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Research on The Path of Carbon Emission Trading in China Under The Double Carbon Background

Badanie ścieżki handlu uprawnieniami do emisji dwutlenku węgla w Chinach w kontekście podwójnego węgla

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Abstract

With the continuous development of the global economy, the rapid deterioration of the global ecological environment has caused a huge impact on the future development of the world. In order to solve the problem of global warming and enhance the self-development capacity of all countries, based on the concept of sustainable development, China has set the ambitious goal of *dual carbon*. To this end, China is actively promoting the establishment of a national carbon emissions trading system. In response to low price competitiveness, such as nonstandard trading system, the influence of the development of the carbon emissions trading system in the future, should not only attach importance to enrich and strengthen the basic function of the carbon market, also continue to carbon pricing system and in-depth reform of the fiscal and taxation system, clear up the thoughts to the carbon market trading rules, is on its relevant rights and obligations, firmly adhere to steadily promote carbon market links between countries. Currently, China's carbon emission trading is still in its infancy, and its effect is still limited in specific practice. Meanwhile, carbon emission trading markets in developed countries such as the United States and the United Kingdom have begun to implement *carbon tariffs* and other means to maintain their carbon borders. Therefore, the construction of carbon emission trading is necessary for development, but also for the sustainable development of the country. The lag of China's carbon emission market leads to the worsening of the problem of carbon excess emissions of industries in the regions not covered, and the increased economic burden caused by the carbon barriers of other countries in foreign trade. Of course, this requires China take the path of sustainable development to continue to strengthen the system construction of carbon emission rights and promote the further optimization of their functions.

Key words: Double Carbon, carbon emission rights, trading market, sustainable development, zrównoważony rozwój

Słowa kluczowe: Podwójny węgiel, uprawnienia do emisji dwutlenku węgla, rynek obrotu, zrównoważony rozwój

1. Aims and Background

Double carbon target is based on promoting the construction of a community of human destiny China bear responsibility and to realize the inherent requirement of sustainable development and a major strategic decision, showed China to cope with global climate change, new efforts and contribution, embodies the firm support of multilateralism, for the international community provided strong impetus overall effective implementation of the *Paris agreement*, The revival of confidence and hope for global climate action demonstrates China's firm determination to actively address climate change, follow the path of green and low-carbon development, promote common development of mankind, and achieve harmonious coexistence between man and nature. At present, China's carbon emission trading is still in its infancy, and its effect is still limited in specific practice. Meanwhile, the carbon emission trading market of the United States, The United Kingdom and other developed countries has begun to implement *carbon tariff* and other means to maintain their carbon boundary. The impact of carbon trading pilot

policies on China's economy and environment has always been a hot issue for scholars (Liu et al., 2022). Carbon emission trading has become one of the important factors to ensure the sustainable development of enterprises and promote the transformation of industrial energy structure. It is a key system of low-carbon economy in various countries and a strategic method of carbon emission reduction game among countries (Zhao, 2021).
During the 14th Five-Year Plan period, the sustainable development of China's ecological civilization has entered a critical period of focusing on carbon reduction as the strategic direction, promoting the synergistic effect of pollution reduction and carbon reduction, promoting the comprehensive green transformation of economic and social development, and realizing the improvement of ecological and environmental quality from quantitative to qualitative change. Due to the lag of China's carbon emission market, the problem of carbon excess emissions of industries in the regions not covered is worsening, and the economic burden is increased due to the carbon barriers of other countries in foreign trade. Of course, this requires China to continue to strengthen the system construction of carbon emission rights and promote the further optimization of their functions.

2. Literature Review

Carbon trading policies attempt to control carbon emissions by setting a price on carbon emissions and establishing a corresponding carbon trading market (Wang et al., 2022). Currently, researches on carbon emission right market can be roughly divided into two categories: the first category focuses on whether carbon emission right trading pilot policy can promote high-quality development of regional economy, and how to promote high-quality development of regional economy, represented by Jing Guowen (2022). The second group, represented by Zheng Yunjian, Wu Shijuan (2022) believes that carbon emission trading is a critical way to achieve carbon emission control and is of great practical significance to achieve high-quality economic development and promote green and low-carbon technological innovation. Previous studies have focused on the economic impact of carbon emission permits or regarded them as a means or approach of ecological carbon emission reduction. This paper will analyze the existing problems from the system construction of the current carbon emission trading market and promote economic and ecological coordination and win-win situation, and discuss the direction of China's carbon emission trading market as well as the expansion of functions and paths.

