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## Research on Legal Safeguards for Carbon Market Integration in the Guangdong-Hong Kong-Macao Greater Bay Area

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### Abstract

The realization of carbon market integration in the Guangdong-Hong Kong-Macao Greater Bay Area urgently necessitates robust legal safeguards, encompassing legislation, law enforcement, and judiciary as the three foundational pillars of the rule of law. As a distinctive urban agglomeration established under the “One Country, Two Systems” framework, the Greater Bay Area requires close cooperation among all parties to facilitate the achievement of regional “dual carbon” objectives. Promoting the integration of rule of law in the Greater Bay Area’s carbon market undoubtedly serves as the legal cornerstone for leading regional “dual carbon” cooperation and represents a vivid manifestation of regional legal collaboration across Guangdong, Hong Kong, and Macao. Constrained by divergent legal systems, legal cooperation on carbon markets in the Greater Bay Area confronts challenges of rule-of-law fragmentation at the legislative level, dispersion at the enforcement level, and conflicts at the judicial level, resulting in obstructed exchanges and cooperation in carbon market rule of law among the three jurisdictions and difficulty in forming an integrated legal safeguard framework. To address these issues, while respecting the high degree of autonomy of Hong Kong and Macao, the comprehensive jurisdiction of the central government and its unified leadership over local authorities (mainland) may be leveraged to strengthen legal cooperation in the Greater Bay Area through an “authorization + consultation” approach, flexibly employing various legislative coordination techniques to construct a systematic and comprehensive legal framework for carbon market cooperation in the Greater Bay Area.

## Full Text

### Research on Legal Guarantees for Carbon Market Integration in the Guangdong-Hong Kong-Macao Greater Bay Area

**Abstract:** The realization of carbon market integration in the Guangdong-Hong Kong-Macao Greater Bay Area urgently requires robust legal guarantees, encompassing legislation, law enforcement, and judiciary as the three foundational pillars of the rule of law. As a distinctive urban agglomeration under the “One Country, Two Systems” framework, the Greater Bay Area requires close cooperation among all parties to achieve the regional “dual carbon” goals. Promoting the legal integration of the carbon market in the Greater Bay Area not only serves as the legal foundation for leading regional “dual carbon” cooperation but also represents a vivid practice of regional legal cooperation in this unique context. Constrained by differences in legal systems, legal cooperation in the Greater Bay Area’s carbon market faces challenges of legislative fragmentation, decentralized law enforcement, and judicial conflicts, resulting in obstructed cooperation and communication among the three jurisdictions and hindering the formation of an integrated legal guarantee framework. To address this, while respecting the high degree of autonomy of Hong Kong and Macao, the central government should leverage its comprehensive jurisdiction and unified leadership over local governments (mainland China) to strengthen legal cooperation in the Greater Bay Area through an “authorization + consultation” approach, flexibly employing various legislative coordination techniques to construct a systematic and complete legal framework for carbon market cooperation in the region.

**Keywords:** Guangdong-Hong Kong-Macao Greater Bay Area; carbon market; regional legal cooperation; central-local relations; institutional opening-up

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## 1. Problem Introduction

The construction of an integrated legal framework for the carbon market in the Greater Bay Area constitutes both an important foundation for ecological civilization construction and a crucial component of foreign-related rule-of-law development. The report of the 20th National Congress of the Communist Party of China states: “We must enhance China’s opening-up level... and steadily expand institutional opening-up concerning rules and regulations.” Simultaneously, “actively and steadily advancing carbon peak and carbon neutrality” has been incorporated into the 20th Party Congress report as a key priority in promoting green development and fostering harmony between humanity and nature. Advancing “dual carbon” work will become a critical strategic task for China’s mid-to-long-term ecological civilization construction. It is foreseeable that the Party Central Committee and the State Council will continue to make decisions and deployments in economic development, energy transformation, ecological and environmental protection, technological innovation, and other fields, resolutely advancing climate change response efforts, particularly carbon market construction, using the domestic economic cycle to attract global resource elements and enhance the linkage effects between domestic and international markets and resources.

Examining carbon market construction from a rule-of-law perspective, the institutionalization and standardization of the system will determine whether the “dual carbon” vision can be realized. In this legal development process, regional carbon market legal integration represents a key focus. The state attaches great importance to regional cooperation because environmental factors within specific regions exert common impacts on regional environments. China’s carbon market legal integration must begin by breaking through the fragmentation of regional carbon market legal frameworks. Regions such as the Yangtze River Delta are already conducting collaborative regional governance. Under China’s “One Country, Two Systems” framework, the Greater Bay Area has established a distinctive urban agglomeration with institutional and strategic advantages in international cooperation, which will help China better achieve its “dual carbon” goals within a certain timeframe, actively participate in various environmental activities, and make outstanding contributions to global green governance.

On January 5, 2024, the State Council Executive Meeting reviewed and approved the “Interim Regulations on Carbon Emissions Trading Management (Draft),” establishing relevant systems for carbon emissions trading management, further standardizing carbon emissions trading, and providing legal guarantees for the orderly development of China’s carbon market. With higher-level law already elevated to administrative regulations, the next step in China’s carbon market rule-of-law domain is regional legal integration, ultimately achieving legal unification. On January 11, 2024, the Central Committee of the Communist Party of China and the State Council released the “Opinions on Comprehensively Promoting the Construction of a Beautiful China,” which states the need to “deepen rule 衔接 and mechanism 对接 in the ecological and environmental

field of the Greater Bay Area, jointly building an internationally top-tier beautiful bay area.” In October 2021, the Central Committee and the State Council issued the “Opinions on Fully, Accurately, and Comprehensively Implementing the New Development Concept to Achieve Carbon Peak and Carbon Neutrality,” which mentioned further planning for the Greater Bay Area, designating it as a region for improving spatial layout to help achieve low-carbon development goals and pursue green development paths, with strengthened guidance and clear development requirements. Undoubtedly, the Greater Bay Area will also elevate its carbon market legal integration development to a new level under the guidance of green and low-carbon policies.

The research question of this paper is that existing literature either focuses on constructing cooperative legislative mechanisms for the Greater Bay Area, addresses environmental judicial and law enforcement coordination, concentrates on standard and rule 衔接, or merely mentions mainland “dual carbon” legislation and carbon market construction, all with relatively limited research perspectives. Specialized literature on the legal integration of the Greater Bay Area’s carbon market remains lacking, necessitating further in-depth research and exploration. How to actively and steadily advance carbon market integration, how to resolve the current fragmented situation where local carbon market efforts operate independently, and particularly how to address the legislative, enforcement, and judicial conflicts among the three jurisdictions within the Greater Bay Area—all require further analysis and research. Therefore, it remains necessary to sort out the Greater Bay Area from legislative and other dimensions, based on understanding the current legal “stock,” to further expand the legal “increment” in the near future, providing robust legal guarantees for carbon market cooperation. Subsequently, the author will approach from three levels—empirical investigation, legal theoretical foundation, and implementation pathways—to promote the integrated development of carbon market rule of law in the Greater Bay Area, providing theoretical support for the construction of an integrated Greater Bay Area carbon market.

