

Transformation Strategy of China's Electric Power Enterprises under the Goal of Carbon Neutrality

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Abstract. Based on the national goal of "carbon peaking and carbon neutralization", the electric power industry was selected as the research object, and relevant data of various enterprises were collected and sorted out. Field research was conducted on the target enterprises, and relevant national policy suggestions were interpreted. Through analyzing the problems faced by the green and low-carbon development of the electric power industry, the low-carbon transformation and development path of the traditional thermal power industry and the high-quality innovative development path of the emerging green power industry were put forward. This development approach is conducive to promoting green and low-carbon development of the power industry and protecting China's energy security.

Keywords: Carbon Neutralization; Transformation; Electric Power Enterprise.

1. Introduction

In response to the global warming situation, in March 2021, China proposed at the two national conferences that "carbon dioxide emissions should reach their peak by 2030 and strive for the solemn goal of carbon neutralization by 2060". At present, the mode of economic growth in China has gradually changed from resource consumption-oriented to green ecological-oriented. Based on the situation of energy resources rich in coal, poor in oil and less gas, the transformation of traditional coal and coal and electricity industry is very important. In order to achieve the dual-carbon goal, China has taken a series of policy measures to actively promote the transformation of coal and electricity industry [1].

To achieve the dual-carbon goal, the key is to reduce the use of fossil energy, adjust the energy structure, build a new power system, give overall consideration to "clean energy" and "energy supply and demand balance", and explore the realistic path of transformation and development of green low-carbon energy. Existing research shows that the proportion of coal-fired power generation should be continuously reduced, the proportion of renewable energy generation should be gradually increased, and the proportion of gas power generation should be steadily increased, so as to promote the global power structure to a diversified pattern of coal, natural gas and renewable energy [2]. On the basis of promoting efficient and clean utilization of coal, we should accelerate the replacement of clean energy, vigorously develop renewable energy sources such as natural gas, nuclear energy, wind and light as supplements [3], and thus create a diversified energy production and consumption structure. In this paper, through the study of carbon emission, carbon fixation, water resources utilization and solid waste resource utilization of power enterprises, the transformation of traditional thermal power industry is put forward. By selecting a region's green power industry, in order to build a diversified energy production and consumption structure[4], the paper puts forward suggestions for expanding the range of grid access, overall coordination of power grid, expanding green certificate, green power, carbon emission rights trading market,[5] in order to provide reference for the transformation and development of China's resource-based cities, and promote the construction of a clean, low-carbon, safe and efficient energy system[6].

2. Predicament of Thermal Power Generation

Nitrogen oxides and other air pollutants brought by thermal power generation are important factors causing air pollution. At the same time, the shortage of coal resources forces the reform of the energy industry [7]. The coal cost is the main cost of the power generation of the plant, and the coal resources are non renewable resources. In recent years, affected by the supply side structural reform, the coal output in the market has decreased significantly. At the same time, with the gradual depletion of coal resources in the world, thermal power generation requires a large amount of coal. This contradiction between supply and demand will only intensify over time, leading to rising coal prices. In the market situation, many power plants are losing money, and China's power plants are no exception [8].

3. Development Outlet

Floating tariff. The market ushered in the reform of electricity price. First, in principle, all coal-fired power generation entered the electricity market, and the grid price was formed within the range of "benchmark price+fluctuation" through market transactions. The second is to expand the trading price fluctuation range to no more than 20%. Among them, the power plant will directly connect with the power users, so that the power plant will have the power generation indicators in advance, omit the link with the power grid, simplify the procedures, generate power accurately, and the electricity price will fluctuate with the market price fluctuation, which can reduce the pressure caused by the rising raw material prices at the source.

Deep peak shaving. On the one hand, power enterprises can also develop photovoltaic power generation and wind power generation. As an important means to promote the consumption of new energy, thermal power deep peak shaving technology alleviates the phenomenon of abandoning wind and light. On the other hand, for thermal power plants, deep peak shaving cannot maximize the benefits, so the state has issued corresponding policies to encourage enterprises to conduct deep peak shaving. Power generation enterprises can continuously improve the deep peak shaving technology and actively participate in the auxiliary peak shaving market.

