

Research on the Impact of Carbon Emission Trading Mechanism on Power Industry Based on SWOT Analysis

Zhang Qing

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

Abstract: The Chinese government has increased funding and policy support for low-carbon development of electric power, promoted power companies to optimize energy structure, promote technological progress, deepen the reform of power marketization, and study the significance of the carbon emission trading system of the power industry to promote sustainable energy development. In terms of long-term development, this is also part of our strategic decision. In view of this, this paper uses the SWOT analysis method to conduct an in-depth discussion on the impact of the carbon emission trading system on the power industry, in order to provide ideas for the power industry to adhere to the low carbon environmental protection sustainable development route.

Keywords Carbon emissions trading, Power industry, SWOT analysis

INTRODUCTION

With the continuous development of the social economy, the emission of greenhouse gases has increased year by year. The total emission limitation and management of greenhouse gases to solve the human-induced climate problems has become a major public policy issue worldwide [Bode, 2006]. In this context, the Kyoto Protocol, introduced in 1997 as part of the United Nations Framework Convention on Climate Change, established greenhouse gas emission credits and emission reduction obligations for developed countries in the Contracting States. It identified the “Kyoto Three Mechanisms”. That is, “emissions trade”, “joint implementation” and “clean development mechanism” help developed countries to complete emission reduction tasks at low cost and efficiency [Sousa, et al., 2008]. As a result, the carbon emission trading system was formally established.

The carbon emission trading system can be simplified as a quota trading system. Quotas, that is, emission permits issued by the government, when governments impose restrictions on the total amount of carbon emissions of domestic enterprises, each company is given a certain amount of carbon emission allowances and allowed to trade freely [Cheng, et al., 2008]. If the company's own carbon emissions is below the government-restricted emissions, the excess emission allowances can be sold in the carbon trading market, and companies can make a profit. If the company's emissions are higher than the government's limit, the company needs to purchase additional quotas to offset the excess carbon emissions. In general, the carbon emissions trading system brings a win-win situation for energy

conservation and emission reduction and economic benefits for governments and enterprises [Liu, et al., 2014].

Compared with power companies in developed countries, China's power companies still have gaps in terms of production capacity, production technology, and energy efficiency, whether it is to protect domestic enterprises or enhance the international competitiveness of China's power energy industry [Zhang, et al., 2010]. It is very necessary to consider testing carbon emissions trading in China [Zhang, et al., 2015]. The Chinese government has increased funding and policy support for low-carbon development of electric power, promoted power companies to optimize energy structure, promote technological progress, deepen the reform of power market, and explore the significance of the carbon emission trading system of the power industry to promote sustainable energy development. In terms of long-term development, this is also part of our strategic decision.

OVERVIEW OF SWOT ANALYSIS METHOD

SWOT (Strength Weakness Opportunity Threats) analysis method, also known as situational analysis method, is to analyze and evaluate the advantages, disadvantages, development opportunities and threats of enterprises, and deeply analyze the internal and external environment and market positioning of enterprises to formulate medium and long-term suitable for the enterprise. Using SWOT analysis helps companies to maximize their own advantages while avoiding project disadvantages and minimizing threats.

In a sense, SWOT analysis belongs to the internal analysis method of an enterprise, which is to conduct

analysis within the given conditions of the enterprise. SWOT analysis has its basis. The competition theory put forward by the famous competitive strategy expert Michael porter thoroughly analyzes and explains the "possible" aspects of an enterprise from the perspective of industrial structure, while the competency school management scholars deconstruct the value creation process of the enterprise by value chain, focusing on the analysis of the company's resources and capabilities.

