

# Research on Carbon Emission Right Accounting Issues and Countermeasures

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**Abstract:** Against the backdrop of global climate change, China is actively promoting the construction of an ecological civilization and green and low-carbon development, and the accounting treatment of carbon emissions trading, as one of the important market mechanisms to achieve this goal, has become increasingly prominent. Although China has issued a number of accounting guidance documents on carbon emission rights trading, there are still a number of challenges and shortcomings, which limit the accuracy and comparability of accounting information and affect market participants' perception of the value of carbon emission rights. This paper firstly outlines the international accounting confirmation and measurement methods for carbon emission rights allowances, and comparatively analyzes China's current relevant regulations, pointing out the controversial points and deficiencies therein. In response to the above problems, this paper puts forward specific suggestions for improvement in the expectation that, to help the development of China's carbon emission right trading accounting system, to improve the quality of China's carbon emission right trading accounting system, to promote the healthy development of the entire carbon market, and to provide a solid accounting foundation for the realization of China's carbon neutrality goal.

**Keywords:** Carbon emissions trading, Accounting confirmation, Accounting measurement.

## 1. Introduction

The concept of carbon emissions trading dates back to 1968, when American economist Dale W. North (sometimes incorrectly referred to as Dales) first introduced the concept of "emissions trading". The concept centers on creating a legal right to emit pollutants and allowing these rights to be bought and sold in the marketplace. 1997 saw the adoption of the Kyoto Protocol at the third Conference of the Parties (COP3) in Kyoto, Japan, which was the first time that greenhouse gas emissions were limited in the form of international regulations. limits in the form of international regulations. Subsequently, on December 12, 2015, the 21st United Nations Climate Change Conference (COP21) adopted the Paris Agreement, signed by 178 parties worldwide, which is intended to serve as a unifying framework for post-2020 global action on climate change. The adoption of treaties such as the Kyoto Protocol and the Paris Agreement signaled the international community's growing concern over global warming, and these agreements aim to encourage countries to take action in accordance with their capabilities to reduce greenhouse gas emissions and adapt to the impacts of climate change through the principle of common but differentiated responsibilities. Climate change was a global challenge that transcended national borders and required coordination and international cooperation at all levels in order to help countries transition to a low-carbon economy.

## 2. Overview of Domestic and International Accounting Standards for Carbon Emissions Trading

### 2.1. Foreign Accounting Standards for Carbon Credits

Europe was the first region to establish a carbon emissions

trading system and is the largest carbon emissions trading market in the world, with the majority of companies included in the system, contributing significantly to the global reduction of carbon emissions. Currently, carbon emission rights are a commonly traded commodity in Europe, and in December 2004, the International Accounting Standards Board (IASB) published IFRIC 3: Emission Rights, in which companies are able to acquire government-issued emission permits (i.e. emission rights) for free or for a fee. In terms of accounting confirmation, emission rights acquired through purchase are recognized as an intangible, while emission rights issued free of charge by the government are accounted for as a government subsidy. At the same time, a liability or expense is recognized when the enterprise actually emits. In terms of accounting measurement, the initial measurement of emission rights is recorded at fair value, while the subsequent measurement uses the historical cost or revaluation method. For the portion of carbon emission rights distributed free of charge by the government, when the government allocates the emission rights to individual enterprises in the form of subsidies, if the price of the carbon emission rights received by the enterprise is lower than its fair value, the difference between the two is also treated as a government subsidy and subsequently deferred and amortized. Enterprises are also measured initially at the historical cost at the time of actual emission and adjusted subsequently according to the fair value in the market [1]. However, the release of IFRIC3 has been resisted by all parties, and it is believed that recognizing the purchased allowances as intangibles will not solve the problems of mismatch between the point of time of recognition of emission rights assets and liabilities at the time of compliance, and the subsequent measurement of the liabilities is different so that the free allowances are not proportional to the cost of emissions [2]. Subsequently, in June 2005, the IASB was forced to withdraw IFRIC3.

