



# Research on Financing Risk Management of State-owned 2x660MW thermal power Project

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**ABSTRACT.** As the ballast stone of the national economy, thermal power enterprises play a decisive role in the development of the whole social economy. However, due to the long approval process, the large number of compliance documents required and other situation, most enterprises choose self-financing and bank loans as the main financing methods, and there are also many risks in corporate financing. Though case analysis method, comparative analysis method and other methods, this paper takes the financing of 2x660MW thermal power project of J fire-power enterprise as the research object, selects three enterprise projects under the same group as J enterprise for analysis and comparison. From the perspective of project construction cycle, system risk and non-system risk, this paper finds the possible risks and problems in the process of thermal power project financing, and puts forward corresponding countermeasures and suggestions. It is hoped that these can have some reference and help for most thermal power projects to avoid financing risks.

**Keywords:** Thermal power project financing, Financing risk, Risk response

## 1 Introduction

Electricity is essential in life. From the perspective of economic development, coal is the main energy of the primary energy composition in China. In a long time, coal-fired power generation will still occupy the dominant position in the field of power generation. Although the profit of state-owned fire-power enterprises is relatively stable, still mainly in the traditional financing form, it has some risks and problems in financing. Affected by factors, many projects by fossil fuel are sharply reduced, most projects have slight profit or loss and suffered heavy performance, which affects financing managements.

The development of ultra-supercritical coal-fired units is not only conducive to improving thermal efficiency of units and reducing coal consumption for power generation, but also the most effective and realistic measure to improve the technical level of China's thermal power units and realize technical optimization and upgrading of thermal power units.

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J Enterprise 2×660MW cogeneration plant is located in the Ulanqab City, Inner Mongolia. For the 2x660MW thermal power project, when the generating hours of the unit are 5000 hours per year and the internal rate of return of the project capital is 10%, the feed-in price excluding tax is 214.66 RMB/MWh, and the feed-in price including tax is 242.46 RMB/MWh, which is lower than the benchmark price of the local power grid 282.9 RMB/MWh. The main economic indicators of the project can meet the requirements of the investors, it is economically reasonable. The project plays an important role in meeting the demand of load and the power supply capacity of regional grid, urban central heating, the effective use of coal, and the sustainable development of local economy. through sensitive analysis, when the change range of project investment, annual power generation and coal price is less than 10%, on the premise of meeting the return on investment, the highest estimated feed-in tariff including tax is about 259.05 RMB/MWh, among which fuel price, total investment and power generation have the greatest impact on the economic indicators of the project.

The 2×660MW units will be the first choice for prefecture-level heating in China. Thus, it is forward-looking and practical to analyze financing risk managements and solutions for similar thermal power projects.

## 2 Observation of electric power investment and financing and comparative analysis of cases

The report shows that, affected by various factors, listed companies focusing on thermal power generation, such as Huaneng International and Huadian International, which are subordinate to the five major power generation groups, all suffered serious losses. Net profit of 27 listed thermal power companies fell sharply, down 547 percent year on year, among which 20 thermal power companies suffered losses, totaling more than 64 billion yuan.[1]

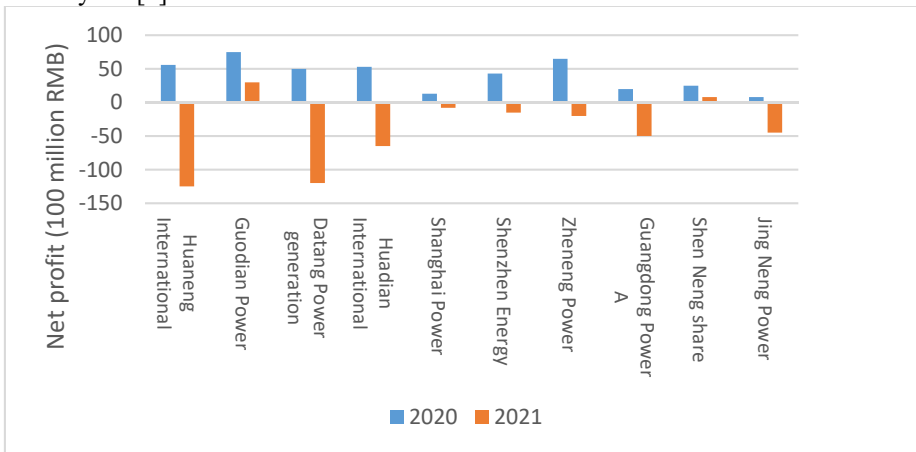


Fig. 1. Net profit of top ten listed thermal power companies by asset size in 2020-2021

