not defined as property per se under all national legal systems in the EU, these allowances benefit from statutory protections, standardized registry protocols, and court-enforceable transfer rules. Boute & Zhang (2019) underscore that legal recognition of emissions allowances as secure, transferable rights is crucial for market stability and price reliability (Boute & Zhang, 2019).

California's Cap-and-Trade Program similarly recognizes emission allowances as instruments that are fully transferable within the market and can serve as the underlying for derivative products, albeit within regulatory boundaries. In both cases, allowances are embedded in legal regimes that offer transparency, administrative consistency, and the potential for judicial resolution in the event of disputes. These characteristics help reinforce market credibility and provide certainty for investors and regulated parties alike.

Chinese legal scholars have proposed several frameworks to resolve the ambiguity surrounding the nature of carbon allowances. One influential proposal is to treat them as "usufruct rights" under China's civil law system. Usufruct rights, codified under the Civil Code, allow an entity to use and benefit from property owned by another—typically the state—while enjoying a degree of legal protection and economic autonomy. According to Liang et al (2018), classifying carbon allowances as usufructs would balance state ownership of atmospheric resources with market participants' need for certainty, transferability, and investment security (Liang et al, 2018).

Under this model, the state would remain the ultimate owner of emission rights as environmental commons, but enterprises would hold robust legal claims to use quotas under specified conditions, subject to judicial defense. This reframing could open the door to more sophisticated financial instruments linked to emissions performance, such as carbon forwards, swaps, insurance products, or carbon-linked green bonds. As Pei et al. (2013) argue, establishing carbon allowances as new categories of property rights could help rescue China's market from institutional

ambiguity and offer legal remedies for firms that operate across compliance cycles (Pei et al., 2013).

Legal codification of allowance rights would also support the development of secondary carbon markets. These are essential to efficient carbon pricing and dynamic allocation of abatement resources across firms and sectors. Without transferable, enforceable assets, the carbon market remains confined to its primary issuance function, unable to deliver on the full promise of cost-effective emissions reductions. Experience from the SO_2 trading program in the United States and the Kyoto Protocol's Clean Development Mechanism suggests that legal certainty around tradable instruments is a precondition for market liquidity and institutional trust.

Another issue tied to property rights is enforcement and dispute resolution. Since the current system lacks judicialized mechanisms for resolving ETS disputes, questions over allowance revocation, erroneous allocation, or transfer failure fall under the purview of administrative bodies. There is no legal channel for regulated entities to sue regulators for wrongful deprivation or denial of quota use. This absence of legal recourse further reduces confidence in the durability of carbon allowances as economic assets. As Duan, Pang, and Zhang (2014) highlight, a legal basis for allowance operations is fundamental to the implementation of any ETS (Duan et al., 2014).

Some proposals suggest that China adopt a two-tiered model. In this model, compliance allowances would remain under tight administrative control, but voluntary carbon units or surplus quotas could be granted more liberal property status, subject to market trading and financial regulation. This could allow a gradual expansion of legal protection without compromising state oversight of core regulatory instruments. It would also facilitate linkages between China's ETS and international carbon markets, which demand asset standardization and legal interoperability.

Defining carbon allowances as property rights is not merely a technical matter of legal drafting. It raises deeper questions about the relationship between the state and the market, and about the nature of environmental governance under conditions of climate emergency. The legal status of carbon allowances shapes not only who bears the cost of pollution but also who profits from its reduction. A system that confers durable, transferable rights may stimulate investment and innovation but may also introduce financialization risks if not adequately regulated. A system that denies property status may preserve state control but fail to generate meaningful market incentives. The path forward requires careful calibration between legal certainty, environmental integrity, and economic flexibility.

China's carbon market, still in a developmental phase, can benefit from international best practices while preserving its unique institutional context. Any move toward clearer legal recognition of carbon allowances must be accompanied by complementary reforms in registry governance, judicial review capacity, and financial supervision. A comprehensive Carbon Emissions Trading Law could serve as the vehicle for defining the nature, scope, and protections of emission rights, anchoring them in China's legal architecture in a way that supports both environmental and economic goals.

