

Development Status and Management Experience of Corporate Carbon Management in the Dual Carbon Background: A Case Study of Huayin Power

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Abstract: In order to address global environmental issues such as climate change, countries around the world have introduced climate change policies, such as the Kyoto Protocol and the Paris Agreement, to limit global carbon emissions. China has actively responded to climate change and other political and economic issues and proposed the "Dual Carbon" strategy in 2020, vigorously developing clean energy and promoting the green and low-carbon transformation of industries. This paper analyzes the impact of "carbon trading" on the "carbon management" of Hua Yin Electric Power from the perspective of ESG analysis, focusing on the environmental, social, and corporate governance aspects. The study aims to summarize the management experience of Hua Yin Electric Power in "carbon management" and provide reference for further optimizing and improving the "carbon management" in the power industry. Hua Yin Electric Power, as a leading company in the power industry, is representative and has reference significance for the optimization and improvement of "carbon management" in the power industry.

Keywords: dual carbon, carbon trading, carbon management, Hua Yin Electric Power

1. Introduction

With the continuous development of modern industrial production modes, scientific and technological advancements, and changes in the world, the economy has been growing rapidly and the living standards of people have been improving. However, the emissions of greenhouse gases such as carbon dioxide and methane have caused global climate change, rising sea levels, and other environmental problems [1,2]. In order to mitigate the environmental problems caused by economic development and global climate change, countries around the world have jointly discussed countermeasures and formulated policies such as the Kyoto Protocol and the Paris Agreement to limit global carbon emissions [1].

To respond to global climate change, China has proposed the "Dual Carbon" strategy and vigorously developed the clean energy industry. Various companies have also accelerated the green and low-carbon transformation. However, they face challenges such as high costs of emission reduction, insufficient funding, low liquidity and activity in the domestic "carbon trading" market [3-5], lack of regulatory oversight [4], and a shortage of professional talents in the "carbon trading"

market [4]. Therefore, China has decided to restart the national verification of voluntary emission reduction credits (CCER) to improve the national "carbon trading" market system [6], establish institutions and systems for the registration and trading of "national carbon emissions rights," and further optimize the management of "carbon trading" order [7].

However, the power generation industry is the first industry to be included in the national "carbon market," [8] and Hua Yin Electric Power is a leading company in the power industry and "carbon trading." Therefore, based on the above background and the existing problems in the current "carbon trading" market, this paper takes Hua Yin Electric Power as the research object and uses the ESG analysis method to analyze the impact of "carbon trading" on the "carbon management" of Hua Yin Electric Power from the perspectives of environmental, social, and corporate governance. The paper aims to summarize the management experience of Hua Yin Electric Power in "carbon management" and provide reference and guidance for the management experience of "carbon management" in the power industry. This research has important significance and value. By adopting a micro perspective, the paper breaks through the conventional macro analysis and enriches the relevant theoretical literature, demonstrating a certain level of innovation.

2. Impact of "Carbon Trading" on the "Carbon Management" of Huayin Electric Power

In 2020, China proposed the "Dual Carbon" strategy, and companies actively responded to the government's call to accelerate the green and low-carbon transformation of industries. In July 2021, the national carbon emissions trading market for the power generation industry was launched based on the pilot carbon trading market [9]. Hua Yin Electric Power, as a leading company in the power industry and a listed company, participated in the power "carbon trading" in July of the same year. At the same time, Hua Yin Electric Power was required to be included in the emission reduction system and disclose "carbon management" information in accordance with international "carbon management" information disclosure standards [10]. The company's social responsibility report was first released on July 20, 2021, covering one fiscal year (from January 1 to December 31). Currently, three social responsibility reports have been disclosed, and data information for 2020-2022 can be found on the official website of the Shanghai Stock Exchange.

