

# Development Trend and Construction Path of National Carbon Market Under the Background of "Carbon Peak" and "Carbon Neutralization"

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## ABSTRACT

Establishing a national carbon market and improving the market trading mechanism of carbon emission rights are important ways to achieve the goals of "carbon peak" and "carbon neutralization". Under the background of strengthening the construction of ecological civilization, combined with the specific objectives of "carbon peak" and "carbon neutralization", the development of the national carbon market shows an obvious trend. The construction of carbon market is not achieved overnight, but a phased and continuously developed long-term project. Starting from the different stages of carbon market construction, this paper analyzes the choice of national carbon market construction path. It is of great significance to clarify the development trend and construction path of the national carbon market, which can make the carbon market construction more consistent with the development goals of economic development, environmental improvement and energy conservation.

**Keywords:** national carbon market; "carbon peak"; "carbon neutralization"; development trend; construction path

## 1. INTRODUCTION

On September 22, 2020, general secretary Xi Jinping announced in the general debate of the seventy-fifth UN General Assembly that China will adopt more effective policies and measures, and strive to achieve the peak of carbon dioxide emissions by 2030, and strive to achieve carbon neutralization by 2060. Establishing a national carbon market and improving the market trading mechanism of carbon emission rights are important ways to achieve the goals of "carbon peak" and "carbon neutralization". Carbon emission trading is an important policy tool to control and reduce greenhouse gas emissions by using the market mechanism<sup>[1]</sup>. Usually, the government sets the total carbon emission cap, allocates carbon emission quota to emission control enterprises in key industries, and enterprises manage their own carbon emissions within a specified period of time<sup>[2]</sup>. On the basis of quota trading, carbon financial products such as carbon options and carbon bonds can be traded to support hedging of trading entities. At present, 31 carbon emission trading markets have been or are planned to be

established in the world. Typical carbon markets include EU carbon emission trading system EUETS, American RGGI market<sup>[3]</sup>.

## 2. PROGRESS OF CARBON MARKET CONSTRUCTION IN CHINA

In September 2011, the national development and Reform Commission issued the notice on the pilot work of carbon emission trading, which officially approved the pilot of carbon emission trading in seven provinces and cities: Beijing, Tianjin, Shanghai, Chongqing, Shenzhen, Guangdong and Hubei. The pilot markets have started trading since 2013<sup>[4]</sup>. The pilot carbon market has operated continuously for more than five years, covering more than 20 industries such as steel, electric power and cement, and nearly 3000 high emission and key energy consuming enterprises, accounting for 40% - 60% of the total emission in each pilot area. By the end of December 2020, the cumulative turnover of the seven pilot carbon markets had exceeded 11 billion yuan, of which the cumulative turnover of quota was 445 million tons and the cumulative turnover was about 10.431 billion yuan;

The cumulative trading volume of CCER exceeds 200 million tons and the cumulative turnover exceeds 2 billion yuan. In addition to the first seven pilot carbon markets announced by the national development and Reform Commission, Fujian pilot was launched in 2016, becoming the eighth pilot carbon market in China. Although the pilot carbon market has operated continuously for many years, operated independently and disconnected from each other, the establishment of a national carbon market is still an inevitable trend<sup>[5]</sup>.

In 2014, under the organization and guidance of the national development and Reform Commission, we started the top-level design and construction of the national carbon market system by learning from the experience of pilot carbon market construction. In December 2017, the national development and Reform Commission issued the construction plan of the national carbon emission trading market (power generation industry) to start the construction of the national carbon market. In December 2020, the Ministry of ecology and environment announced the national measures for the administration of Carbon Emission Trading (for Trial Implementation) and the implementation plan for the setting and allocation of the total amount of national carbon emission trading quotas from 2019 to 2020 (power generation industry). The first performance cycle of the national carbon market has been started on January 1, 2021. In 2020, after the "3060" target was put forward, the Ministry of ecological environment intensively issued relevant documents, and the construction of the national carbon market continued to accelerate.

### **3. RESEARCH ON THE DEVELOPMENT TREND OF NATIONAL CARBON MARKET**

The goals of "carbon peak" and "carbon neutralization" require accelerating the construction of the national carbon market, strengthening the total carbon emission control, accelerating the low-carbon transformation of energy and power, forcing the optimization and upgrading of industrial structure, promoting green and low-carbon technological innovation, and effectively implementing the national carbon emission reduction goal. In the future, the construction of carbon market will show the following five trends.

