

# *The Establishment of China's Carbon Emission Quota Futures Market*

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**Abstract:** As global climate change continues to intensify, carbon emission trading has garnered increasing attention from nations worldwide as an effective market-based mechanism. As the world's largest carbon emitter, China's establishment and development of a carbon emission quota futures market holds immense significance. In order to actively tackle climate change, promote the achievement of peak carbon neutrality in cities, enhance the control and management of greenhouse gas emissions, harmonize the regulation of pollutant emissions, and standardize carbon emission trading and associated activities, Beijing has formulated and issued specific Administrative Measures on Carbon Emission Trading. These measures are grounded in the Interim Regulations on the Administration of Carbon Emission Trading (Decree No. 775 of The State Council of the People's Republic of China), as well as the Decision of the Standing Committee of the Municipal People's Congress on the Pilot Work of Carbon Emission Trading in Beijing, which operates under the strict condition of controlling total carbon emissions. Additionally, these measures adhere to other pertinent laws and regulations and will take effect from May 1, 2024. Through these comprehensive measures, Beijing aims to further strengthen its commitment to sustainable development and mitigate the impact of climate change.

**Keywords:** Carbon allowances, carbon trading, global climate change, China's carbon emissions

## 1. Introduction

With the escalating severity of global climate change, the imperative to reduce greenhouse gas emissions has emerged as a collective challenge confronting governments and enterprises alike. Carbon emission trading, as an efficient market-based mechanism, has garnered widespread attention and application in response to this challenge. Carbon emission quota futures, a type of financial derivative emerging from this context, represent a key tool in managing carbon emissions. The growing recognition of the deleterious effects of climate change and global warming has prompted initiatives aimed at curbing the emission of greenhouse gases, typically measured in terms of carbon dioxide equivalents. Among these efforts, the establishment of emission trading schemes (ETS) stands out as a particularly significant endeavor. A typical ETS employs a cap-and-trade approach through the utilization of emission allowances. At the commencement of each compliance year, participating enterprises receive an initial allocation of allowance contracts from regulatory authorities. Each contract authorizes the emission of a designated unit of carbon dioxide equivalent

[1]. At the conclusion of a given year, firms must reconcile their emissions with their allowance holdings, purchasing additional allowances if necessary to cover any excess emissions or selling unused allowances to other entities. China, as the world's largest carbon emitter, has taken significant steps towards establishing a carbon trading system. The government has designated seven regions as carbon trading pilots, and these regions have made notable progress in the implementation of carbon trading mechanisms. By the end of October 2014, the cumulative trading volume in these pilot regions reached 28 million 960 thousand tons, with a total turnover of CNY 1,280,000,000. This momentum continued to gather pace, with the carbon trading system expanding to cover over 2,000 enterprises by October 2015. Furthermore, in a significant milestone, China inaugurated its national carbon trading market for the power generation industry on December 19, 2017 [2].

The establishment and development of China's carbon emission quota futures market holds immense significance not only for domestic climate action but also for global efforts to tackle climate change. It represents a commitment to green production and carbon emission reduction, which has become an inevitable trend in economic development. Through the effective utilization of carbon emission trading mechanisms, China aims to balance economic growth with environmental sustainability, thus contributing to a more resilient and sustainable future.

## 2. Literature Review

With approximately 85% of all greenhouse gases having a climate-forcing influence, carbon dioxide is the most significant greenhouse gas listed in the Kyoto Protocol.[3] Although the US has historically been the biggest carbon dioxide emitter, China has been catching up to the US quite quickly. The U.S. Department of Energy's Energy Information Administration (EIA) reports that in 2000, the country's share of global carbon dioxide emissions was 24.4%, down from 21.9 percent in 2004.[4] According to EIA estimates, China emitted 18.0 percent of the world's total carbon dioxide in 2005, the US released 20.5 percent, and Russia, Germany, the UK, and the rest of Europe combined released 22.5 percent. Throughout this time, annual emissions from the US did not decrease.[5] Rather, they went up by about 100 million tons, but China's emissions went up by about 1.5 billion tons, or more than 50%. Therefore, I think it is very necessary to establish a certain carbon emission quota mechanism in China to control China's carbon emissions, which can not only protect the environment, but also better promote China's economic development.

Asset owners are calling for portfolios to have reduced carbon emissions and less exposure to transition risk as a result of climate change and the related policy, technological, legal, consumer, and employee responses to it. Consequently, a growing quantity of climate funds and indicators have been introduced [6]. In the United States, carbon emission quota futures have been established and achieved some success, but China has not established relevant financial derivatives to control carbon emissions and cope with volatile weather.

