Briefly Discussing Measures to Promote the Clean Energy Accommodation

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Abstract: Following the national strategies of energy conservation and environmental protection and sustainable development, it is necessary to clarify the requirements for clean energy development to alleviate energy shortage and control environmental pollution, which can provide support for clean energy development projects. Many companies in China have been involved in clean energy development activities under the guidance of preferential national policies and have made a lot of useful attempts, which have so far yielded certain results. Clean energy accommodation involves a wide range of elements, covering economic, technical and policy aspects. In addition, the extremely deep interest relationship exists between new energy generation companies, conventional energy generation companies and users. Due to the complexity of the situation, it is difficult to realize the idea of clean energy consumption in the short term. Based on the "14th Five-Year Plan" development policy system, this paper proposes measures to promote clean energy accommodation around the new energy and hydrogen energy industries. And on this basis, combined with the operation of the electricity market, this paper gives suggestions to promote the level of clean energy consumption in order to have a positive role in promoting energy consumption in China.

1. Introduction

During the “14th Five-Year Plan” period, responding to the strategic instructions made by the state in the energy sector, the energy industry has been transformed by innovation, controlling the direction of the industry development, continuously increasing investment in models and technologies, and promoting technological innovation. Guided by national policies a synergistic upstream and downstream development relationship is established between the new energy and hydrogen energy industries. During this period, the large-scale scenic base construction projects are continuing to advance. Due to the demand for electrical energy replacement, hydrogen energy "production, storage, transmission and use" technology is constantly innovating, which provides technical achievements for China’s economic development in a green and low-carbon direction.

2. Analysis of the current situation of clean energy accommodation

2.1 Construction of clean energy consumption demonstration model projects

During the process of replacing electric energy with clean energy, demonstration projects should be actively promoted, project construction requirements should be clarified and effective solutions should be given to rely on the increment of electric energy for clean energy consumption. In the use of electric energy substitution technologies such as electric storage boilers, decentralized electric heating and coal-fired captive power plant substitution, the consumption of clean energy power should be demanded by electric energy substitution and the use of equipment that can achieve peak and valley regulation such as storage and cooling air conditioners. In the promotion of new energy electricity storage projects, the electrical energy increment is significantly enhanced, and the system flexibility will also grow. The project to convert coal to electricity in areas such as Beijing, Tianjin and Hebei has enabled the transformation of coal-fired boilers for clean heating in key cities in the northeast, which can be carried out quickly. For the northwest region, increasing of light and wind energy, there are more wind and wind...
complementary heating projects. Based on the corresponding works, energy transformation through the use of light and wind energy, which is abundant at the site\[1\].

In the industrial sector for industries that consume more energy, new energy generation modes must be explored. Under the requirements of the national industrial policy, various industries in China need to be grouped according to their own energy consumption in production activities. And for industries that are subordinate to high energy consumption, electrical energy replacement work is carried out at an accelerated rate to generate electricity with clean energy for industry production activities and reduce the use of energy in the development of the industry\[2\].

2.2 Application performance of new mechanisms for electricity substitution

In the clean energy consumption, the replacement of electric energy should promote activities with a new mechanism to ensure that electric energy can replace the participation mode and the participation subject. In the new energy consumption, the service mode is constantly adjusted according to the work needs. The electric energy is gradually applied to the business field of energy saving service companies. The energy saving service company serves the users and acts as a third party to trade with them. In the link of expanding the participation subjects of electric energy substitution, it cooperates with the heating company to establish a strategic partnership, which gives solutions to the problems of winter heating and wind power consumption. In the mapping of electrical energy substitution, a positive incentive system is established around the work. For the implementation of demonstration projects, work innovation, preparation of important reports, participation in project research and the introduction of subsidy-type policies, all of which can become important support means to promote electrical energy substitution work. For power users who are actively involved in the activities, certain concessions will be given, if the policy allows, to further increase the enthusiasm of power users in the electric energy substitution activities, so that they can participate well in the activities and serve for the smooth development of China's clean energy consumption activities\[3\].