4. Market Operation and Legal Safeguards

The operational framework of China's national carbon market is anchored in the Shanghai Environment and Energy Exchange (SEEE), which acts as both the central trading venue and the national registry for carbon allowances. The SEEE manages account registration, records all transactions in the primary and secondary markets, and facilitates the surrender of allowances during the compliance cycle. It serves as the digital backbone of the national ETS, maintaining data integrity through a combination of secure database infrastructure, real-time transaction monitoring, and standardized reporting interfaces. All entities covered by the ETS are required to open accounts in the registry, where they must receive allocations, trade allowances, and submit compliance reports. The Ministry of Ecology and Environment (MEE) exercises supervisory authority over this system, issuing operational guidance, coordinating

provincial-level environmental departments, and enforcing compliance obligations.

At the core of the ETS's credibility is the Monitoring, Reporting, and Verification (MRV) mechanism. MRV protocols ensure that the emissions data underpinning allocation and compliance are accurate and verifiable. Under the Interim Measures for the Administration of Carbon Emissions Trading (2021), regulated entities must submit annual greenhouse gas emissions reports. These reports must be prepared in accordance with sector-specific technical guidelines issued by the MEE and verified by independent third-party verification agencies accredited by the ministry. The verification process involves cross-checking operational data, energy consumption records, and production output, with site visits in certain cases. Once verified, the data are entered into the national registry, forming the basis for calculating each entity's compliance obligation. Duan, Pang, and Zhang (2014) emphasize that MRV serves as both a technical and legal foundation for the credibility of trading, acting as a prerequisite for any meaningful market-based regulation (Duan et al., 2014).

While MRV is formally binding nationwide, its implementation quality is uneven across provinces. Some regions have well-developed verification industries with highly trained auditors, while others rely on a small pool of verification bodies with limited technical capacity. This variation can lead to discrepancies in emissions reporting and create opportunities for misreporting or strategic underestimation of emissions. The transparency of MRV data also varies; while the MEE has released aggregate compliance statistics, detailed facility-level data are often withheld, limiting external scrutiny. The absence of mandatory public disclosure of verified emissions data reduces the capacity of civil society and independent researchers to monitor market integrity, which is a safeguard present in systems such as the EU ETS.

The trading rules themselves are structured primarily through administrative norms. The Interim Measures grant the MEE authority to impose penalties for non-compliance, including monetary fines, rectification orders, and public naming of violators. These measures create a deterrent effect but do not provide a specialized judicial or quasi-judicial process for market-related disputes. If a company disputes the allocation of its allowances, challenges a verification outcome, or alleges trading irregularities, it must pursue remedies through the general administrative reconsideration process or bring claims under administrative or contract law. Neither route is tailored to the technical nature of carbon trading, and courts have yet to develop a body of case law specific to the ETS. This contrasts with the European Union, where disputes over allowance allocation or compliance penalties can be adjudicated under EU law and national administrative law, with the European Court of Justice serving as the final arbiter.

The absence of explicit legal recognition of carbon allowances as enforceable property rights exacerbates the problem. Without such recognition, participants face uncertainty over whether they can seek judicial protection against fraud, breach of contract, or expropriation of allowances. In the event of trading platform malfunctions, cybersecurity breaches, or price manipulation, the lack of a liability framework specific to the carbon market could leave buyers and sellers without recourse. Financial institutions considering participation as intermediaries, custodians, or insurers have raised concerns about their legal standing in transactions involving assets that lack statutory recognition. As Boute and Zhang (2019) argue, markets require both price stability and legal certainty in asset ownership to attract sustained investment (Boute & Zhang, 2019).

Market oversight in China is concentrated in the MEE, which holds a dual mandate as both market administrator and enforcement authority. This centralization offers advantages in policy coherence and administrative efficiency but raises questions about accountability and checks on regulatory discretion. The absence of independent oversight bodies or specialized carbon market tribunals limits the avenues for impartial review of enforcement actions. Some scholars, such as Liang (2018), have recommended the establishment of dedicated dispute resolution mechanisms for the ETS, possibly in the

form of specialized arbitration panels or environmental courts with carbon trading expertise (Liang, 2018).