When creating applicable legislation, the government often optimizes the welfare of society as a whole when designing institutional frameworks to fulfill the goal of requiring each economic player to reduce pollution [7]. Therefore, government agencies need to carefully consider how to determine an effective and reasonable carbon emission mechanism, not only reduce pollution, but also promote economic development. The realization of clear water and green mountains is the concept of gold and silver mountains. Scholars have written a great deal on the emissions trading scheme as a market-driven environmental policy [8,9,10]. The carbon emission quota futures market is a new market tool, and its role in risk management, price discovery and market deepening needs to be further discussed. Therefore, this study aims to fill the research gap in this field and provide valuable insights for policymakers, market participants, and academia by analyzing the establishment process, operation mechanism, and impact on carbon markets and broader economic activities in China. Then establish an orderly futures market for carbon emission allowances in China.

### 3. Carbon Emission Trading Scheme

To limit greenhouse gas emissions, many countries have implemented carbon emission trading schemes. Under this system, the government or an international organization sets an overall carbon emission quota and issues a certain number of carbon emission allowances to companies. If the company's actual emissions are lower than the quota, the remaining quota can be sold on the market; Conversely, if actual emissions are higher than the quota, additional allowances need to be purchased on the market.

### 4. Production of Carbon Emission Quota Futures

Carbon emission quota futures are the product of the development of the carbon emission trading market to a certain stage. With the maturity of the market and the increase in the number of participants, the demand for forward trading of carbon emission allowances has gradually emerged. The launch of carbon emission quota futures provides an effective risk management tool for market participants, while also providing new investment opportunities for investors.

**Formation of carbon emission market:** The establishment of a carbon emission reserve futures market will promote the formation of a carbon emission market, provide a new trading platform for enterprises and investors, and make carbon emission a tradable commodity.

**Increased incentives for companies to reduce emissions:** Companies will face greater economic pressure to take steps to reduce carbon emissions to avoid additional costs. This will incentivize companies to be more aggressive in taking measures to reduce emissions, including improving energy efficiency, adopting clean energy and improving production processes.

**Innovation and technological development:** To meet the demand of the carbon emission reserve market, enterprises may increase their investment in research and development of low-carbon technologies and clean energy to promote technological innovation and development.

**Capital flow:** The carbon reserve futures market will attract more investors and funds to flow into low-carbon technologies and clean energy, promoting the development of these industries.

**Government regulation and policy adjustment:** The government may strengthen the regulation of the carbon emission market and formulate more stringent emission standards and policy measures to ensure the effectiveness and fairness of market operation.

**International cooperation and carbon market links:** The establishment of China's carbon reserve futures market will also promote cooperation and links with carbon markets in other countries and regions, and strengthen cooperation and coordination on global carbon emission reduction.

**Green financial development:** The establishment of carbon reserve futures market will promote the development of green financial products and services, including carbon trading funds, carbon letters of credit, etc., to provide investors with more sustainable development investment options.

**Corporate image and social responsibility:** Enterprises that actively participate in the carbon reserve market will gain better corporate image and social responsibility recognition, which is conducive to attracting consumers and investors.

**Economic structure adjustment:** The establishment of carbon emission reserve market will have a certain impact on the domestic economic structure. It might hasten the economy's transition and upgrading in the direction of low-carbon and environmental protection while encouraging the structural adjustment of high-carbon industries. **Contribution to global climate governance:** As one of the world's largest greenhouse gas emitters, China's establishment of a carbon reserve futures market will contribute to international climate governance and strengthen the international community's attention and actions to address climate change.

However, while the establishment of futures markets has added new vitality to the carbon market, it has also exposed some problems and challenges, such as market manipulation and information asymmetry.

**Market manipulation:** There is the possibility that market participants may influence the futures price of carbon reserves by manipulating supply or demand, so as to profit or interfere with the stability of market operations.

**Information asymmetry:** Some market participants may have more information about the carbon reserve market, leading to information asymmetry and affecting the fairness and effectiveness of the market.

**Increased volatility:** The carbon reserve futures market may be affected by policy, technology and climate factors, resulting in increased price volatility and increased risk for investors.

**Regulatory challenges:** The regulatory carbon reserve futures market needs to establish an effective regulatory mechanism and system, including the challenges of monitoring market behavior, preventing market manipulation and ensuring the transparency of information disclosure.

