

Research on the construction of carbon asset management system in thermal power enterprises under the background of dual carbon

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Abstract: As the problem of global climate warming becomes more and more serious, the work of carbon emission reduction is urgent. Power as the pillar industry of the national economy, fire power occupies its dominant position, is the priority among priorities of our country to carry out emission reduction work. In fact, there are abundant carbon assets hidden in the business activities of electric power enterprises. They should pay attention to the management and development of carbon assets, avoid increasing huge performance costs, and turn “assets” into “liabilities”. Therefore, this paper takes thermal power enterprises as the research object, and on the basis of comprehensive consideration of the development of carbon assets of thermal power enterprises, analyzes and discusses the path of carbon asset management of enterprises, and carries out corresponding research on the construction of carbon asset management system to improve the level of carbon asset management of enterprises.

Key words: Thermal power plants; Carbon asset management; Carbon emissions; Low-carbon economy

Introduction

Climate change has become an important issue for all countries in the world, and a number of international treaties have been formulated, such as the Kyoto Agreement and the Paris New Agreement on Global Climate Change. With the introduction of various policies and the launch of carbon emission reduction measures, it can be seen that the inclusion of national carbon emission enterprises in the carbon emission trading system is an irreversible trend. The carbon emissions of China’s power generation industry account for about half of the country, and about 70% of the power supply comes from thermal power generation. Thermal power enterprises, as representatives of high energy consumption and high emission enterprises, face the double pressure of reducing carbon emission costs and economic development and transformation. Before the establishment of the carbon trading market, there is no constraint on the carbon emissions of the control enterprises, which means that the enterprises do not have the related cost problems caused by the performance of the contract. After the establishment of the carbon trading market, if the carbon emissions of the enterprises exceed the quota limit stipulated in the policy, in order to avoid the penalty policy, the enterprises have to buy a large number of carbon quotas. It means that the daily business activities such as the strategic planning of carbon investment, capital operation and business behavior within the enterprise have been greatly impacted. Therefore, in this situation and background, it is necessary to accelerate the promotion of enterprise carbon asset management.

1. Overview of carbon asset management

Carbon asset is a new concept. At present, there is no unified definition of carbon asset in the academic circle. At present, scholars generally agree that carbon assets can be divided into two categories: carbon assets with quota and carbon assets with emission reduction. At first, carbon assets are considered as a functional tool to implement corporate carbon strategy or carbon policy with the aim of reducing emission risk, and later, carbon assets are considered as a supplementary tool to help enterprises gain market competitive advantages, thereby improving corporate reputation and profitability. (Yuan Mozhen, 2022) Nowadays, carbon assets have become the fifth type of emerging assets after monetary assets, physical assets, intangible assets and data assets. The definition of carbon assets in this paper is as follows: it refers to the carbon emission allowances, emission reduction credits and related activities generated under the trading mechanism of mandatory carbon emission rights or voluntary carbon emission rights, which can directly or simply affect the greenhouse gas emissions of an organization.

On the issue of carbon asset management, as the definition of carbon asset has not been unified, the corresponding research on carbon asset management is not comprehensive enough. With the increasing requirements of economic development on carbon asset management of enterprises, scholars also begin to study carbon asset management from different angles. Wang Wenju explained how to improve the measures of carbon asset management, and believed that a fair and effective carbon quota allocation system should be established at the provincial level, and the research should be carried out from the fairness principle and the efficiency principle respectively, in order to narrow the differences in emission reduction costs between regions. Zhang Caiping proposed that in the process of carbon asset management, it is necessary to plan carbon assets first, and then it is necessary to manage carbon asset trading. Huang Jinpeng put forward the concept of comprehensive carbon asset management, believing that carbon asset management should not simply carry out compliance trading, but should start from “data sorting, quota trading and compliance trading”, organize all contents in the whole process, analyze the implementation of carbon asset management at home and abroad, and put forward suggestions for the development of enterprise carbon asset management. Wan Huanmin believes that the transaction management strategy is the key in carbon asset management, and emission control enterprises should choose the best plan between storing and selling carbon assets, so as to improve the sensitivity of enterprises to carbon trading forecast. To sum up, the domestic research on carbon asset management is still in its infancy, carbon asset management is

relatively scattered, lack of a unified system, and there is still a large research space.