In October 2013, the European Financial Reporting Advisory Group (EFRAG), in conjunction with the different

accounting standards applied by European countries, proposed a new concept that defines carbon emission rights as a new type of asset that is not attributable to any of the currently existing accounting asset classes, and accounts for carbon emission rights separately according to the purpose for which they are held, with carbon emission rights acquired in the market and traded for the purpose of trading. For carbon emission allowances acquired in the market and traded for trading purposes, they are recognized as fair value through profit and loss and measured using historical cost, while for carbon emission allowances issued by the government free of charge, they are initially measured using fair value and recognized as deferred income [3].

At the end of the twentieth century, the concept of "emissions trading accounting" was introduced in the United States. The U.S. Federal Energy Regulatory Commission (FERC) issued the Uniform System of Accounts document (CFR18), proposed that, in terms of accounting confirmation, emission allowances held by enterprises for the purpose of production are regarded as a piece of inventory, and emission allowances held for the purpose of investment are regarded as an intangible asset, while allowances issued by the government free of charge are not subject to accounting confirmation, and actual emissions generated by the enterprises in the course of actual compliance are regarded as an expense. In terms of accounting measurement, allowances purchased in the trading market are measured at historical cost, and emissions from actual compliance are measured at fair value. The United States has also established an emissions trading market, enterprises can trade in the market, through the purchase of allowances to make up for the gap between the enterprise's own emissions and the shortage of allowances, in this case, if the actual emissions of the enterprise and the due performance of the

quota is equal, the enterprise does not need to carry out bookkeeping [4]. In 2010, the FASB and the IASB proposed in a joint meeting that an asset should be recognized for carbon emission allowances issued by a government free of charge, and a liability should be recognized when the enterprise actually emits the allowances. Both the purchase of carbon credits and the free allocation of carbon credits by the government, as well as the related liabilities, should be measured initially and subsequently at fair value. Since most U.S. companies acquire allowances for compliance purposes or for trading in the market to earn a price difference, U.S. companies usually recognize carbon emission allowances purchased in the market in inventory or intangibles. For such allowances, fair value is commonly used for measurement [5].

The Accounting Standards Board for Business Entity Accounting in Japan (ASBJ) issued a bulletin on "Accounting Treatment of Emissions Trading" in November 2004 and revised it in 2006. The revised announcement stipulates that the accounting treatment is different depending on the purpose of acquiring emission right quotas [6]. In terms of accounting confirmation, emission allowances held for the purpose of self-use, allowances acquired through purchase are accounted for as intangibles, and allowances acquired through investment transactions are accounted for as derivative financial instruments. For allowances held for investment transactions, allowances acquired through purchases are accounted for as inventories, and allowances acquired through investment transactions are accounted for as derivative financial instruments. In terms of accounting measurement, the quota is measured using a combination of historical cost and fair value, i.e., where fair value does not exist, it is measured at historical cost. Quotas for production operations or investments are also tested for impairment at the end of the period.

**Table 1.** Comparison of accounting confirmation and Accounting Measurement Treatment of Carbon Emission Rights in Foreign Countries