International experience suggests that a degree of institutional separation can enhance market credibility. In the EU, for example, the European Securities and Markets Authority (ESMA) oversees certain aspects of carbon trading from a financial regulation perspective, complementing environmental regulators. California's system operates under the California Air Resources Board (CARB) but allows for judicial review of CARB decisions in state courts, with specialized administrative law judges hearing environmental compliance cases. Such separation helps reduce conflicts of interest and reinforces due process guarantees for market participants.

The legal safeguards in China's ETS are also being tested by the prospect of expanding into carbon financial derivatives. The development of futures, options, and swaps on carbon allowances would require integration with the Securities Law and oversight by the China Securities Regulatory Commission (CSRC). This would necessitate clear definitions of the legal status of allowances, as well as detailed provisions on market manipulation, insider trading, and investor protection. Without such safeguards, the introduction of derivatives could amplify systemic risks, particularly in the absence of robust transparency and risk management protocols.

Despite these structural challenges, China has taken steps toward institutionalizing transparency and compliance in the ETS. The centralization of registry functions, the standardization of MRV guidelines, and the digitization of trading records have improved the reliability of market operations. The MEE has also signaled interest in strengthening third-party verification and enhancing data disclosure, as reflected in policy discussions during the 14th Five-Year Plan period. The gradual introduction of auctions for allowance allocation could also bring more price discovery into the system, although this too would require legal adjustments to ensure fairness and competitive neutrality.

To transform the ETS from an administratively managed compliance tool into a mature market mechanism, legal safeguards must evolve alongside market operations. This means clarifying the rights and obligations of participants, introducing statutory recognition of allowances as enforceable assets, creating specialized dispute resolution pathways, and developing oversight structures that separate administrative functions from adjudicative ones. Such reforms would align China's ETS with international best practices while respecting its governance traditions, thereby enhancing investor confidence, market stability, and the system's overall capacity to deliver sustained emissions reductions.

5. Progress and Ongoing Challenges

Since its formal inauguration in July 2021, China's national emissions trading system (ETS) has advanced from a patchwork of regional experiments into the largest carbon market in the world in terms of emissions coverage. This transformation has involved a substantial consolidation of institutional functions under the Ministry of Ecology and Environment (MEE), replacing the fragmented governance of the earlier pilot programs. The creation of a centralized national registry hosted by the Shanghai Environment and Energy Exchange (SEEE), the establishment of a uniform trading platform, and the release of the *Interim Measures for the Administration of Carbon Emissions Trading* in 2021 have together provided a unified procedural and operational structure. This shift from regional diversity to national uniformity reflects a deliberate policy choice to prioritize coherence and administrative control in the formative years of the market.

The operational progress is particularly visible in the development of the Monitoring, Reporting, and Verification (MRV) infrastructure. Technical guidelines issued by the MEE for different industrial sectors have standardized emissions measurement methodologies, providing a clearer basis for compliance obligations. Third-party verification agencies have been accredited to conduct audits of reported data, and a growing number of verifiers have received capacity-building training in carbon

accounting techniques. The introduction of a national digital reporting platform has streamlined the submission and review process, reduced manual data errors, and allowed regulators to access real-time information on compliance performance. In its first compliance cycle, the national ETS recorded a compliance rate reportedly exceeding 95% for covered entities in the power sector, an outcome that the MEE has cited as evidence of the system's credibility and operational readiness.

These achievements indicate that the Chinese ETS has succeeded in creating an administrative foundation for market-based climate governance. Yet beneath these successes lie structural and legal deficiencies that could limit the system's ability to fulfill its long-term mitigation objectives. Chief among these is the absence of a dedicated *Carbon Emissions Trading Law*. Current operations are grounded in ministerial-level administrative measures, which lack the legal authority, permanence, and interpretative clarity of a statute enacted by the Standing Committee of the National People's Congress. Without a statutory framework, the ETS occupies a subordinate position within China's legal hierarchy, rendering it vulnerable to shifts in administrative priorities and leaving many aspects of its operation subject to regulatory discretion.