2. Status quo of carbon asset management in power industry

From the perspective of energy consumption structure, China's power generation industry mainly includes hydropower, thermal power generation, nuclear power generation and other energy power generation enterprises, including thermal power generation has been the main source of electricity in China, but in order to meet the needs of high-quality development of the country, follow the principle of sustainable development, the structure of China's power generation industry is adjusted, thermal power generation accounted for the proportion of national power generation has declined year by year. The proportion of other energy generation has increased steadily, but in spite of this thermal power generation still accounts for more than two-thirds of the national consumption, thermal power generation is still the main force of China's power supply, in our country's power supply system has an absolute position. Therefore, the future development direction of carbon assets in the power industry will march to the reserve and development of carbon assets. Because only in this way can we better participate in the national carbon emission rights trading market.

3. Construction of carbon asset management framework

3.1 Construction principle of carbon asset management system for thermal power enterprises

With comprehensive reference to the carbon asset management experience of EU countries and power generation enterprises, this paper combined with the relevant policies of carbon asset management in China's power industry, aimed at China's thermal power enterprises, according to the scope of carbon asset management and the track of carbon activities between the internal and external thermal power enterprises, to establish a set of positive cycle logic relationship, as shown in Figure 3-1. In other words, development, data, distribution and trading management are restricted, influenced and balanced with each other, so as to achieve reasonable control of carbon emissions of thermal power enterprises and effective management of carbon assets.

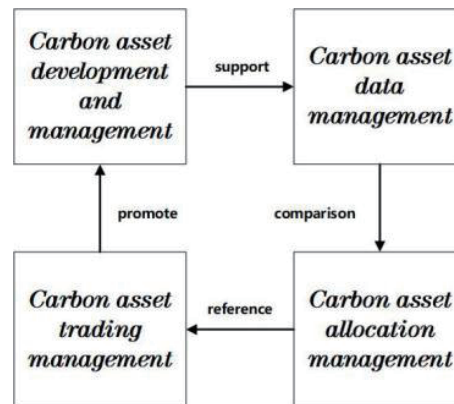


Figure 3-1 Principle of carbon asset management system

From the perspective of the role of carbon asset management, development management requires enterprises to adjust their own energy structure, use energy-saving technology transformation and operation emission reduction to improve energy efficiency; Data management plays the role of monitoring and verification. Thermal power enterprises can only tap the financial attributes of carbon assets in the process of compliance by mastering the real and reliable emission data. Carbon asset allocation management refers to the allocation of carbon allowances. Based on the government quota data, the profit and loss analysis of carbon allowances is carried out by comparing with the enterprise's own carbon emission inventory report, which is helpful for enterprises to effectively control their current carbon emissions at a macro level. Trading management can make use of carbon quota profit and loss analysis to deal with carbon quota balance, and then trade carbon emission rights through trading time points and trading strategies to help enterprises maximize the benefit of carbon assets; The obtained carbon trading income, the purchase of advanced carbon saving equipment, through intelligent and electrified transformation, more conducive to carbon data detection.