## 2. Empirical Investigation of Carbon Market Legal Integration in the Greater Bay Area

Regional collaborative legalization represents a major strategic initiative for promoting rule-of-law development and progress in the new era, with the legal integration of the Greater Bay Area being the top priority in implementing this strategy. Although the “dual carbon” goal is a recently emerging concept, achieving legal cooperation among Guangdong, Hong Kong, and Macao to realize low-carbon green development has long been China’s aspiration. Agreements jointly signed by the National Development and Reform Commission and the three governments, or documents issued by the State Council, have all established “green development” as a fundamental principle for Greater Bay Area development cooperation, providing strong guidance for the region’s development. To better realize the green principle, existing development models should

be transformed to pursue green and low-carbon development paths. In addition to central government documents and Guangdong-Hong Kong-Macao cooperation agreements related to low-carbon green development themes, numerous legal cooperation practices in carbon market rule of law among the three jurisdictions can be found in central and local legal construction efforts.

## 2.1 Current Legal Status of Central Government and Pearl River Delta Nine Cities

**2.1.1 Legislative Level** When analyzing the legislative status of carbon markets in the Pearl River Delta nine cities, we must first examine the construction process of China's carbon market institutional system, particularly its institutional architecture from central to local levels. Hierarchical legislation constitutes a primary characteristic of China's legal system construction. Analyzing the central institutional architecture, China takes the Constitution as the fundamental law, endowing it with supreme legal status, wherein norms related to state obligations form the foundation of China's carbon market legislative framework. China's mainland carbon market legislative framework currently comprises administrative regulations, administrative rules, and normative documents, still lacking top-level rules at the legal hierarchy level. Essentially, China's ecological and environmental problems can be attributed to high-carbon energy structures, high energy consumption, and industrial structure issues. Carbon emission issues mirror pollution discharge problems. In China's carbon market field, laws applicable to this domain originate from environmental protection (or governance) related laws.

China focuses on local pilot programs for carbon market construction. Since 2011, the National Development and Reform Commission has approved carbon emissions trading pilots in Beijing, Shanghai, Guangzhou, and other locations. The national carbon market launched trading on July 16, 2021, initially establishing a system framework compatible with China's national conditions, initially cultivating a carbon trading market to better serve carbon emissions management, achieving preliminary results and effectively reducing carbon reduction costs. This indicates that China's carbon market has entered a new legislative development stage. Regarding carbon market legislation, the Legislation Law contains relevant provisions, with Articles 88, 89, and 91 specifying that central and local-level legislation refers to national carbon market legislation and Pearl River Delta region nine cities' carbon market legislation, respectively. The latter includes legal provisions and rules and regulations issued by local governments, with varying levels of effectiveness. Local legislation generally has distinctive characteristics, while central foundational laws often contain principled and general rules, with local legislation making more specific provisions in response to central legislation. Under these circumstances, Pearl River Delta nine cities should gradually synchronize with the central government in carbon market legislation to enhance the efficiency of the carbon market institutional system. For example, Guangdong Province has issued the "Guangdong

Province Environmental Protection Regulations” and other regulations, which explicitly stipulate atmospheric pollution supervision and governance within the provincial domain. At the municipal administrative division level, cities like Guangzhou are continuously promulgating and improving legal provisions and rules. For instance, the “Guangzhou Ecological Environment Protection Regulations,” passed in October 2021, explicitly stipulate local dual carbon goals, carbon inclusion, and carbon emission reduction. Since September 2021, the Shenzhen Municipal People’s Congress has implemented the “Shenzhen Special Economic Zone Ecological Environment Protection Regulations,” which specifically address local atmospheric pollution prevention and governance, incorporating overall environmental governance into the agenda through mechanisms such as the Gross Ecosystem Product accounting system. Although cities like Foshan have not issued specialized local legal provisions or rules, they can refer to central and provincial-level local legal provisions or rules to conduct local carbon market legislation.

**2.1.2 Enforcement Level** The most critical link in the legal integration of the Greater Bay Area carbon market is implementation, which cannot be separated from the enforcement actions of regulatory authorities. Currently, the Greater Bay Area carbon market faces problems of fragmented regulatory systems and singular information disclosure forms. In the absence of higher-level law basis, especially in cross-legal-jurisdiction and cross-regional collaborative legislation scenarios like the Greater Bay Area with few precedents, relying solely on the Climate Change Department of the Ministry of Ecology and Environment is insufficient in terms of both authority scope and professional capacity to oversee carbon trading regulatory responsibilities. As the national carbon market expands and various participants join, enterprises unfamiliar with carbon financial market rules or attempting to exploit legal loopholes for profit will inevitably generate numerous violations. Carbon financial market regulatory departments, as the direct entities facing enterprise violations, must first address enterprises’ violations of carbon financial market verification, reporting, trading, and compliance obligations.

Specifically, in the process of carbon market legal integration, the government supervision aspect still faces diverse issues such as inadequate supervision and management. This is because state intervention plays an important role in the carbon market enforcement stage. Under China’s amplified regulation of carbon markets, the government should further fulfill its regulatory responsibilities, supervising whether trading entities fulfill contracts and whether their trading behaviors comply with regulations. This also leads to a substantial increase in government regulatory costs, followed by problems such as weak government supervision and inability to conduct effective interventions. The existence of confused regulatory subject logic, unsmooth internal administrative coordination, and multi-subject regulatory system design will inevitably exacerbate information asymmetry problems, thereby reducing regulatory efficiency and even triggering formalism issues. The following factors contribute to

this phenomenon: First, the failure to establish a mature information disclosure system reduces regulatory intensity. Second, the existence of power rent-seeking problems negatively impacts market stability. Third, confused regulatory subjects create drawbacks of multi-headed regulation. The key to these problems lies in inadequate carbon market supervision and weak penalties for violations.

Taking the administrative penalty case of a certain electronic technology company in Shenzhen, Guangdong as an example, although the company was penalized multiple times for insufficient carbon emission quota settlement and has entered bankruptcy proceedings, it still refuses to fulfill its settlement obligations and ignores administrative penalties, while administrative agencies cannot impose further penalties. From a governance perspective, conflicts between government governance and market demand result in a low degree of marketization in carbon trading, specifically manifested in unclear legal attributes of carbon emission rights, insufficient basis for carbon emission rights trading, and limited governance capacity of regulatory subjects. Meanwhile, for violations such as failure to report carbon emissions as required, exceeding emission quotas, or market manipulation, Chapter 6, Articles 35-39 of the “Guangdong Province Carbon Emission Management Trial Measures” have stipulated corresponding penalties, including fines and market access restrictions, aimed at ensuring the standardized operation of Guangdong’s carbon market and achieving “dual carbon” goals. However, how these rules can be further extended to the Greater Bay Area and coordinated with Hong Kong and Macao requires further analysis and research.

**2.1.3 Judicial Level** From a national perspective, judicial cases related to the Greater Bay Area carbon market have attracted increasing attention, with two judicial cases already included in representative cases released by the Supreme People’s Court that orderly promote dual carbon goal realization through justice. On July 25, 2022, the Supreme People’s Court issued the “Opinions on Providing Judicial Services and Guarantees for Accelerating the Construction of a Unified National Market,” which states that by researching and issuing corresponding judicial policies, strong support can be provided for China’s smooth achievement of “dual carbon” goals, properly handling disputes related to carbon emission quotas and other rights, thereby improving the carbon emission rights trading mechanism. The correct application of the green principle and clauses in the Civil Code can further clarify carbon emission-related issues and improve adjudication rules for disputes related to carbon emission rights.