enterprise organization	Accounting confirmation		Initial measurement	Subsequent measurement
IASB	Purchase of acquired quotas	intangibles	Fair value	Historical cost or revaluation
	Quotas issued by the Government at no cost; Difference between the price of carbon credits acquired and the fair value of the credits acquired	Accounted for as government grants	Deferred income recognized for the difference	Revenue recognition
	Actual emissions from actual compliance	Liabilities or expenses	Historical cost	Fair value
FERC	For production purposes	Inventory	Historical cost	-
	For investment purposes	Intangibles	Historical cost	-
	Quotas issued by the Government at no cost	-	-	-
	Actual emissions from actual compliance	Expenses	Fair value	-
EFRAG	Quotas issued by the Government at no cost	Carbon credits assets	Fair value	Recognition of deferred income
	Purchase of acquired quotas	Carbon credits assets or fair value through profit or loss accounting entries	Historical cost	-
FASB	Quotas issued by the Government at no cost	Asset	Fair value	Fair value
	Purchase of acquired quotas	Inventory or intangibles	Fair value	Fair value
	Actual emissions from actual compliance	Liabilities	Fair value	Fair value
ASBJ	For personal use	Purchase of acquired quotas	Intangibles	Measured at historical cost where fair value does not exist
		Quotas obtained from investment transactions	derivative financial instrument	
	For investment purposes	Purchase of acquired quotas	Inventory	
		Quotas obtained from investment transactions	derivative financial instrument	

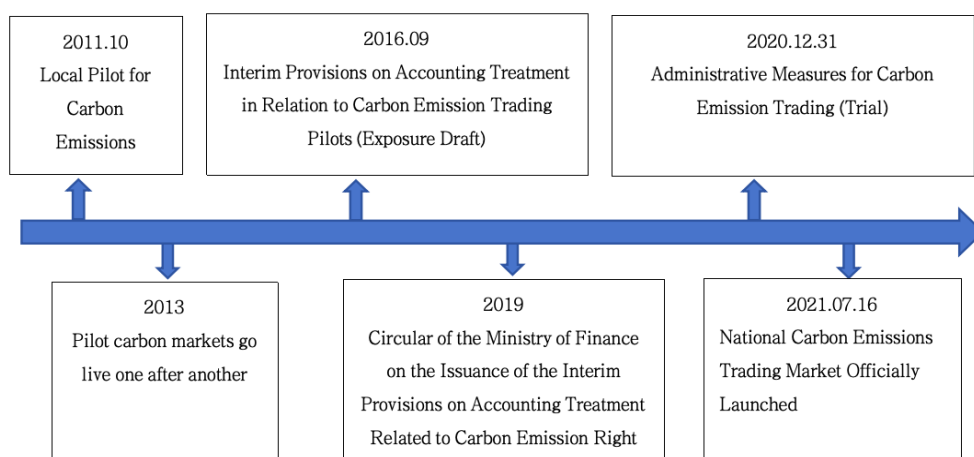
Despite the large number of countries and regions participating in the global carbon trading market, there is currently no uniform accounting confirmation and measurement method for carbon emission rights, as the depth of scientific research in each country or organization and the degree of development of the national carbon market vary greatly.

## 2.2. Domestic Accounting Standards for Carbon Emissions Trading

The construction of China's carbon market started with local pilots. In October 2011, Beijing, Tianjin, Shanghai, Chongqing, Guangdong, Hubei and Shenzhen launched local pilots of carbon emissions trading. Since 2013, seven local pilot carbon markets have started online trading one after another. In September 2016, the State Ministry of Finance issued the Interim Provisions on Accounting Treatment Related to Carbon Emission Right Trading Pilot (Draft for Public Comments), and in 2019 formally promulgated the

Notice of the Ministry of Finance on the Issuance of the Interim Provisions on Accounting Treatment Related to Carbon Emission Right Trading (hereinafter referred to as the "Interim Provisions"). The issuance of this provision marked the beginning of the nationwide implementation of the carbon emissions market mechanism and its corresponding accounting and reporting system. On December 31, 2020, the Ministry of Ecology and Environment issued the Administrative Measures for Carbon Emissions Trading (Trial), which came into effect on January 1, 2021. On July 16, 2021, the national carbon emissions trading market was formally launched, with simultaneous launch events held in Beijing, Shanghai and Wuhan, marking the official launch of the national carbon market for trading.

Up to now, the accounting treatment of carbon emission rights trading in China still follows the Provisional Regulations for accounting. At the same time, issues such as accounting confirmation and measurement related to carbon emission rights trading have received widespread attention.