Trend 1: the coverage is gradually from a single industry to eight key industries, and the coverage ratio is rising. Expanding the coverage of key industries in the national carbon market will help to expand the market scope and improve the efficiency of resource allocation, and help to take advantage of the cost difference of emission reduction among industries and reduce the overall cost; If it is included in key emission industries, the market mechanism can be used to encourage enterprises in key industries to reach the peak first. It is

expected that all the eight industries will be included in the national carbon market in the 14th five year plan. Considering the emission reduction potential, data base, industrial policies and the impact of EU carbon tariffs, building materials (cement), steel and nonferrous metals (electrolytic aluminum) will be included first.

Trend 2: the total amount control will gradually change from relative amount to absolute amount, and the upper limit of absolute total amount is expected to be set around 2030. Before 2030, it is mainly based on the relative total amount target based on intensity. Considering the goal of reaching the peak before 2030 and reaching the peak at a lower peak as far as possible, it is suggested that the national carbon market form a more mature total amount setting mode during the Tenth Five Year Plan period, strive to fully implement the annual quota total amount management around 2030, determine the annual decline rate and release a stronger long-term emission reduction signal.

Trend 3: quota allocation gradually introduces paid auction mechanism on the basis of free. During the 14th Five Year Plan period, the national carbon market was mainly free distribution; During the "15th five year plan" period, we can choose specific industries (such as iron and steel, electric power, etc.) and try a certain proportion of auction mode; After the market is developed and improved, the auction proportion should be further increased and strive to reach more than 50% in the mature stage of the market. The auction system has the advantages of increasing government revenue, discovering prices and activating the secondary market. While providing a fast and effective price signal for the market, the introduction of price management also helps to eliminate the unfair impact on consumers. At the same time, auction also has some disadvantages, such as increasing the performance cost of enterprises and transferring the price to consumers. The shortcomings of the auction system make it difficult to promote in the early stage of the establishment of the carbon market.

Trend 4: the carbon price level has gradually increased, showing a steep upward trend. In theory, the carbon price should reflect the social cost of carbon and represent the economic cost of an additional unit of carbon dioxide or carbon dioxide equivalent<sup>[6]</sup>. According to the 2020 China carbon price survey report jointly released by China Carbon Forum, ICF international consulting company and Zhongchuang carbon investment, based on the expectations of more than 500 stakeholders on China's future carbon price, the survey results show that the vast majority of respondents expect the national carbon market price to rise steadily. In the stage of deep decarbonization and neutralization, as the difficulty of emission reduction increases, the marginal cost of emission reduction increases, and the carbon price may rise.

Trend 5: gradually develop carbon finance on the

basis of quota spot trading, and the scale of forward trading will reach trillions. At the initial stage of the market, the trading targets are mainly quotas and supplemented by CCER, and carbon financial products such as carbon futures and carbon options are gradually launched. In terms of transaction subjects, institutional investors and individuals are introduced to further enhance market liquidity. During the "14th five year plan" period, the total quota of the national carbon market at the initial stage was 4.5 billion tons. After the inclusion of steel, nonferrous metals and building materials, the

total quota will be further increased, and the annual transaction scale of quota spot will also be increased. If carbon futures trading is introduced, the scale of carbon futures is expected to increase significantly. In the future, the trading scale will gradually expand. With the development of carbon futures market and the rise of carbon price, the forward and spot trading volume will also be very huge. With the deep decarbonization and carbon neutralization, the direct carbon emissions will be greatly reduced, and the total carbon market quota will gradually shrink.