SWOT analysis, it is in front of a combination of both, on the basis of represented by resource school scholars, will be the company's internal analysis (that is, in the mid-1980s management authorities concerned research orientation), and represented by ability school of industrial competition environment analysis of the external (i.e. earlier the center of the institute of strategic studies focus on the theme, with Andrews and Michael porter) represented together, formed its own balance of structured system analysis system. Compared with other analytical methods, SWOT analysis has significant structural and systematic characteristics from the very beginning. In terms of structure, first of all, in form, SWOT analysis shows the construction of SWOT structural matrix, and endows different analysis significance to different regions of matrix. Secondly, the main theoretical basis of SWOT analysis also emphasizes the analysis of the external environment and internal resources of an enterprise from the perspective of structural analysis.

In SWOT analysis, advantages and disadvantages are internal factors of enterprises, while opportunities and threats are external factors. The advantage of this method is that it can comprehensively evaluate the development trend of the enterprise and combine the analysis problem with the problem solving. Analyze the internal and external environment while constructing the SWOT matrix, and use the method of system analysis to formulate corresponding alternative countermeasures. External environmental analysis includes external macro environment analysis, company strategy analysis and market analysis; internal environmental analysis includes energy structure analysis and production capacity analysis.

THE IMPACT OF THE CARBON EMISSIONS TRADING SYSTEM INTRODUCED IN CHINA'S POWER INDUSTRY

Advantage analysis

In terms of policy support and institutional guarantees, the government mainly provides policy support for technology upgrading, elimination of backward production capacity and development of new energy. In recent years, in order to improve the efficiency of resource utilization, promote cleaner production, and take the path of sustainable development, the Chinese government has introduced

a series of related laws, such as the "Renewable Energy Law of the People's Republic of China" adopted on February 28, 2005. The "Energy Conservation Law of the People's Republic of China" passed on October 28, 2007. The "Measures for Energy-Saving Power Generation Dispatching" promulgated in 2007, and the "Clean Production Promotion Law of the People's Republic of China" promulgated in February 2012. The above-mentioned laws and regulations provide institutional guarantee for promoting the development and utilization of new energy and renewable energy in the power industry and promoting the development and progress of energy-saving technologies.

At the end of October 2011, the National Development and Reform Commission issued the "Notice on Conducting Pilot Work on Carbon Emissions Trading". In order to implement the requirements of the '12th Five-Year Plan' for the gradual establishment of a domestic carbon emissions trading market, the government agreed to conduct pilot carbon emission trading in Beijing, Tianjin, Shanghai, Chongqing, Hubei, Guangdong and Shenzhen. By 2013, five pilot provinces in Shenzhen, Beijing, Shanghai, Guangdong and Tianjin successively launched carbon emission trading, providing a trading platform for the power industry to conduct carbon emissions trading.

China's power companies have different production technologies, different energy structures, and different marginal abatement costs, which offer the possibility of implementing carbon emissions trading. Only when marginal abatement costs are different, companies with lower abatement costs will choose to purchase carbon credits from companies with lower abatement costs. The main difference in the cost of abatement is that the energy consumption per unit is different. The greater the energy consumption, the greater the cost of abatement.

As a state monopoly industry, the power industry does not involve enterprises from other parts of the world. Therefore, the implementation of carbon emissions trading in the industry will not cause carbon emissions transfer problems. Power companies have gained some experience in energy conservation and emission reduction and energy consumption reduction. In recent years, China has gradually developed carbon capture and storage technology and integrated gasification combined cycle technology. Taking the Green Development Action Plan launched by Huaneng Group in April 2010 as an example, according to the plan, the proportion of clean energy power generation installed by the company reached 15% in 2010, up nearly 20% from 2005. Actively develop super-critical coal-fired units with higher capacity, higher efficiency and lower emissions. Actively apply advanced technologies to improve energy efficiency, reduce carbon emissions from production sources, and vigorously develop hydropower, wind power, nuclear

power and natural gas. New energy power generation projects such as power generation can partially achieve the ideal state of zero carbon emissions.

