

# Analysis of the Current Situation and Problems of the Carbon Finance Market in the Context of the "Double Carbon" Target

Changpei Lyu<sup>1,\*</sup>

<sup>1</sup> International College, Zhengzhou University, Zhengzhou, 450000, China

\*Corresponding author. Email: 33004@hnzj.edu.cn

## ABSTRACT

At present, climate change is an important issue that all of humanity needs to face together. With China's ambitious target of achieving carbon peaking by the year of 2030 and carbon neutrality by the year of 2060, the development of carbon finance is crucial. The development of a carbon finance system is of great significance in bridging the green and low-carbon investment gap; and there is a significant effect that using it as a tool for controlling the distribution of carbon. With the market continues to grow, the financial features of the market will gradually deepen, and will emerge to complement. In China, although the development of carbon market financing is generally low, some local carbon markets have made useful explorations in carbon financial products but with some limitations. The next step is to build and enhance the system of the carbon finance, innovate and develop the judicial practice of carbon finance, ensure the stable, orderly, and healthy development of the carbon finance system, and form an overall pattern of synergy and efficiency in reducing pollution and carbon. By analysing the background of the development of domestic and foreign into markets, this paper provides an in-depth study and analysis of the current situation and problems in the development of China's carbon market and carbon finance, and puts forward corresponding development suggestions to promote the carbon market to play a full role in realising China's vision of carbon neutrality.

**Keywords:** carbon finance, carbon peaking, carbon neutral, carbon emissions trading, low carbon economy, green finance.

## 1. INTRODUCTION

Secretary-general Xi Jinping announced for the first time on 22 September 2020 that "China will increase its autonomous national contribution, adopt stronger policies and measures, and strive to reach peak CO<sub>2</sub> emissions by 2030 and work towards carbon neutrality by 2060." With the concern of climate change and the idea of green, low-carbon life style striking people's mind, the introduction of carbon neutrality target heralds a new stage in China [1]. Over the next 30 years, carbon neutral investments are expected to exceed \$138 trillion, yet the government's financial outlay will only account for 15.94% of the total, making carbon finance the main way to pay for the funding gap in the carbon neutral economy. As an important market-based emission reduction tool, the carbon market will play an important role in the process of achieving China's "double carbon" target. China's carbon market started as a pilot project, and after years of local pilot exploration, a solid foundation has

been laid for the construction of a national carbon market [2], which will be opened on 16 July 2021. The financial logic of carbon neutrality lies in the creation, implementation, formation and operation of a market for the effective operation of carbon emission trading rights. Therefore, the essential attribute of carbon finance is to support and serve the carbon market [3].

By Carbon finance, it means various kinds of financial institutional arrangements and financial trading activities which aims at reducing the emission of greenhouse gas. These measurements mostly includes the permission of carbon emission, the investments and dealing of its derivatives, investment and financing of the low-carbon project exploitation, and other related financial intermediation activities [4]. Based on the growth development of major international carbon markets, the financialization of this market will gradually deepen in China, and the carbon financing market will emerge to supplement the carbon market [5]. Although

some local carbon markets have made useful explorations in carbon financial products, the growth of carbon finance continues to be hampered by unreasonable economic structure, insufficient market construction, limited function of carbon financial products, and the urgent need to build a judicial protection system, as well as the absence of a systematic carbon financial market [6]. Against the backdrop of an imperfect carbon market system and green financial system, China's development of carbon finance faces numerous challenges, and there is a significant gap between the national goal of green and low-carbon development and the "double carbon" goal [7].

Against this background, this paper expects to conduct an in-depth study and analysis of the current situation and problems in the development of market-based carbon financing in China by studying the theoretical basis and research methods of carbon finance and drawing on the development experience of mature foreign carbon markets [8]. In response to a series of current problems, such as the scarcity of green technology products, the lack of relevant standards, the imperfect incentive innovation mechanism, and the difficulties in financing that are prevalent in investment and financing to address climate change, the paper puts forward suggestions to address these problems. The recommendations to solve the problems are as follows: enriching green financial investment and financing channels and product innovation systems, improving green financial standards, building a market-oriented financial system for low-carbon technology innovation, developing incentive innovation systems and international cooperation frameworks[9], as well as actively promoting carbon financial innovation, building green infrastructure, promoting local pilot green financial reform zones and climate finance pilots, exploring peak carbon and carbon neutral targets under. This will provide experience and reference for the development of a green and low-carbon financial market, thereby promoting the full role of the carbon market in achieving China's carbon neutrality goal.

