

# Comparison and Analysis of Chinese and Foreign Carbon Emissions Trading

Zhang Qing

*Department of Economic Management, North China Electric Power University (Baoding), Baoding City, Hebei Province, China, 071003  
Mail: ncepu51851443@163.com*

**Abstract:** In the context of the rapid development of the global carbon emission trading market, China's carbon emission trading market needs to be improved. This paper introduces the development status and transaction process of the global carbon emission trading market, and compares and analyzes the various processes of China's carbon emission trading market, and proposes development for the improvement of China's carbon emission trading market.

**Keywords** Carbon emission rights, transaction process, comparative analysis, development recommendations

## INTRODUCTION

In 2002, the EU approved the Kyoto Protocol in response to climate issues and established the EU carbon emissions trading market system [Alberola, et. al., 2008]. In 2016, 170 countries signed the Paris Agreement, the third international law to address climate change. The EU complies with the provisions of the Kyoto Protocol and the Paris Agreement and conducts mandatory emission reductions and carbon emissions trading. The EU carbon emission trading market is a compulsory market [Carlén, et. al., 2003]. The United States refuses to accept the provisions of the "Kyoto Protocol" and the "Paris Agreement," so the US trading system is local and voluntary, and there is no nationwide mandatory trading market, some of which have made independent agreements and regulations [Elkins, et. al., 2010]. Voluntary emission reduction commitments constitute a spontaneous carbon emission trading market. From the establishment of the seven carbon emission trading pilots in 2011, China began its preliminary exploration stage. By the end of 2017, the establishment of a national carbon emission trading market, China has actively promoted the transformation of enterprises with low carbonization and the effectiveness of the Paris Agreement [Lo, 2012].

The carbon emission process includes five stages: emissions data reporting, third-party verification, quota allocation, trading entities and performance clearing [Zhang, 2015]. This paper will compare the above five steps with the domestic market by selecting the larger foreign trading markets and the more mature regions and countries - the United States and the European Union, so that China can learn from the foreign trading market and find that the domestic trading market is insufficient to promote the healthy development of the national carbon emission trading market.

## COMPARISON OF CARBON EMISSIONS DATA REPORTS

Here, we mainly compare the two aspects of the emission data report object and the emission statistics range.

### Emission data report object

Greenhouse gases can produce the greenhouse effect, common are carbon dioxide, methane and other gases. The greenhouse gases to be controlled under the Kyoto protocol include carbon dioxide, methane, hydrofluorocarbons, perfluorocarbons, nitrous oxide and sulfur hexafluoride. But the impact of carbon dioxide is the most important, so the international general greenhouse gas eventually converted into carbon dioxide to calculate.

The EU emissions trading system is the world's first emissions trading market, and its development is divided into three stages. The first and second stages (2008-2012) cover only one greenhouse gas, carbon dioxide, but the third stage adds emission limits for perfluorocarbons and nitrous oxide.

The Chicago climate exchange is a non-mandatory greenhouse gas trading system. The US environmental protection agency (EPA) launched the greenhouse gas reporting system in October 2009, requiring the reporting of six greenhouse gases specified in the Kyoto protocol.

China has issued a national greenhouse gas inventory, which stipulates that the gases to be reported are carbon dioxide, methane and nitrous oxide.

### Emission statistics range

In the EU carbon emission trading market, the industry is divided into two categories, one is that emissions are measurable and included in the tradable

industry, and the other is that emissions are not quantifiable and are included in non-tradable industries. The EU's carbon trading market is only applicable in the tradable industry. The EU carbon emission trading system requires all countries in the EU to implement emission reduction measures for gases that are not subject to the Montreal Protocol, and transparently regulate and announce forecasts and actual emission reductions.

As one of the most developed countries in the world, the United States has always opposed the Kyoto Protocol and withdrew from the Paris Agreement. However, the United States is also one of the first countries in the world to implement greenhouse gas emission reduction actions. The Chicago Climate Exchange, established in Chicago in June 2003, is the world's first carbon emission exchange. Because the United States has not carried out emission reduction work at the national level, its carbon emission trading system has been characterized by regionalization. The "dual track system" is implemented, and each state has its own greenhouse gas emission reduction bill divided into two categories.

