

Economic Feasibility Study of Power Construction Project Based on Economic Cycle Research

Gu Zheng, Wang Ye, Nan Zhe

State Grid Liaoning Electric Power CO,LTD. Power Electric Research Institute, Shenyang, Liaoning110015, China

ABSTRACT. *When evaluating the economic feasibility of a traditional power construction project, it did not correlate it with the macroeconomic cycle fluctuations, but statically used the regional power demand and on-grid power prices in the three or five years before the project feasibility study as the basis for economic calculation. This has caused some power projects to be completed and put into production at the same time as the recession or even depression of the macroeconomic cycle, and project operations are in trouble. Therefore, the extension of other strong cycle industrial projects also has the same problem, which is easy to cause project investment early decision-making mistakes, and later business difficulties. The article looks for the relationship and law between the macroeconomic cycle and the economic feasibility of the project, and discusses and analyzes how to better judge the economic feasibility of power construction projects.*

KEYWORDS: *feasibility study; business cycle; project investment*

1. Introduction

Economic cyclicity refers to the fluctuation of economic activity on the overall level measured by major indicators such as GDP, currency circulation, wages, and prices. The entire cycle is divided into four stages: depression, recovery, prosperity, and recession. The depression period is a period of economic downturn, when national income and economic activities are below normal levels, characterized by reduced output, credit searches, falling prices, and general public pessimism about the future. The recovery period is a transitional period, and the economy began to recover from the trough, but it has not yet reached its peak. The extraordinary characteristics of national income and economic activities in the boom period are rapid growth in production, increased investment, credit expansion, rising prices, increased employment, and public optimism about the future. The decay period is the transitional period from prosperity to depression, when the economy begins to decline from its peak, but it has not yet reached the bottom[1].

The market economy itself has an economic cycle, which cannot be completely

eliminated or slowed down by relying on certain market mechanisms. That is, the economic cycle comes from the imperfect market mechanism. Through the study of the industry economic cycle, we can understand the various stages of the development of the power industry. Grasp the changing trends of the power industry in the four periods of depression, recovery, prosperity and recession, and predict the development trend of the power industry from a macro perspective. It can be used as a reference basis for project economic evaluation, for enterprise investment and subsequent provide strong support for continued business decision-making. Strong cyclical industries refer to industries with a strong positive correlation and cyclicity between the external macroeconomic environment and the external economic environment. Strong cyclical industries are characterized by cyclical fluctuations in product prices, demand and production capacity. During the peak period of the industry's prosperity, temporary product demand increases and prices rise sharply. In order to meet the sudden expansion of demand, production capacity has been greatly expanded, while the opposite is true in the recession. The current power industry is a cyclical industry[2].

2. Cycle characteristics of the power industry

The development of the power industry is the foundation and pillar of the entire social economy, and it also plays a very important support and auxiliary role for the stable and healthy development of other industries. The stable and sustained sound investment and operation and maintenance of power facilities are important conditions and guarantees for the stable development of the entire social economy. Since the deepening of reform and opening up, the power industry in western China has developed rapidly, China's power investment has increased rapidly, power construction has made great achievements, and the power industry has strongly supported the development of the secondary and tertiary industries. However, from 1998 to 2005, the industrial structure and the power supply and demand situation in the new energy market has undergone significant cyclical changes; in 2005, the power industry experienced a temporary oversupply. In 2008, there was a relative shortage of power, and in 2012, the power supply and demand situation eased. During the period of change, the reform of the power system and the profitability of the power industry have gradually become important issues affecting subsequent project investment. For this reason, it is necessary to establish an investment analysis system for the power industry. Analyze the cyclical fluctuations of the power industry, and put forward corresponding suggestions on the economic feasibility of power projects[3].

The impact of macroscopic factors on coal prices has a strong cyclical nature. As an upstream product of the power industry, coal makes its cost unstable, which will cause the cost of the thermal power industry to change with the cycle. At the same time, the seasonality of hydropower and wind power is also a cycle. The competition of thermal power is mainly manifested in the matching of cost control, capacity changes and power cycle[4-6].