From: Power investment trends from the perspective of business performance of listed power generation enterprises

This paper summarizes the differences of feasibility study reports and post-evaluation reports of 2×350MW cogeneration projects with three companies under the same group of J enterprises, and compares the differences and common problems affecting investment and financing with 2×660MW heating units. The following table 1 and table 2 are the basic average situation of investment and financing funds of the three enterprises:

**Table 1.** Capital composition table (Unit: Ten thousand Yuan)

Number	Investor	Available capital	Actual capital in place	2013	2014	2015	2016	2017	2018
1	Joint-stock company	49,740	49,700	5,900	4,700	30,000	100	7,400	1,600
2	Limited company	33,160	33,100	4,100	3,200	10,000	10,000	4,800	1,000
Total		82,900	82,800	10,000	7,900	40,000	10,100	12,200	2,600

**Table 2.** Project financing situation (Unit: Ten thousand Yuan)

Project	2017	2018	2019	Total
Postal Savings Bank	75,000.00			75,000.00
Local Bank		1,800.00		1,800.00
Construction Bank		50,000.00	10,000.00	60,000.00
Bank of China			30,000.00	30,000.00
Corporation Financing	30,000.00	80,000.00	20,000.00	130,000.00
Total Capital	105,500.00	131,800.00	60,000.00	297,300.00

At present, bank loan is the most important way of debt financing for thermal power enterprises. Now China attaches great importance to the policies of new energy and double carbon reduction. Coupled with the fact that most enterprises are in deficit, the prospect of thermal power industry is difficult. However, due to the lack of cost and technology, and the long construction time, the power generation of new energy cannot develop rapidly in a short time. Most thermal power enterprises have a good cooperative relationship with banks, and their credit rating and line of credit have high evaluations. In the future, thermal power generation enterprises will still occupy an important position in the power generation industry, and bank loans is still a more common means for thermal power enterprises.

However, the project benefits are basically not up to expectations and the main indicators are not up to the design value. Especially in the newly put into production, the

depreciation and financial costs are high, the company's heating cost and heat sale price always have the problem of upside down. The reasons for serious losses and operating difficulties are as follows:

(1) Heating market problems: the actual supply of heating has not reached the annual supply level of the feasibility stage, and the price of heating is relatively low.

(2) Coal supply problems: coal prices continue to rise, and the cost increases sharply. Most of the designed coal types of northern enterprises are Jinxi coal and Mengxi coal. Since 2021, the price of thermal coal has risen significantly. The unit price of power standard coal in the feasibility study and evaluation stage is 520 RMB/ton (tax included), the comprehensive standard coal unit price in 2020 is 738.46 RMB/ton (tax included), and the comprehensive standard coal unit price in 2021 is 1125.63 RMB/ton (tax included). The increase of coal price will increase fuel cost by 155,119,500 RMB in 2020 and 518,636,500 RMB in 2021.

(3) Power generation market problems: When it is calculated, the annual power generation utilization hours of the unit are 5,000 hours, but the actual data in 2020 and 2021 are 4191.06 hours and 4223.13 hours. During the COVID-19 outbreak, when many large and medium-sized enterprises shut down production and demand of power shrank. In the first two years of project operation, the power generation utilization hours have not reached the feasible data.

(4) When the project is put into operation, it encounters the downtrend of the power industry. The proportion of transaction electricity is high, and the average price is too low. Due to the combined influence of such factors as the reduction of on-grid electricity price, the rapid increase of market trading electricity, the continuous decline of unit utilization hours, the sharp rebound of thermal coal price, and the increasing of environmental protection policies, the power generation industry, represented by the five major power generation groups, has been on a slide since 2016, showing a pattern of both volume and price decline and regional differentiation of benefit decline.