China's seven carbon emission trading pilots are geographically distributed, covering industries such as power generation, chemical industry and other high-energy-consuming and high-emission industries in China, and their emissions account for a large share of China's total emissions. However, the seven transaction pilots not only included high-emission industries, but also incorporated their respective characteristic industries according to the actual conditions of their respective pilots, making them more adaptable to local conditions.

### **COMPARISON OF THIRD PARTY VERIFICATION**

In the process of implementing the carbon emissions trading policy, the EU has gradually improved its management system and legal system. "Regulations on Establishing the EU Greenhouse Gas Emissions Quota Trading System", "Regulations on the Certification and Verification of Greenhouse Gas Emissions and Tonne-Kilometer Reports" were issued, which apply to all legal subjects of the EU and also has high legal force. The EU has established verification specifications and accreditation specifications for third party verification agencies and provided legal support.

The California carbon emissions trading system and regional greenhouse gas actions in the United States are relatively large-scale trading systems. The Regional Greenhouse Gas Initiative is a regional carbon emission trading mechanism for the power industry. Due to its complete indicators and accurate and high-quality data, the competent authorities can verify it without the need for third-party verification. However, California's carbon emission trading system covers a number of industries, and its verification system is relatively complete.

China's third party verification agencies must verify the accuracy of carbon emissions reports issued by enterprises, and submit third party verification reports by April 30 of each year. China's carbon market has not yet fully developed and perfected, the quota market and the voluntary market have not yet been perfected, and the pilots of each transaction operate independently. In this context, China's standards for carbon accounting and certification have not been unified.

### **COMPARISON OF QUOTA ALLOCATION**

Here, we mainly compare the two aspects of the total quota determination mode and quota allocation mode.

#### **The total quota determination mode**

The EU carbon emissions trading system aims to reduce carbon emissions, and the commitments under the Kyoto Protocol are based on reducing total carbon emissions. On this basis, the overall emission reductions of the EU and the carbon dioxide quotas allowed to be emitted are determined. The EU said that from January 2019, the EU market stability reserve mechanism will reduce the excess carbon emission quota by 24% each year. Until 2023, the decline will be narrowed to 12% per year.

Although the United States is reluctant to join the Kyoto Protocol and accept mandatory national greenhouse gas emission limits, many states and local governments in the United States have implemented mandatory greenhouse gas emissions controls within their jurisdiction. In December 2005, multiple eastern states of Delaware, Connecticut, New York, New Hampshire, New Jersey, Maine, and Vermont agreed to establish statewide CO<sub>2</sub> emission limits and compliance areas. The Greenhouse Gas Initiative, followed by Massachusetts, etc., also joined. Member states agreed to stabilize emissions at the 2009 level by 2014 and gradually reduce emissions by 2.5% annually from 2014 to 2018. By 2018, emissions after emissions are reduced by about 35% relative to emissions under normal economic conditions. The US Midwest Greenhouse Gas Agreement also announced that it will reduce emissions by 20% in 2020 and 80% in 2050.

At the end of 2005, China announced its emission reduction target: by 2020, CO<sub>2</sub> emissions per unit of GDP will fall by 40% to 50% compared to 2005. In 2014, President Xi Jinping said that at the latest, in 2030, China's total carbon emissions will reach a maximum.

#### **The quota allocation mode**

In 2003, the EU legislation passed the 2003/87/EC Directive, which stipulated specific quotas, coverage industries, distribution methods and other aspects, laying a solid foundation for the smooth operation of the EU carbon emission trading system. In the first phase and the second phase of the EU carbon emission trading system, countries separately

formulate distribution plans, report them to the EU for review and sum up the total quotas of the EU, and countries will then issue them in a customized manner. In the first two phases, 95% and 90% of the quotas were allocated free of charge, and the remaining small parts were distributed through auction.

The distribution methods used in different parts of the United States are also different. Under the California carbon emissions trading system, free distribution and auction methods coexist. It is planned to auction 10% of the budget quota from 2015 to 2020. Regional greenhouse gas actions in the eastern United States are mainly distributed by auction.

