

Case Study on the Financing Benefits of Green Bonds of Jidian Corporation

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Abstract: As an energy enterprise, Jidian Corporation is facing transformation pressure and funding needs, and green bonds have become an important choice for its financing. The article analyzes the background, process, and characteristics of the issuance of green bonds by Jidian Corporation, revealing that its financing motives mainly include responding to national policies, meeting funding needs, and reducing financing costs. At the same time, the article also evaluated the benefits of Jidian Corporation's green bonds, including economic benefits, social benefits, and environmental benefits. The results show that the issuance of green bonds has had a positive impact on the financial condition, social responsibility image, and environmental protection of Jidian Corporation. Overall, the successful issuance of green bonds by Jidian Corporation provides a new financing path for energy enterprises to transform and upgrade and achieve sustainable development.

1. Introduction

Over the past forty years of reform and opening up, China's economy has developed rapidly, but environmental issues have become increasingly prominent. The traditional high pollution and high energy consumption development model contradicts the sustainable development goals, and reducing pollutant emissions, improving energy utilization efficiency, and developing clean energy have become the goals pursued by governments around the world. The report of the 20th National Congress of the Communist Party of China emphasizes the path of green and low-carbon development. The government is actively adjusting the industrial structure, promoting the transformation of traditional industries, and supporting green and low-carbon industries to achieve a win-win situation for economic development and environmental protection. Against the backdrop of economic growth and environmental challenges, China has proposed the goals of "carbon peak" and "carbon neutrality" by 2060. Green bonds, as the core tool of green finance, have significant implications for accelerating China's low-carbon transformation[1]. Electricity is the foundation of industry and people's livelihood. Traditional thermal power plants have high carbon emissions and are difficult to meet the demand for electricity growth. It is urgent to promote the transformation of power enterprises into the new energy field. There is a huge demand for funds for the green transformation of power enterprises. The issuance of green bonds can open up stable sources of funds through the capital market, directly support green projects of enterprises, and play a guiding role in encouraging enterprises to increase investment in green development, accelerate the transformation to low-carbon and environmentally

friendly production models, and promote sustainable economic and social development^[2].

2. Case Introduction of Jidian Corporation

2.1 Company Profile

Jidian Corporation is a listed company controlled by State Power Investment Group, founded in 1993 and listed on the Shenzhen Stock Exchange in 2002. Through forward-looking strategies, it has developed into a large-scale integrated energy enterprise covering multiple fields such as new energy and comprehensive smart energy. By the end of June 2024, the installed capacity will reach 13.6699 million kilowatts, with clean energy accounting for 75.86%, and new energy bases will be established in the five major regions of the country. The company actively practices the concept of green development and injects capital into clean energy projects through financing methods such as issuing REITs and technology innovation bonds, demonstrating its activity and high recognition in the capital market.

2.2 Basic Situation of Green Bond Issuance by Jidian Corporation

In 2022, Jidian Corporation successfully issued two green bonds, namely "22 Jidian G1" (1.5 billion yuan, 5-year term, 3.80% interest rate) and "22 Jidian G2" (1 billion yuan, 3-year term, 2.90% interest rate), respectively, for green carbon neutrality projects and green rural revitalization and carbon neutrality projects, focusing on wind and solar power generation, promoting rural revitalization, employment, improving infrastructure, and supporting the "3060" goal and the development of green low-carbon industries. In 2023, Jidian Corporation will issue the first batch of "23 Jidian GCKV01" technology innovation green rural revitalization corporate bonds (500 million yuan, 3-year term, 2.99% interest rate), with funds specifically used for carbon neutrality projects, investing in photovoltaic projects, promoting the integration of new energy and rural revitalization, providing employment, improving facilities, solving electricity problems for poverty-stricken areas, and promoting the optimization of the company's energy structure and high-quality development. Previously, Jidian Corporation's plan to issue technology innovation green rural revitalization bonds of no more than 5 billion yuan was approved by the China Securities Regulatory Commission, and this 500 million yuan bond belongs to this plan. In addition, the company has launched a carbon emission rights asset guarantee debt financing tool, with an initial order of 62 million yuan for the wind power project in Xingguo County, Jiangxi Province, guiding financial resources to flow towards clean and low-carbon and poverty alleviation areas.