Based on the political consideration of the “dual carbon” strategy as a unified national chessboard, China adopts a reform strategy from local pilot to central coordination, gradually incorporating carbon emission rights into the overall reform of factor market allocation. Therefore, as an important regional integrated collaborative demonstration zone, the Greater Bay Area must conduct pilot trials in green and low-carbon development and climate change response, especially in the regional carbon market, summarizing judicial practical experience to pro-

vide assistance for national carbon market development. In September 2021, the Guangdong Provincial Government issued the “Action Plan for Deepening the Market-oriented Allocation Reform of Capital Factors,” which states that based on Guangdong’s carbon emission rights trading market, further research should be conducted to create a Greater Bay Area carbon emission rights trading market, attracting investment funds from Hong Kong and Macao to achieve Guangdong carbon market transactions and construct a cross-border carbon emission rights trading mechanism.

Therefore, when handling carbon market-related disputes, courts within the Greater Bay Area should consider not only traditional civil and commercial law rules, administrative law rules, and traditional environmental law rules but also special rules based on the carbon market, including how to define the legal nature of carbon emission rights, how to handle disputes during carbon emission rights trading processes, and how to ensure fairness in carbon market transactions and complete and accurate information disclosure. Observing current Guangdong judicial practices reveals huge loopholes in carbon emission compliance management that are easily exploited by enterprises for profit. For example, in case (2020) 粤..., the court lacked experience in hearing carbon trading cases, affecting the enthusiasm and reasonable expectations of various parties in carbon trading. Specifically, because carbon exchanges neglected payment-versus-delivery functions similar to securities trading during program design, they cannot impose restrictions on trading institutions like securities trading, resulting in frequent arbitrary quota allocations by carbon exchanges.

Taking the case of Shenzhen Xiangfeng Container Co., Ltd. v. Shenzhen Development and Reform Commission as another example, the court did not define the calculation standards for annual carbon emission quota compliance, lacking the critical step of defining carbon emission verification standards. Therefore, courts need sufficient professional knowledge when handling such cases and may reference judicial cases and experience summaries from international regional carbon markets, such as the EU carbon market.

## 2.2 Current Legal Status of Hong Kong Special Administrative Region

**2.2.1 Legislative Level** Hong Kong’s positioning in the Greater Bay Area carbon market is as an international trading, pricing, and financial center, providing continuous economic support for Greater Bay Area construction. Hong Kong’s carbon market legal environment is unique and markedly market-oriented. Compared with the mainland, Hong Kong’s legal system more closely resembles common law. Hong Kong’s legal system primarily consists of unwritten law. Although local legal practice mainly relies on judicial interpretation and government orders, the local legislature also timely proposes solutions or adds to and improves Hong Kong ordinances in accordance with the laws of development of the times.

Hong Kong has achieved good results in carbon emission reduction work. In

2020, carbon emission scale had already decreased by 20% year-on-year. Moreover, unlike regions such as Macao, Hong Kong achieved its carbon peak target in 2014. The “Hong Kong 2020 Policy Address” announced that the local carbon neutrality target would be achieved before 2050. These achievements are inseparable from Hong Kong’s relatively complete low-carbon legal system. On July 5, 2022, the Hong Kong Stock Exchange announced the establishment of the Hong Kong International Carbon Market Council, while also signing a memorandum of cooperation with Guangzhou Carbon Emissions Exchange Co., Ltd. (Guangzhou Carbon Exchange), stating that both parties would cooperate to actively explore further development of the regional carbon market and establish a voluntary emission reduction mechanism compatible with Greater Bay Area development status.

Against this background, Hong Kong’s carbon market legislation has become an important issue. The “Hong Kong Climate Action Blueprint” proposes the concept of priced carbon reduction. Taking power generation as an example, based on Hong Kong’s environmental factors and limited land with dense population, the potential for large-scale development of renewable energy such as solar and wind power is relatively limited. Therefore, a carbon market should be actively constructed to fully leverage its role. For instance, the Hong Kong Special Administrative Region Government established the “Scheme of Control Agreement” in 2018, launching and implementing the “Feed-in Tariff Scheme.” The agreement states that for privately developed renewable energy, the Hong Kong SAR Government will strongly support purchasing from these companies at prices higher than conventional rates, providing inspiration for establishing positive relationships between government departments, enterprises, and society.

**2.2.2 Enforcement Level** Currently, Hong Kong’s carbon market is still in the preparation and trial operation stage, with relatively new practices that have begun to demonstrate important impacts on market operations. Therefore, analysis of Hong Kong’s carbon market enforcement belongs to precautionary planning. Under the profound influence of UK administrative law, Hong Kong’s administrative law focuses on administrative procedure legislation, aiming to standardize government behavior and provide strong guarantees for its legality. Hong Kong’s carbon market enforcement also adheres to this jurisprudence.

To reduce carbon emissions, Hong Kong has begun carbon pricing, which requires sufficient information disclosure. It can be predicted that Hong Kong’s carbon market enforcement will concentrate on the information disclosure field, especially ESG-level information disclosure. Hong Kong has established an ESG information disclosure mechanism following a gradual development principle, progressively imposing stricter disclosure requirements. In November 2021, the Hong Kong Stock Exchange issued the “Climate Disclosure Guidance,” adopting TCFD disclosure standards that incorporate multiple major TCFD recommendations, mandating disclosure in accordance with TCFD recommendations

before 2025. It is foreseeable that the Hong Kong SAR Government will adopt relatively flexible measures in carbon market regulatory mechanisms while also having certain requirements for carbon emission reporting and verification to ensure the authenticity and reliability of carbon market information.

However, in the carbon market enforcement process, how to ensure market participants comply with rules, how to handle illegal emission behaviors, and how to balance market development and environmental protection all require exchange, interaction, and 衔接 with the carbon market within the Greater Bay Area scope, especially drawing on relevant experience from the mainland carbon market.

**2.2.3 Judicial Level** Like the discussion at the enforcement level, since Hong Kong's carbon market is still in its infancy, analysis of Hong Kong's carbon market judicial level belongs to forward-looking analysis. The author believes that Hong Kong's carbon market will emphasize market mechanism guidance and civil and commercial mediation methods, stressing more on contractual freedom in carbon trading and flexibility in market access, while also emphasizing the reflection of environmental protection goals, such as promoting green finance development through legal means and encouraging enterprises to adopt low-carbon technologies and clean energy, adopting more flexible and market-friendly approaches aimed at motivating enterprises and market entities to actively participate in climate action.

Hong Kong has long been an international financial center. Based on the connection between the carbon market and the mainland, Hong Kong possesses certain advantages that are of significant importance for Hong Kong's market diversification construction. Although Hong Kong's carbon market currently has limited transactions, it is currently building Hong Kong International Carbon Market Core Climate, one of the world's first voluntary carbon markets using offshore RMB, which is crucial for conducting transactions in RMB in Hong Kong, the future development of Hong Kong's offshore RMB market, and Hong Kong's role in RMB internationalization. Therefore, Hong Kong's judicial practice in the carbon market field is still developing. Courts' reasoning, interpretation, and judgments regarding the carbon market play crucial roles in guiding carbon market behavior, resolving carbon market disputes, and promoting healthy carbon market development. As the carbon market continues to develop and mature, Hong Kong's judicial practice related to the carbon market is expected to become richer and more in-depth, providing assistance for mainland carbon market development.