## **2. CURRENT STATE OF THE CARBON FINANCE MARKET**

Carbon finance now encompasses all financial activities aimed at reducing production, including direct investment and financing, carbon target trading, and bank loans. The rise of "carbon financing" is a consequence of changes in international climate policy, specifically in relation to two major international treaties: the United Nations Framework Convention on Climate Change and the Kyoto Protocol.

Carbon financing is the usage of financial capital to drive the improvement of environmental rights and interests, supported by laws and regulations, through the usage of financial instruments and methods that enable

relevant carbon financial products and their derivatives to be traded or circulated on a market-based platform, ultimately achieving the goal of low-carbon economy, green growing, and sustainable development.

Carbon market participants, products, and financial market hierarchy are the three components of the carbon financial market system. The purpose of the development and innovation of carbon financial products is to protect the operation of the carbon financial market system and to provide additional channels for capital inflow. The carbon financial market hierarchy supports the carbon financial market system, and the self-regulatory system and the macro-prudential regulatory system interact to provide strong support for the carbon financial market system's systematic operation.

As the matter of fact, with the global economic growth and the expansion of population size, the greenhouse effect caused by excessive carbon emissions has become increasingly significant and damaging to the climate environment, which has gained the attention of governments, and the issue of carbon emissions needs to be addressed urgently. The United Nations Conference on Environment and Development was held in Rio de Janeiro, in 1992, with the goal of stabilizing the concentration of greenhouse gases in the atmosphere at levels that are not harmful to the climate system. Climate and environmental policies, as well as laws governing carbon emissions, have been constantly updated and improved since then, and countries have joined forces to address global climate change issues. In particular, after the entry into force of the Kyoto Protocol in 2005, the international community for the first time limited greenhouse gas emissions in the form of regulations, and established three flexible cooperation mechanisms aimed at reducing greenhouse gas emissions, which laid the foundation for the growing of the carbon financial market. The growing of the financial market has laid the foundation for the development of a carbon trading market, which is formed by the trading activities of various greenhouse gas emission rights and the derivatives and related financial activities.

What's more, as the world's largest carbon emitter, China has assumed a prominent approach to climate and environmental change. In the long run, the market of carbon financing in China is vast and has full potential for development. The development of this market has broadly gone through three stages: the tentative CDM stage, the pilot allowance trading stage, and the full-gule launch of a national carbon emissions trading system in 2017. The country's emphasis on carbon emissions trading and building a carbon financial market is to encourage enterprises to respond positively to the green economy and carry out technological innovation in environmental protection with the help of market-based means to achieve the purpose of optimizing and upgrading energy and industrial structures. However, in

the meantime, the development of China's carbon finance market still faces many challenges and limitations, due to the previous rough economic development model and the short history of development and other objective factors, and still needs to be further resolved and improved.

### **3. DOMESTIC PROBLEMS AND SOLUTIONS UNDER THE "DOUBLE CARBON " TARGET**

#### ***3.1. Challenges of China's carbon financial market***

The initial emergence of China's carbon financial market faces many challenges, firstly, the technology and innovation level of carbon finance is relatively weak. The development of China's carbon finance market is relatively late compared to its foreign counterparts, and the relevant carbon finance technology is not yet mature, such as the technical facilities for monitoring need to be updated, carbon measurement and other monitoring technology capacity is weak, the carbon finance product development and innovation is insufficient, and there is also a lack of perfect software testing standards. China's carbon finance market has just started and has only learned from developed countries and international practices, and has not yet come up with a new set of practices of its own in carbon finance market related business such as carbon credit, which highlights the lack of China's ability to innovate in carbon finance and shows that China's carbon finance innovation work is seriously lagging behind. The main reasons for the lack of innovation are: firstly, there is a serious lack of talents in carbon finance in China, and education on carbon finance is also seriously inadequate; secondly, China's carbon finance market has not yet been fully integrated with the international carbon finance market, and there are too few links between the two; thirdly, the Chinese government has not yet fully liberalised, and is still relatively cautious about the development.

Secondly, the carbon financial market system is not sound. Because China has not yet constructed a quota-based carbon trading system with a mandatory nature, this leaves our enterprises without the need to access carbon trading emission resources. In the context of a market economy, small enterprises are completely uninterested in ver trading with voluntary requirements, and these small enterprises are technologically backward and are the very ones that need to be subject to carbon emission restrictions. Secondly, the CDM project verification and validation department, DOE, two authoritative UN-approved carbon bodies, are not yet able to meet the needs of Chinese companies due to their lack of experience and numbers. Moreover, the supervision is not strong enough. The National Development and Reform Commission (NDRC) has not yet established a sound monitoring system to verify the

implementation of approved CDM projects. There are many carbon financial intermediaries in China's carbon finance market, but they have been unregulated for a long time, and the government has not issued a corresponding accreditation system to regulate these institutions. Finally, the lack of laws and regulations governing the carbon finance market has added many unseen risks to companies and investors who actively participate in carbon finance transactions.

