A Brief Analysis of the Necessity and Feasibility of Chinese Power Market Reform

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Abstract: The development of electric power industry was destined to have a transition from a natural monopoly to competition in the market, the situation of natural monopoly is not suitable for China's national conditions today, the electric power market reform is a complex process, the complexity of the power grid and the real-time balance of producing and using electricity to electricity market reform has brought problems such as difficult problem. So, the necessity and feasibility of carrying out the power market reform are open to question. Since the early 1990s, the construction of the power market has lasted for more than 30 years, and the pace of reform has spread all over the world. Although different countries in the form of market-oriented reform and the background are different, but the whole route all roads lead to Rome, which is to electric power industry as the carrier, give full play to the role of the market economy, so as to optimize the allocation of resources and energy conservation and emissions reduction, improve the production efficiency of the electric power industry, so as to improve the system of electric power to promote the benign development of the power industry. China's marketization process started late and faced many difficulties. Since 2002, when China State Council formally approved the "electric power system reform plan", China's electric power industry has undergone more than ten years of reform, gradually breaking the historic monopoly situation, and initially forming a diversified competition pattern in the electric power market. However, due to the complexity of the power industry itself, imperfect trading system and imperfect market pricing mechanism and many other factors seriously hinder the construction of the power market. Although the course of marketization is faced with many difficulties, but it is urgent to promote the reform of the power system. This article will analyze the necessity and feasibility of China electricity market reform.

1. Necessity

1.1 The disadvantages of natural monopoly are becoming increasingly obvious

At the beginning of the establishment of the power industry, the investment in plant construction was large and the regional networking was difficult. For a long time, some regions were always faced with the problem of power shortage. In order to promote the development of the power industry and form certain scale effect and short-term profit, the monopoly mode was undoubtedly the best choice at that time. With the development of society, power shortage has become a kind of history, the development of power grid has been extremely large, and the network security operation ability is not what it used to be, when the electric energy is saturated, the disadvantages of natural monopoly gradually appear. Because the electric power industry has the characteristics of administrative monopoly, industry monopoly, and regional monopoly, the government and enterprises do not separate, both thermal power by using coal and electricity used by the user are the government pricing, governments do both athletes and referees, seriously hindered the normal development of power industry, the repression of the enterprise and the staff initiative and creativity, to arouse the enthusiasm of enterprise production and operation. Therefore, in order to conform to the development of the new era, in order to enhance the competitiveness of enterprises, to seek a new market model, break the monopoly, promote the harmonious development of power and society is imminent.

1.2 The inevitable trend of energy conservation and emission reduction and the optimal allocation of natural resources

The operation of traditional power industry has the characteristics of planned economy, and its defects and historical limitations naturally appear. With the expansion of network scale, the expansion of industrial structure, the development of national economy and industrial progress, the internal relations of the power industry become increasingly complex, so that the traditional industry model tends to be weak, neither to meet the maximization of social welfare, nor to achieve energy saving and emission reduction and the optimal allocation of resources. The introduction of competition to the power industry will reflect the energy consumption rate through the price, so the indirect allocation of resources by the market is undoubtedly the best option for the optimal allocation of energy. At the same time, hydropower and new energy power generation costs are extremely low and environmentally friendly, and the units are convenient to switch on and off, which provide powerful measures and reliable guarantee for the safe and stable operation of the power grid.

1.3 For a long time plant network development is not coordinated and so on many problems

As one of the triggers of China's electricity reform, the plight of ertan hydropower station is typical. Since the new construction of power plants and power grids takes a long time, and the power industry keeps pace with The Times, the incoordination between power plant capacity and power demand. For ertan hydropower station, it is a rational use of water resources, to provide enough energy for each grid, relieve the strain on the power supply problem, however, built in the operation, the situation has undergone great changes: on the one hand, Chongqing municipality, Chongqing power grid was also independent, on the other hand, since Sichuan power grid has built its own thermal power plants during this period, although the cost of hydropower is low, Sichuan power grid naturally hopes that its thermal power plants can generate more power and generate higher profits since the power plants are not separated from the power grid. This not only makes energy saving and emission reduction impossible, but also causes a huge waste of resources. Such a situation is common in the traditional power industry system, so if these problems are not solved, the power industry to adapt to the needs of modern development is difficult to achieve.

1.4 Difficulties in absorbing new energy resources

The primary energy used in electric energy production is rich and diverse, but because the electric power industry has different characteristics from other industries, the new energy power generation is in conflict with the existing power industry pattern. Current power generation plan is set by the power grid companies, and power generation cost is an important factor to decide whether or not to access the Internet. The first advantage of new energy power generation is its low cost. However, China is a large country of thermal power, and the cost of thermal power generation is larger, then no doubt new energy robbed the jobs of thermal power generation, this creates a "wind fire competition", "over competition" the interests of the situation. Due to the advantages of new energy, thermal power generation was forced to adjust its peak for a time. This situation makes the interests of thermal power enterprises cannot be guaranteed, which is undoubtedly not conducive to the benign development of the power industry. In recent years, power demand slows down, thermal power construction grows against the trend, and a large number of new energy electric powers seek market access, making the current problems faced by the power industry more embarrassed, so it is inevitable to promote the reform of the power system.