Disadvantage analysis

China does not currently have a complete system of carbon emissions trading. The market rules are not perfect and the main body is not clear. Although pilot carbon exchanges have been established in Beijing, Tianjin, Shanghai, Shenzhen and Guangzhou, they are still cooperating with developed countries. The CDM project for emission reduction is the main one, and the complete carbon emissions trading market has not been established.

From a nationwide perspective, due to different levels of economic development, different energy distributions, and different levels of power demand, the total amount of carbon dioxide emissions varies from region to region. It is necessary to formulate fair and reasonable carbon emission quota allocation standards and carbon emissions for each region. The total set of standards, it is difficult to promote the operation of carbon trading in the power industry on a large scale in the short term.

China's power industry lacks the ability to independently measure the total amount of carbon emissions. Most power companies do not know enough about carbon emissions trading, and they can meet the national emission standards. They lack the implementation power and lack sufficient attention to the overall environmental quality.

The overall technical level of the power industry is not high. There is still a big gap between new energy technologies and energy-saving technologies in developed countries. Some small and medium-sized thermal power plants have low output and high energy consumption. The introduction of carbon trading system has increased the capacity requirements. In the short run, it has placed a heavy burden on the power industry, especially for small and medium-sized power companies, it is difficult to guarantee the benefits of enterprises.

Opportunities and threats

The carbon emissions trading in the power industry will help implement the national environmental protection policy, promote the structural transformation of the power industry, realize the transformation of development mode, and improve the efficiency of resource utilization. Through more efficient competition, we can reduce carbon dioxide emissions and alleviate resource crises, and adhere to the development path of green, low-carbon and environmental protection.

On the one hand, carbon emissions trading has prompted power companies to increase their technology investment and develop clean energy technologies in order to reduce carbon emissions. On the other hand, through cooperation with developed countries through clean development projects, they can learn from their advanced production experience.

From the perspective of potential hidden dangers, after the establishment of the carbon emission quota trading system, a large carbon finance industrial chain will be created, carbon emission trading and carbon emission trading as basic products, as well as carbon futures, carbon funds and carbon management. Derivative products, the carbon emissions trading market is completely determined by policy simulation, and it contains many factors of instability. Therefore, power companies need to be more cautious in conducting carbon trading to prevent various risks in the carbon financial market.

In recent years, the power industry has faced the problem of contradiction between supply and demand. The government has imposed restrictions on the total amount of carbon emissions. At the same time, the regional economies are still developing at a high speed. The demand for electricity is increasing year by year, and the interaction between the carbon market and the electricity market is increasing. There is a problem that environmental protection and economic development may create conflicts. Whether it is to reduce emissions and affect social and economic development, or to deliberately pursue the total amount of GDP at the expense of environmental damage, it is a price to pay.

In addition to the construction of the market system, the key issues to introduce carbon trading in the power industry are fair and reasonable quota allocation, inclusion of trading subjects, determination of emission responsibility and other issues. Once the basic issues are not properly addressed, the normal operation of the carbon trading system in the power industry will be affected.

Table 1. The impact of the introduction of carbon emissions trading in the power industry based on SWOT analysis

Internal (Organization)	Advantages
	Policy Support Differences in marginal abatement costs among enterprises There is no carbon leakage in carbon trading between industries Each power company has mastered certain experience in reducing carbon dioxide emissions
External (Surroundings)	Disadvantages
	The overall carbon trading market is not perfect The carbon emission intensity and production technology of thermal power plants vary from region to region, and it is difficult to determine the emission limits of different trading entities. Price transmission mechanism can't work Power companies do not fully understand the carbon emission trading system
	Opportunities
	Promote enterprises to develop clean production technology Learn from the experience of reducing emissions and advanced production technology in developed countries
	Threats
	Carbon finance market exists in the province Carbon emissions are limited by the contradiction between increased electricity demand

COPING STRATEGIES OF POWER COMPANIES UNDER THE CARBON EMISSION TRADING SYSTEM

Based on the above SWOT analysis results, the strategy of power companies to deal with the carbon trading system is proposed:

Although the carbon emissions trading system has caused power companies to face the pressure of increasing electricity demand and increasing carbon emission limits, in general, it is both a challenge and an opportunity for power companies to join the carbon trading system.