3. Motivation Analysis of Jidian Corporation's Issuance of Carbon Neutral Bonds

3.1 Motivation Analysis based on National Level

3.1.1 Responding to the Requirements of Green Transformation in the Power Industry

In recent years, the Chinese government has continuously introduced a series of policy measures to accelerate the green and low-carbon transformation of the power industry. The 14th Five Year Plan for Modern Energy System specifies the large-scale development of non fossil energy generation such as wind power and nuclear power, and accelerates the construction of a new type of power system; In 2022, the Ministry of Industry and Information Technology and other departments issued the "Action Plan for Green and Low Carbon Innovation and Development of Power Equipment" to ensure the market demand for wind power, solar energy, and nuclear power equipment; The Planning

and Development Department of China Electricity Council has set a carbon peak target for the power industry by 2028 and gradually reduced carbon emissions; The "14th Five Year Plan for the Development of the Power Industry" emphasizes the urgency of green and low-carbon development of the power industry, and proposes specific targets for wind and solar power installation by 2025; In August of the same year, the State owned Assets Supervision and Administration Commission issued measures emphasizing that central enterprises should promote the clean and low-carbon transformation of energy structure. Although the proportion of clean energy generation in China is less than 30%, and the high emissions and pollution problems in the power industry are prominent, Jidian Corporation, as a subsidiary of State Power Investment Corporation, is actively leading the energy transformation. By the end of 2023, the proportion of clean energy in its power generation will reach 55.4%. In order to achieve the goal of clean energy accounting for over 90% by 2025 and the group's 2035 target, it is necessary to accelerate transformation and increase investment. Faced with external system construction requirements and internal strategic challenges, the transformation of the power industry is facing numerous difficulties. However, the fast approval, low cost, and dedicated use of green carbon neutral bonds provide strong support for the transformation and project construction of the power industry[3]. Through this, Jidian Corporation promotes the green and low-carbon development of the power industry and society.

3.1.2 Enjoy Relevant Carbon Neutrality Policy Subsidies

With the development of the economy and society and the damage to the natural environment, the government has implemented green carbon neutrality policies to accelerate the green and low-carbon transformation of high polluting and high emission industries. However, due to insufficient government funding, there is a funding gap. Therefore, green finance and its derivatives, such as green carbon neutral bonds, are adopted to assist in green transformation. Green low-carbon projects have long cycles and high funding requirements[4]. The government has formulated carbon neutrality policies and subsidy measures to alleviate the pressure on enterprises to transform, and encourages the use of green financial tools, especially carbon neutral bonds, to participate in green transformation. The government also encourages investment in the construction of clean energy projects such as wind and solar power, promoting the popularization and sustainable development of clean energy. Green finance has significant advantages in promoting economic growth, and the government hopes to use this to promote green, low-carbon, and sustainable economic development. The wind and photovoltaic projects invested in by Jidian Corporation's recent bond issuance are highly in line with the national green energy subsidy policy. They not only receive generous subsidies to reduce construction costs, enhance cash flow, and respond to sustainable development needs, but also demonstrate support and practice for the national green development strategy, raise valuable construction funds, and use carbon neutrality subsidy policies to promote green development, contributing to the country's sustainable green development.

3.2 Motivation Analysis based on Investor Level

3.2.1 Obtain a Good Green Reputation

The concept of Corporate Social Responsibility (CSR) requires companies to actively practice social responsibilities such as environmental protection and low-carbon emissions reduction in pursuit of economic benefits, in order to maintain and enhance their social reputation. In recent years, investors have placed increasing emphasis on corporate green reputation in their decision-making, which is directly related to the actual performance of corporate green management, strategic decision-making, and other aspects. As the parent company of Jidian Corporation, State Power Investment