The social responsibility report primarily discloses and publicizes the performance of Huayin Power in the three aspects of environment, society, and corporate governance. The three perspectives of environment, society, and corporate governance are the Chinese translation of the acronym ESG, which stands for Environment, Social, and Governance. ESG is an emerging investment concept and evaluation standard that focuses on the non-financial performance of companies in terms of environmental, social, and corporate governance factors. The ESG evaluation methodology can also serve as a decision-making model for companies to formulate future development strategies and as an analytical tool for investors to assess the potential for a company's future growth. The three ESG dimensions include the following specific content, as shown in Table 1. The article will analyze the impact of Huayin Power's participation in "carbon trading" on its internal "carbon management" based on collected environmental, social, and corporate governance (ESG) data and information. Huayin Power, officially established on March 22, 1993, has a development history of 30 years. The full name of the company is Datang Huayin Power Co., Ltd. (referred to as Huayin Power below), which is a power generation company and the only listed company in the power industry in Hunan Province. It is also the leading enterprise in the power industry. Huayin Power was listed on the Shanghai Stock Exchange on September 5, 1996, with a total share capital of 192 million yuan. After the company went public, the controlling shareholder changed to China Datang. Through issuing stocks to raise funds, the company has continued to develop and grow. China Datang has always been the largest shareholder of Huayin Power, holding an important position and influence in the company. Huayin Power has a wide range of businesses. Since its establishment, its business has mainly

involved eight sectors, including thermal power, hydropower, real estate, electric power, service industry, waste-to-energy, coal mining, and coal-fired power generation.

Table 1: ESG details.

Environment	The degree to which enterprises have a direct or indirect impact on the environment during production, including carbon emissions, climate change strategies, biodiversity, water and energy resource efficiency, carbon intensity, and environmental management systems.
Social	The various impacts of enterprises on the society. Such as employee management, welfare and compensation, employee safety, relationship with upstream and downstream suppliers and service providers, product security, etc.
Governance	Organizational structure, interests between shareholders and management, corruption and fraud, information disclosure and transparency, business ethics, etc.

Source: Sorting out Baidu Encyclopedia data.

2.1. Environmental Impact

Tables 2 and 3 specifically reflect the energy-saving and emission reduction situation of Huayin Power in 2020 and 2022. Huayin Power implements President Xi Jinping's concept of "green mountains are golden mountains and silver mountains" and actively responds to the "dual carbon" strategic goal. According to the environmental performance indicators data in 2020 and 2022, Huayin Power actively adapts to the new situation of energy revolution, continuously optimizes its power structure, and improves its level of green and low-carbon development. The main emissions from Huayin Power's power plants include sulfur dioxide, nitrogen oxides, and particulate matter [9]. The carbon emissions reduction of these main emissions is significant, indicating that Huayin Power has achieved remarkable results in "carbon reduction" and effectively controls its carbon emissions.

Table 2: Energy conservation and emission reduction performance indicators of Huayin Power in 2020.

Reduction in sulfur dioxide	Reduction in nitrogen oxides	Reduction in smoke and dust
85.91%	92.9%	93.3%

Data source: Social Responsibility Report of Huayin Power in 2020.

Table 3: Energy Conservation and Emission Reduction Performance Indicators of Huayin Power in 2022.

	Sulfur dioxide	Nitrogen oxides	Smoke and dust
Emissions	1579 ton	2807 ton	191 ton
Emission Value	0.087 g/kwh	0.156 g/kwh	0.01 g/kwh

Data source: Social Responsibility Report of Huayin Power in 2022.

As a power generation company, Huayin Power mainly produces solid waste such as slag, fly ash, and gypsum in the electricity production process [9]. From the analysis of the data in Table 4, it can be observed that Huayin Power has a relatively high comprehensive utilization rate of solid waste generated during electricity production. This indicates that they are constantly accelerating the comprehensive utilization of solid waste, achieving sustainable utilization of resources, and reducing resource waste. It indirectly reflects Huayin Power's contribution to "carbon management" by improving resource utilization efficiency and promoting "energy conservation and carbon reduction".

Table4: Comprehensive utilization of solid waste of power generation project of Huayin Power in 2022.

Comprehensive utilization rate of slag	Comprehensive utilization rate of fly ash	Comprehensive utilization rate of gypsum
98.22%	98.22%	99.70%

Data source: Social Responsibility Report of Huayin Power in 2022.

2.2. Social Responsibility

As a leading enterprise in the power industry, Huayin Electric Power actively takes on social responsibility and fulfills its obligations in social security. It actively participates in the construction of the power market and ensures the effective supply of electricity in the province and city. Huayin Electric Power optimizes its management mechanism to ensure the supply of coal for electricity production. At the same time, Huayin Electric Power also increases investment in energy and adheres to a long-term mechanism for energy supply guarantee, actively assuming the responsibility of ensuring supply. It adheres to a daily scheduling mechanism, coordinates safety production, fuel supply, and financial security, and timely resolves any problems that arise.