2.3 Base projects are under greater economic pressure

The construction of large wind and photovoltaic bases will use the technology of hydrogen production to be able to produce electricity in the use of energy, but its construction costs appear to be too high at the moment. Photovoltaic power stations have a greater pressure in base projects due to evaluation projects. There is a greater pressure on the economics of our large base projects, which result in larger costs required for photovoltaic systems due to material acquisition and technical development needs when building photovoltaic systems. In addition, the new requirements imposed on photovoltaic systems have led to a continuous rise in the costs required for the construction of the systems, which can have a negative impact on the operation of large base projects. In the second half of 2020, the construction costs of wind power photovoltaic projects are raised significantly and the prices of the photovoltaic industry chain change, while the trend of rising industry chain prices will continue for some time. Wind photovoltaic projects in the early stages of operation, due to the presence of technical and other factors, higher prices are to be expected. According to the predictions put forward by the industry, wind power photovoltaic industry chain prices will gradually decline with the development of new energy technologies, but at the moment there is no downward trend in the construction cost of photovoltaic power stations. The performance of wind power projects and photovoltaic power projects in operation is different in terms of kWh investment, with wind power being significantly lower than photovoltaic in terms of kWh investment. From the recent performance of photovoltaic projects, it is more difficult for photovoltaic to achieve grid parity in a short period of time\[4\].

3. Measures to promote the consumption of clean energy

3.1 Ensuring the position of nuclear power as the main source of base-load power in China's energy mix

In China's energy structure, it is important to give a plan for the development of nuclear energy that is suitable for the development of our electricity market. In the course of the large-scale development of clean energy sources such as solar and wind power, the dominant advantage of nuclear power as a base-load power source is more prominent. Guided by the goal of carbon neutrality, the multi-energy synergy with the carbon neutrality target proposed by the state needs to be used as a traction tool. Based on the demand for energy use and existing energy reserves, the country has formulated a nuclear development plan coordinated with the two-carbon goal after weighing various aspects, which promotes the synergistic development of clean energy. During the use of nuclear energy, it is necessary to dismantle China's new energy system and give energy construction plans under the dual carbon goal, which improves the rationality of the planning content. For new energy projects such as solar and wind energy, the construction of nuclear power projects is given in conjunction with the planning requirements for cross-regional grid channels, on the basis of which an energy supply system is established. This energy system uses nuclear power as the base load power source to provide a guarantee for the stable operation of the power system, to avoid the problem of high energy consumption during power transmission and to achieve the goal of electricity transfer\[5\].

There is an urgent need to establish a new grid model, which should form an integrated development model.
with scenery, nuclear and storage as the main lines, and increase the capacity of new energy sources such as wind and light energy in the grid connection. The coordination and operation of all types of power sources has become a concern for modern grid operation. At the moment, combined with the needs of electrical energy production and transmission, modern intelligent technology can be used. The modern intelligence technology encompasses a larger number of elements, using the nuclear power plant as the centre of work, enabling intelligent control of scenery and nuclear storage in a certain range and providing conditions for the interconnection of scenery and nuclear storage energy-related activities. During the construction of the scenery base, the intelligent energy internet established needs to have the ability to self-regulate. Nuclear power has been very influential in the clean energy system, and when the smart energy internet is built, it will play a role in promoting various clean energy projects, and will also have a strong ability to regulate the coordination of the grid, so that all elements are in a balanced state.

During the construction of a large scenic site, a solution is given for the integrated development of nuclear energy and hydrogen production, so that the two can be well integrated in the coming period. The development of hydrogen production in China has not been short, during which time an industrial base has been formed in the country, and the coupling of clean energy, nuclear heat, nuclear power and other energy sources to carry out the work of hydrogen production can improve the effectiveness of this work. In the field of hydrogen production in China, high-temperature gas-cooled reactor hydrogen production is favoured by the industry and is believed to have better performance in the future, which has made certain achievements in the present. According to the requirements made by the state for energy development, the industrial layout of nuclear energy to produce hydrogen should be done well to promote the development of nuclear energy to produce hydrogen technology. Hydrogen energy has undoubtedly become an important element in the development of energy strategies in China. The research and development of nuclear hydrogen production technology needs to be coordinated with wind energy construction projects, while ensuring an adequate supply of resources, which can meet the demand for resources for the research and development of nuclear hydrogen production technology. At the present time and for some time, high-temperature pyrolysis of hydrogen from high-temperature gas-cooled reactors needs to be a research priority to provide the conditions for the realization of large-scale hydrogen production[6].