Corporation has put forward green and low-carbon transformation goals such as "2023 Carbon Peak" and "2035 First Class Strategy", demonstrating its responsibility. Jidian Corporation is keeping up with the pace and has set strategic goals in 2021. It plans to become a top clean energy enterprise in China by 2025, with a clean energy proportion of over 90%, and become a world-class listed clean energy company by 2035. In the energy transition, Jidian Corporation has successfully transformed from a traditional power generation enterprise and entered into new energy fields such as photovoltaics and wind power, as well as new energy industries such as hydrogen energy and energy storage. In this context, Jidian Corporation issues green bonds to accelerate the layout of offshore wind power and onshore photovoltaic projects, convey the determination of low-carbon development, and place corporate social responsibility at the core. Through issuance, it aims to establish a green development image, win a green reputation, enhance market attractiveness and competitiveness, attract more green investors, and open up broader financing channels.

3.2.2 Improve the ESG Information Disclosure System of Enterprises

In recent years, the deepening of corporate social responsibility (CSR) and ESG concepts has promoted the transformation of corporate values towards sustainable development. Stakeholders and investors have increased their attention to ESG information disclosure, viewing it as a key measure of a company's competitiveness and value. Although Chinese listed companies have begun to attach importance to ESG information disclosure, they still face challenges. With the deepening of CSR concepts and the intensification of climate issues, investors are pursuing long-term sustainable returns, and ESG investment meets this demand. Energy companies such as electricity have become a key focus of national environmental information disclosure[5]. As a leading enterprise in clean energy generation and a model of green and low-carbon transformation in the power industry, Jidian Corporation deeply recognizes the importance of building an ESG information disclosure system. The company held an ESG kickoff meeting, integrating the construction of the ESG system into the entire process of corporate governance and development, prioritizing the fulfillment of social responsibility, and committed to transforming the results of ESG work into high-quality development support. At the same time, Jidian Corporation has issued green financial products such as carbon neutral bonds to enhance environmental performance, enrich ESG green finance content, enhance market reputation and competitiveness, convey signals of green and low-carbon transformation to the market, and showcase environmental achievements. In addition, the company strengthens communication with investors and stakeholders, draws on international experience to improve ESG information disclosure standards and processes.

3.3 Motivation at the Issuer Level

3.3.1 Achieving the Company's Low-Carbon Development Strategy Goals

Jidian Corporation has clear goals, aiming to achieve an installed capacity of over 20 million kilowatts and a clean energy share of over 90% by 2025. It is expected to peak carbon emissions in 2023 and become a world-class clean energy enterprise by around 2030. In 2023, the company will newly put into operation 1.057 million kilowatts of units, with a clean energy installed capacity of 10.1212 million kilowatts and a grid connected electricity of 26.68 billion kilowatt hours. The proportion of clean energy power generation will significantly increase, contributing to the national "dual carbon" goal. The company obtained a registration quota of 5 billion yuan for medium-term notes and 1 billion yuan for carbon asset-backed bonds through capital market financing, and also introduced external equity funds. It issues carbon neutral green bonds to raise funds, supports the construction of clean energy projects, promotes low-carbon, environmental protection, and

sustainable development. With the implementation of projects, the proportion of clean energy installed capacity will increase and carbon emissions will be reduced.

3.3.2 Meet the funding needs of the company's green projects

According to the Figure 1, when raising project funds, enterprises usually consider internal financing first, mainly retained earnings, followed by debt and equity financing. Jidian Corporation should also prioritize internal financing when raising funds for clean projects. However, in the past four years, the retained earnings of its parent company, State Power Investment Corporation, have been negative for consecutive years and the amount is relatively large. It will only turn into a positive 110 million yuan in 2023; Although retained earnings in the consolidated financial statements have been confirmed, the amount is limited and cannot cover the huge funds for wind and photovoltaic clean projects. Therefore, from the perspective of the overall group and the parent company, retained earnings are difficult to meet the funding needs of the Jidian Corporation project, and there are difficulties in internal financing. Debt and equity financing need to be considered. Although China's carbon neutral bond market started late, as an emerging debt financing tool, it has become increasingly important in meeting the financing needs of green projects for enterprises. The relevant departments have introduced policies to encourage issuers to issue carbon neutral green bonds for fundraising. So for Jidian Corporation, issuing carbon neutral bonds is currently the preferred financing method for raising funds for green projects.