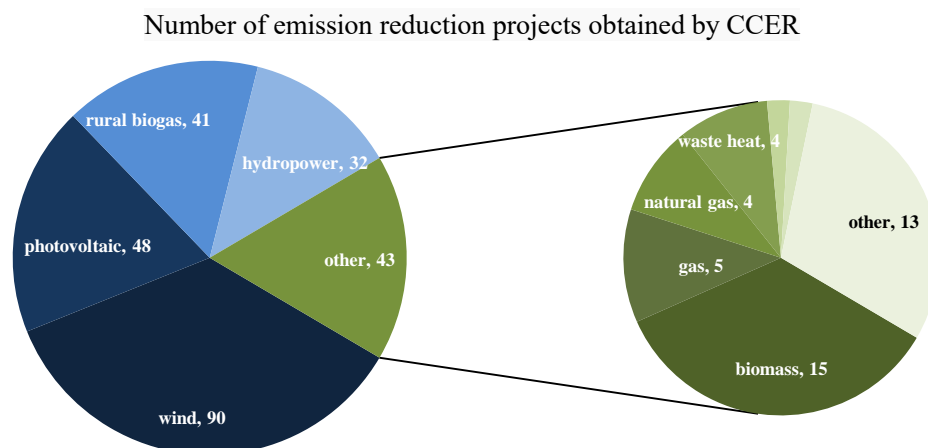


Fig.1 Number of CCER project records

#### 4. PATH DESIGN OF NATIONAL CARBON MARKET CONSTRUCTION

According to the experience of foreign carbon market, the construction of carbon trading mechanism is a process of continuous improvement of "learning while doing". Compared with the developed countries such as the European Union and the United States, China is a developing country with a high proportion of high-energy consumption industries. It is difficult to coordinate economic growth and control carbon emissions. The market mechanism is not perfect in some industries such as power, which determines that the construction of the national carbon market can not be achieved overnight, but a phased and continuously developed long-term project. Combined with the dual background of "carbon peak" and "carbon neutralization", this paper divides the construction of carbon market into three stages: initial operation stage, realization of "carbon peak" stage and realization of "carbon neutralization" stage, and designs the path of carbon market construction in different stages.

**Initial operation stage (2021-2025).** The total quota of the national carbon market is set based on the carbon emission intensity, and the total quota in the initial stage is 4.5 billion tons. On the basis of taking the lead in trading in the power generation industry, the coverage should be continuously increased. By 2025, the national carbon market should be expanded to eight preset high

energy consuming industries. The quota allocation is mainly based on the free quota allocation method based on the industry carbon emission benchmark, gradually improve the strictness of the industry carbon benchmark, and timely introduce the auction quota allocation method in industries with mature conditions. The trading varieties are mainly carbon emission quota spot trading and CCER, and gradually explore the carbon futures market.

**Realization of "carbon peak" stage (2026-2030).** At this stage, a more mature total amount setting method should be gradually formed, and the annual total quota management should be fully implemented around 2030. At this stage, the national carbon market will develop into a mixed carbon market, with both intensity based and total amount based attributes. According to the principle of "stability with reduction", set the total quota of the national carbon market, continuously increase the proportion of quota auction, and further improve the strictness of the industrial carbon benchmark. For industries that will not cause obvious carbon leakage, the auction quota allocation method shall be introduced in time. We should strive to improve the trading system and enrich the trading varieties day by day. Multiple subjects such as emission control enterprises, investment institutions and individuals participate in the market and use the market mechanism to achieve the goal of "carbon peak".

**Realization of "carbon neutralization" stage (2030-**

2060): This stage is the maturity and transformation stage of the carbon market. Service carbon is neutralized. The total target will gradually shrink. It will also further reduce the threshold for inclusion in enterprises, expand greenhouse gas control and include transportation, construction and other industries. The carbon market serves for deep decarbonization. The total quota will be tightened rapidly, the annual total quota and the gradual decline rate will be determined, and the paid auction will gradually be given priority. The development of carbon futures market has accelerated and the trading scale has expanded. Gradually connect with the international market and strive for the right of global carbon price. Focus on improving energy efficiency and promoting negative carbon, and continue to play a role.

## 5. CONCLUSION

The goals of "carbon peak" and "carbon neutralization" not only increase the pressure on China's carbon emission reduction, but also put forward new requirements for the construction of the national carbon market. Under the new development model, clarifying the development trend and construction path of the national carbon market can provide clear ideas for the design of carbon market mechanism. Generally speaking, the construction of carbon market may show trends in the future, including the continuous rise of coverage ratio, the introduction of paid auction mechanism, the full development of carbon finance, etc. At different stages, the development path of carbon market may also be different. In the initial operation stage, the trading varieties are mainly carbon emission quota spot trading and CCER, and gradually explore the carbon futures market. In the stage of achieving "carbon peak", the trading system is relatively perfect and the trading varieties are increasingly rich. The market mechanism can be used to achieve the goal of "carbon peak". In the stage of achieving "carbon neutralization" stage, which is the maturity and transformation stage of the carbon market, the carbon futures market accelerates its development, expands the trading scale, and gradually connects with the international market.

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