3.2 Content of carbon asset management system for thermal power enterprises

Have measurable basic carbon data through data management enterprise carbon inventory. At the same time, cooperate with the third party to compile a list of documents and a certification report to lay a solid foundation for low-carbon financing of credit institutions; Carbon quota allocation management through carbon quota target decomposition accounting, analysis of enterprise quota surplus, to prepare for carbon asset trading in the early stage; Transaction management includes trading strategies, trading plans, etc. When an enterprise has surplus carbon quota, the enterprise can sell the surplus carbon quota under the drive of economic benefits. Enterprises can consider whether to sell all the remaining carbon credits or retain some of them according to their own development needs. Therefore, the performance result will also affect the carbon quota target and carbon asset development plan of enterprises in the next year. The carbon asset development management includes its own fuel substitution and voluntary emission reduction mechanism. Under the mandatory regulations and requirements of the National Energy Administration, enterprises have an objective demand for new energy projects. On the whole, when the total cost increase of fuel substitution plus the loss of production efficiency reduction is less than the benefit of carbon quota compliance caused by fuel substitution, it is an alternative emission reduction program.

4. Proposals for strengthening carbon asset management

4.1 Actively expand the development model of new carbon assets

Thermal power enterprises can try to combine their own industrial characteristics and business advantages to join in the market operation of emerging carbon asset development models, such as carbon inclusive mechanism. Carbon inclusive mechanism is a new innovation mechanism for green development, linking the consumption side and the production side to reduce emissions. By trying to build an internal carbon inclusive platform for employees, the low-carbon behavior of employees in the power plant can be recorded, authenticated and accumulated, and they can get corresponding rewards, thus effectively guiding the internal employees in the power plant to practice the concept of green life.

4.2 Set up a professional carbon asset management department

Due to the complex business process and incomplete carbon asset management mode of thermal power enterprises, carbon asset management is very difficult. Enterprises should set up a professional carbon asset management department, cooperate with other departments of enterprises, strengthen their own emission reduction research, make scientific judgments and formulate combined strategies in the emission reduction paths such as investment in energy-saving technology transformation, research and development of new technologies and carbon trading. To help enterprises carry out unified management and trading in terms of transaction performance and data inventory. At the same time, the carbon management department pays close attention to the trend of national policies, strengthens policy research, and improves the ability of enterprises to resist risks.

4.3 Seek cooperation from third-party financing and credit institutions

At present, only thermal power enterprises are allowed to participate in the trading of the national carbon market, which provides a good application environment for the carbon asset management of thermal power enterprises, especially in the aspects of trading and compliance. With the further development of the carbon market, thermal power enterprises should make full use of their own advantages, actively establish long-term cooperative relations with banks, securities companies and other institutions, innovate the application model of carbon finance, and jointly design and develop financial products such as carbon pledge, carbon repurchase, carbon trust, and carbon asset securitization products.

5. Conclusion

Based on the current management status of thermal power enterprises, this paper explores the carbon asset management mode, provides a reference carbon asset management system for thermal power enterprises, and enriches the carbon asset management content from three dimensions: carbon asset data management, development management and transaction management. In this way, thermal power enterprises can reduce the pressure of compliance in the carbon market, maximize the efficiency of enterprise operation and management, and also contribute to the completion of the dual carbon goal of the country.

References:

- [1] Mozhen Yuan. Research on the professional management of carbon assets under the “dual carbon” strategic goal [J]. Journal of Jinan (Philosophy and Social Sciences),2022,44(08):122-132.
- [2] Wenju Wang,Zhenling Chen. Research on initial carbon quota allocation scheme of provincial regions in China -- based on the perspectives of responsibility and target, equity and efficiency [J]. Management World,2019(03):81-98.
- [3] Caiping Zhang,Hui Wang,Deming Tan. Construction and case analysis of enterprise carbon budget system: Based on interactive control perspective [J]. Finance and Accounting Monthly, 2022(14) : 127-132.
- [4] Jinpeng Huang,Shaozhou Qi,Dalin Jiang. Enterprise carbon asset management model and countermeasures under the background of national unified carbon market construction [J]. Environmental Protection,2019(16):13-17.
- [5] Juanmin Wan. Research on optimal decision of carbon asset management in non-pilot controlled emission enterprises [J]. Energy Conservation in non-ferrous Metallurgy,2019(04):51-54.

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