3. Experimental

3.1. Theory Expouding

Carbon emission right is based on the theory of atmospheric environmental capacity, and the right takes atmospheric environmental capacity as the object (Wang, 2010). Emissions trading is one of the three main mechanisms defined by the Kyoto Protocol. The basic principle of its operation is the efficient allocation of scarce air environment capacity by market mechanism. Therefore, in theory, the concept of carbon emission trading should contain two levels: first, the market should play a decisive role in the allocation of space and resources, and effectively achieve the purpose of emission reduction through the impact of marginal costs. Second, carbon emissions trade is a policy tool to promote global climate governance, which helps countries to fulfil their commitments, avoid international accountability and promote global climate governance. At present, global sustainable development finance continues to gain momentum, and China is emerging as a new force. At present, global sustainable development finance continues to gain momentum, and China is emerging as a new force.

(1) Market mechanism reduces the cost of carbon emission reduction

As an important theoretical model of environmental economics, *Tragedy of the Commons* clearly shows us the public goods attribute of *environment* as a public resource (Deng, 2008). In solving the problem of negative externality, Pigou and Coase give two different approaches from the perspective of internalization of external influence. On the one hand, Pigou advocates that the state should use taxation to deal with external problems. On the other hand, Coase advocated the introduction of the theory of property rights. In Mr Coase's view, a clear definition of ownership reduces transaction costs and improves efficiency. If there is no clear division of ownership, resources will be wasted and destroyed. Dales, an American economist, introduced the concept of property rights into the field of pollution control in his book Pollution, Property and Price published in 1968, and proposed the concept of emission trading for the first time (Zeng and Wan, 2010), thus promoting the development of Coase theorem.

(2) Fulfil international carbon emission reduction obligations and promote global climate cooperation

The external negative problems caused by carbon emissions can be divided into three aspects: First, the negative externalities caused by carbon dioxide emissions in the region; Second, the negative externalities caused by carbon emissions in the world; Third, negative intergenerational external problems caused by the accumulation of carbon emissions. Compared with the mandatory emission responsibility stipulated in the Kyoto Protocol, the Paris Agreement attaches more importance to the autonomy and international cooperation of the contracting parties. Trade in carbon emissions, based on market technology and centered on self-decision making, conforms to the *bottom-up* implementation trend of the Paris Agreement, and has important practical significance for expanding the regional and legal framework of global climate management.

3.2. Research Expounding

(1) Problems and causes of current carbon emission trading in China

Carbon trading is a market-based emission mechanism aimed at further reducing carbon emissions to further enhance the overall level of sustainable development through efficient and stable development momentum. Compared with conventional methods such as *command-and-control*, it is cheaper, more efficient and more flexible, as well as more economical and market flexibility. However, there are still many problems in the carbon trading system as a cap-and-trade system due to the fact that carbon trading has not yet entered the *balanced* stage, the imperfect development of market economy, the unfinished economic transformation and other objective reasons. A rigorous and reasonable institutional design is the prerequisite for the carbon financial market to play its role (Li, 2022).

1) Existing problems

First, the pricing mechanism is not perfect. In terms of coverage, the current market only includes power generation, while industries with high carbon emissions, such as concrete, various forms of transportation and construction are not considered. Due to the reduction of market size, the price of carbon emission trading is also restricted to a certain extent. By October 2021, although the total volume of Carbon emission trade in China has exceeded 18.7 million tons, the cumulative total has reached 845 million yuan. With the continuous adjustment of climate change and European climate-related policies, the carbon market in Europe will further rise, therefore, the *price difference* between China and the EU will further expand. Prior to the official operation of the national carbon emission market in 2021, China has established regional carbon emission trading markets in eight provinces and cities: Chongqing, Shenzhen, Hubei, Beijing, Shanghai, Tianjin, Guangdong and Fujian (Liu et al., 2021).