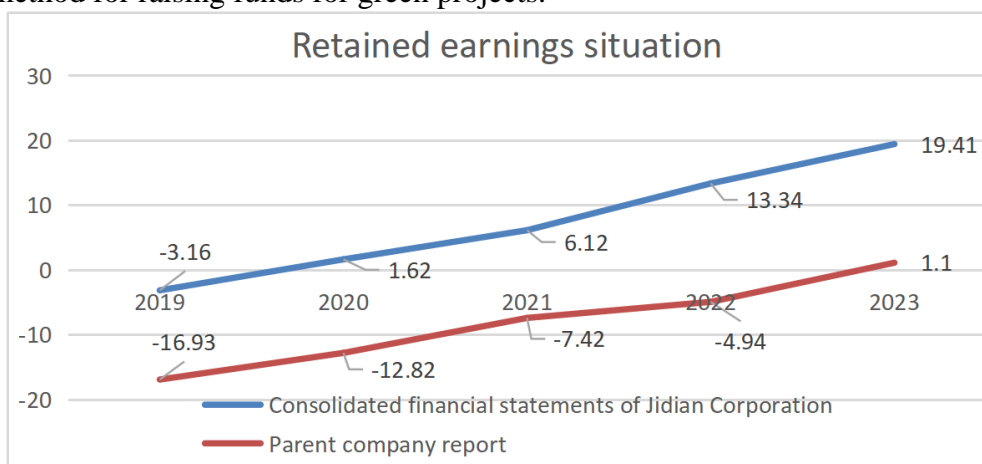


Figure 1: Retained earnings of Jidian Corporation from 2019 to 2023

3.3.3 Reducing Corporate Financing Costs

Table 1: Medium and Long term Loan Interest Rates

| Year | 2022 | 2023 |
|---------------------|-------|-------|
| One to five years | 4.75% | 4.75% |
| Five to ten years | 4.90% | 4.75% |
| More than ten years | 4.90% | 4.90% |

According to the table 1, when the internal financing of a company cannot meet its needs, it can consider bank loans, debt and equity financing and other channels. Data shows that the interest rate for medium and long-term loans ranging from one to five years (including five years) is 4.75%, while the average coupon rates for five-year, AAA rated project income special bonds and general corporate bonds are 4.00% and 4.02%, respectively. It is worth noting that Jidian Corporation has recently issued several carbon neutral bonds with coupon rates of 3.8%, 2.9%, and 2.99%, respectively. By comparison, it can be seen that the issuance of carbon neutral bonds by Jidian Corporation can

significantly reduce the financing costs of green and clean projects, effectively alleviate the financing burden of enterprises, and have obvious advantages in debt financing methods, making it an ideal financing choice

4. Benefit Analysis Of Jidian Corporation's Issuance Of Carbon Neutral Bonds

4.1 Financing Benefit Analysis

4.1.1 Expand debt financing channels

Prior to issuing green bonds, Jidian Corporation had issued 18 bonds, including 1 medium-term note, 1 non-public targeted debt financing instrument, and 16 ultra short term financing bonds. The issuance of three green bonds in 2022 and 2023 has opened up financial product options for its bond market financing. These green bonds are designed specifically for carbon neutrality goals and are an important practice for Jidian Corporation to use green financial tools to promote green and low-carbon development, reflecting its response to the national "3060" strategy and implementation of the "dual carbon" concept. The power industry is a capital intensive industry with long project cycles and high funding requirements. The funding provided by 5-year and 3-year green bonds can better meet the long-term funding needs of Jidian Corporation, helping it plan projects, alleviate financial pressure, and promote comprehensive and sustainable development.

4.1.2 Financing Efficiency Output

According to the table 2, Jidian Corporation has achieved certain financing benefits after issuing green bonds. These benefits are mainly reflected in the improvement of the company's profitability, manifested in the growth of return on equity and net profit margin, indicating that the company's capital operation efficiency has been improved. But in terms of operational and development capabilities, the company also faces some challenges and uncertainties. Therefore, Jidian Corporation needs to continue to pay attention to market dynamics and policy changes, optimize its capital structure, and improve the efficiency of capital utilization to ensure that the issuance of green bonds can continue to bring stable financing benefits to the company[6].