The lack of a comprehensive law also impedes integration of the ETS with other legal regimes, including property law, contract law, and financial regulation. Carbon allowances are currently treated as revocable administrative licenses rather than proprietary assets. This classification means that they cannot be fully transferred across different sectors of the economy, pledged as collateral, or securitized into carbon-linked financial products. The legal ambiguity surrounding allowances discourages financial institutions from developing products such as carbon futures, swaps, or emissions-linked bonds, thereby limiting the market's ability to attract private investment capital. In addition, the administrative nature of allowances complicates the development of intertemporal trading mechanisms. Banking of surplus allowances into future compliance periods and borrowing of future allocations remain subject to ad hoc regulatory approvals, which reduces predictability for enterprises making multi-year decarbonization investments.

Transparency constitutes another area of partial progress but continuing weakness. The MRV system has improved the reliability of reported emissions data, yet public disclosure remains limited. Aggregate compliance outcomes have been published, but facility-level data and detailed verification reports are not systematically made available. This lack of openness constrains external scrutiny by civil society, academics, and market analysts. In systems such as the European Union Emissions Trading System (EU ETS), public disclosure of verified emissions data has been a key element of market credibility, enabling independent actors to identify anomalies and hold both market participants and regulators accountable. In China, the absence of equivalent transparency may fuel perceptions of opacity and diminish trust among investors and international partners.

Institutional gaps in dispute resolution and judicial oversight also pose a barrier to the market's maturation. Disagreements over allowance allocation, verification outcomes, or allegations of market misconduct cannot be adjudicated by a specialized carbon tribunal or environmental court with ETS expertise. Instead, affected parties must navigate general administrative reconsideration procedures or pursue claims under the broad categories of administrative or civil law. These processes often lack the technical specificity to address the complexities of carbon trading, such as the treatment of registry errors, contractual breaches in allowance transfers, or disputes over the validity of verification methodologies. The reliance on administrative enforcement without independent review mechanisms creates the risk of regulatory overreach and erodes procedural fairness. In international practice, specialized adjudication bodies have played an important role in reinforcing market confidence. For example, in the EU ETS, allocation disputes have been litigated before national courts and, in some cases, elevated to the European Court of Justice, producing a body of jurisprudence that clarifies market rules and participant rights.

Market oversight in China remains concentrated within the MEE, which combines the roles of policy-maker, administrator, and enforcer. While this centralization facilitates rapid decision-making and ensures policy alignment with national climate objectives, it raises governance concerns about the absence of checks and balances. The potential for conflicts of interest—where the same body designs the rules, implements them, and adjudicates alleged breaches—has been noted by domestic legal scholars as a structural weakness in the current arrangement. Independent oversight bodies or multi-agency governance structures, which are common in mature carbon markets, could introduce greater accountability without sacrificing administrative efficiency.

Another emerging challenge is the prospective expansion of the ETS into carbon financial derivatives. The MEE has indicated an interest in allowing futures and other financial instruments to be developed on the basis of carbon allowances. Such a move would necessitate collaboration with the China Securities Regulatory Commission (CSRC) and alignment with the *Securities Law* to address issues such as market manipulation, insider trading, and systemic risk. Without statutory recognition of allowances as financial assets, derivatives markets would operate in a legal grey area, potentially amplifying risk for both traders and the broader financial system.

Despite these constraints, the ETS continues to evolve in ways that suggest a trajectory toward greater legal and institutional maturity. Policy statements in the 14th Five-Year Plan have emphasized the need to improve the legal framework for market-based climate instruments and to explore legislative codification of the carbon market. Academic proposals have called for granting carbon allowances the status of *usufruct rights* under the Civil Code, which would preserve state ownership of atmospheric resources while granting market participants secure rights to use and benefit from their allocated quotas. This approach could strengthen the enforceability of allowances, support the development of carbon finance, and encourage long-term abatement investments.