**Figure 1.** China's carbon trading market development events and document release time narrative map

The scope of application of the provisions in the Interim Provisions is key emitting enterprises. The relevant enterprises among the key emission units in China that carry out carbon emissions trading business mainly include enterprises in the petrochemical, chemical, building materials, iron and steel, paper-making, electric power, aviation and other industries.

There are two main ways for an emitting entity to acquire its carbon emission allowances: firstly, by purchasing allowances through market transactions; and secondly, by obtaining free allowances from the government in accordance with the policy. According to the Interim Provisions, for those enterprises classified as key emitting entities, a specific accounting account - "1489 Carbon Emission Right Assets" - is required to be set up to record and account for carbon emission allowances purchased through market trading. In addition, in order to differentiate between different acquisition channels, a second-level line item needs to be established under this account [7]. It is worth noting that, as

can be seen by comparison, both documents do not address the recognition, measurement, and accounting treatment for the gratuitous acquisition of carbon emission rights allowances through free government allocation.

On the other hand, another accounting requirement for key emitters was introduced in the Draft for Public Comments: the establishment of the account "2204 Carbon credits payable" to facilitate the recording of the value of carbon credits payable as a result of the fulfillment of emission reduction obligations. In the event of actual emissions exceeding the allowable limit, enterprises should measure their carbon emission liabilities based on the fair value of the excess emissions in the current period. At the same time, at the end of each reporting period, the enterprise should also adjust the book value of the "Carbon credits payable" account according to the changes in the fair value of carbon credits. However, the Interim Provisions do not currently provide specific guidance on the recognition, measurement and accounting treatment of carbon emission liabilities.

**Table 2.** Comparison of the accounting confirmation and measurement treatment of carbon emission rights in two policy papers

Enterprise \ File	Accounting confirmation		Accounting measurement
Draft for Public Comments	Carbon credits acquired by purchase	Carbon credits assets	Historical cost
	Quotas issued by the Government at no cost	-	-
	When complying with carbon emission obligations	Carbon credits payable	Fair value
the Interim Provisions	Carbon credits acquired by purchase	Carbon credits assets	Historical cost
	Quotas issued by the Government at no cost	-	-
	Does not involve carbon credit liabilities		

In China's enterprises, there are some enterprises that recognize the excess carbon emission right allowances as trading financial assets measured at fair value [8], unlike the Interim Provisions, which are measured at fair value, the value of this asset can change with the fluctuation of the quota price in the carbon trading market, and in accordance with the classification as well as the applicable accounting standards, its earnings are included in the account of gain or loss on changes in fair value, which will have a direct impact on the enterprise's Profit for the period.

### 3. The Main Problems of China's Carbon Emissions Trading Accounting Standards

#### 3.1. Accounting Confirmation and Measurement Aspects

The Measures for the Administration of Carbon Emission Right Trading (for Trial Implementation) mentioned that the allocation of carbon emission right quotas is mainly free of charge, and compensated allocation can be introduced in due course in accordance with the relevant requirements of the State. The introduction of this approach has laid the foundation for the full and effective implementation of carbon trading on a national scale, but there are still some problems

in the accounting confirmation and measurement of carbon emission rights in China, which are related to the healthy development of the carbon trading market and the quality of financial reports of enterprises.

First of all, in China's Interim Provisions, carbon emission right allowances allocated by the government free of charge are not accounted for, recognized as assets and subsequently measured, which can make accounting information incomplete. Meanwhile, it was mentioned in the Exposure Draft that key emission enterprises should set up the account "2204 Carbon Emission Rights Payable" to account for the value of carbon emission rights payable by the key emission enterprises to fulfill their carbon emission obligations, but the Interim Provisions issued by the Ministry of Finance made no mention of this related matter. It can be seen that reasonable accounting confirmation will help the carbon market to mature, while the lack of this link may slow down the pace of market development. China's key emitting enterprises have a large base, if the enterprises do not recognize this, will not only make the enterprises in the formulation of emission reduction strategies or the selection of low-carbon technology lack of reliable data support. And with the expansion of the carbon emissions trading system in the future, the types and number of enterprises included will continue to increase, and the government's free allocation of carbon emission allowances may increase day by day, which may affect the long-term planning and investment decisions and may affect the completeness and comparability of the entire industry and market data [9].