Table 2: Relevant Indicators of Jidian Corporation from 2019 to 2023

| Year | Profitability | | Operating capacity | | Development capability | |
|------|---------------|----------------------|-----------------------------------|---|---------------------------|------------------------|
| | Roe (%) | net profit margin(%) | Total asset turnover rate (times) | Accounts receivable turnover rate (times) | net profit growth rate(%) | Revenue growth rate(%) |
| 2019 | 2.30 | 5.01 | 0.207 | 2.091 | 70.07 | 17.13 |
| 2020 | 6.31 | 7.94 | 0.203 | 1.676 | 86.58 | 17.64 |
| 2021 | 5.18 | 6.48 | 0.216 | 1.698 | 7.47 | 31.75 |
| 2022 | 6.22 | 7.92 | 0.216 | 1.742 | 37.50 | 12.83 |
| 2023 | 7.85 | 10.82 | 0.195 | 1.677 | 32.06 | -3.42 |

4.2 Financial Benefit Analysis

4.2.1 Improving Debt Maturity Structure

From the data in the table 3, it can be seen that after Jidian Corporation issued green bonds in 2022, the ratio of its current liabilities to total liabilities decreased from around 40% from 2019 to 2021 to 30.61%, and the ratio of long-term liabilities to total liabilities also increased from around 60% to

69.04% at the end of 2023, indicating that the injection of long-term funds has played a certain role in improving Jidian Corporation's debt maturity structure.

Table 3: Debt Structure of Jidian Corporation from 2019 to 2023

| Year | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|--------|--------|--------|--------|--------|
| Current liabilities (in billions of yuan) | 126.77 | 172.68 | 214.23 | 173.22 | 174.53 |
| Long term liabilities (in billions of yuan) | 187.21 | 273.64 | 308.06 | 340.25 | 393.62 |
| Total liabilities (in billions of yuan) | 315.70 | 447.93 | 524.72 | 515.81 | 570.16 |
| Current liabilities/total liabilities | 40.15% | 38.55% | 40.83% | 33.58% | 30.61% |
| Long term liabilities/total liabilities | 59.30% | 61.09% | 58.71% | 65.96% | 69.04% |

4.2.2 Improve debt paying ability

Table 4: Debt paying ability indicators of Jidian Corporation from 2019 to 2023

| Year | 2019 | 2020 | 2021 | 2022 | 2023 |
|--------------------------------|-------|-------|-------|-------|-------|
| current ratio | 0.558 | 0.524 | 0.558 | 0.678 | 0.632 |
| quick ratio | 0.550 | 0.507 | 0.538 | 0.663 | 0.624 |
| Asset liability ratio | 74.70 | 79.86 | 78.52 | 72.19 | 74.29 |
| EBITDA interest coverage ratio | 3.00 | 3.03 | 3.17 | 3.43 | 4.33 |

4.2.2.1 Short term solvency

From the table 4, it can be seen that the current ratio and quick ratio of Jidian Corporation have shown an overall upward trend from 2019 to 2023, but still remain at a relatively low level. This is because the asset structure of the power industry is mainly composed of non current assets, and the proportion of current assets is low. After issuing green bonds in March, October, and November 2022, Jidian Corporation's current ratio and quick ratio slightly increased, and its short-term solvency improved. This is mainly because green corporate bonds are non current liabilities and have little impact on current liabilities; And most of the bonds are used to replace the previous self owned capital investment, with a small portion supplementing the working capital of the green industry, increasing the proportion of current assets and monetary funds, thereby improving the current ratio and quick ratio.