## 2.3 Current Legal Status of Macao Special Administrative Region

**2.3.1 Legislative Level** The construction of Macao SAR's carbon market is in full swing, supported by the Macao SAR Government's legislative efforts. On July 22, 2021, Ho Iat Seng stated at a meeting that the Macao SAR Government would implement "dual carbon" work effectively, striving to achieve the carbon

peak target by or before 2030. Regarding legal architecture, the Macao SAR has been committed to constructing a complete green legal system, especially concerning the legislative framework design for Macao's carbon market. Therefore, Macao's carbon market legislation reflects its special administrative and legal background. Due to Macao's economic structure and resource constraints, it has adopted different strategies in carbon market legislation compared to the mainland and Hong Kong.

Written law occupies a dominant position in Macao SAR's legal system, with its legislative framework composed of laws and administrative regulations. Regarding environmental protection, the Macao Basic Law contains explicit provisions, with Article 119 stating that "the Macao SAR Government should actively fulfill its basic environmental protection responsibilities." In response, the "Macao Environmental Framework Law" has been enacted, incorporating air governance as a fundamental element in local environmental policy through system establishment, general principle issuance, and legislative constraints. Additionally, specific air pollution behaviors have been incorporated into the "Macao Criminal Code" to constrain carbon emission behaviors by clarifying legal consequences.

Macao uses legislation to improve its administrative functional structure to keep pace with low-carbon energy reforms. In 2020, the Macao Chief Executive revised Administrative Regulation No. 14/2009. According to Administrative Regulation No. 38/2020, starting from the beginning of the following year, the Environmental Protection Bureau would uniformly perform functions related to energy planning previously performed by the Energy Industry Development Office. This functional adjustment has better aligned local energy policies with the environmental legal system, playing a positive role in promoting Macao's carbon market development and providing strong support for better achieving local "dual carbon" goals.

Local legislation also stipulates requirements to incorporate environmental quality protection content into general legal obligations and separately establishes emission standards for multiple sectors including industry, laying a legal foundation for obtaining underlying carbon market data and conducting more efficient low-carbon governance. Simultaneously, Macao's carbon market-related legislation emphasizes public education and awareness enhancement. Through legal provisions, the Macao Government promotes public understanding and participation in low-carbon lifestyles and enterprises' responsibilities in carbon emission reduction. Additionally, Macao's legislation emphasizes alignment with international carbon emission reduction standards, attempting to promote Macao's participation and cooperation in international carbon markets through legislation.

**2.3.2 Enforcement Level** The Macao SAR has considerable potential in carbon market enforcement, serving as an optimal testing ground for building a green and low-carbon ecological island and a hub connecting domestic and international carbon market dual circulation and carbon standard linkage, serving

global trade green transformation, assisting national industrial green upgrading, and promoting green growth in foreign trade. The Macao SAR faces many challenges in carbon market regulation. Due to Macao's relatively small and immature carbon market, establishing effective regulatory mechanisms and enforcement capabilities represents Macao's main challenge.

Portuguese administrative law has profoundly influenced Macao's administrative law. Although Macao rapidly achieved localized development in legislation after its return, the local Basic Law states that Macao has not changed its previous legal system, retaining the characteristics of the original legal system, still adopting the French model where administrative actions enjoy the privilege of priority execution without judicial review, with administrative courts responsible for hearing administrative activities, and public administration functions aimed at safeguarding public interests. Macao still implements a public administrative system named "executive administration."

In administrative law, Macao's development model is not a single "control" model focusing only on improving administrative efficiency, represented by Macao's current "Administrative Procedure Code," nor is it a single "power control" model focusing only on supervising relevant agencies and personnel. Instead, it achieves harmonious development of both, aligning with development trends in most regions. Before Macao's return, Macao's environmental regulations were primarily based on the "Environmental Framework Law," with the establishment of the Environmental Committee serving as a consulting body for the Governor to formulate local environmental policies. Additionally, the Environmental Committee was a public legal person with dual autonomy in administrative and financial aspects, possessing legal personality, actively performing functions such as mediating environmental disputes, handling environmental complaint cases, providing suggestions on environmental permits, and vigorously monitoring compliance with and implementation of environmental regulations. These have all laid a legal foundation for carbon market enforcement.

After Macao's return, as the local economy continues to develop, resulting environmental problems have become increasingly severe. Macao's Environmental Committee alone is insufficient to effectively resolve environmental problems. On the basis of abolishing the Environmental Committee, the Macao SAR Government established the Environmental Protection Bureau—a public department responsible for in-depth research and effective implementation of environmental policies—requiring it to perform 23 functions and establishing specialized consulting bodies. This demonstrates that while mainland China continuously strengthens its "dual carbon" efforts, the Macao SAR is also vigorously enforcing its carbon market. Additionally, various "environmental guidelines" still exist in local environmental law, significantly impacting enforcement actions. These environmental guidelines are not substantive legal provisions but specific provisions made by administrative agencies during the administrative enforcement stage regarding technical matters requiring detailed explanation,

aiming to correctly implement environmental legal provisions.

**2.3.3 Judicial Level** Since Macao’s carbon market is still in its infancy, analysis of Macao’s carbon market judicial level belongs to forward-looking analysis, lacking judicial cases for specific analysis. However, overall, when Macao’s carbon market enters judicial procedures, it should reflect a balance between environmental protection and market regulation, similar to the enforcement level analysis. When handling such carbon market judicial cases, Macao courts must consider not only the 衔接 of civil and commercial rules including the Macao “Civil Code” but also specific applications based on the particularities of the carbon market and relevant requirements of Macao’s “Environmental Framework Law.”

The “Hengqin Guangdong-Macao Deep Cooperation Zone Development Promotion Regulations,” passed in January 2023, stipulate regarding the institutional opening-up of the cooperation zone that Article 56 states, “strong support should be provided for the cooperation zone to rapidly conduct institutional opening-up concerning rules and other systems, gradually establishing a civil and commercial rules system that keeps pace with Macao and international development levels.” This indicates that when handling carbon market disputes, Macao courts will apply laws based on specific circumstances of different regions. Moreover, as the carbon market gradually matures, Macao’s judicial practice related to the carbon market is expected to become richer and more detailed.

### 3. Legal Theoretical Foundation for Carbon Market Legal Integration in the Greater Bay Area

Following empirical investigation of the carbon market legal status in the three jurisdictions, the necessity of constructing a legal integration cooperation mechanism for the Greater Bay Area carbon market becomes evident. Before institutional construction, we must conduct in-depth analysis of the legal theoretical foundation for carbon market legal integration in the Greater Bay Area, involving two dimensions: Greater Bay Area rule-of-law construction and the national “dual carbon” unified chessboard. From a global perspective, unconstrained carbon emissions will cause global average temperatures to rise, leading to glacier melting and frequent extreme weather such as heavy rainfall worldwide, which will severely impact human survival and development. As an important policy tool for mitigating climate change, the carbon market uses market incentives to promote carbon emission reduction. Therefore, understanding the carbon market requires not only attaching importance to carbon emission reduction but also treating it as a climate environmental issue requiring forceful measures for improvement. Achieving “dual carbon” goals requires in-depth analysis from three dimensions: power-power dimension, power-rights dimension, and rights-rights dimension. This indicates that carbon obligations related to the carbon market are also obligations that the Greater Bay Area should jointly fulfill

through cooperation, not limited to macro-level state obligations or obligations performed by single entities such as governments. Therefore, the corresponding legal system also provides strong support for local carbon market cooperation within the rule-of-law domain.