3. Cycle change of power supply system

China's power industry is showing cyclical characteristics, and the industry's revenues are growing simultaneously with the national economy. Among these measures, the main body of coal-electricity linkage is the National Development and Reform Commission. However, in September 2019, the State Council's executive meeting cancelled coal-electricity linkage and stipulated the implementation of a "fixed price + floating price" electricity price policy. The price adjustment has made the thermal power industry show counter-cyclical characteristics for a period of time. After rising in 2016, coal prices fell in 2017. According to the National Electricity Price Monitoring Report 2017 of the Bureau of Energy, the average on-grid electricity price of power generation companies nationwide was 3.76 yuan/KWh, an increase of 1.9% over the same period last year. During this period, with the maintenance of electricity prices and the decline of coal prices, the price difference between coal prices and electricity prices has continued to expand, and the revenue of the power industry has also declined at the same time. Its performance is the countercyclical characteristics of the power industry from 2017 to the second quarter of 2019[7-8]. In addition, in the electricity price reduction policy issued by the State Council from 2018 to 2019, the electricity price was lowered by 10% twice. Due to the impact of the coal cycle, the coal price fell and the electricity price spread widened, and power companies generally made profits in the first half of 2019. In the first half of 2019, the main business income of major domestic thermal power listed companies was close to 400 billion yuan, a year-on-year increase of 10%; net profit after deducting non-recurring gains and losses was as high as 19 billion yuan, an increase of more than 50%. Although the electricity consumption of the whole society has dropped by about 4.5% compared with the same period last year, the utilization hours of thermal power generation have dropped by nearly 90 hours. The rapid increase in the profitability of the thermal power generation industry is mainly affected by upstream fuel prices and fiscal policies. Periodic power supply system: Electricity demand mainly comes from the cyclical industrial sector. At present, China is in the stage of industrialization. In the electricity structure, the demand side with the largest electricity consumption is all cyclical industries. In 2018, the electricity consumption of the whole society is about 8,400 billion kWh, of which the industrial secondary industry (industry) consumes the most electricity, reaching 4.720 billion kWh (accounting for 69% of total electricity consumption), of which the four industries of nonferrous metals, metallurgy, chemicals, and building materials are all cyclical industries. It accounts for the vast majority of total electricity consumption. Cycle cost: After the liberalization of coal prices, the upstream industry has become a strong cycle industry. After the liberalization of coal prices, the degree of marketization of price changes in the coal industry has gradually increased, coal prices have become a market-based pricing, and the country has completely withdrawn from the coal pricing strategy. Since 2008, coal prices have shown strong cyclical fluctuations, indicating that the coal-electricity linkage policy implemented in 2005 is also a strategy to implement electricity price marketization, which leads to changes in the income of the power industry with changes in the national economy.

The periodic characteristics before the "coal-electricity linkage" was cancelled,

the implementation of this policy strengthened the cyclical characteristics of the power industry. The coal-electricity linkage policy established a linkage mechanism in 2004 and implemented linkage for the first time in 2005. Thermal power accounts for a large proportion of China's power generation. The cost of coal also accounts for a large part of the cost of a company, and the marginal profit of a company is greatly affected by the fluctuation of coal prices. In the current secondary market, the factor of coal price decline has been fully reflected in the price of the thermal power sector, but this factor will not become the core factor leading the price trend of thermal power in the secondary market in the future. Future cycle characteristics: In the future, with the cancellation of the current benchmark tariff system, competition

The grid price will become the mainstream. The future profit growth of the industry will mainly depend on power generation capacity. If the economic situation improves in the future, coal prices will also rise. However, the reduction of general industrial and commercial electricity prices from 2018 to 2019 will have little impact on the power industry. At this time, electricity prices are stable, and the profitability of the power industry has increased. On the other hand, if the economy declines in the future, coal prices will continue to decline, because the country will cancel coal-to-electricity connections in 2019 and will begin to implement a fixed floating price system. Under this system, the future will be accompanied by a decline in power generation capacity and changes in the fluctuation of electricity prices. Corporate profits will face certain pressures.

4. Conversion of coal price cycle to power cycle

Electricity is the most important factor determining the profit growth of thermal power companies in the future. In the future, attention should be paid to the electricity cycle from the coal price cycle to the electricity cycle. In the first half of 2019, the country's thermal power generation output increased by almost 0 year-on-year, while the same period in 2018 increased by 8.0%, the full-year growth rate was 6.0%, and the utilization hours decreased by 60 hours year-on-year. The utilization hours of hydropower generation have been on the rise, while the utilization hours of nuclear power and wind power have been declining year by year. In the first half of 2019, the national hydropower utilization hours increased by 169 hours year-on-year. The hydropower installed capacity of hydropower companies such as Yangtze Power, Huaneng Hydropower and SDIC Power all increased by more than 5%, and Huaneng Group's hydropower installed capacity increased by nearly 60%. The substantial increase in installed hydropower capacity has also led to a sharp surge in the performance of listed hydropower companies. From March 2019 to September 2019, thermal power has the highest operating income. For example, Huaneng Power reached 83.4 billion yuan, while Yangtze Power, the largest hydropower company's main business income, was only 20.4 billion yuan, lower than the top five listed thermal power companies. Although the overall operating income is lower than that of thermal power, the net profit of Yangtze Power reached nearly 8.6 billion yuan. The net profit of Huaneng Group, which is the leader in the thermal power industry, was close to 4.9 billion yuan, which is far lower than that of hydropower companies.

5. Conclusion

The country's electricity demand began to increase in 1999, reached a peak in August 2000, then fell slightly, reached a trough in August 2001, and then continued to increase, and began to maintain a 10% increase in January 2003. After reaching the peak in February 2004, it began to decline again. After reaching the trough in February 2005, it rose again. After reaching its peak again in 2010, it continued to increase with the increase in GDP. Decrease slowly. That is, from 2000 to 2019, the power industry experienced a "balance of supply and demand-local use.

There are two cycles of power shortage-national power shortage-local power shortage-supply and demand balance. If the power project construction and commissioning period coincides with the economic recovery cycle, the electricity price when the project is put into operation is higher than the recession period, and the power generation is also higher than the recession period. Therefore, it is recommended that the project economic feasibility study should include the consistency analysis of the investment construction period and the economic cycle law, which can better determine the economic feasibility of the project. At the same time, when an investment company has multiple strong cycle projects, it must be combined. The economic cycle rules scientifically arrange investment timing to avoid the overlapping effect of strong cycle projects and overwhelm the company's operating capital chain.

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