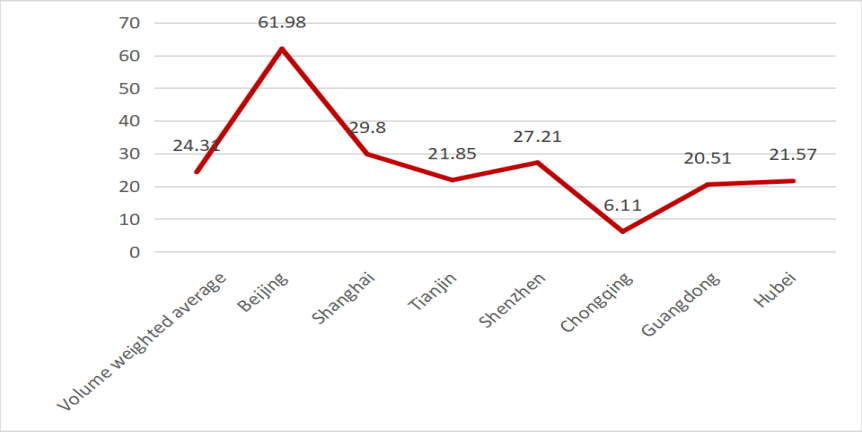

Figure 1. Average price of carbon trading market and overall carbon trading in China (unit: yuan/ton), source: based on forward looking Industry Research Institute

As can be seen from Figure 1, the pilot carbon trading markets in China are not balanced enough. The weighted average price in Shanghai, Beijing and other cities is significantly higher than that in other cities and the overall average price. This indicates that the pricing mechanism in China still has some problems and needs to be further improved. Of course, due to different resource endowments and carbon emissions of different regions, the formulation of carbon emission price should be market-oriented on the one hand and should take measures according to local conditions on the other hand (Shi and Li, 2021).

Second, market rules are not clear. The definition of property rights involves the establishment of regulatory system, relief system and other aspects, which is very important for the establishment of carbon emission trading market. For the construction of carbon market rules and the definition of rights and responsibilities of trading subjects, it is necessary to clarify carbon market trading rules. The clear definition of rules is not a deliberate evasion of interests, but a long-term solution to stimulate carbon market trading and promote low-carbon transition. In addition, the trend of policy fragmentation due to excessive implementation is also a worrying issue in emissions trading. This situation also appears in the implementation of carbon trade controls. The fundamental purpose of carrying out system reform is to deal with environmental problems in our country. It is necessary for the government to improve market efficiency and ensure the coordinated development of China's pilot carbon emission trading market and the national carbon emission trading market (Xiao, 2022).

Third, inadequate risk prevention. Unilateral carbon price systems, such as emissions trading and related taxes and fees, operate by regulating the carbon emissions of domestic companies, so as to achieve the goal of reducing emissions. Because of the high degree of autonomy and regional characteristics of carbon trading, countries that trade carbon emissions worldwide or adopt high restrictions will suffer higher greenhouse gas emissions than other

countries that are free riders. In practice, European countries use it as a basis to advocate a *Green New Deal*. The European Union applies *carbon border regulation*, or what academics call *carbon tariffs*, to specific industries.

2) The main reasons for the problems existing in China's carbon emission trading

First, the distribution of the industry is relatively single. At present, there are still few participants in China's carbon trading market, among which the vast majority of 2225 companies listed in the national key list are enterprises in the electric power industry, which illustrates a problem – homogenization. As a result, the carbon trade is either too crowded or too empty to sustain a stable and sustainable trade. This will have a direct impact on emissions from other industries.

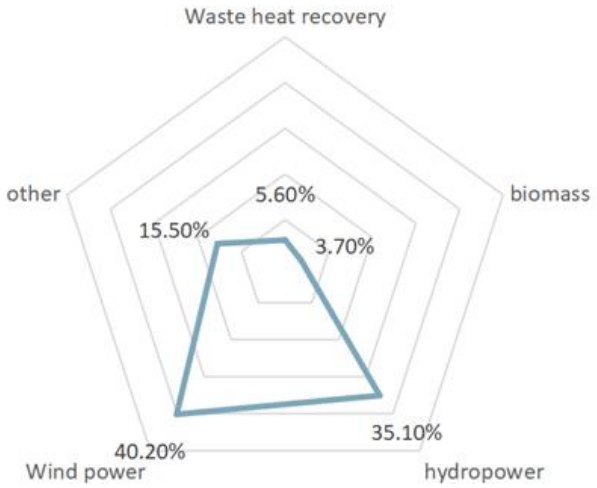

Figure 2. types of CDM projects registered in China by the end of 2020 (unit: %),
source: based on forward looking Industry Research Institute of China government network

As can be seen from Figure 2, there are fewer CDM project types in China as a whole, and they are mainly concentrated in hydro power and wind power industries, with unbalanced market share classification. Therefore, in the actual operation of the whole market, it is inevitable that carbon trading in the power industry will not be hot while other industries are too cold.