### **3.1 State Environmental Obligations Governing Central-Local Rule of Law**

Under the “One Country, Two Systems” framework, central-local coordination and rule-of-law practice coordination at the carbon market level are key to achieving national environmental protection goals, especially “dual carbon” goals. The climate change mitigation issue behind the carbon market essentially stems from climate environmental crises, requiring deeper analysis of environmental elements. Environmental elements possess dual characteristics: they are both public and welfare-oriented. In a sense, environmental rights cannot be performed by private parties. The public relies on public trust to transfer public power, with agencies exercising partial usage and management rights over the environment to provide strong guarantees for legitimate public rights and interests. Entrusted agencies should also fulfill their obligations, making outstanding contributions to environmental protection through forceful measures, rationally fulfilling obligations, and exercising restraint in power exercise to avoid infringing upon citizens’ rights. This provides a theoretical basis for the state to fulfill environmental obligations.

State environmental obligations can be divided into central environmental obligations and local environmental obligations according to the division of powers between central and local governments. The environmental obligations involved in the Greater Bay Area are more special regional local environmental obligations, based on laws such as the Constitution, promoting harmonious rule-of-law development through “central policy issuance, local governments actively exercising powers to conduct legislation, and the three jurisdictions jointly signing intergovernmental agreements.” According to relevant provisions of the “Greater Bay Area Development Plan Outline,” the Greater Bay Area will organically integrate cooperative development concepts to conduct integrated construction. Among these, the important highlight of green development lies in the sustainable development concept, aiming to reach consensus and pool strength to provide guarantees for meeting the needs of current and future generations, promoting harmonious Greater Bay Area development, and satisfying citizens’ needs for a better life. Therefore, unlike conventional central-local environmental obligation relationships, the relationship between local environmental obligations and central environmental obligations in the Greater Bay Area has the following characteristics: First, the central government plays a coordinating role in environmental obligations. When issuing environmental policies, the central government’s goal is to achieve national environmental protection and long-term development objectives.

The Constitution is the fundamental law that constrains public power and pro-

vides strong guarantees for citizens' rights. The Constitution explicitly stipulates the state's environmental obligations. First, relying on the basic public ownership system, the Constitution explicitly stipulates the ownership of natural resources, with Article 9 stating that the state is the owner of natural resources, which simultaneously implies the state's responsibility for natural resource protection and rational utilization. Additionally, the Constitution explicitly stipulates the state's ecological and environmental protection issues, with Article 26 stating that the state should vigorously prevent and control pollution and other hazards. Article 89 states that the State Council should perform corresponding leadership and management functions to achieve better results in urban and rural construction. These legal provisions all identify the state as the subject of environmental protection obligations and state that the state has an unshirkable responsibility in environmental governance. From a constitutional perspective, the preamble and Article 33, which relates to human rights protection, also explicitly state that the state should fulfill environmental protection and governance obligations.

Second, local environmental obligations in the Greater Bay Area have their own characteristics, forming the unique form of the Greater Bay Area carbon market. When implementing central national environmental goals, especially "dual carbon" goals, local governments within the Greater Bay Area must consider the special environmental conditions and economic and social development levels of the three jurisdictions in constructing the Greater Bay Area carbon market legal system. Therefore, Greater Bay Area carbon market integration must not only follow central government instructions but also combine with the actual regional circumstances of the Greater Bay Area.

To promote carbon market cooperation and coordinate legislation in the rule-of-law domain, three relationships should be clarified: first, the relationship among the three regions involved in the Greater Bay Area; second, the relationship between the central government and Guangdong Province; third, the relationship between the central government and Hong Kong and Macao. Among these, the third relationship should be prioritized and properly resolved, coordinating the high degree of autonomy of Hong Kong and Macao with the central government's comprehensive jurisdiction. Although the Constitution has identified the state as the subject of environmental obligations, the essence of whether the Greater Bay Area can conduct "dual carbon" cooperative legislation under the "One Country, Two Systems, Three Legal Jurisdictions" framework lies in whether Hong Kong and Macao can rely on their high degree of autonomy to be unconstrained by the national management system and whether the state can exercise corresponding powers to conduct overall supervision over these regions.

On June 10, 2014, the State Council Information Office issued the White Paper "The Practice of the 'One Country, Two Systems' Policy in the Hong Kong Special Administrative Region" (hereinafter referred to as the "One Country, Two Systems" White Paper), which states that the central government can directly exercise powers over Hong Kong or grant corresponding powers to the region to

conduct autonomy according to law, and can exercise corresponding supervisory powers—all important contents of the central government’s “comprehensive jurisdiction” over Hong Kong. Generally, this power includes the power to create special administrative regions and organize their political power organs. According to the White Paper, comprehensive jurisdiction includes the listed powers but is not limited to them. The central government has corresponding powers to comprehensively govern or supervise the Macao SAR, which enjoys a high degree of autonomy. For example, a document issued by the Standing Committee of the National People’s Congress requires joint implementation by three subjects: the Macao SAR, relevant mainland aspects, and the central government that legally guides and supervises other subjects. This demonstrates that in legal cooperation, the Greater Bay Area inevitably involves relationships among three subjects, and cooperation can only be conducted on the basis of the central government legally exercising “comprehensive jurisdiction” over Hong Kong and Macao.

In cooperative practice, power and law rarely appear in single forms. The mutual penetration of power and law is a typical manifestation of specific social orders. The Greater Bay Area involves multiple relationships among multiple regions, mainly concerning Guangdong Province, Hong Kong and Macao, and the nine Pearl River Delta cities, involving legislative relationships among these three regions and legal relationships between the central government and these three regions. All three regions share the central government as their common superior, requiring unified guidance and overall planning by the central government. Comprehensive jurisdiction is the central government’s jurisdiction over special administrative regions, corresponding to national sovereignty, with the national constitution laying the foundation for sovereignty in the legal domain. Therefore, although Hong Kong and Macao need not fulfill positive obligations related to the socialist system stipulated in the Constitution, they must still fulfill negative obligations of not violating the system. Moreover, carbon markets aimed at achieving “dual carbon” goals are related to climate and environmental issues and do not inherently possess any social system nature, and international law identifies China as a state subject that should fulfill international obligations. Therefore, in the governance of Hong Kong and Macao affairs, the state should fulfill constitutional responsibilities, playing a positive role in achieving national overall environmental goals and implementing the “dual carbon” strategy. Regarding carbon market matters related to Hong Kong and Macao, the central government can exercise supervisory powers, and the mainland can also conduct rule-of-law cooperation with Hong Kong and Macao on carbon markets under centrally granted authority.

### **3.2 Legislative Authority Division Guiding Legal Cooperation**

The division of legislative authority and rule-of-law cooperation among the three jurisdictions in the Greater Bay Area is a complex but necessary process because Greater Bay Area construction is regional cooperation conducted under a special

institutional environment, benchmarking against the goal vision of internationally first-class bay areas with high openness, innovation-driven development, and coordinated development, achieving free flow of production factors within the region, and improving the institutional framework for regional cooperative governance. Therefore, the rule-of-law cooperation and institutional framework of the Greater Bay Area are essentially composite forms. The rule-of-law framework for Greater Bay Area cooperative legislation includes both the mainland legal system corresponding to the Constitution and the special administrative region legal systems corresponding to the Hong Kong and Macao Basic Laws. The Party Central Committee has made important plans to build the Greater Bay Area to promote local economic development. This plan has important strategic significance and has set a good example and played a leading role in adapting to China's reforms in various fields in the new era. The region cannot solely rely on policy support to achieve further coordinated rule-of-law development; more critically, it must vigorously conduct rule-of-law supply, providing strong guarantees for local integrated construction through systematic rule of law, focusing on the goals of the "five major systems" to enhance multi-subject legal domain governance capabilities.