Secondly, after summarizing the existing studies on the accounting measurement attributes of carbon emission rights, it is found that scholars believe that the feasible measurement method mainly involves two attributes, one of which is historical cost and the other is fair value. However, in the current Provisional Regulations of China, the carbon emission right quotas purchased by key emission enterprises from the carbon trading market are debited to the "carbon emission right asset" account according to the price actually paid on the same day, and the initial and subsequent measurement is carried out at historical cost. Carbon emission right allowances acquired without payment are not reflected in the accounts. Meanwhile, it is mentioned in the Exposure Draft that when the actual emission behavior occurs, the liability for carbon emission rights shall be measured according to the fair value of the actual excess emissions in the current period, and at the end of the period, the book value of the "Carbon emission rights payable" account shall be adjusted according to the change in the fair value of the carbon emission rights. However, there is no mention of carbon emission right liabilities in the subsequent Interim Provisions. It can be seen that if the accounting measurement of carbon emission rights quotas is inappropriate and incomplete, enterprises may not be able to effectively manage and predict the costs related to carbon emissions, thus affecting their cost control ability, and at the same time, it may lead to inefficiency in the investment and use of carbon emission rights, affecting the effective allocation of capital. In the long run, it may even affect the ability of the entire industry and market to achieve emission reduction targets.

## **3.2. Other Aspects**

### **3.2.1. A perfect legal framework for the market has not yet been fully established**

Since China's carbon emissions trading market started late

and is in the early stage of development, compared with other well-established carbon emissions trading markets in the international arena, there are deficiencies in the establishment of a sound legal system and a system of incentives and penalties, as well as in the enhancement of law enforcement efforts. At present, although relevant laws and policies on the carbon emissions trading market have been promulgated, such as the Interim Regulations on the Administration of Carbon Emissions Trading, there are still no specific enforcement mechanisms and regulations in the laws and regulations on carbon emissions trading and accounting treatment of carbon emissions, which leads to significant shortcomings in the market in terms of regulatory intensity, a level playing field and accounting treatment.

### **3.2.2. Barriers to market data quality and control**

With the continuous development of China's existing market, a more comprehensive carbon emissions monitoring, reporting and verification (MRV) system is gradually being established, such as the use of CEMS (Continuous Emissions Monitoring System) and other technical means to improve the accuracy and reliability of data. However, despite the improvement in technical means, there may still be challenges in data quality control, especially for small or low management level enterprises. Due to the lack of accurate basic data, it is difficult for governmental departments to accurately assess the carbon emission situation of the enterprises, and therefore timely coordination and effective disposal are not possible, and at the same time it may lead to irrational allocation of the initial quota, which may be too high or too low, this affects the fairness and effectiveness of the market.

### **3.2.3. Enterprises lack the enthusiasm to participate, and the development of the carbon market is in a bottleneck**

With the continuous development of China's carbon trading market, the carbon financial market has also grown, and now covers a series of diversified financial instruments and services, including carbon futures, carbon options and other derivatives trading, as well as carbon funds, carbon bonds and other innovative financial products. However, the current major players are concentrated in the power generation industry, and the participation of these enterprises shows a high degree of homogeneity. Many enterprises still have limited knowledge of carbon trading and lack sufficient experience and motivation to join the market activities in a more active manner. This status quo not only limits the depth and breadth of the market, but also affects the effective utilization and development potential of carbon financial instruments.