4.2.2.2 Long term solvency

Overall, the asset liability ratio of Jidian Corporation has been above 70% in the past five years, which is due to the high debt ratio characteristics of the power industry as a capital intensive industry, and its issuance of green bonds has increased non current liabilities. However, Jidian Corporation's EBITDA remains at a high level and shows an increasing trend. The photovoltaic and wind power projects raised through the issuance of green bonds can implement the new energy industry strategy after completion, enhance the company's ability to obtain operating cash flow, and the future operating cash flow is expected to remain stable or grow. The reduction of interest coverage ratio in 2023 may be due to the payment of interest on two green bonds in 2022. Overall, Jidian Corporation's long-term debt paying ability has improved.

4.3 Analysis of Stock Price Benefits

We use event study method to select the first issue of green bond "22 Jidian G1" issued in 2022 as the analysis object. Set March 14, 2022, as the event date (T=0) for Jidian Corporation to announce

the issuance of this bond. Set the event window to 10 trading days before and after the event date, i.e. the [-10,10] interval, to observe whether the market was informed of relevant information in advance during the 10 trading days before the event date, and whether the event brought abnormal returns to the company during the 10 trading days after the event date. At the same time, select the 150 trading days before the event date, namely the [-160, -11] interval, as the estimation window to estimate the normal return rate of the company's stock.

The regression equation is obtained by fitting the relationship between the individual stock return rate and market return rate of Jidian Corporation through the CAMP model $E(R_t) = 0.0035583 + 0.7701078R_{mt}$

Combining the specific calculation formulas of AR and CAR:

$$AR_t = R_t - E(R_t)$$

$$CAR = \sum AR_t$$

Calculate the excess return and cumulative excess return of Jidian Corporation during the window period [-10,10], and obtain the stock price response as shown in the following Figure 2.

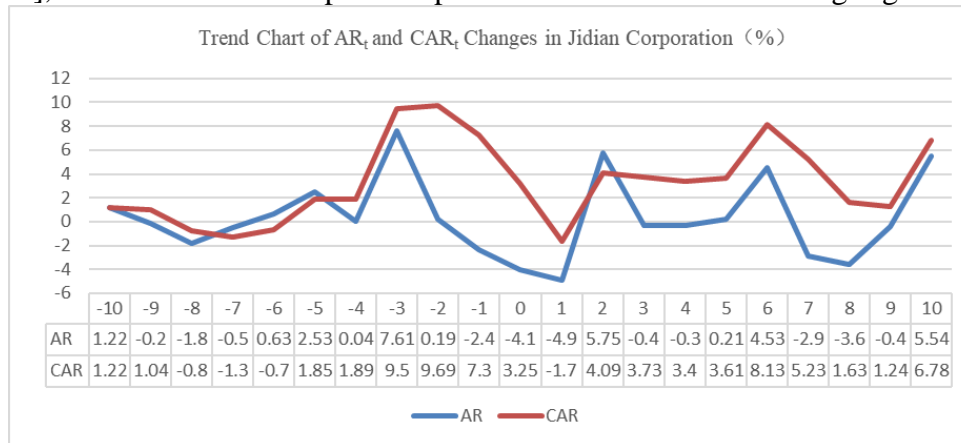


Figure 2 Trend Chart of AR_t and CAR_t Changes in Jidian Corporation

4.4 Analysis of Carbon Emission Reduction Benefits

4.4.1 Analysis of Environmental Benefits of Carbon Emission Reduction

Jidian Corporation has issued "22 Jidian G1", "22 Jidian G2" and "23 Jidian GCKV01" green bonds for 2022, supporting multiple clean energy projects such as wind power and photovoltaic power plants. In 2023, these projects will generate over 4.3 million kilowatt hours of electricity online, reducing carbon dioxide emissions by over 3.3 million tons and saving over 1.3 million tons of standard coal compared to equivalent thermal power generation. They will also significantly reduce SO_2 , NO_x , and smoke emissions. 22 Jidian G1 and 22 Jidian G2 have invested in wind power and photovoltaic projects respectively. The completed projects have reduced carbon dioxide emissions by about 520000 tons and saved about 200000 tons of standard coal; The "23 Jidian GCKV01" focuses on distributed photovoltaic power stations, and has completed projects that reduce carbon dioxide emissions by about 137500 tons and save about 50000 tons of standard coal, demonstrating the company's positive contribution to environmental protection.