Rule of law possesses "systematic" characteristics, which also requires prioritizing the guiding role of concepts, changing traditional development thinking, better achieving coordinated rule-of-law construction, and using rule-of-law thinking to play a positive role in local integrated construction. The guiding role of concepts should be exerted under institutional support, and the region should form basic concepts for further rule-of-law coordination based on a scientific institutional system. Institutional creation contains basic legislative functions. Therefore, to effectively implement the four major development concepts, a three-dimensional legislative mechanism for the Greater Bay Area should be established. Relying on three development poles, a coordinated governance pattern in the rule-of-law domain has been basically established in the Greater Bay Area. The Greater Bay Area, spanning three legal jurisdictions with extensive radiation, has a relatively complex rule system including policy rules and other legislative rules. Some scholars take the "government-led" rule-of-law evolution approach as an entry point, pointing out that regional administrative agreements jointly form its main legal governance mechanism, hoping to promote harmonious regional rule-of-law development through establishing fair legal systems and other diversified methods. This demonstrates that clarifying legislative authority is a prerequisite for promoting harmonious development and achieving market cooperation in the rule-of-law domain in the Greater Bay Area. Especially in promoting integrated development of carbon market rule of law within the region, it cannot be separated from strong support from relevant systems.

Although laws such as the Hong Kong Basic Law explicitly stipulate that Hong Kong and Macao need not implement general national laws not specified in Annex III, the Constitution is the foundation for establishing national sovereignty and still applies and maintains corresponding legal effectiveness despite institu-

tional differences. Additionally, the Constitution provides a basic framework for national legislation and establishing corresponding social systems. The Constitution possesses supreme legal effectiveness, taking precedence over any departmental law and any local law. Therefore, the constitutional foundations of Hong Kong and Macao are jointly constituted by the Constitution and other laws.

First, in promoting integrated development of carbon market rule of law in the Greater Bay Area, the Constitution and other laws clarify the foundation of sovereign jurisdiction. Unlike mainland China, although Hong Kong and Macao implement unique social systems and can continue using capitalist methods for 50 years, different social systems and legal systems will not shake the central government's sovereign foundation over Hong Kong and Macao. The Hong Kong Basic Law's preamble mentions "confirming that the Chinese Government's exercise of sovereignty over Hong Kong will be restored on July 1, 1997." The Macao Basic Law's preamble mentions "confirming that the Chinese Government's exercise of sovereignty over Macao will be restored on December 20, 1999." This demonstrates that since the return of Hong Kong and Macao, their jurisdiction has been dominated by the central government, and localities can conduct affairs cooperation under unified sovereign jurisdiction.

Second, the Constitution and other laws stipulate that central authority grants are the source of Hong Kong and Macao's autonomous powers. The Greater Bay Area should strengthen "One Country," effectively utilize "Two Systems" to promote regional construction, properly handle the relationship between the two, and conduct rule-of-law cooperation and rule 衔接 according to this basic principle. Greater Bay Area construction is an unprecedented important project requiring designers to expend more effort. The Greater Bay Area can also effectively utilize rule of law as a magic weapon to further conduct construction work, which is also the greatest common divisor for promoting integrated development among the three regions. This still requires using rule-of-law concepts to promote regional rule-of-law cooperation and achieve smooth 衔接 of various legal rules. The Greater Bay Area promotes integrated rule-of-law development through central policy issuance, tripartite agreement signing, and local active exercise of legislative powers, based on the Constitution and other laws. "One Country, Two Systems" means Hong Kong and Macao still belong to the national management system. The Basic Laws of China's two special administrative regions both stipulate the autonomy of special administrative regions, with Article 2 stating that special administrative regions enjoy a high degree of autonomy, including administrative management powers, under the authority granted by the National People's Congress in accordance with the Basic Law. Both laws state in Article 12 that special administrative regions are local administrative regions directly under the Central People's Government, enjoying a high degree of autonomy. The Constitution stipulates that the National People's Congress should establish special administrative regions and determine their systems. Therefore, according to the normative logic of the Constitution and other laws, although China's two special administrative regions have been granted a

high degree of autonomy, these powers are still granted based on the authority of the state's highest power and legislative organs, and both are directly under the Central People's Government, which can conduct overall management and exercise supervisory powers over cooperation affairs in the two regions.

Finally, integrating Hong Kong and Macao special administrative regions into China's development situation is also the basic direction established by the Constitution and other laws. The Constitution and other laws provide different dimensional solutions for Greater Bay Area cooperative legislation. Although these three laws do not specify central authorization legislation as a concrete institutional provision, sorting out their normative logic reveals that such systems can still be applied in practice. For example, regarding the legislative power 衔接 of Hong Kong and Macao special administrative regions, the Basic Laws of China's two special administrative regions both explicitly stipulate the central government's legal filing system for the two regions, both explicitly stipulate the legal interpretation system for the two regions, and clarify the participation channels of Hong Kong and Macao residents in mainland legislative affairs. The central government can also incorporate laws formulated by the Standing Committee of the National People's Congress into the Basic Laws of the two special administrative regions through central authorization, making them applicable in Hong Kong and Macao. This demonstrates that the development of Hong Kong and Macao special administrative regions is not separated from mainland China's development. Especially carbon market cooperation is an important issue related to the development of the three regions, national development, and even the development of all humanity. The realization of "dual carbon" goals is also an important issue related to the development of the three regions, national development, and even the development of all humanity. The three regions should strengthen rule-of-law cooperation based on the Constitution and other laws, and use the system established by the mainland's Legislation Law as a foundation.

#### **4. Implementation Pathways for Carbon Market Legal Integration in the Greater Bay Area**

Since the Greater Bay Area does not implement a unified legal system, in carbon market legal cooperation, the Greater Bay Area urgently needs to coordinate and resolve various specific issues through cooperation. Using overly rigid means to solve problems is inappropriate, nor is using overly soft means, because existing soft exchange mechanisms cannot effectively function, while using unified legislation as a rigid means to solve problems is inappropriate. Only establishing a legal integration cooperation mechanism is an effective strategy. As long as we follow the thinking of cooperation and mutual benefit, carefully analyze specific problems, we can effectively resolve regional rule conflicts and smoothly 衔接 regional rules. Detailed to the carbon market rule-of-law domain, through legislative, enforcement, and judicial integration construction strategies, integration and fusion can be achieved at the Greater Bay Area carbon market

rule-of-law level, laying a solid legal foundation for the long-term integrated development of the Greater Bay Area carbon market.

#### 4.1 Legislative Integration Construction for Greater Bay Area Carbon Market

As an important engine of China's economy, the legislative integration construction of its carbon market has important strategic significance for achieving China's "dual carbon" goals. In the future legislative integration process of the Greater Bay Area carbon market, we should clarify common goals among mainland China, Hong Kong SAR, and Macao SAR, strengthen collaboration among legislative bodies, steadily expand institutional opening-up concerning carbon market rules, regulations, management, and standards, and rely on the regional characteristics of the Greater Bay Area to lay a solid foundation for effective carbon market operation and regional environmental goal achievement.