China's approach to environmental governance often follows a pattern of pilot experimentation, incremental scaling, and eventual legal consolidation. The current institutional and legal gaps in the ETS can thus be understood as transitional features of an adaptive regulatory process. This process allows for flexibility and policy learning but comes at the cost of temporary uncertainty for market participants. Addressing these challenges will require deliberate legal reform to solidify the market's foundation. A dedicated *Carbon Emissions Trading Law* could clarify the legal status of allowances, set binding transparency requirements, establish specialized dispute resolution mechanisms, and define the division of oversight responsibilities between the MEE, financial regulators, and the judiciary.

The success of such reforms will determine not only the domestic effectiveness of the ETS but also China's ability to engage credibly with international carbon markets. As global climate cooperation increasingly emphasizes market linkages, robust legal underpinnings will be essential for integrating the Chinese ETS with other trading systems. A legally coherent, transparent, and institutionally accountable carbon market would position China as a central actor in global carbon governance, capable of influencing the evolution of market-based climate policies beyond its borders.

6. Recommendations for Legal Development

As China's ETS advances from a formative administrative scheme to a system with the ambition to function as a sophisticated market-based climate instrument, reinforcing its legal architecture is no longer an optional enhancement but a strategic necessity. The existing framework, though operational and administratively coordinated, does not yet provide the degree of legal certainty, institutional stability, and inter-system compatibility needed to sustain market confidence, stimulate financial innovation, and meet the demands of international integration. Moving toward a comprehensive legal framework requires a multi-dimensional reform agenda that addresses statutory codification, property rights clarification,

transparency, dispute resolution, and financial market alignment.

A priority reform is the enactment of a National Carbon Emissions Trading Law to serve as the statutory foundation of the ETS. This legislation should codify the market's operational principles and define the scope of regulatory authority, clarifying the jurisdictional boundaries between the Ministry of Ecology and Environment (MEE), the Ministry of Finance, the People's Bank of China, and the China Securities Regulatory Commission (CSRC). Such a law must harmonize carbon trading rules with other legal regimes, including environmental protection, property rights, and financial regulation. Provisions should address the methodologies for quota allocation, eligibility of market participants, compliance obligations, MRV standards, and a penalty framework calibrated to deter non-compliance without discouraging market participation. Institutionalizing these provisions through national law would not only anchor the ETS in China's legislative hierarchy but also reduce the risk of policy discontinuity and provincial divergence. In systems such as the EU ETS, the anchoring directive has provided the legal certainty necessary for consistent implementation across diverse jurisdictions, a precedent that China can adapt to its unitary system.

Equally significant is the need to legally define the status of carbon allowances. Current administrative practice treats allowances as revocable licenses, which inhibits their use in financial transactions and limits their market value. While granting allowances the status of absolute private property may not align with China's public ownership principle over natural resources, civil law models such as usufruct rights or quasi-property rights offer a viable middle ground. Recognizing allowances as usufruct rights under the Civil Code would allow entities to possess, use, and benefit from them within regulatory limits, while preserving state ownership of the atmospheric commons. This status should carry statutory protection against arbitrary revocation and include rights to compensation in the event of wrongful expropriation or allocation errors. Legal scholars such as Liang (2018) and Boute & Zhang (2019) have underscored that without clear property-like protection, investment in carbon abatement projects and carbon-linked financial products will remain limited, constraining the ETS's ability to leverage private capital.

Transparency and public oversight require deliberate legal design. Although China's MRV infrastructure has improved data accuracy, disclosure obligations remain narrow. Legislation should mandate timely publication of verified emissions data, aggregated trading statistics, and compliance outcomes, subject to legitimate confidentiality protections for trade secrets. Public accreditation of third-party verifiers and regular audits of their performance should be codified to ensure independence and technical competence. In the EU ETS, public access to emissions and allocation data has strengthened market discipline and public trust; adopting a tailored version of such disclosure rules could enhance the legitimacy of China's ETS and facilitate external monitoring by researchers, civil society, and investors.