### **3 Risks and problems faced by 2×660MW thermal power projects**

At present, the project financing of thermal power enterprises is mostly carried out by traditional bank loans, in a relatively simple form. The level of capital construction cost of thermal power projects will directly affect the size of depreciation expense after the operation, and will have a crucial impact on the subsequent survival and development of enterprises. Although the project loan term is longer, it is not conducive to cost control. The advantage of short-term loans is that the interest rate is low, but it will bear the pressure of repayment in a short time. If the maturity date cannot be controlled after the trial run, it may cause the lack of repayment funds.

This paper analyzes the feasibility evaluation reports of several enterprises, and briefly summarizes the financing risks of nature, society, economy and technology. Project financing problems will cause the construction unit to be unable to continue construction. Once there is a risk of a broken capital chain, the construction unit will suspend construction and demobilize workers before resuming construction, which

may generate more opportunity costs. How to reduce the cost of capital construction financing on the premise of controlling the financing risk is a common problem facing this type of power plant.

According to the relationship between financing risk and external environment, financing risk can be divided into systematic risk and non-systematic risk. The systematic risks political and legal risks, economic risks and force majeure risks. Non-systematic risks are divided into medium risk of failure to complete, cost overruns, downtime and other risks including environmental protection and emission reduction standards.

During construction, a lot of money is spent and interest is paid on loans or financing. From the perspective of the lending bank, the project has not yet generated income, risks increase and approach the maximum.[2] Due to unpredictable factors like personnel, duration design and construction, cost may overruns. In the operation stage, unit maintenance and shutdown can cause huge losses. Domestic macro policy and power industry policy risk also have great influence on the project. The same type of project and new energy industry competition have certain risks. The number of approved power projects that rely on fossil fuels has decreased year by year. With the deepening of power management system reform, there are some uncertain policy risks, such as bidding for Internet access, energy conservation scheduling and other management policy changes, which will lead to the decline of power plant profit space. The increasing stringency and perfection of national environmental policies will also lead to increased environmental spending by enterprises.

#### **4 Suggestions on risk control of 2×660MW thermal power project financing**

Collect all kinds of approval data in advance. On the one hand, financial personnel should keep an eye on the approval progress, on the other hand, broaden financing channel. In the early stage of project construction, we should focus on contacting high-risk and high-yield banks to solve the problem of funds first. In terms of financial products, direct lease financial leasing products or guarantee loans can be selected, to make adequate preparations for the adjustment of financing structure in the later stage.

At present, many academics have proposed new investment and financing methods such as green finance, joint loan or syndicated loan financing models for large power projects[3], using carbon quota in financing innovation: dynamic pledge financing and repurchase financing models based on carbon quota[4], and supply chain finance (SCF) application in thermal power generation enterprises. For example, apply supply chain finance in large enterprises or a certain industry system, and design specific models to solve the financing problems of power generation enterprises and improve the efficiency of capital use through supply chain finance.[5] In the choice of credit loan, try to choose the long-term and short-term matching pre-project loan.

Improve the financing structure and pave the way for production and operation in advance. After entering the stage of boiler and water pressure, the financial department should fully communicate with the business department to determine the general period

of trial operation, and reasonably formulate the short-term loan withdrawal plan under the premise of doing a good job in the production period operating cash flow forecast.

## 5 Conclusion

Overall, China is still in the environment where the level of deposit and loan interest rates is controlled by the central bank. Combined with the international and domestic financial market situation, the short-term national interest rate is relatively stable, but the possibility of interest rate increase cannot be ruled out. The interest rate risk exists objectively. The project unit should arrange the initial investment of capital as far as possible. In addition, when signing financing contracts, companies should leave the swap space for debt interest rate, that is, the control and management of interest rate risk. However, due to the particularity of the power industry, there are restrictions such as trade secrets and non-disclosure of specific data, and some data may lack accuracy. The quantity of samples and quantitative comparative analysis of specific data in the study of thermal power project financing risk are insufficient. There are different realities for specific projects, and universal applicability is not enough.

## 6 Deficiencies and Prospects

Among them, the author consulted a large number of relevant literature works, data and materials, and obtained several enterprises' feasibility research reports and post-evaluation reports. However, due to the particularity of the power industry, there are restrictions such as trade secrets and non-disclosure of specific data information, and some data may lack accuracy. There are still many uncertain objective and subjective factors in the research of thermal power project financing risk. In this paper, the quantity of samples and quantitative comparative analysis of specific data in the study of thermal power project financing risk are insufficient. There are different realities for specific projects, and universal applicability is not enough.

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