Due to differences in legal systems among the three jurisdictions, environmental legal system conflicts exist, making unified legislation at the regional level difficult. We can first explore environmental collaborative legislation among the three jurisdictions, strengthen legislative communication and coordination, and recommend that the three jurisdictions sign the "Guangdong-Hong Kong-Macao Legal Work Regional Cooperation Agreement." Through regional collaborative legislation in the environmental field, we can avoid disconnection in regional relevant legal systems. We can start with soft law to promote 衔接 of climate response legal systems within the region. Soft law here includes policy plans, guidance opinions, administrative agreements, relevant standards, and rule codes formulated by official institutions. The three jurisdictions can coordinate the introduction of laws and regulations promoting carbon emission reduction, jointly negotiate and formulate carbon emission-related rules, formulate collaborative development plans and implementation plans for carbon emission reduction, and strengthen 衔接 of energy conservation and carbon reduction standards in the Greater Bay Area. Based on the existing "Guangdong-Hong Kong-Macao Regional Atmospheric Pollution Joint Prevention and Control Cooperation Agreement," we can jointly sign the "Greater Bay Area Green and Low-Carbon Development Promotion Agreement," highlighting and emphasizing "dual carbon" cooperation, especially carbon market cooperation-related content, and determining rights and obligations agreements among the three parties. Through regional collaborative legislation, we can avoid conflicts in carbon peak and carbon neutrality policies, standards, and supervision among the three jurisdictions.

Therefore, Greater Bay Area carbon market legislative integration construction requires conducting regional carbon market cooperative legislation, which is an important institutional foundation for regional carbon market rule-of-law cooperation. Regional (inter-regional) cooperation requires multi-subject cooperation in economic and other fields, especially inter-regional cooperation represented by legal cooperation involving conflicts of legal powers at different levels

and of different natures. Therefore, the following four methods can be adopted for cooperation in the carbon market legislative field: first, collaborative legislation, where multi-subjects cooperate in legislation; second, joint legislation, where multi-subjects jointly participate in legislation; third, consultative (transformation) legislation, where multi-subjects conduct legislation through consultation; fourth, authorized legislation, where legislation is conducted through granted authority.

Among these methods, the first legislative method, although explicitly stipulating hard obligations for multi-subjects, falls into a dual dilemma of both constitutional and legal legitimacy because it does not specifically define the cooperation foundation, procedures, or authority limits for multi-subjects in reality. The joint legislation model, although effectively saving communication costs, requires the central government to break current power and institutional boundaries to create a subject granted legislative authority when adopting this model. Legislative subjects under the Greater Bay Area institutional system should be generated through democratic elections. Additionally, the impact of the high degree of autonomy on the legislative powers of Hong Kong and Macao must be comprehensively considered, making it natural that legislative organizations established in this way need to be constrained by democratic supervision. Simultaneously, such legislative organizations will also be constrained by the basic “One Country, Two Systems” institutional framework. Thus, the first two legislative cooperation models are not suitable for current Greater Bay Area carbon market cooperative legislation.

The third cooperative legislative method focuses on exchanges among legislative subjects, rarely containing content related to power adjustment, and is therefore often recognized by subjects seeking regional cooperation. Within the region, previous agreements such as CEPA are products of harmonious development among Guangdong, Hong Kong, and Macao. However, legal changes require modification and optimization of multi-subject interest issues, while consultative legislation is merely the consensus reached by multi-subjects regarding cooperation, often coordinated through consultation, unable to provide favorable guidance in legislative practice. Essentially, consultative legislation suffers from a lack of standardized effectiveness, hindering subsequent transformation legislation work. Therefore, Greater Bay Area carbon market cooperative legislation should be implemented through hard means based on consultation, playing a positive role in promoting the implementation of transformation legislation.

Following the 2017 cooperation arrangement for “co-location inspection,” the scope of responsibilities for implementing this system in mainland China and Hong Kong was explicitly stipulated, explicitly stipulating the cooperation obligations of both regions, playing a positive guiding role in smoothly conducting legal 衔接 between the two regions. In May 2020, the Standing Committee of the National People’s Congress was responsible for relevant legislative work under authorization, incorporating the provisions into Annex III of the Hong Kong Basic Law for implementation in the Hong Kong SAR, further advancing lo-

cal legislative work and enabling the Hong Kong SAR to break free from the predicament of lacking national security maintenance mechanisms. Using central authorization to supervise Greater Bay Area legislative work and coordinate legislative work within the region. This method not only aligns with the basic logic of the constitutional framework but also avoids the defects of joint and collaborative legislation, improves the arbitrariness defects unique to this legislative method, and improves the regulatory effects of consultative legislation, improving its uncertain effectiveness defects. Therefore, authorized cooperative legislation models and consultative cooperative legislation models should be organically combined for carbon market cooperative legislation in the Greater Bay Area. Under the premise of organically combining the two cooperative legislation models, Guangdong, Hong Kong, and Macao implement a chief executive responsibility system. Under the drive of the Standing Committee of the National People's Congress, decisions can be used to explicitly stipulate regional carbon market cooperative legislative authority and responsibility issues, explicitly stipulate regional carbon market cooperative legal obligations, supervise the formulation or amendment of local laws by Guangdong, Hong Kong, and Macao legislative bodies regarding green finance and other matters discussed on common platforms by local governments and chief executives of Hong Kong and Macao. Regarding potential legal conflicts in the transformation legislation stage, constitutional review powers and other authorities or systems can also be flexibly used to consolidate cooperative legislative achievements during Greater Bay Area carbon market cooperative legislation.

#### **4.2 Enforcement Integration Construction for Greater Bay Area Carbon Market**

Regional carbon market enforcement integration construction is crucial for ensuring the achievement of carbon emission reduction goals in the Greater Bay Area. Since the Greater Bay Area encompasses different legal systems and administrative jurisdictions, establishing an effective, integrated enforcement mechanism is particularly important. The Greater Bay Area has long established scientific administrative cooperation mechanisms in specific regional environments, but these mechanisms have relatively loose defects that cannot effectively satisfy the need to create a high-quality living circle within the region. To improve this defect, it is necessary to further exert the leading role of concepts, further strengthen concepts, further treat the Greater Bay Area as a “dual carbon” community, and further improve the overall administrative law enforcement mechanism for the regional carbon market. Specific aspects include:

First, improve the current administrative law enforcement cooperation mechanism, increase exchange efforts, and clarify diversified overall law enforcement methods through consultation. By establishing cross-regional regulatory mechanisms, strengthening information sharing, enhancing enforcement capabilities, and effectively handling violations, the Greater Bay Area can achieve carbon market enforcement integration, which not only helps achieve regional carbon

emission reduction goals but also promotes regional environmental protection and sustainable development.

Second, during environmental administrative law enforcement, enforcement procedures among Guangdong, Hong Kong, and Macao should be coordinated. When administrative enforcement procedures have certain differences, they will significantly impact regional carbon market governance effectiveness. In the advancement stage of regional administrative law enforcement, further achieving regional integrated development and procedural administrative law enforcement is the top priority for establishing a regional carbon market overall mechanism. In environmental administrative law enforcement, Hong Kong has established relatively standardized enforcement procedures, which although provide strong guarantees for Hong Kong's exercise of administrative power according to law, negatively impact administrative efficiency value to some extent. In environmental administrative law enforcement, Guangdong Province has relatively high efficiency advantages, but excessive discretion weakens the proper value of administrative procedures, negatively impacting justice value to some extent. In environmental administrative law enforcement, Macao organically combines the advantages of "power-control" and "control" administrative models, having "executive administration" characteristics, but urgently needs to prevent divergence caused by some administrative regulations and orders lacking legal justification, which may negatively impact climate justice value. In carbon market administrative law enforcement, the three jurisdictions each have unique advantages and certain drawbacks, still requiring complementary advantages and coordination of administrative behaviors among the three regions. The three jurisdictions should adopt a coordinated approach to clarify administrative enforcement procedures and methods to promote integrated development of regional carbon market administrative law enforcement, considering both administrative efficiency and climate and procedural justice values.