The second is the company's inexperience in the carbon market. At present, most companies in the power industry have not participated in carbon trading before, so they do not know much about the trading process and rules. However, many companies in China are facing the same problem, so many companies are still holding a wait-and-see attitude towards this emerging carbon emission trading market. So, the desire to trade in carbon markets needs to be strengthened.

Third, the ratio of free carbon dioxide emissions is too high. According to the implementation plan, the 2019-20 quota will be issued free of charge and the allocation of equipment held by each major emission unit will be calculated based on a baseline method. More free distribution means that companies with large quotas have no intention of participating in the carbon market, and their emissions have already been met, so they do not need to participate in the carbon trading.

Fourth, the lack of speculative need for liquidity. Since many domestic carbon transactions are carried out with a large amount of demand without the participation of any institutions or individuals, it indicates that there is a lack of speculative activities to make up for and improve the liquidity of the market at the present stage. In addition, when considering their own carbon trading, many companies will take into account their own trading of carbon emissions and decide whether to buy and sell emissions allowances accordingly. It may even lead to an oversupply and a shortage of funds in the market.

Fifth, there is no perfect security mechanism, the enthusiasm of investment in the financial market is not high. In the international environment, a number of relatively developed countries have introduced a carbon futures as the leading derivative products, control companies through this way to avoid trading risks, thus greatly improving the investment enthusiasm of companies. In China, not only has not formed a complete carbon emission system, but also the enthusiasm of the financial market is very low.

3) Utility expansion of China's carbon emission trading system

According to the above analysis, there is still a long way to go between the framework planning of China's carbon trading market mechanism and the expected diversified functions of the system. Therefore, it is the top priority to build a carbon emission trading system by developing and innovating the functions of the existing system.

1) Information centralization

Fundamentally, solving the problem of negative externalization of greenhouse effect is an economic problem in nature. Environmentalists, led by Pigou and Coase, have proposed three mechanisms to solve this problem. One is the traditional command-and-control approach. Second, through carbon tax and other means to control prices.

The third is the quantitative system based on carbon emission trading. In contrast, carbon sink trading based on quantity management has obvious intelligence advantages and higher benefits because it can reflect the carbon sink price and development dynamics of point sources in real time.

2) Ability integration

Carbon emissions trading, as a kind of artificial guide the construction of the market, in order to solve the negative external effect due to carbon emissions, this particular feature makes it become a kind of pure rely on factors such as environment and resources of the relevant laws and regulations to promote external product, its sustainable development and the implementation of the rules and regulations formulated by the state are closely related. In order to play the role of settling disputes, it is urgent to clarify the legal attributes of carbon emission rights, the cornerstone of carbon market system construction, in the field of carbon emissions (Tian, 2018). people will give full play to the innovation-driven role and, as some scholars have pointed out, make solid progress in rapid of basic and major technologies in the energy sector (Wang, 2022).

3) Platform Internationalization

The popularity of carbon tariff scheme in Europe is influenced by many factors, including the influence of European social trend and political party changes on climate policy, but more importantly, the EU's anxiety about the hollowing out of regional manufacturing industry in the post-industrial era (Han, 2021). As a charter regulating the global climate governance order in the post*-Kyoto era*, Paris Agreement provides a legal basis for international carbon emissions trading (Cao, 2016).

(3) China's carbon emission trading path

In the final analysis, the function expansion of carbon right trading still lies in the institutional design that can cope with both endogenous defects and exogenous challenges. Therefore, in the following long period of time, China's carbon market related system design and development should be carried out from the following three aspects.