Third, the constraints of the original economic model. China's rapid economic development in the early years of reform and opening up relied mainly on the export of resource-intensive and labour-intensive products, and was built on massive resource consumption and environmental pollution. Although the country currently strongly advocates the development of a low-carbon economy, the reality still relies more on the past economic development model, and the transformation of this economic model is slow and gradual, and difficult to convert in a short period of time. As a result, the low-carbon development model accounts for a relatively limited share of China's economic development, failing to form a scale effect and constraining the development of the carbon finance market. Resource-intensive and labour-intensive industries have been transformed into high-tech industries.

Finally, society has not paid sufficient attention to the carbon finance market. Due to the past economic development model, the public still has a relatively vague understanding of the low-carbon economy and does not attach importance to the carbon financial market. Firstly, China's carbon finance industry is in its infancy, and a carbon finance market mechanism suitable for national conditions is still being explored. Domestic producers are not sufficiently aware of the operational model of carbon finance and the huge benefits and value that the carbon finance market can generate, and the number of enterprises applying for and receiving financial services such as green credit is limited. Secondly, the product structure and level of China's carbon finance market is relatively single, with a low level of innovation and insufficient support for innovation, and a perfect carbon finance market service system has yet to be built.

#### ***3.2. Suggestions for Chinese carbon finance market***

Firstly, innovation and diversification of carbon finance products. At present, the business of carbon finance in China is mainly in carbon emission reduction technology transfer, voluntary emission reduction projects and clean energy, and the number of business items is small and modest. The only carbon finance products available are audited emission reduction CERS and carbon credits, and the variety of products is too small, which seriously affects the development of China's carbon finance market. The government should

encourage major financial institutions to pay attention to this, actively research and develop new carbon finance products, increase investment in innovation and build a multi-level carbon finance product structure. For example, increase the development of carbon finance business and products, gradually improve carbon finance-related business and products, establish carbon funds as soon as possible, and develop trust-type carbon finance products, so as to further promote the development of China's carbon finance market.

Secondly, improve relevant policies and laws and regulations, such as implementing a system of the carbon emissions trading, clarify the scope of the subject matter of carbon emissions trading, scientifically control the total carbon emissions in China, and reasonably assign initial carbon emissions quotas. Reasonable auctions can be adopted to make the auctions open, fair and just, and to establish a transparent carbon quota trading system, which can motivate firms to lower carbon emissions and increase the effectiveness of resources. In the allocation process, it is also necessary to take into account China's national conditions, the industrial structure and economic differences of each region, the level of emission reduction technology of each enterprise, etc. At the same time, legislation should be used to clarify the rules and legal basis for carbon trading, establish a strict penalty mechanism, and determine the rights and obligations of each participating party to the success of it. In addition, the government should increase its support and play a guiding role by enacting reasonable incentives, such as tax breaks for low-carbon enterprises and the establishment of special financial schemes, to benefits carbon financial market development.

Third, implementing a economy with low carbon. In order for China's economy to run smoothly and effectively and for a low-carbon economy to develop healthily, a structural transformation of the economy is imminent. Deepening the supply-side reform, starting from the supply side, improving the quality of supply, transforming the original high energy-consuming and high-polluting production mode into a low-carbon and clean production mode, thus accelerating the transformation of the economic structure and laying a good foundation and have a strategic significance for China's economy to adjust the structure, remove production capacity and make up for shortcomings.

Finally, low carbon living concept. The development of the carbon financial market also requires extensive publicity. By promoting a low-carbon lifestyle and cultivating low-carbon consumption habits among the public, it can lead to a healthy and environmentally friendly consumption structure, as well as leading and guiding the production side. Nowadays, the internet is a convenient and developed tool for raising awareness of the low-carbon economy and carbon finance through online and offline campaigns. Once the financing of

carbon has been paid attention, relevant carbon finance products will be developed and tested, which will not only help to activate and develop the carbon finance market, but also further promote the concept of low-carbon living and improve the quality of life of residents, forming a positive cycle.

## **4. CASE STUDIES AND DATA RELATED TO THE CARBON FINANCE MARKET**

### ***4.1. Development of the National Carbon Emissions Trading Market***

The National Carbon Emissions Trading Market (NCTM) closed its 2021 trading year triumphantly. From the launch on July 16 to December 31, the national carbon emission trading market operated for 114 trading days, with a cumulative turnover of 179 million tons of carbon emission allowances (CEA) and a cumulative turnover of RMB 7.661 billion. The closing price on 31 December was RMB 54.22 per tonne, up 12.96% from the opening price on the first day of trading. More than half of the key emission units actively participated in the market trading[10].