4.4.2 Analysis of Carbon Emission Reduction Derivative Benefits

At the end of June 2021, China fully launched the carbon emissions trading market, mainly trading

carbon emission allowances (CEA). From the table 5, the government sets the total emissions and allocates quotas, and emission control enterprises can trade surplus or insufficient quotas. The power industry was included in the scope of emission control in the early stage, and the carbon dioxide emissions reduced by Jidian Corporation's wind power projects can be traded and profited in the carbon emission rights market. In 2023, the three phases of green bonds issued by Jidian Corporation will reduce a total of 661200 tons of carbon dioxide emissions through conversion. Based on the average transaction price of the national carbon emission quota listing agreement and bulk agreement for that year, if all transactions are made, they can generate capital income of 4853.87 and 44.3599 million yuan respectively. In addition, after the completion of the onshore wind power project of Jidian Corporation, the on grid electricity quantity meets the green power trading standards, and the clean energy price is higher than the benchmark price of thermal power, including the electricity energy price and green premium. If Jidian Corporation does not participate in carbon emission trading, it can choose to join the green power trading. The annual on grid electricity generated by its three green bonds is about 4.315 billion kilowatt hours. After conversion, the invested funds can trade about 882 million kilowatt hours of green electricity annually. Calculated based on the long-term transaction price of green electricity, which is about 0.04 yuan/kilowatt hour higher than the ordinary electricity price, Jidian Corporation can earn 35.28 million yuan in "green premium" income annually. The state encourages emission control enterprises to participate in green power trading to achieve carbon reduction. In the future, the "green premium" of green power is expected to expand, and the profits of green power generation enterprises will further increase.

Table 5: Average transaction price and project benefits of CEA in 2023

| Project Name | Annual average transaction price (yuan/ton) | Annual reduction of carbon dioxide emissions (10000 tons) | Project revenue (10000 yuan) |
|--|---|---|------------------------------|
| National CEA: Listing Agreement: Average Transaction Price | 73.41 | 66.12 | 4853.87 |
| National CEA: Bulk Agreement: Average Transaction Price | 67.09 | 66.12 | 4435.99 |

4.5 Reputation benefits

As a subsidiary of a leading power generation group, Jidian Corporation actively responds to the national carbon peak and emission reduction strategy by issuing carbon neutral green bonds, demonstrating its determination and action towards green and low-carbon transformation. This news has been extensively reported by the media and the internet, and the company's slogans such as "2023 Carbon Peak" have frequently appeared on news websites, attracting widespread social attention and enhancing its visibility and green corporate image. This move also conveys to investors the company's determination and strength to promote energy transformation, enhances investor confidence, and attracts more green investors. At the same time, the bond issuance demonstrates Jidian Corporation's innovative capabilities and leading position in the field of green finance, providing investors with more choices and confidence guarantees.

5. Conclusion and Suggestions

Jidian Corporation has issued carbon neutral green bonds, expanding debt financing channels and reducing financing costs. The funds are used for the construction of clean energy projects such as

wind power and photovoltaics, increasing the proportion of clean energy installed capacity, supporting green and low-carbon transformation, conveying low-carbon development determination, enhancing the image of green enterprises, strengthening investor confidence, and attracting more green investors. The increase in the company's return on equity and net profit margin, as well as the improvement of capital operation efficiency, although the operational and development capabilities still face challenges, the issuance of bonds has a positive impact on the financial situation, promoting the company's development towards low-carbon, environmentally friendly and sustainable direction, and the carbon emission reduction benefits will be more significant. In the future, Jidian Corporation should continue to optimize its financing structure, comprehensively utilize various financing methods, and strengthen financing cost control; We need to strengthen information disclosure and investor communication, enhance transparency and reputation; In response to the national "dual carbon" target, we need to increase investment in clean energy and technology research and development, and optimize carbon emissions levels; we need to pay close attention to market dynamics and policy guidance, flexibly adjust strategies, cooperate with government departments and industry associations, strive for policy support and industry resources, and lay the foundation for sustainable development.

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