In terms of production control and operation, Huayin Electric Power strengthens communication and coordination with the power grid dispatching and energy management departments, actively cooperating to ensure energy supply security by 2023. In 2020, faced with the impact of the COVID-19 pandemic and the arrival of a cold wave, Huayin Electric Power formulated a scientific strategy for power supply guarantee. It monitored and supervised the daily, weekly, and monthly power management and scheduling situation, summarized and reviewed the power supply guarantee situation, coordinated and managed power generation plans, and strengthened process management to promptly identify and resolve issues.

To ensure the smooth operation and timely supply of electricity, Huayin Electric Power adopted a "two-pronged" approach, managing the stability of the grid and units, and strengthening the maintenance of backup units. The establishment of a unit at the Leiyang Power Generation Company achieved ultra-low emission transformation, providing strong support to alleviate the electricity shortage caused by the cold wave in Hunan Province and making a positive contribution.

2.3. Corporate Governance

Huayin Power increased new energy generation, its photovoltaic power generation, wind power generation investment, good economic benefits. During the construction of Datang Huayin Suining Baodingshan Phase III project, after many challenges such as COVID-19, environmental protection storm, and harsh on-site climate, the Group, Huayin Company and the local government, together with the new energy company, realized full capacity grid connection for this power generation project in December 2020, and successfully completed the task of electricity price protection. This wind power project was officially transferred to production in February 2021 and put into production, making great contributions to the local economic construction. In May 2020, Datang Huayin Yiyang Xingang Photovoltaic power Station will implement commercial operation. It is a large water surface floating photovoltaic power station integrating ecology, environmental protection and power generation. The power station uses the unique floating floating body technology, which can effectively reduce the evaporation and algae photosynthesis on the water surface, inhibit the negative nutrition of the water body, effectively improve the water resources, and truly realize the multi-energy complementary mode of "power generation on the top and fish farming at the bottom". The intelligent operation and maintenance system is used to monitor and manage the booster station and photovoltaic power generation equipment in real time, and to find and accurately locate the faults

in time to ensure the smooth and effective operation of photovoltaic power generation. This power station project from production, establishment to implementation, the current profit situation remains good.

Huayin Power has made remarkable progress in energy conservation and emission reduction management. It actively promotes the wastewater treatment work, invested about 120 million yuan, in Xiangtan, Zhuzhou, Leiyang and other power generation companies have implemented comprehensive wastewater treatment, upgrading and transformation, to achieve standard discharge. The company in Xiangtan, Zhuzhou, Shimen, Leiyang, Jinzhushan power generation company has completed the transformation of the coal yard wind and dust suppression wall work. During this period, China silver power actively promote coal closed management work, the implementation of the local government and group company unorganized emissions governance crucial target, strengthen ash field, mobile pollution sources, material transportation, storage, such as unorganized emissions management, strict enforcement of local government of coal and related transportation materials, all kinds of site, yard dust control all meet the requirements of environmental protection. Silver power to strengthen solid waste management and comprehensive utilization of China, adhere to the implementation of the law on the prevention and control of environmental pollution by solid waste, further standardize hazardous waste collection, storage and disposal, effective management and comprehensive utilization such as ash, slag, gypsum main solid waste or other hazardous waste, etc., the company comprehensive utilization of solid waste in good condition.

3. Management Experience and Enlightenment of Huayin Power's "Carbon Management"

3.1. Scientific and Standardized Organizational Structure

Huayin Power strictly adheres to and complies with the requirements of laws, regulations, and relevant normative documents such as the Company Law, Securities Law, and Listed Company Governance Guidelines, establishing a sound governance system composed of the Shareholders' General Meeting, Board of Directors, Supervisory Board, professional committees, and management team. The Shareholders' General Meeting is the highest authority of the company, the Board of Directors is the executing body of the Shareholders' General Meeting, the Supervisory Board is the internal supervision body of the company, and the General Manager is responsible for the daily operation of the company. The professional committees include the Strategic Committee, Nomination Committee, Audit Committee, and Remuneration and Assessment Committee. Huayin Power's organizational structure clarifies the responsibilities of each institution in decision-making, execution, and supervision, ensuring clear division of responsibilities and checks and balances between organizations, and ensuring the effective implementation of the decision-making power of the Board of Directors and the supervisory power of the Supervisory Board on major matters.