In addition, although China has already established a carbon trading market, its transaction scale is still small and the market depth is insufficient compared to more mature markets internationally. In addition, although the types of carbon financial products have increased, they are still mainly dominated by traditional green credit, and the existing carbon financial products are relatively single and lack diversity and innovation, which makes it difficult for them to meet the diversified needs of different enterprises and investors. Currently, the development of China's carbon market is in a bottleneck.

### **3.2.4. Poor disclosure of carbon information**

On the one hand, enterprises disclosing carbon information are mainly concentrated in high-pollution industries, which

may be due to the fact that these industries are more susceptible to the influence of policy regulation, or that they receive more attention due to their higher carbon emissions. However, the overall disclosure ratio is still low, especially among enterprises in non-high-pollution industries, which are not highly motivated to disclose carbon information, either due to insufficient awareness of carbon information disclosure, lack of corresponding technical capabilities, or disclosure costs. Meanwhile, among enterprises that have disclosed carbon information, the quality of disclosure varies greatly, with some providing detailed data and analysis while others provide only limited information.

On the other hand, carbon emission allowances allocated by the government without compensation constitute the core part of carbon emission allowances for enterprises. However, these government-allocated carbon emission allowances are not integrated into the accounting system of enterprises, which means that this key component is actually outside the accounting system. Particularly for companies that rely heavily on government allocation of carbon allowances, information on these allowances is not only not integrated into the accounting system, but also not adequately disclosed. This situation poses a challenge for regulators to effectively monitor and manage the carbon emission information of enterprises [10].

## **4. Recommendations for Accounting for Carbon Emissions Trading**

### **4.1. Accounting Confirmation and Measurement Aspects**

#### **4.1.1. Accounting confirmation principles**

First, a distinction should be made between the purposes for which quotas are held by an enterprise. Most enterprises mainly hold allowances for two purposes: compliance and trading. In the first case, enterprises hold allowances mainly for the purpose of fulfilling their carbon emission control obligations. This helps enterprises to formulate emission reduction plans, track compliance, and evaluate the effect of emission reduction. In the latter case, which is speculative in nature, the holding of allowances can reflect changes in the market value of allowances, and also help enterprises to manage risk, avoid profit manipulation, and improve the transparency of financial reporting.

Secondly, a new account "Carbon Emission Rights Assets" is created for accounting confirmation. Carbon credits can meet the definition of an asset, are scarce, and can be traded in the carbon market, thus bringing economic benefits to enterprises. For example, an enterprise can sell the remaining allowances to other enterprises for profit, or use the allowances for its own emission reduction to reduce production costs. In addition, the ownership and control of carbon credits belongs to the enterprise, which can use and dispose of them according to its own needs. Furthermore, carbon emission rights quotas are fundamentally different from traditional assets, and their value is affected by various factors such as policy, market, technology, etc., which makes them more volatile. Therefore, categorizing them as a new type of asset account can help better reflect their characteristics and risks and distinguish them from other assets.

At the same time, carbon emission rights liabilities should also be recognized, i.e., an account "Carbon emission rights liabilities" should be established. This account meets the

definition of a liability, e.g., in the case of excess emissions the enterprise will face fines, purchase of allowances, etc., which may result in an outflow of economic benefits. It is worth noting that excess emissions are relatively homogeneous and do not need to be further subdivided, which would also simplify the accounting process.

#### **4.1.2. Accounting measurement**

##### **(1) Carbon emission right assets**

Enterprises recognizing carbon emission right assets should use historical cost in the initial measurement, which can reflect the actual cost of acquiring allowances and facilitate accounting and cost control. For example, the cost of a quota allocated by the government for free is zero; the cost of a quota purchased in the market is the purchase price.

The use of fair value in subsequent measurement can reflect the changes in the market value of quotas and meet the needs of investors and other information users for information on the value of carbon assets. For example, the price fluctuations in the carbon trading market, the fair value can reflect the impact of market supply and demand, policy changes and other factors on the value of allowances.