In the initial stage, China's distribution method is based on free quotas, introducing paid distribution at an appropriate time and gradually increasing the proportion. At the same time, the competent department will reserve a part of the quota reserve in advance for market adjustment and other aspects. The proceeds of paid distribution will be invested in the construction of relevant projects such as national energy conservation and emission reduction.

#### **COMPARISON OF TRADING ENTITIES**

The trading entity of the EU carbon emission trading market is the legal or actual controller of a certain emission unit, including natural persons and legal persons. Specifically refers to the developed countries that have joined the Kyoto Protocol and the operating entities of these countries, such as enterprises, institutions, non-governmental organizations, etc. In addition to this, the following conditions must be met: record calculation compliance for emission indicators; updated national inventory reports and additional information on changes to inventory reports; and a qualified national assessment system. If the above provisions are violated or are not registered with the Secretariat, the qualification of the transaction subject will be lost.

US trading entities refer to institutions or individuals that voluntarily participate in transactions in the carbon emission trading market to reduce emissions and are not subject to mandatory indicators. Take the Chicago Climate Exchange as an example. The Chicago Climate Exchange has a membership system in which all participants in the transaction must be members of the Chicago Climate Exchange. The members of the participating companies are divided into three categories: trading entities that directly emit greenhouse gases, indirect trading entities, and trading entities that only conduct financial operations. According to the different positions of different trading entities in the carbon emission trading market, the rights and obligations are divided into members, sub-members, participating members and trading participants. Members are entities with significant direct greenhouse gas emissions, and members have their

own emission reduction obligations at each stage. An associate member is an entity that has fewer, negligible direct emissions of greenhouse gases, such as museums, medical and service agencies, and non-governmental organizations. Associate members will make a commitment to indirect emissions reductions and will provide relevant reports, audited by the National Association of Securities Dealers (NASD). Participating members refer to offset providers, offset aggregators, and liquidity providers included in the Chicago Climate Exchange. The offset provider is the owner of the offset item already registered and sells the offset transaction amount for its benefit. The offset aggregator is to aggregate the various entities that offset the emission reductions of the production project in order to offset the interests of the transaction project owner. A liquidity provider is not an entity or individual that trades on the exchange to complete the emission reduction schedule. Local traders of the hedge fund can participate in the transaction as a liquidity provider. The trading participants are entities or individuals, and the trading participants wish to be able to offset the commercial organization or individual that achieves specific greenhouse gas emission tonnage associated with specific activities, meetings, special events and business activities.

China's carbon emission trading exchanges are used as organized emission allowance transfer places. The trading entities involved in the carbon market include not only buyers and sellers of quotas, but also market organizers who formulate trading rules, professional institutions responsible for clearing settlement business, and management. A verification agency that oversees the circulation of quotas and a professional intermediary service agency. These economic entities, in accordance with strict trading rules and procedures, spontaneously adjust the remaining quotas through the trading activities of the carbon market, and pursue their own economic benefits under the background of total emission control and reduction.

#### **COMPARISON OF PERFORMANCE AND LIQUIDATION**

The EU's carbon emissions trading mechanism stipulates that each phase should determine the carbon credits that the emission entity can obtain through free distribution. Member States must ensure that each company is able to pay its quota equal to its total emissions in the previous year, that is, before April 30. Companies need to calculate the total amount of carbon dioxide emissions in a year based on the carbon allowances allocated by countries at the end of the year. Equal carbon credits will be written off after settlement. If a company's carbon credits are insufficient to meet production needs or have surplus, they can be traded on the carbon emissions trading market.

The clearing platform of the Chicago Climate Exchange is used to process data and information for all trading activities, and the company's performance can be judged from this settlement system. However, since the United States is a voluntary emission reduction market, the penalties for companies that fail to comply in time in the RGGI Carbon Emissions Trading Model Rules are more lenient because their fines are compensatory rather than punitive.

