

New energy development plan under the background of “dual carbon” goals

Yunjia Liu*, Xueyan Yin, Xinyue Chen

Department of Electrical Engineering & Information Technology, Shandong University of Science and Technology, Jinan, China.

Abstract

Due to the promulgation of the “dual carbon” goals, the new energy industry has gradually become the main theme of China's current social development, and China's existing energy industry will also face major reforms. Therefore, if we want to achieve the ideal goal, we must adhere to building a new energy system, optimize and upgrade the traditional energy structure, so as to achieve a new period of high-quality development. This paper summarizes and analyzes the background of the “dual carbon” goals, the impact of the policy on the current economic development, the existing problems in the process of new energy development and the planning.

Keywords

“dual carbon” goals, new energy, development planning, social development theme.

1. Introduction

In the 14th Five-Year Plan of China, "carbon neutrality" in 2021 and "carbon peaking" were proposed for the first time, which has aroused a strong reaction from the society and laid the melodic tone for the future social development. But reducing greenhouse gas emissions and increasing the development of new clean energy sources is not a whim. As early as 2015, the Fifth Plenary Session of the 18th CPC Central Committee clarified that the new environmental protection concept of "innovation, coordination, green, open and sharing" should be developed. Among them, "green" is the premise and focus of this concept. Because only "green" and sustainable is an important guarantee for steady economic development. Taking history as a mirror, we also found through the actual cases in the past that the promotion of economic development cannot be based on the premise of destroying the natural environment that we rely on, because the natural environment itself is an economy, and only by ensuring the natural environment can the economic development be promoted sustainably.

2. Background of the “dual carbon” goals

After the concept of "clear waters and green mountains are as good as mountains of gold and silver", this sentence has taken root and sprouted in everyone's heart, and has also become an extremely important part of the melody of social development. At the UN General Assembly in 2020, China showed that it would make its biggest contribution to world environmental protection. Meanwhile, it would introduce relevant policies, optimize the existing energy structure, maximize greenhouse gas emissions by 2030, and balance greenhouse gas emissions and absorption by 2060^[1]. In December of the same year, China said again at the climate ambition summit that its greenhouse gas emissions would fall by more than 65 percent by 2030 compared with 2005. Therefore, in this context, China's social development trend will inevitably appear large-scale adjustment and optimization, in which the development mode and industrial structure of the new energy industry will face major reform and development.

3. The impact on economic development under the “dual carbon” goals background

With the promulgation of the “dual carbon” goals, China's development goal has shifted to reducing its emission greenhouse gas emissions while maintaining the steady development of the national economy. For developed countries, the GDP development model is mainly to stimulate the economic development through the innovation of the tertiary industry. So for developed countries, their economic development is not linked to the total greenhouse gas emissions. However, China's national conditions are still in developing countries, and the development of industrialization is still in a rapid rise, and the improvement of GDP still needs the promotion of the secondary industry such as energy industry^[2]. Compared with developed countries, the tertiary industry can not play a decisive role in China. At the same time, China's secondary industry has gradually transformed from manual operation to machine operation. However, the energy that powers the machine is mainly fossil fuels such as coal and gasoline, which indirectly directly links China's gross industrial product to the total greenhouse gas emissions. Therefore, in this case, if these enterprises are directly shut down, although the total greenhouse gas emissions can be reduced to some extent, it will inevitably reduce China's GDP, so it cannot truly achieve the real purpose of the “dual carbon” goals. According to China's existing national conditions, energy is a solid pillar for social economic development, so if we want to truly realize the great rejuvenation of the Chinese nation, we must implement the “dual carbon” goals, effectively understand the essence of the policy, and promote it to become the main theme of today's social development. Among them, we should continue to adhere to the important concept of sustainable development, and accelerate the reform of the traditional energy industrial structure^[3].