Dispute resolution mechanisms must also be embedded within the legal framework. The complexity of carbon market transactions—spanning allocation disputes, contractual breaches, verification disagreements, and allegations of manipulation—demands specialized adjudicative capacity. Establishing carbon-specific arbitration bodies or dedicated environmental court divisions with ETS jurisdiction would create an expert-driven forum for resolving such disputes. Judicial review of administrative penalties, registry decisions, and allocation methodologies should be available to ensure procedural fairness and to develop a jurisprudence that guides both regulators and market participants. The experience of the California Cap-and-Trade Program, where regulatory decisions are subject to judicial scrutiny, shows that the availability of independent review enhances both compliance discipline and stakeholder confidence.

Integrating carbon allowances into the financial market ecosystem is another legislative imperative. As the ETS matures, the need for hedging instruments

such as carbon futures, options, and swaps will intensify. The legal recognition of allowances as underlying assets for such derivatives requires statutory clarity, coordination with the CSRC, and alignment with the Securities Law and related financial regulations. Rules addressing market conduct—such as prohibitions on insider trading, price manipulation, and excessive speculation—should be incorporated into the carbon trading statute or parallel financial legislation. This proactive integration will enable the ETS to support sophisticated risk management and investment strategies without compromising its environmental objectives.

A comprehensive reform strategy should combine statutory clarity with regulatory adaptability. The ETS operates within a dynamic context of evolving emissions caps, technological innovation, and shifting macroeconomic conditions. Legislation should set out foundational rights and obligations while authorizing the MEE and other relevant agencies to adjust technical parameters, allocation methodologies, and compliance schedules within defined legal boundaries. Sunset clauses, periodic legislative reviews, and mandatory stakeholder consultations can be embedded in the law to ensure that the system remains responsive to both environmental imperatives and market realities.

Such reforms will not only strengthen the ETS domestically but also prepare China for deeper engagement with international carbon markets. As cross-border carbon pricing mechanisms gain prominence—exemplified by the EU's Carbon Border Adjustment Mechanism—legal convergence on asset definitions, transparency standards, and dispute resolution will be critical for facilitating market linkages. A legally mature ETS would position China to shape global norms for carbon market governance, leveraging its scale to influence both market design and environmental ambition.

By advancing legislative codification, clarifying property rights, institutionalizing transparency, enabling specialized dispute resolution, and integrating with financial regulation, China can transform its ETS from a primarily administrative compliance tool into a credible, investment-friendly, and internationally interoperable market instrument. Such a transformation would not only secure the domestic environmental benefits of emissions trading but also elevate China's role as a central actor in the architecture of global climate governance.

7. Conclusion

China's Emissions Trading System (ETS) is a landmark institutional innovation in the architecture of environmental governance, reflecting an effort to reconcile the efficiency of market-based instruments with the strategic authority of centralized state regulation. As the largest national carbon market in terms of covered emissions, it operates both as a domestic compliance mechanism aligned with China's development model and as a potential reference for how large emerging economies may structure their climate change mitigation efforts. Its trajectory embodies a deliberate policy pattern: initiating with pilot experimentation, consolidating institutional capacity, and advancing toward gradual legal codification. This process mirrors broader trends in China's governance reforms, where practical implementation precedes legislative entrenchment, allowing for policy calibration before locking in legal form.

The ETS's evolution from fragmented regional pilots to a unified national market under the supervision of the Ministry of Ecology and Environment (MEE) demonstrates a degree of institutional consolidation rare in complex environmental policy domains. The creation of a national registry, standardization of monitoring, reporting, and verification (MRV) protocols, and integration of compliance and enforcement functions into a single administrative framework have provided a functional operational base. These developments have created institutional knowledge, improved intergovernmental coordination, and enhanced technical capacity for emissions accounting and compliance oversight.