Before the introduction of the national carbon emission trading management measures, there is no unified punishment system in China, but the local regulatory agencies separately. Shenzhen is the most typical representative. In Shenzhen, if an enterprise fails to complete the performance task on time or in accordance with the quota, the enterprise will need to pay the excess emission quota within the limited period. If the enterprise is unwilling to pay, the management department will be in its account. Enforcement of withholding, if the account balance is insufficient, will continue to carry out the withholding in the next year. The company will be counted in the credit history and will be fined a certain amount and reported to the state-owned regulatory agency.

### **SUGGESTIONS ON THE DEVELOPMENT OF CHINA'S CARBON EMISSION TRADING MARKET**

Through the comparison of the carbon emission trading processes at home and abroad, we can see that there is a certain gap between China and the EU, the US carbon market. Therefore, China should rationally understand this gap, optimize China's carbon market system, and increase China's international carbon. The right to speak in the market.

#### **Expand the scope of the report**

From the comparison of emissions data reports, China should expand the scope of the report. The greenhouse gases required to be reported in China's relevant regulations are: carbon dioxide, methane and nitrous oxide. Compared with the six greenhouse gases reported by the United States, there is space for improvement. China should formulate a sound system to improve the corresponding technical level. Measure the types of greenhouse gases as much as possible, so that the greenhouse gas emissions can be more accurately counted, laying the foundation for energy conservation and emission reduction.

#### **Strengthen third-party verification efforts**

Compared with developed countries, China's carbon verification market verification capabilities are uneven. China should improve the access and exit mechanism for carbon emission third-party verification agencies and personnel. Only after a rigorous qualification review can it be qualified as a third-party verification agency for carbon emissions. If there is a major mistake or intention in the course of practice. The act of issuing a false report shall be

subject to legal liability and the qualification of a third-party verification agency for carbon emissions.

#### **Accelerate the transformation of distribution methods**

China needs to accelerate the transformation of the distribution pattern. China is still in the initial stage of the development of the carbon market, and the current distribution method is mainly based on free distribution. Although China adopts a carbon emission intensity-based approach and an industry-based emission benchmark in the national carbon market quotas, it avoids the problem of whipping fast cattle, and the free distribution method is more easily accepted by enterprises, which can reduce the resistance during the implementation process. However, because it may not touch the interests of enterprises, it is not conducive to the strengthening of corporate awareness of emission reduction. China needs to promote the auction-based distribution method as soon as possible, which will bring greater competition awareness to enterprises, reduce greenhouse gas emissions while achieving their own rights and interests, and achieve a win-win situation.

#### **Improve the performance of the settlement system**

Although China's "Regulations on the Management of Carbon Emissions Trading in the Country" clearly stipulates the penalties imposed by the enterprises that fail to meet the performance targets, there is no specific amount of punishment, which may give law enforcement officials excessive freedom of law enforcement, and even breed problems such as the right to corruption.

### **CONCLUSIONS**

This paper compares the carbon emission trading processes at home and abroad from the five aspects of emissions data reporting, third-party verification, quota allocation, trading entities and performance clearing, and finds out the gap between China and the EU and the US carbon market. The development proposal of China's carbon emission trading market is given in order to provide guidance and reference for the construction and development of China's future carbon emission trading market.

### **ACKNOWLEDGEMENT**

This work is supported by the Fundamental Research Funds for the Central Universities (Project No. 2016MS125).

### **REFERENCES**

- Alberola E, Chèze B, Chevallier J. The EU Emissions Trading Scheme : Disentangling the Effects of Industrial Production and CO2 Emissions on Carbon Prices[J]. Social Science Electronic Publishing, 2008, 116(4):93-126.
- Carlén B. Market Power in International Carbon Emissions Trading: A Laboratory Test[J]. Energy Journal, 2003, 24(3): 1-26.

Elkins P, Baker T. Carbon Taxes and Carbon Emissions Trading[J]. Journal of Tsinghua University, 2010, 15(3): 325-376.

Lo A Y. Carbon emissions trading in China[J]. Nature Climate Change, 2012, 2(2):765-766.

Zhang, Zhongxiang. Carbon emissions trading in China: the evolution from pilots to a nationwide scheme[J]. Climate Policy, 2015, 15: 104-S126.