At this stage, if we want to reduce the total greenhouse gas emissions while ensuring that the GDP remains unchanged, the best solution is to greatly develop the new energy industry and replace the traditional energy mode with the new energy mode. In this way, the pillar of China's secondary industry can be guaranteed while reducing the CO₂ emissions brought by the combustion of traditional coal, oil and other fuels. According to China's national statistics, by the end of 2019, only 15.3 percent of new energy sources were used, still a long way from the target of 25 percent. In terms of China's installed capacity of new energy sources, by the end of 2021, China's installed capacity of new energy power generation was 664 million kW, which is still a big gap from the goal of the total installed capacity of wind and solar power reaching more than 1.2 billion kW by 2030.^[4] According to the statistics of China's National Energy Administration, under the background of “dual carbon” goals, the development of new energy will become the main theme of today's social development, and will continue to grow substantially.

4. Problems existing in the process of new energy development

With the proposal of the “dual carbon” goals, the new energy industry has been greatly developed, but there are also various problems in the development of new energy in this era. These questions are key to whether China can achieve the great goal of “dual carbon”.

4.1. Large regional differentiation, limiting the centralized development of the new energy industry

Compared with the traditional thermal power generation, new energy power generation requires more restrictions, resulting in a relatively scattered industrial development scale. And new energy industry such as wind power need large work unit, so the land area is larger, but China's land use division with new energy land planning there are certain differences, at the same time the regional policy may not fully meet the demand of new energy land, so these

problems are greatly limited the large-scale development of new energy industry. Although the land area in the western part of China is large, due to the relatively fragile ecological environment, most of the land needs to build a sand isolation zone, so it is impossible to build large-scale new energy equipment in this area. But China's Central Plains region has a large population and a relatively developed economy. Therefore, the electricity consumption is large, so it is suitable to build small new energy power generation equipment, and the generated electricity can be connected to the grid^[5]. But because the central plains per capita land area is small, the land price is relatively expensive, at the same time in the equipment construction and operation process usually produce greater noise, easy to affect the surrounding residents, coupled with the local government for development will is not strong, so limit the large-scale development of new energy industry in the region. For China's coastal areas, wind energy resources are rich, more suitable for the development of offshore wind power industry. However, the establishment of large wind farms in the ocean requires the layout of various cable pipe corridors on the seabed, which is easy to overlap with the local Marine aquaculture, navigation routes and other areas, resulting in more complex planning.

4.2. The quality and distribution of new energy generation are unstable

Because the electricity generated by new energy power generation equipment has voltage fluctuations and flicker. Because in the operation of the generator set, intermittent impact current resulting in power quality decline. At the same time, due to the existence of nonlinear load electronic devices such as inverters, the unit will produce harmonics in the process of power generation, which has adverse effects on various electronic devices^[6]. Also restricted by the quality and safety of thermal power generation, power grid, high cross-regional power transmission loss, so low transmission utilization; China's power consumption period is relatively concentrated, so it is easy to cause the peak power shortage, and new energy generation can not provide sufficient and stable power in each time period, so it is relatively difficult to maintain the real-time balance of power.

5. New energy development planning

Under the background of "dual carbon" social environment, China should not only develop new energy industry equipment, but also integrate all fields of society into the thought of "dual carbon", so as to achieve the mutual connection between all walks of life. At the same time, we should also strengthen the support of regional government departments. For example, in western China, we should ensure the local ecological environment and make full use of local land resources to develop new energy, and constantly seek a balance between the two. All the local government departments should actively plan the development of the new energy industry according to the local actual situation and the economic development level^[7]. In addition, it is necessary to continuously expand the scale of new energy development, and gradually from million kilowatts level to ten million kilowatts level. At the same time, while vigorously developing the scale of wind power and photovoltaic, we should also strengthen the development of other clean energy sources, establish a complete energy supplement system, prevent the shortage of power supply at the peak of the power grid, and ensure the high-quality and stable output of new energy generation.