3.2. Development and Improvement of Corporate System

3.2.1. Modern State-Owned Enterprise System Reform

Huayin Power revised and improved relevant company systems in 2022, such as the "Implementation Measures for Implementing the 'Three Major Decision-making Systems'" and the "List of 'Three Major Decision-making Systems' and Important Decision-making Matters." The relationship between the three governance entities of the Party Committee, the Board of Directors, and the management team and the decision-making boundary and responsibility boundary between them and grassroots enterprises were comprehensively clarified. Huayin Power continuously improves the decision-making ability of the Board of Directors, establishes a high-quality and professional Board

of Directors team, formulates methods for evaluating corporate directors, and promotes the standardized and effective operation of the Board of Directors.

3.2.2. Development and Improvement of Internal Control System

Huayin Power regularly organizes internal control self-inspection and self-assessment of various departments and subsidiaries of the company, and constructs an internal control system for implementation, rating, and feedback, in order to further improve the internal control mechanism of Huayin Power, reduce potential internal control risks, and ensure the reasonable and efficient operation of internal governance of the company. At the same time, Huayin Power prepares the "2020 Annual Internal Control Self-Assessment Report" and invites accounting firms to participate in the internal control audit of the company. Huayin Power has established and effectively implemented relevant internal control systems, achieved its internal control objectives, and has no major defects.

3.3. Continuous Improvement of Information Disclosure Standards and Quality

Since its listing in 1996, Huayin Power International Inc. has attached great importance to the standardization of its corporate governance and information disclosure, effectively fulfilling its obligations as a listed company, and continuously improving its compliance management system. In accordance with laws, regulations, and listing rules, Huayin Power International Inc. has continuously improved its compliance management-related systems to provide effective support for all business operations to comply with laws and regulations. Huayin Power International Inc. has never been publicly criticized or condemned by regulatory authorities and exchanges for information disclosure issues, nor has it received any negative media coverage, maintaining a good corporate social image in the industry. The comprehensive analysis and evaluation of the legal health index of A-share listed companies of central enterprises, including the standardization of the convening of shareholder meetings, the establishment of special committees, the appointment of independent directors, and the health of board composition, shows that Huayin Power International Inc. has an average score of 105.69 over the past five years, ranking first.

3.4. Strengthening Communication with Stakeholders at Huayin Power International Inc

Huayin Power International Inc. has always strictly complied with and followed relevant laws and regulations, standardized its behavior, and strengthened communication with government, shareholders, employees, customers, and communities, among other stakeholders. It has established diversified communication channels, methods, and mechanisms to build a comprehensive, timely, and effective communication platform, and continuously provide high-quality services to investors and other stakeholders. Huayin Power International Inc. actively communicates with the capital market through regular performance release conferences and roadshows, as well as daily investor visits. At the same time, it has established communication channels such as an investor email, hotline, official website column, WeChat official account, and WeChat group, actively promoting the company's values and culture, enhancing transparency, and improving investors' understanding and recognition of the company.

3.5. Strengthening Enterprise Integrity Construction at Huayin Power International Inc

In terms of compliance management, Huayin Power International Inc. continuously strengthens integrity construction, adheres to clean and honest practices, strictly abides by the law in its operations, and practices compliant operations. It formulates and improves regulations and supervision systems, including establishing a sound corporate governance structure and

strengthening litigation risk prevention and control. At the same time, Huayin Power International Inc. continues to pay attention to new changes in regulatory laws and regulations in the listing area, grasp new regulatory trends, and implement new regulatory requirements. It continuously enhances risk prevention capabilities and operational management levels, creating an atmosphere of integrity, compliance, and law-abiding. Huayin Power International Inc. innovates its propaganda methods, insists on carrying out extensive and long-lasting legal publicity and education activities, and makes the legal publicity activities detailed and practical.

4. Conclusion

As a leading company in the power industry, Huayin Electric Power has set an example for the entire industry by issuing its first Corporate Social Responsibility (CSR) report in 2020. This paper disclosed important information about the company's environmental, social, and governance practices, demonstrating its proactive commitment to corporate social responsibility. Huayin Electric Power's actions have instilled confidence in investors and other participants in the financial market. With its positive social impact, the company's stock price is expected to further increase.

Authors Contribution

All the authors contributed equally and their names were listed in alphabetical order.

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