##### **(2) Carbon emission rights liabilities**

When generating carbon emission right liabilities, measuring them at fair value can reflect the value of the compliance obligation of the enterprise's excess emissions and reflect the risk of the liabilities. For example, with price fluctuations in the carbon trading market, the fair value can reflect the market's expectation of the severity of penalties for excess emissions and the cost of penalties or allowances to be paid by the enterprise in the future.

Offsetting carbon credit liabilities against carbon credit assets at the end of the year can reflect the final results of a company's carbon emission controls and simplify financial statement presentation. For example, liabilities resulting from an enterprise's excess emissions can be offset against its allowance asset holdings to reflect the enterprise's actual compliance.

## **4.2. Other Aspects**

### **4.2.1. Establishment of a sound legal system**

A strong legal framework is a key pillar to ensure the stable and orderly development of the carbon emissions trading market, which can clearly define the rights, responsibilities and obligations between market participants. Specifically, first of all, establish the status of carbon emission right accounting in the accounting legal system, clarify the responsibility of enterprises and external parties for carbon emission right accounting, and establish a sound legal responsibility and penalty system for illegal behavior [11]. Secondly, the concept, connotation and extension of carbon accounting should be clarified, the scope of application of carbon accounting should be standardized, and the basic accounting confirmation, accounting measurement, accounting accounting and accounting information disclosure of carbon accounting should be improved. At last, in order to build a legal and standardized market system, the existing policies should be based on the rapid introduction of laws and regulations specifically for carbon emissions trading to ensure that the main body of the transaction, trading rules, emission limits and data management are appropriately regulated.

It should be noted that the legislation must be adhered to from the practical point of view of our country and be compatible with the green and low-carbon development model. Such detailed regulation not only promotes the

operational activities of carbon-emitting enterprises to be more in line with the law, but also effectively protects the legitimate rights and interests of market participants.

#### **4.2.2. Positively play the role of government orientation**

Along with the development of carbon emissions trading and carbon market, the government plays a crucial role in this process. For this reason, the government should actively fulfill its guiding role and increase its policy support and financial investment in the carbon emission right trading market in order to promote the maturity and development of this market. By strengthening publicity and education, it should carry out popularization and education on carbon emissions trading knowledge to raise enterprises' and the public's awareness of the importance of carbon trading, so that they will realize the great potential and development opportunities of China's current carbon emissions trading market. For the carbon financial market, the government can encourage enterprises to reduce carbon emissions through financial subsidies, tax incentives and other incentives to promote the innovation and development of carbon financial products. Secondly, it should increase financial support for the carbon financial market to improve market liquidity and attract more investors to participate in carbon trading.

At the same time, the government should accelerate the construction of a national carbon emissions trading market, including the construction of a trading platform and the improvement of technical support systems. It should also establish a sound regulatory system to strengthen the supervision and management of the carbon trading market, and deeply improve the current MRV system to further ensure the authenticity and accuracy of the data and the fairness, justice and transparency of the market. In addition, it is also necessary to develop a more reasonable pricing mechanism for carbon emission rights and make price interventions at the right time, so as to guide enterprises to carry out reasonable trading behavior and promote the healthy development of the whole market.

#### **4.2.3. Focus on cultivating high-tech talents and increasing the innovation of carbon financial products**

In recent years, China's government has attached great importance to the development of the carbon market and regarded it as one of the key means to realize the goals of carbon peak and carbon neutrality. However, the shortage of professional talents has become one of the major bottlenecks constraining the development of China's carbon finance market. To address this situation, a reasonable and scientific development plan should be formulated as soon as possible, aiming to enhance the overall capacity and competitiveness of the carbon finance market and ensure that it can effectively support the national emission reduction goals. The carbon finance market should be strengthened through the establishment of special training programs, scholarships and internships to cultivate local carbon finance professionals; at the same time, preferential policies should be adopted to attract senior overseas talents to return to China to serve in the carbon finance market.