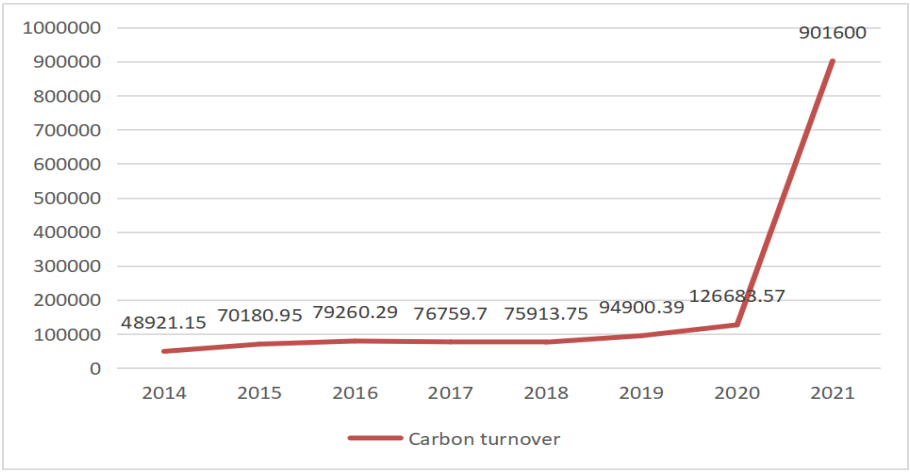

Figure 3. carbon turnover of China's carbon trading market from 2013 to 2021 (unit:10000 yuan) source: based on China carbon trading network forward looking Industry Research Institute

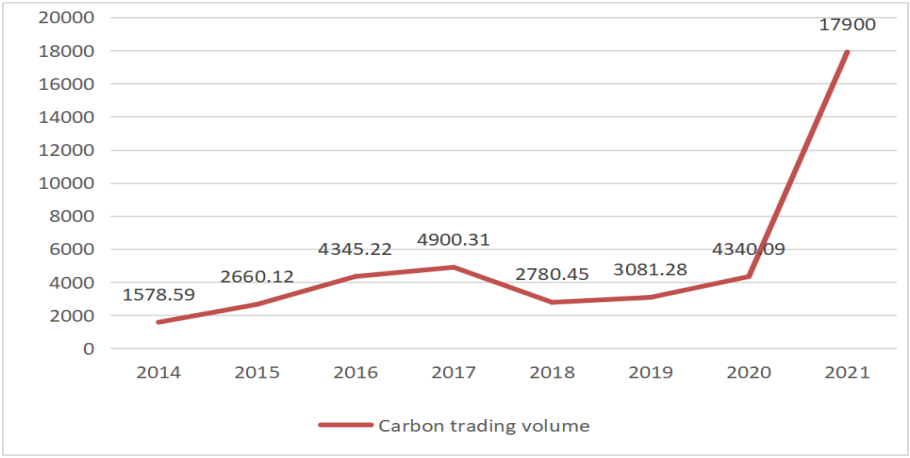

Figure 4. carbon trading volume of China's carbon trading market from 2013 to 2021 (unit: 10000 tons), source: based on China carbon trading network forward looking Industry Research Institute

Based on the analysis of Figure 3 and Figure 4, it can be seen that China's carbon trading market has a broad prospect. The capacity of the carbon trading market in the future is huge and has a great space for development.

However, under the premise of huge opportunities, there are also many problems, for which specific measures should be formulated to solve them. The national carbon market started relatively late and is still immature compared with developed countries and regions. People should follow the problem-oriented and goal-oriented principles, adhere to progress while maintaining stability, and promote the continuous improvement of carbon market construction in the development process (Li et al., 2022).

1) Deepen reform of pricing mechanisms and fiscal and tax systems

In the initial allocation of low-carbon quota, China adopts an industry benchmark allocation model with intensity control as the theme (Ministry of Ecology and Environment), which is basically to establish an initial carbon sink transaction and try to balance the environmental management and carbon emission companies' tolerance. In the short term, this approach is more suitable for our actual situation. However, as the field of carbon trading expands, the shortcomings of this free distribution will become more and more obvious. It is more suitable for China to adopt the mixed allocation mode of *free + competitive bidding*. For industries with high emissions and difficult technology conversion, such as iron and steel, the method of free distribution is implemented to strengthen the control of free distribution. In future development, the allocation of free quotas will be gradually reduced until all free allocations are competitive. The standardization of laws is the source to ensure the smooth financing process of carbon emission right pledge (Qiu et al., 2022). From the perspective of micro regulation and macro regulation, institutional guarantee is provided to give full play to the efficiency advantage of carbon market in the allocation of emission reduction resources (Liu, 2021).