Build factories overseas. Due to the large number of employees in most power plants, which puts great pressure on their personnel funds, enterprises can consider following the "Belt and Road" initiative to actively set up plants overseas, and transfer competent, skilled and experienced employees from the original power plants to set up plants overseas. As China's thermal power generation technology is relatively mature, enterprises' overseas plant construction can not only reduce the pressure on local personnel and capital, but also increase overseas earnings.

4. Transformation Suggestions

4.1 Traditional Thermal Power Enterprises

Expand the coal market, switch to foreign and provincial coal markets, tap foreign and provincial high-quality coal sources, and expand procurement channels. Innovate and adjust the coal procurement structure, purchase low-quality coal through market price comparison, coordinate the proportion of main selling coal and blended selling coal, reduce fuel costs, and improve the overall efficiency of enterprises to a certain extent.

Enterprises can fully implement the "speed up and scope expansion" project of ultra-low emission and energy-saving transformation of coal-fired power plants, build high-efficiency ultra-low emission coal-fired power units, and walk out the path of clean and efficient utilization through technological revolution. With the help of intelligent Internet, the energy network will be deeply integrated with information, big data technology, etc. to improve energy efficiency.

Continue to improve the deep peak shaving technology, and improve the stability and safety of unit operation under the deep peak shaving state. Proficient in the rules of the peak shaving auxiliary

market, gain a favorable position in the peak shaving auxiliary market, and obtain the peak shaving subsidy income to a greater extent, so as to improve the operating capacity of thermal power plants.

Seek government policy support. National policies can provide platform support for the reform of thermal power plants. Government policies can give the market an accurate direction and guide the development of the power industry.

4.2 New Green Power Enterprises

Formulate and improve the development plan of photovoltaic power station. Through formulating relevant environmental policies, encourage the transformation and utilization of local abandoned plants to develop floating photovoltaic power generation. Encourage fishery farms to develop floating photovoltaic power stations, make full use of the farm area, and expand the scale of photovoltaic power stations.

The development of affordable online projects can promote the cost control of photovoltaic power generation enterprises, promote the development of photovoltaic power generation projects towards the market direction, and reduce the pressure of government financial subsidies. PPP mode is adopted to solve the problem of insufficient funds for photovoltaic power generation projects, and the corresponding benefits are obtained through green card transactions.

Continue to expand the trading scope of green certificates and green power, straighten out the green power certification mechanism as soon as possible, and ensure that the environmental attributes of green power in China can be uniquely and universally proven. Promote the gradual maturity of the carbon emission trading market, expand the coverage of the main body, and reduce the free quota. At the same time, do a good job of deep integration and reasonable connection between various markets.

We will improve relevant regulatory systems and procedures and strengthen the sharing of statistical information. Promote the supervision and management of cleaner production, and implement the mandatory cleaner production audit for the industry of "double super double high energy consumption". We will accelerate the implementation of the permit system for pollutant discharge and carbon emission, and strengthen the management of hazardous waste and carbon emission control in industrial production.

Promote the construction of power storage equipment, and accelerate the formation of a fully integrated energy ratio of "wind, wind and fire storage". Carry out the integrated operation of the "wind, water, fire and storage" multi energy complementary system, improve the stability of power output, and enhance the power system's ability to absorb intermittent renewable energy such as wind power, photovoltaic power generation and comprehensive benefits.

5. Conclusion and Enlightenment

Against the backdrop of global climate change and greenhouse gas emission reduction, coal is still the dominant energy source for power generation. At the same time, China hopes to seek industrial transformation by cultivating new energy industries. As the two stars of renewable energy, wind power generation and photovoltaic power generation provide clean energy and achieve renewability. However, due to time and location constraints, the development of energy storage capacity is still a good idea. At present, the coexistence of thermal power generation and new energy power generation will still exist for a long time.

From the perspective of goal orientation, problem orientation and bottom line thinking orientation, the power industry should do a good job during the "Fourteenth Five Year Plan" period, including: ensuring power security, making up for the shortcomings of the power system, optimizing the functions of coal power, starting a number of nuclear power and large-scale hydropower construction, promoting the commercial development of energy storage and promoting comprehensive energy services, and improving the energy conservation and emission reduction policy system under the leadership of carbon. At the same time, the connection between energy, transportation, construction and other carbon related industries should be well done.

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