4. Recommendations to promote clean energy consumption levels

4.1 Introduction of interruptible tariffs

It is important to forecast and judge future development trends, to consider the study of new energy grid connection and consumption, to promote stable system operation, to improve the capacity of new energy grid connection services, the results that emerged during the construction of the electricity market. In the coming period, it is necessary to promote the work of new energy consumption according to the demand. In China’s electricity market, it must systematically analyze demand and work accordingly during this activity, which has a huge impact on load control and allows for operations such as China’s time-of-use tariff and load interruptions to promote the consumption of new energy. During the growing improvement of China’s market mechanism, new energy consumption should be clarified and activities should be carried out with real-time tariffs. New energy companies seek new methods of energy consumption, improve the flexibility of new energy consumption in resource allocation and create a market-based operation mechanism that meets the relevant requirements[7].

Over the past few decades, the purpose of interruption tariffs is to control peak loads and avoid shortages of power supply capacity during peak power supply periods. When new energy sources are connected to the grid on a large scale, interruption load control can be chosen to solve problems such as insufficient new energy backup, combined grid transfers and wind power conflicts. Under the orientation of new energy consumption target, the work of electricity price interruption guarantee should be carried out to improve the effectiveness of this work. In the new energy promotion activities, the newly established new energy consumption is used for the purpose of promoting new energy consumption by interrupting the load. In the operation of this mechanism, the focus of attention will be on the exploitation of demand-side resources, in which the potential for consumption is exploited to the extent possible. In promoting new energy grid connection in the development of interruption tariffs, it is important to ensure that tariffs are set at a reasonable level to prevent excessive costs of integration of new energy sources into the grid[8].

4.2 Awareness campaigns on clean energy consumption at the social level

Although the idea of clean energy consumption has been proposed for some time, many subjects do not have a correct understanding of clean energy consumption, nor have they formed the relevant awareness, which are unable to adjust their perceptions in a timely manner in line with the strategies made by the country in terms of energy. The relevant departments should do a good job of promoting the new energy consumption activities, so that more people are aware of the significance of clean energy consumption, which enterprises can take clean energy consumption as the main idea in their production and study ways of replacing electricity with clean energy. The problem of consumption can be solved by the participation of many subjects. In China, clean energy and new energy are gradually increasing in number and the industry is gaining momentum due to the support of the state. There has been a gradual increase in the number...
of companies in related industries, committed to the expansion of production scale. However, market mechanisms should also come into play when companies expand their production scale. According to the information available so far, there are still some gaps in the market distribution system. Industry personnel need to clarify the concept of green development in the electricity market. When designing and operating, industry personnel should carry out innovative activities for clean energy consumption and strive to improve the mechanisms related to clean energy consumption to provide a boost to green development. The current transaction costs in the power industry are high and the price of energy use is not reasonable. If the situation is not better controlled, the consumption of clean energy will be hindered and the generation of electricity will not be carried out in accordance with the requirements set out in the green development concept. Now that China has achieved full interconnection and the establishment of a unified mechanism in the electricity market can improve energy exchange capacity. In the development of clean energy, the consumption market should be based on the existing characteristics of the power sector, with a unified set-up for operational design and other tasks, giving a coordinated solution. In the way of network interconnection, the unified and coordinated development of the power grid is promoted, and after all the subjects have formed a sense of clean energy consumption, it provides a solid backing for the green development of energy in China.[9]