At the same time, improve the market environment, provide favorable policy support for financial institutions, lower the threshold of participation, enhance market vitality, and encourage more participants to join the carbon finance market. Encourage institutions from different industries, such as funds and securities, banking and the Internet, to actively participate in the construction and development of the carbon

financial market, and jointly promote the innovation and diversification of carbon financial products by providing technical support and innovative services. Support technological innovation in the carbon financial market, including the research and application of new models and methods of carbon asset management and trading, in order to enhance the efficiency and transparency of the market.

This will not only make up for the shortage of professionals, but also significantly enhance the innovation of carbon financial products, which will in turn promote the development of China's carbon financial market in the direction of greater maturity and efficiency.

#### **4.2.4. Strengthening the disclosure of accounting information on carbon emission rights**

Although China has issued some regulations on the disclosure of accounting information on carbon emission rights, on the whole, these regulations still lack systematic and mandatory. And the enterprises for carbon emission rights accounting information disclosure is not active, the number is not high, the quality is not high, the caliber of the data statistics is not consistent and many other problems exist, so that the relevant carbon emission rights accounting information lack of comparability.

Therefore, first of all, the comprehensiveness and mandatory nature of information disclosure should be strengthened to enhance the comprehensiveness of enterprises' carbon emission right accounting information disclosure, which can ensure the truthfulness, timeliness and consistency of information disclosure. It is recommended that carbon emission information be released through public platforms, including information on target planning, technical and financial inputs, and effectiveness. Further refine the disclosure of accounting matters, including, but not limited to, the calculation method and basis for determining the carbon emissions of enterprises, the requirement to disclose the pricing mechanism and pricing basis of carbon emissions trading rights, and other key accounting treatment matters. At the same time, the mandatory nature of information disclosure should be strengthened to ensure that all relevant enterprises strictly comply with the regulations. Secondly, to improve the legal disclosure system of corporate environmental information, it is recommended to learn from the mature and perfect accounting and information disclosure system of carbon emission rights in foreign countries, to establish and improve the reporting standards of carbon emission rights accounting and information disclosure that are generally recognized by the market, and to unify the standards in order to improve the consistency and standardization of information disclosure; and to ensure that all enterprises make information disclosure on the same basis so as to allow for effective horizontal comparisons. In addition, third-party auditing can also be strengthened by implementing regular auditing and validation procedures conducted by an independent third party to ensure that the data disclosed by enterprises are accurate; at the same time, third-party professional organizations are encouraged to audit the carbon emissions data provided by enterprises to ensure that the data are reliable and complete.

## **5. Conclusions**

Through the systematic combing and in-depth analysis of domestic and foreign carbon emission right accounting system, this paper explores the challenges faced in the

development of China's carbon emission right accounting system and its carbon emission right trading market, and puts forward a series of targeted improvement measures accordingly. The goal of this study is to deepen the accounting theory and promote the cross-fertilization among accounting, economics, environmental science and other multidisciplinary disciplines in order to promote the synergistic development of the disciplines. By exploring the significance and role of carbon emissions trading, this paper aims to enhance the awareness of enterprises and the public about environmental protection, and to stimulate the enthusiasm of all sectors of society to participate in carbon emission reduction activities, so as to promote the process of green and low-carbon development. In addition, this study is also committed to promoting the establishment of a sounder carbon market mechanism to ensure the healthy and stable development of the carbon market by improving the efficiency of market operation and increasing market transparency, so as to lay a solid foundation for the realization of China's strategic goals of carbon peak and carbon neutrality.

This paper emphasizes that a perfect carbon emissions trading market needs to be jointly promoted from multiple levels. Through policy support, technological innovation, talent cultivation and other efforts, a carbon emissions trading market with comprehensive functions, efficient operation and strong supervision can be constructed. Such a market can not only promote China's carbon emission reduction work, but also promote the realization of global carbon emission reduction goals in a wider scope.

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