2) Clear legal attributes and division of rights and responsibilities

Compared with the practice of integrating property ownership and usufruct in common law system, the dual practice of ownership and usufruct in civil law system makes the national ownership of atmospheric environmental capacity resources coexist with the usufruct enjoyed by carbon emission subjects (Zhang, 2014). Because carbon trading is built on the basis of public power, it is the most reasonable legislative option to assign ownership to carbon trading from the perspective of interpretation. The behavior of each stakeholder in utilization and income is its main component. Respect the internal law of population development, and at the same time, based on the city's functional positioning, cultivate differentiated leading industries, and build green and low-carbon cities through the coordinated development of population structure and employment structure (Long et al., 2022).

3) Promote the link of international carbon market and master the right to speak on rules

As the link of the international carbon market has high requirements on the compatibility of the certification standards of the existing market, and the EU-- Switzerland and Canada-Quebec-Ontario, which have established the link of the carbon market, all adhere to the industry benchmark (Dang and Zeng, 2019). Finally, the integration of the trading rules of the carbon market is faced with many challenges and constraints of practical factors. Realize links with other carbon market in the near future the possibility of a smaller (Gao et al., 2019), in reference to the existing experience and the new international environment under the premise of management measures, determine the selection criteria of the mechanism, so as to establish worldwide have a greater say in the future to provide a theoretical basis for fulfilling the obligation to protect the sustainable development of the environment in the community with a shared future for mankind.

4. Results and Discussion

China aims to be carbon neutral by 2060. It will take hard work, but we will do our best. This is a major strategic decision made by China to fulfil its responsibility for building a community with a shared future for mankind and to achieve sustainable development. For the research on the construction path of China's carbon emission trading, the following conclusions are drawn on how to develop the market according to the actual situation at home and abroad.

1) Establish and improve the policy control system of the national carbon trading market. Current national carbon trading market development has entered a new stage, but the laws and regulations of the national carbon trading market and the imperfection of the supervision system, carbon emissions quota allocation is not enough scientific, management level is not complete, give full play to the government in the regulation of carbon trading process and auxiliary function, in carbon trading market, for protection, through the competition mechanism and price mechanism to promote carbon emissions;

2) Scientific development of carbon emission quota allocation mechanism. At present, China's carbon trading market is still in the early stage of development, and the carbon quota allocation method for enterprises is mainly free quota given by the government to enterprises. China's carbon trading market is in its early stage of development and needs to establish a scientific carbon emission quota allocation mechanism. Unify the quota allocation method and clarify the appropriate emission quota of each enterprise;

3) Establish and improve the price regulation mechanism of the carbon trading market. Through the analysis of the fluctuation characteristics of the carbon trading price and return rate in China, it is found that there is no asymmetry in most of the carbon trading pilots in China, and there is no risk premium in the carbon trading market, so the market will not compensate for the fluctuation of the return rate. When subjected to external shocks, the

relevant enterprises involved in carbon trading will face very big risks. After the launch of the national carbon trading market, it is necessary to establish a perfect price control mechanism.
4) Develop carbon financial derivatives innovatively. As the national carbon trading market is still in the early stage of development, it mainly focuses on carbon spot trading and the financial degree is not high. Some carbon trading pilots have introduced carbon financial products, but the transaction scale is small. From the perspective of traditional finance, carbon trading market also belongs to financial market, so the State Council should issue regulations as soon as possible to clarify the financial nature of carbon trading market, as well as strengthen the innovative development of carbon financial market, encourage the innovation of carbon financial products, and increase the variety of carbon trading.

5. Conclusion

The creation of an emissions trading system is not simple, but it is an important force for long-term change. The ETS will play an important role in making the EU and China carbon neutral by 2050 and 2060, respectively. In view of the problems that need to be paid attention to in future carbon market trading and construction, from the domestic perspective, attention should be paid to the collaboration between carbon market and green and low-carbon technology development and promote the research and development of innovative technologies and accelerate the application of technological achievements through carbon market. From an international perspective, people should steadily promote the effective implementation of carbon markets and publicize them and play an active role in leading international climate governance.
Around the world, in promoting the green low carbon transformation, China has a huge market advantages, comprehensive industry advantage and advanced system advantage, in the realization of the second goal of the campaign in one hundred, driven by innovation and green drive, the goal of construction of Chinese modernization will be realized in the *double carbon* goals, people will make great contributions to mankind's response to climate change, sustainable development, and the building of a community of life between man and nature, and leave a clean and beautiful world to future generations.

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