4.3 Establishing a high share of new energy power systems

In the energy transition, the new energy installations have shown a steady increase in China, which has been maintained for 10 years. After the country proposed clean energy consumption, the northwest region, with its fertile solar and wind energy resources, is rapidly promoting clean energy construction work. According to a number of indicators, the Northwest Power Grid has more achievements in the field of new energy generation. Based on the high proportion of new energy in the outgoing scale of the Northwest Grid, active exploration is being carried out in terms of system security perception and balance. The Northwest Division of China needs to establish an energy balance model for the energy internet at minimal cost in order to determine the role of electrical energy in the energy internet. In addition, the North West Division should make electrical energy replacement an important task in the construction of the project. According to the future demand for the use of the energy internet, new energy companies focus on the construction of high percentage new energy power systems to determine the future direction of new energy construction. When building a high proportion of new energy power systems, new energy companies will give corresponding planning and development solutions for safety reasons, to remove obstacles to grid security and stability. According to current information, there is an irreconcilable conflict between frequency stability and grid security stability, which cannot be achieved simultaneously.[10] During the construction of wind power photovoltaic base projects in the Northwest Division of China , new energy companies set up monitoring systems and early warning systems for rotational inertia to achieve full monitoring of system operation and to guide conventional units to operate in a scientific and effective start-up form. By monitoring the frequency of the high percentage of new energy feeders and providing effective protection solutions, the new energy feeder grid can be kept in a relatively smooth state during operation. In the balance of the high-occupancy new energy power system, it is necessary to respond on the load side according to the situation of the Northwest Division of the State Grid in terms of balance. Based on the analysis of the quantitative relationship between new energy utilization and different loads accordingly, a practical approach towards load measurement should be explored to ensure that the functional requirements of load measurement are met. For load-side peaking work, the service market should be used to increase the power level of equipment and further expand the space for consumption, using the model of virtual energy storage.

4.4 Expanding the space for clean energy consumption

Grid companies should be clear on the importance of clean energy consumption in their own future development. Power grid enterprises need to pay attention to the development of clean energy consumption and fully support the related work. According to the Party Central Committee's decision on the content of the deployment of a clear division of labour, power grid enterprises, based on the big picture dimension, should follow up on the various tasks of clean energy consumption, such as the reasonable deployment of energy and the eastward transmission of electricity from the west when the construction of clean energy projects. Hydropower consumption in China has been underway for some time, but the situation remains critical. There is an immediate need to increase the amount of clean energy across the grid to ease the dire situation of hydropower consumption. In the activity of renewable energy consumption, it is necessary to control the amount of rejected water, which limits it to within 200 billion kilowatts. This achieves full consumption of renewable energy such as photovoltaic and photoelectric power.

4.5 Enhancement of transmission line construction

The development of clean energy has received extensive attention from the general public, and it is closely linked to China's manufacturing industry. Renewable energy generation provides ample electricity to supply manufacturing industries with enough power to meet their production needs. After the country proposed the concept of green sustainable development, the electricity
industry needs to clarify its future development direction, adjust its work forms, and respond to the requirements of the country's green development. During the process of the country's various strategies focused on energy conservation and environmental protection, it is necessary to provide clean energy consumption solutions based on the green and energy-saving development concept, which becomes the basis for the benign construction of clean energy consumption projects. When clean energy consumption projects are operating, it is necessary to establish clean energy systems that enable energy to be transported across regions to ensure the operation of power grids. Based on the macro-level study of China's clean energy development, it needs to give a scientific resource planning scheme to meet the sustainable development of new energy needs.

5. Conclusion

In summary, at this stage, clean energy consumption needs to be analyzed in terms of the factors that influence it, and awareness campaigns should be promoted to facilitate a proper understanding of the importance of clean consumption. With the campaign, all parties are called upon to participate in clean energy consumption activities and propose targeted solutions to specific problems. In clean energy consumption, analysis is carried out from the demand side and marketing should focus on clean energy consumption and make it a long-term undertaking, aiming to achieve organic coordination between conventional business and clean energy consumption and to connect with customers. China needs to do a good job of electric-hydrogen coordination in the construction of renewable energy base power generation and grid connection, to solve the problem of power volatility brought about by the continuous rise in the proportion of renewable electricity, which is of greater significance to China's power sector and energy sector to achieve sustainable development.

Reference