Third, in carbon market administrative law enforcement, the Greater Bay Area should establish a carbon market administrative enforcement overall mechanism based on the "One Country, Two Systems" framework. This is not merely a single innovation but an attempt to reach consensus despite differences. Exchanges and consultations should be conducted according to principles of compromise and inclusiveness. In carbon market administrative law enforcement cooperation, the three jurisdictions should establish coordination mechanisms based on specific successful cooperation experiences and educational summaries, thereby diluting potential future carbon market administrative enforcement conflicts and providing strong guidance for resolving such conflicts. This is based on the regional "dual carbon" community seeking common ground while reserving differences according to compromise and inclusive principles, aiming to provide the strongest possible guarantee for regional climate interests. Therefore, in carbon market administrative law enforcement, the Greater Bay Area should establish corresponding coordination mechanisms and timely optimize these mechanisms according to regional development status to effectively satisfy the region's continuous development needs.

### 4.3 Judicial Integration Construction for Greater Bay Area Carbon Market

In the future, China needs to conduct judicial integration construction for the Greater Bay Area carbon market. By establishing unified standard scales, regional judicial coordination, and adaptive and flexible carbon market application rules and adjudication mechanisms, the Greater Bay Area can provide solid judicial support for effective carbon market operation. The “contract enforcement” indicator is one of the World Bank’s top ten business environment evaluation indicators directly related to rule of law, another being the “bankruptcy handling” indicator, with financial credit and other indicators also involving rule-of-law environment aspects. Commercial subjects can use trial results to predict judicial evaluations of their similar behaviors in modern commercial society. It is worth noting that the judiciary can provide strong guarantees for market competition fairness and innovation. To some extent, the evaluation of business environment in a region or even a country is determined by this guarantee capability. Commercial adjudication plays an important role in constraining market behavior, and courts should attach importance to this to make the regional economy more dynamic.

Overall, regional judicial cooperation should be understood in its broad sense, covering legislative 衔接, information exchange, and various other aspects, not limited to judicial assistance. The basic purpose of judicial cooperation and guarantees is to enhance the overall competitiveness of regional rule of law, thereby playing a positive role in promoting regional economic and social development. Specifically, regional carbon market judicial cooperation comprises the following elements:

First, replace the original judicial assistance model with a “model law model,” where the mainland can conduct legislative transformation according to model law content, report to central legislative bodies, and after approval, issue laws for implementation. The two regions can report to relevant institutions for review and conduct judicial transformation according to their own legislative procedures. The Hong Kong region can complete legal transformation through case law. The model law model can play a positive role in establishing unified judicial coordination rules for the regional carbon market and avoid insufficient systematic institutional construction.

Second, expand the scope of judicial coordination. During the implementation of the carbon market judicial coordination mechanism, the Greater Bay Area has certain problems that will be effectively solved with the implementation of the “model law model.” However, before implementation, improvements can only be made based on the current “arrangement model.” The inter-regional judicial assistance system includes important content on mutual recognition and implementation of effective judgments, which also provides strong guarantees for resolving parties’ conflicts. Various efforts by residents of the three jurisdictions aim to protect their legitimate rights and interests. Any judgment that cannot

be recognized or implemented becomes worthless. Therefore, regional judicial coordination is a key construction direction for the carbon markets of the three jurisdictions.

Third, explicit provisions should be made regarding the application of public order established to protect national interests. After Hong Kong and Macao returned to the motherland, they formed a community of shared destiny with the mainland, sharing economic interests and overall interests with the motherland. This means that theoretically, public order should not be established in agreements between the mainland and Hong Kong and Macao regarding the Greater Bay Area carbon market. However, because the mainland and Hong Kong and Macao have significant differences in economic and other aspects, the central government allows them to retain public order to show respect for Hong Kong and Macao's high degree of autonomy. However, the concept of public order has certain uncertainties, and specific provisions should be made for this concept.

Fourth, establish diversified platforms to achieve judicial coordination. The most ideal business environment stems from strong rule-of-law guarantees. The Greater Bay Area should attach importance to platform construction and vigorously conduct institutional construction. The three jurisdictions should jointly conduct platform construction under central authorization, establish scientific mechanisms to achieve judicial information and resource exchange and close communication, and coordinate solutions to thorny problems faced in judicial cooperation. Regarding regional carbon market judicial coordination issues, improvements can be made and institutional construction strengthened from the following aspects: First, learn from advanced measures of Alternative Dispute Resolution (ADR) mechanisms and establish corresponding platforms for judicial cooperation. Establish specialized institutions under central guidance to be responsible for communication and coordination, enabling judicial organs of the three jurisdictions to handle cases efficiently. Second, fully utilize information network technology to establish digital platforms to solve regional carbon market judicial coordination problems. The "Greater Bay Area Development Plan Outline" includes plans to help the Greater Bay Area establish an integrated digital carbon market judicial coordination platform, such as creating an international scientific and technological innovation center. In July 2019, the Guangzhou Internet Court first conducted online trials for cross-regional litigation-mediation 对接 cases. Regional people's courts efficiently achieved extraterritorial service goals through the promotion of "E-key service." Such measures are positive attempts by mainland judicial organs to leverage the advantages of contemporary advanced technology, but continuous efforts are still needed to accelerate the construction process of digital platforms and establish corresponding systems. The digital platform includes diversified modules such as judicial document service, and diversified functions should be set for each module according to actual needs, thereby conveniently handling various activities related to carbon market judicial coordination through the platform.

Overall, the construction of an integrated legal framework for the Greater Bay Area carbon market is the proper meaning of implementing foreign-related rule-of-law strategy and “dual carbon” strategy in the new era and must be promoted collaboratively and actively implemented. First, law aims to maintain social order, but the stability of law tends to breed legal inertia, causing law to have defects of “resisting dynamics.” In this situation, external pressure should be fully utilized to play a positive role in promoting timely rule-of-law actions. The legal order established within the region makes it difficult for multi-subjects to cooperate smoothly, also making the Greater Bay Area more sluggish in rule-of-law construction. Nevertheless, the integrated development of Hong Kong and Macao with mainland China represented by Guangdong remains the general trend. Further actions should be taken in carbon market rule-of-law cooperation to better achieve “dual carbon” goals, which will also help enhance exchanges between Hong Kong and Macao and mainland China, achieve integrated development of different regions, improve the overall environment, and achieve further order improvement based on the basic constitutional system of “One Country, Two Systems.” The Greater Bay Area urgently needs legislative cooperation, enforcement cooperation, and judicial cooperation in the carbon market. This also requires accurately grasping the constitutional foundation for judicial cooperation within the region, relying on benign cooperation mechanisms to play a positive role in promoting integrated development of regional carbon market rule of law and cooperation in legislation and other aspects, contributing to the realization of the great goal of world harmony and promoting the country’s better overall development.

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*Note: Figure translations are in progress. See original paper for figures.*

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