### ***4.2. Case study -- the Shanghai carbon emission trading market***

The Shanghai Municipal Bureau of Ecology and Environment issued a notice on 29 January 2022 regarding the "List of Shanghai's Units Included in the Management of Carbon Emission Quotas (2021 Edition)" and the "Shanghai Carbon Emission Quota Allocation Plan for 2021". According to the city's carbon emission control objectives and requirements, under the principles of insisting on the implementation of total carbon emission quota control, promoting energy efficiency and energy structure optimization, and smoothly connecting to the national carbon trading market, and in accordance with the overall requirement that the control of carbon emission of the regulated enterprises is stricter than that of the city, the total amount of carbon emission trading system quotas in Shanghai for 2021 is determined to be 109 million tons (including directly issued quotas and reserve quotas). In addition, the industry baseline method, the historical intensity method and the historical emission method will be adopted to determine the base allowances for regulated enterprises in Shanghai for 2021. Where available, priority will be given to emission efficiency-based allocation methods such as the industry baseline method and the historical intensity method[11].

The industry baseline method is the method used for enterprises in the electricity and heat sectors such as power generation, power grids and heat supply in the city. Power generation enterprises (pure power generation and cogeneration ratio <100%) determine their annual base allowances based on the carbon emission benchmark per

unit of integrated power supply of different types of power generation units and the annual integrated power supply. Power grid enterprises determine their annual base allowances based on the unit power supply line loss rate benchmark, annual power supply volume and the city's power emission factors. Heat supply enterprises (pure heat supply and cogeneration ratio  $\geq 100\%$ ) The annual base allowance for enterprises is determined based on the carbon emission benchmark of unit integrated heat supply of different types of heat supply equipment and the annual integrated heat supply. The historical intensity method is used for industrial enterprises whose main products can be classified as those with a high correlation between product output and carbon emissions and are well measured, as well as enterprises in the aviation, port, water transport and water production industries. Industrial enterprises determine their annual base allowances based on the historical carbon intensity base and annual product output for each type of product of the enterprise. In addition, the historical emissions method is used for buildings such as shopping malls, hotels, business offices and airports, as well as industrial enterprises with complex products and large boundary changes in recent years that make it difficult to use either of these methods. The methods of issuing allowances for carbon emission rights carried out in Shanghai are direct issuance of allowances and paid issuance of allowances.

Allowance clearing and offsetting mechanisms for carbon emission rights are also running in parallel. The NACs shall submit allowances equivalent to their carbon emissions for 2021 as audited by the Municipal Bureau of Ecology and Environment through the allowance registration system to fulfil their clearing obligations. If there is a shortage of allowances, they should be purchased through the city's carbon trading platform to make up for it; if there is a balance of allowances, they can be used in subsequent years or for trading of allowances. The voluntary emission reduction projects to which the CCERs belong should be non-hydropower projects, and all the CCERs should be generated after 1 January 2013. The proportion of CCERs used shall not exceed 3% of the enterprise's carbon emissions for 2021 as audited by the Municipal Bureau of Ecology and Environment, which will introduce other emission reductions as supplementary offsetting mechanisms as appropriate.

The evolving market for carbon finance in China based on Shanghai's pioneering experience is recommended: firstly, to improve relevant policies, introduce normative policies and regulations on carbon emissions trading, etc., and precisely calculate and arrange the carbon emission standards for all industries under control in a detailed and scientifically based manner before issuing allowances. A low-carbon economy requires supply-side reforms to speed up economic transformation and the development of a

carbon financial market also requires a popular base, and it is important that the concept of a low-carbon economy takes root in people's minds. Finally, innovation and enrichment of carbon financial products, although this is the part of China's carbon financial market that is generally lacking, Shanghai as a pioneer can learn from the more mature carbon financial market in the United States and Europe and combine the current situation of the carbon market in China to launch the most suitable carbon financial products.

## 5. CONCLUSION

In summary, this paper has analysed the opportunities and China's carbon finance market's challenges from four aspects: the theoretical basis of carbon finance, the current development situation, the problems and the suggestions for improvement. It can be seen that China's carbon finance market is still in an imperfect stage of development and has many shortcomings compared with the mature markets in Europe and the United States. In the future development process, we should pay attention to the investment of talents and the improvement of regulations, accurately grasp the significance of promoting the development of circular economy in the new development stage, and promote the innovation of carbon financial products and the maturity of the market system. We need to strive to transform China from a big carbon emission rights country to a big carbon financial trading country, so as to enhance the international carbon financial market discourse.

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