Implementing a carbon emission trading system for China's power industry, power generation enterprises should actively adapt to the carbon trading system, actively seek development opportunities in the carbon trading market, and passively respond to carbon emission control, which will only cause enterprises to lose their voice in the carbon trading market. It is not conducive to the long-term development of the company.

First of all, from the perspective of enterprise management, the decision-making layer should speed up the construction of internal carbon emission monitoring and statistical systems, and accurately grasp relevant basic data such as the company's own carbon emission intensity and total carbon emissions; and timely and accurate supervisors in accordance with relevant laws and regulations. The department reports the actual carbon emission data of the enterprise to coordinate with the government department to formulate a carbon trading policy; formulate a medium and long-term development strategy according to the carbon emission requirements of the enterprise.

Secondly, from the perspective of enterprise power generation, carbon dioxide emission can be reduced by adjusting energy structure and improving production technology. Carbon emissions from thermal power generation account for more than 80% of the total emissions in the power industry. We will increase the proportion of clean energy in power sources, develop nuclear power in line with local conditions, and give priority to non-fossil fuel energy sources under the same conditions. The development and utilization of wind energy, geothermal energy, tidal energy, solar energy and other new energy. Then, improve the production technology, optimize the traditional thermal power units, and shut down the small thermal power units with large carbon emission and low production efficiency. We will eliminate outdated production capacity and reduce standard coal consumption in thermal power supply. We will introduce low-carbon and energy-saving technologies, improve the smart grid, promote local balance of power supply, and try to avoid waste caused by power transmission and distribution, so as to reduce greenhouse gas emissions at the source. Third, attach importance to the application of carbon capture technology, establish relevant research institutions

and platforms, and study and develop key technologies of post-combustion carbon capture technology with independent intellectual property rights. We will promote the research and development of technologies for large-scale carbon dioxide capture, utilization and storage systems, as well as the production of large-scale equipment, and do a good job in commissioning and operation of large-scale systems and technical and economic evaluation, so as to continuously improve the efficiency of capture and storage, reduce project cost and create conditions for large-scale industrial application.

Finally, policy exchanges and communication between enterprises and governments should be strengthened to promote the market-oriented reform of electric power, so that the electric power price in the coal and electricity linkage system can not only effectively reflect the rise of coal price, but also reflect the rise of carbon emission cost. The carbon cost is transmitted from the upper and lower reaches of the energy industry chain to the consumer end, which means that consumers are also participating in the task of sharing carbon dioxide emission control, which is conducive to the promotion of carbon emission trading. Therefore, carbon emission trading is not only limited to enterprises, but also closely related to all walks of life in the whole society.

CONCLUSIONS

In the early stage of the development of the carbon emission trading system, power companies should gain experience through increased practice, and actively use the Clean Development Mechanism to cooperate with developed countries to learn advanced technical experience. With the deepening of the construction of the carbon emission rights system, the carbon emission trading market will be more prosperous, and power companies can use this as an opportunity to accelerate the transformation of their industrial structure. All in all, the Chinese government needs to recognize the situation, actively build a carbon emission trading market, and adhere to the long-term goal of low-carbon sustainable development. China's power companies need to have a deep understanding of the carbon trading system, so that they can adapt to the development of the situation and will not be eliminated. Only in compliance with the situation, actively cooperate with relevant government departments for statistical work, detailed planning of future carbon trading paths for power companies, intensifying the reserve of professional talents, and improving management management and capabilities, in order to firmly stand in the future carbon market. This is not only a challenge, but also an opportunity. How the power companies respond to the carbon trading market determines the future development of power companies.

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