**Market depth and liquidity:** The liquidity and market depth of the carbon reserve futures market may be limited, especially at the initial stage of establishment, which may affect the effectiveness of the market and the trading experience of participants.

**Price fluctuation risk:** The price of carbon reserve futures market may be affected by external factors, such as energy prices, policy adjustments, etc., which may lead to price fluctuation risk and increase the trading risk of investors.

**Lack of standardization:** The carbon reserve futures market may face a lack of standardization of carbon assets and contracts, which may lead to trading uncertainty and difficulties among market participants.

## 5. Discussion

Based on our findings, this paper believes that the establishment of China's carbon emission quota futures market provides an important market tool and policy support for China's low-carbon transition. However, to achieve an effective reduction in carbon emissions, it is necessary to improve market supervision mechanisms further, enhance information disclosure and transparency, and improve the risk management capabilities of market participants. In addition, government departments and enterprises should strengthen cooperation to jointly promote the development of carbon markets and achieve a virtuous cycle of economic development and environmental protection.

This paper also made predictions about his buyers and sellers

**Emissions-intensive enterprises:** These enterprises are required to purchase carbon emission allowances to meet their emissions needs due to the large amount of greenhouse gas emissions generated by their production processes. These could include companies in the energy, manufacturing, transportation and other sectors.

**Financial institutions:** Financial institutions such as banks, securities companies, fund companies, etc. may participate in the carbon emission quota futures market as buyers. They may use carbon allowances as an asset for investment or risk management, or they may provide related financial services to other entities.

**Speculators:** Some investors may use carbon allowances as a speculative tool to make a difference by predicting market movements. These speculators may include individual investors, hedge funds, etc.

**Sellers of carbon credit futures** mainly include entities with excess carbon credits. These entities may be corporations, governments, or other institutions that, for one reason or another, have more carbon credits than they need to emit and are therefore willing to sell them to other buyers who need them.

**Companies with low emissions:** These companies produce fewer greenhouse gas emissions from their production processes, so they may have excess carbon emission allowances. These companies may generate additional income by selling quotas.

**Governments:** Governments often play an important role in the allocation of carbon emission allowances and may sell excess allowances to companies that need them. In addition, some governments may sell carbon emission allowances to raise funds to support sustainable development or combat climate change.

**Investment institutions:** Some investment institutions may purchase carbon emission allowances to invest as assets. When they need to adjust their portfolios or access capital, they may choose to sell their carbon allowances to buyers who need them.

With global attention to climate change and the continuous improvement of emission reduction targets, the carbon emission quota futures market is expected to be further developed. In the future, this market may expand the trading variety, optimize the trading mechanism, and improve the market liquidity, to better meet the needs of all parties and promote the realization of global emission reduction targets.

China, one of the biggest carbon polluters in the world, is vital to the solution of this global issue. The creation of a carbon cap-and-trade market is one of the actions the Chinese government has taken in recent years to address climate change. To achieve a win-win situation between economic development and environmental protection, the carbon market, as a market-based mechanism for emission reduction, attempts to incentivize emission reduction through the trade of carbon emission rights. Specifically, the creation of the carbon emission quota futures market gives players a tool for managing price risk, which is of great significance for enhancing market efficiency and promoting the transition to a low-carbon economy.

## 6. Conclusion

The establishment of a carbon emission quota futures market represents a significant stride forward in China's pursuit of a low-carbon economy, carbon peaking, and carbon neutrality goals. This market not only enhances the efficiency of the price discovery mechanism for carbon emission rights but also leverages market-based approaches to facilitate carbon emission reduction. Furthermore, it spurs the optimization and modernization of the economic and energy structures.

It is anticipated that further measures, such as refining market mechanisms, increasing market activity, broadening the participant base, and strengthening international cooperation, will be implemented to further enhance the market's efficiency and functionality, thereby contributing to China's, and indeed the world's, carbon emission reduction efforts. With the development of this futures market, it is envisioned that additional futures contracts will be established, further advancing the country's green development and fostering sustainable growth.

However, it is worth noting that the trading of carbon emission quota futures may be subject to regulations and constraints imposed by governments and regulatory authorities of various countries. These measures are necessary to ensure the fairness, transparency, and standardization of the market, thereby promoting its healthy and orderly development.

Future research could delve deeper into the specific mechanisms and policies that can optimize the market's performance, as well as address any potential challenges or barriers to its widespread adoption. By doing so, this paper can contribute to the global effort to mitigate climate change and promote a more sustainable future.

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