The system's current reliance on ministerial regulations and administrative instruments reflects its transitional nature. Without a dedicated *Carbon*

Emissions Trading Law, the ETS remains anchored in a legal structure that lacks the statutory authority, judicial enforceability, and normative stability associated with national legislation. This legal incompleteness is both a limitation and an opportunity. It limits the market's ability to integrate with the financial system, constrains the development of property rights over carbon allowances, and restricts the use of judicial or arbitral remedies for disputes. At the same time, it provides flexibility for regulators to adapt allocation methodologies, expand sectoral coverage, and adjust compliance rules in response to market feedback.

The durability and credibility of the ETS will ultimately depend on consolidating its operational gains into a coherent legal foundation. Clarifying the legal nature of carbon allowances is a critical step. If they continue to be treated solely as administrative licenses, their market value will remain limited, and participation from financial institutions will be cautious. Recognizing allowances under civil law—potentially as usufruct rights—could align them with property protection norms without undermining state ownership of environmental commons. Such recognition would also facilitate the development of carbon-linked financial instruments, allowing the market to mobilize capital for emissions reduction projects.

Institutional safeguards are equally important. The establishment of specialized dispute resolution mechanisms, whether through dedicated arbitration panels or environmental court divisions with ETS expertise, would create procedural fairness and build market trust. Embedding these mechanisms in statute would help balance the MEE's role as regulator with the need for independent adjudication of contested decisions. International experience, including the European Union's judicial oversight of the EU ETS and California's integration of carbon market disputes into its administrative law framework, demonstrates that such safeguards enhance both compliance discipline and investor confidence.

Transparency in market operation and regulatory enforcement is another determinant of the system's legitimacy. Public disclosure of verified emissions data, allocation methodologies, and compliance outcomes can deter misconduct, improve price discovery, and allow for informed participation. Aligning China's disclosure standards with global best practices would also facilitate cross-border market compatibility, a consideration of growing relevance as the EU's Carbon Border Adjustment Mechanism (CBAM) and similar policies link international trade with carbon accounting.

From a global perspective, China's ETS offers several insights for climate governance. It shows that large-scale carbon markets can be constructed within a unitary political system, provided there is sustained political commitment, technical competence, and policy coherence. It also illustrates that market-based climate instruments do not require wholesale adoption of Western legal property regimes to function, though clearer legal entitlements can enhance efficiency and integration with financial systems. For emerging economies where institutional capacity is uneven and political priorities are diverse, the Chinese model may serve as an adaptable template—one that demonstrates how incrementalism can be harnessed to gradually build complex governance mechanisms.

Challenges remain and are not trivial. Legislative incompleteness leaves the ETS exposed to regulatory discretion. Administrative dominance limits the role of independent oversight. Ambiguity over property rights continues to deter deeper market engagement. These features, however, can be understood as transitional characteristics of a system in mid-formation rather than permanent defects. China's governance style—iterative policy design informed by pilot experimentation—suggests that many of these issues will be addressed through phased legal reform. The drafting and eventual enactment of a national carbon trading statute, integration of allowances into civil and financial law, and development of specialized dispute resolution pathways are all foreseeable steps in this trajectory.

In the longer term, the maturation of the ETS will also have geopolitical significance. As climate governance

becomes more interconnected through linked markets, cross-border allowance trading, and trade measures tied to carbon intensity, China's legal choices in structuring its ETS will influence the evolution of global norms. A legally coherent and operationally credible Chinese carbon market could act as both a domestic tool for emissions reduction and an international standard-setter, shaping how other emerging economies design their own market mechanisms.

China's ETS is thus best understood as a dynamic institution—neither fully formed nor static, but evolving in response to domestic priorities and international pressures. Its capacity to transform environmental goals into enforceable market rules depends on legal clarity, institutional trust, and adaptive governance. By embedding these qualities in a robust statutory framework, China can not only secure the ETS's role in meeting its 2030 peak and 2060 neutrality targets but also contribute to the architecture of global climate governance in a way that reflects both national circumstances and shared international objectives.

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