We should improve the trading market system for new energy power generation, increase government support, expand the scope of the market, and divide electricity trading prices according to the power load period. At the same time, reduce the power transmission loss, and gradually realize the cross-province high-power power transmission. We will establish a market trading platform for green certificates and carbon emission rights, combine voluntary subscription with compulsory trading, and reflect the green and low-carbon attributes of new energy through the price mechanism^[8].

Under the background of "dual carbon" development in China, the new energy industry is developing on a large scale, and the related technologies are also constantly innovating, because only the continuous reform and innovation can maintain the high-quality progress of the new energy industry. Therefore, it is necessary to further study the basic theoretical knowledge of the new energy industry, increase the capital investment in new energy equipment, introduce foreign advanced technology and equipment, and at the same time, constantly innovate on this basis to form independent intellectual property rights. At the same time, we should learn from the experience of developed countries, establish China's new energy research and development laboratory, take this as a bridge platform, closely combine basic theoretical research with the needs of actual enterprises, and develop the world's cutting-edge new energy technologies. In addition, opinions from all walks of life should be widely solicited, and Chinese universities should be mobilized to conduct industry and science research, so as to achieve a complete technological innovation of the whole industrial chain^[9].

Finally, it is necessary to comprehensively enhance the awareness of intellectual property protection, build and improve the relevant laws and policies, so as to prevent the loss of talents, and then stimulate the innovation enthusiasm of enterprises, and improve the research and development level of new energy products. To ensure the smooth implementation of new energy projects with high degree of transformation and excellent innovation, so as to promote the development of the new energy field and the upgrading of products.

6. Epilogue

During China's 14th Five-Year Plan period, with the popularity of low-carbon awareness among the people and the promulgation of relevant policies, new energy has gradually become the main theme of social development. However, there are still various problems and challenges in its large-scale development process. In the face of these challenges, China will take active measures to move forward to achieve "carbon neutrality" and "carbon peaking".

References

- [1] Dou Hanzhu, Chen Jixiang, Zhang Kuo. Research and analysis of New energy in new power System [J]. Applied Energy Technology, 2022 (04): 36-38.
- [2] Yin Renhao. Planning and development trend of new energy base under the background of "dual carbon" [J]. Shanghai Energy Saving, 2022 (03): 265-271. DOI:10.13770/j.cnki.issn2095-705x.2022.03.004.
- [3] Li Tiantai. Analysis of the development trend of traditional fossil energy and new energy under the "dual carbon goals" [J]. Shaanxi Education (Higher Education), 2022(03):5-6. DOI:10.16773/j.cnki.1002-2058.2022.03.043.
- [4] Su Wenjing, Su Shi, Yang Yang, Yang Jiaquan, Zhang Xudong. Problems facing the construction of new power system with new energy as the main body [J]. Yunnan Electric Power Technology, 2022,50 (01): 24-28.
- [5] Zhang Xiaoqiang. With green and low-carbon energy development as the key to coordinate the "dual carbon" work [J]. Globalization, the 2022(01): 27-33+134. DOI:10.16845/j.cnki.ccieeqqh.2022.01.002.
- [6] Xiao Xianyong, Zheng Zixuan. New power system with new energy as the main body under the goal of "dual carbon": contributions, key technologies and challenges [J]. Engineering Science and Technology, 2022,54(01): 47-59. DOI:10.15961/j.jsuese.202100656.
- [7] Xie LAN, Xiang Yantao, He Wangjuan. New energy to meet the "dual carbon" opportunity is strong industrialization breakthrough resistance and long [N]. Securities Daily, 2021-December-27 (A04). DOI:10.28096/n.cnki.ncjrb.2021.005532.

- [8] Yu Yaofeng, Huang Xinlei. Under the background of "dual carbon" strategy, the new energy storage explosion is promising [N].National Business News, 2021-12-27 (025).
- [9] Zhang Jinping, Zhou Qiang, Wang Dingmei, Li Jin, Liu Lijuan, Zhang Yanqi, Wang Sheng. Research on the development path of the new electric power system under the goal of "dual carbon" [J]. Huadian Technology, 2021,43 (12): 46-51.