2. Feasibility

2.1 There are reform schemes suitable for China's national conditions

Because electric energy has the property of real-time balance, and the network node is various, the network tidal current is complex and China electric power industry huge scale also aggravates its complexity, such kind of question causes the electric power real-time market implementation

difficulty to be big, Therefore, a series of trade types and organizational forms suitable for China's national conditions must be adopted. At present, China adopts a market-oriented electric power balance mechanism with medium and long term trading as the main method and spot trading as the supplement. It avoids risks through medium and long term trading and USES spot market to find prices, so as to gradually establish a complete electric power market system. Medium and long term transactions are conducted in the form of contracts for difference for many years, annually and monthly respectively. The spot market has day-ahead and intraday markets. Through the complementary of different trade way, cooperate each other to make safeguard for our country electric power market reform process.

2.2 Pilot reform to explore new pattern

Because China is a large country, and energy and the unequal distribution of power load center problems led to the complexity of power network in China, and almost entirely by the grid company monopoly distribution power grid, the difficulty of the reform is obvious, and a high reliance on electricity and modern society, power failure caused by the impact is quite serious, would be a disastrous consequences, electric power market reform adopted the pilot reform way. The pilot reform is carried out in different directions, such as the price of power transmission and distribution, power selling side, power system, regional power market construction and spot power market construction, so as to solve the difficulty and complexity separately through regional exploration and improvement, and promote mature technology to achieve the goal of comprehensive reform. At the present stage, we have carried out a number of pilot reforms. The pilot areas have spread all over the country, and have made great breakthroughs in the formulation of transmission and distribution prices and the exploration of spot trading mechanism. The process of follow-up pilot exploration is still continuing to promote, to help China's power market-oriented reform road to move forward steadily.

2.3 Establish and improve the market operation mechanism and power market trading rules system

Market operation mechanism and trading rule system are the navigation lights of the power market reform, so the establishment of the guiding rule system and the maturity of the market operation mechanism are the cornerstones to ensure the reasonable, safe and reliable operation of the power market. At present, China adopts two major market operation mechanisms, namely power trading center and power dispatching center, so as to effectively organize and manage all kinds of transactions, monitor the operation and maintain the order of the power market, conduct safety check, meet real-time balance and ensure the safe operation of the power system. Various provinces and pilots have established a relatively comprehensive rule system accordingly. Taking Guangdong province as an example, detailed rules for the implementation of Guangdong power market management have been established from many aspects, such as spot electric energy, medium and long-term trading, system operation and management, etc., to ensure the smooth operation of power trading and the safe operation of power grid power flow. From exploration to maturity, from experiment to stability, our market operation mode and rule system will be better and better.

2.4 We will improve the market for ancillary services

The auxiliary service market is one of the essential factors for the safe and reliable operation of power system. Auxiliary services usually include: frequency modulation service, reactive power compensation service, black start service, peak load adjustment service, etc. Because the efficiency of auxiliary service is low or even negative profit appears, so its operation strategy has been unable to solve the problem from the root. According to the traditional power operation scheme, usually ancillary services are provided by the plant in rotation. After the introduction of market competition in the auxiliary service, the problem of difficult auxiliary service is solved from the root. The power plant can arrange redundant units for auxiliary service according to its actual situation of winning the bid, which not only avoids the shutdown loss, but also profits from the auxiliary service. At present, we have made a great breakthrough in frequency modulation auxiliary services. In some

regions, a complete market system has been established to ensure the reliability of market operation through appropriate algorithms, so as to ensure the stability of power system frequency fluctuations and other issues.

2.5 There are mature foreign market mechanisms for reference

At present, the foreign power market has been running for decades, and there are some successful cases and some failure cases, which provide us with a good reference. China has always adhered to the road with Chinese characteristics, suitable for China's national conditions, through practice to test the truth, the facts have proved that such a move is correct, because China's situation can not copy the United Kingdom as the representative of the European medium and long term contract road, also can not like the United States to achieve a high degree of maturity of the spot market. On the road of our own exploration, we have learned from foreign advanced concepts and introduced foreign advanced software platforms. At the same time, we have taken some accident cases such as California power failure as a reference, and made prudent operation in the formulation of policies and rules and the implementation of specific plans, so as to take our own reform path step by step.

2.6 The development of electric power industry technology promotes the process of reform

Power system requires balance between power supply and load, and network power flow is extremely complex, which determines the technical difficulty of safe and stable operation of the system. After more than ten years of development, China's power industry has made remarkable achievements. Research breakthroughs have been made in the key technologies of uhv transmission lines, large-scale new energy generation and grid-connection. The development of intelligent transmission technology, distribution automation and other technologies has brought great help to the operation of China's power system. In the past decade, China's power supply has been sufficient, the reliability of power supply has continued to rise, and new energy power has been developed correspondingly, which makes China's power industry go on the green and clean road. With so many technical supports from the power industry, China has the ability to guarantee the process of power market reform in the technical level.

3. Summary

On the whole, no matter from the perspective of solving the disadvantages brought by the traditional mode or seeking better energy management strategy, the process of power marketization is the inevitable trend of the development of China's power industry, and we have the necessity and ability to explore and reform. In spite of the fact that the road is still facing the constraints of market forces, fluctuations of power supply, potential instability of electricity price, power grid power flow and power system planning and many other problems, the trend of market-oriented reform is certain.

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