Preliminary Study on the Development of New Energy in Jilin Province

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Keywords: New energy, Development, Energy structure, Reform.

Abstract. Jilin Province, as an old industrial base in Northeast China, is also one of the regions with more new energy and renewable energy sources. How to adjust the energy structure to make it more conducive to the revitalization of the Northeast and economic development? At present, although the economy of Jilin Province is on the rise, the economy is still ranked lower in the country. How to revitalize the glory of the eldest son of the Republic, carry out energy structure reform, make full use of new energy is the only way, and build an environment-friendly country. The inevitable choice.

New Energy in Jilin Province

Compared with other provinces in China, Jilin Province is one of the few regions with a relatively complete range of new energy and renewable energy resources. Wind energy, biomass energy, solar energy, hydropower and geothermal energy have abundant reserves in the province. New energy and renewable energy have unique resource conditions.

Current Status of Wind Energy Use

Jilin Province is located in the middle and high latitudes of the East Asian continent and is rich in wind resources. Ranked fifth in the total amount of national wind resources. The main features of wind energy resources in Jilin Province compared with other regions are as follows. (1) The annual effective wind speed is long and the wind energy can be utilized to a high degree. In most areas, the effective wind speed utilization time of 70 meters high is above 7800h, and in some areas it can reach more than 8000h. The annual power generation hours are relatively high. (2) The wind speed is stable, there is little destructive wind speed, and the wind speed frequency distribution is good. The wind speed is mainly concentrated in 4~9m/s, the wind energy is concentrated in 6~15m/s, and the wind speed distribution is concentrated. (3) The distribution of wind direction is more dispersed, and the wind is suitable for plum blossom arrangement. Jilin Province is a province with relatively early use of wind resources in China. In 1999, the first wind farm in Jilin Province, Tongyu Tongfa Wind Farm, was built. After more than ten years of construction, by 2010, there have been 17 power plants in Jilin Province, with a total installed capacity of 140.9 watts, accounting for 12% of the direct installed capacity of Jilin Province. Wind energy has provided tremendous energy for power generation in Jilin Province, and has become the second largest power generation method in Jilin Province, reducing large energy consumption.

Status of Use of Biomass Energy

As a large agricultural province, Jilin Province has a unique advantage in developing biomass energy. First, the biomass is rich in reserves. There are a large number of agricultural products, agricultural wastes and surplus materials available in Jilin Province. Jilin Province is the main producing area of corn, producing a large amount of straw per year, and half of the annual production is used for the development and utilization of biomass energy. Second, Jilin Province has advanced energy agriculture technology. At present, Jilin Province has initially mastered the technology of crop straw conversion into gas. Third, preliminary application of biomass energy has begun. In recent years, Jilin Province has started its energy utilization projects such as the use of
biogas and the development of liquid fuels using biomass energy. In the straw power generation project, three straw power generation projects have been put into operation, with a total installed capacity of about 72,000 kt. In the waste energy utilization project, mainly using garbage energy to generate electricity, two power plants have been built in Changchun City and Jilin City, with a total installed capacity of about 42,000 kt. In the biogas project, Jilin Province has more than 100,000 rural biogas digesters and 10 small straw gasification stations. Biomass energy plays a very important role in the heating of Jilin Province, and it will become an important part of the future new energy.

Current Status of Solar Energy Use

Jilin Province is one of the northernmost provinces in China and belongs to the mid-temperate continental climate. The average solar radiation in Jilin Province is 4787 MJ per square meter. The annual sunshine hours are 2200 to 3000h, and the percentage of sunshine is about 60%, which is an available area. Among them, the eastern mountainous area of Fuzhou, Jingyu generation, central Changchun, Siping area, Tongyu, Daxian, these areas in Jilin Province are the most abundant areas of light resources. At present, the use of solar energy in Jilin Province has the following aspects. One is the solar solar greenhouse, which uses solar, film and other materials to build a solar sunroom. Mainly used for anti-seasonal species and raising production. The second is the application of “sun room”, which mainly uses solar energy insulation room to improve rural living conditions and save energy for winter heating. The third is solar water heaters, solar cookers, providing hot water heating for life. The fourth is solar power generation, which mainly uses solar photovoltaic power generation to convert solar energy into an independent power source, mainly for residential life. As of 2010, the solar water heater has a heat collection area of 1 million square meters, including 70 square meters of solar water heaters in urban areas, 30 square meters of solar water heaters in rural areas, and 22,160 solar energy houses. 630 units. Although there are still considerable obstacles in the use of solar energy in Jilin, in the future, solar energy will become one of the mainstream energy sources in Changchun.

The Obstacles Encountered in the Development of New Energy in Jilin Province

Cost hindrance. At this stage, due to technical reasons, the use of new energy requires excessive costs. At present, the world's best wind power control countries are Germany and the United Kingdom, where German onshore wind power costs ($80/MWh) are lower than natural gas ($118/MWh) and coal ($106/MW). Wah). However, it is clear that China does not reach this level, and above the traditional power generation cost, this does not count the cost of replacing the wind turbine with energy structure reform. Any wind farm needs a lot of government subsidies to build a living. Moreover, the cost of research is even more unpredictable, so so far, cost hindrance is the most realistic problem.

Obstacles to reality. The rapid development of China's economy neglects the construction of a healthy market system. Many people rely on speculation to make a fortune. New energy is a hot spot, and people want to take a slice of it. As a commonly used method of collecting money in the financial market, if you buy a wind turbine, you will dare to use the name of new energy to defraud financing. The lack of supervision leads to a waste of social resources, and even the formal new energy enterprises want to develop due to technical defects. It also requires a large amount of government subsidies to survive, and now the global economy is cold, the government also has a large number of bad debts, and it is difficult to effectively subsidize enterprises.

Cultural obstacles (heating). In the past when the economy was underdeveloped in Jilin Province, the winter heating was used for fire. With the acceleration of urbanization in the 1990s, air conditioning could be used as a substitute for heating or geothermal. However, heating seems to have become the cultural symbol of the people of the North. It will take so many years of heating and fire to change into air conditioning, which requires a lot of time to get used to, obviously not in line with the increasingly lazy modern life pursuit.
Environmental obstacles. In 2015, we ushered in the strongest El Niño phenomenon in history. Unscientific resources have used to raise sea levels and the global environment is unbalanced. This obviously forms a vicious circle, extreme weather, weather, wind power, solar energy and other resources. Needing environmental support, El Niño's enhancement has destroyed the original new energy projects, and has also created a major obstacle to the development of new energy.

The Development Strategy of New Energy Industry in Jilin Province

Strengthening the Design and Supervision of New Energy Policy Systems

The design of the policy system is the key to ensuring the health of the new energy industry. It is necessary to actively formulate local regulations and systems suitable for Jilin Province while implementing the current national laws, regulations and related policies; insist on the new energy planning of Jilin Province and the new national The energy plan is organically integrated, and more projects will be incorporated into the national “13th Five-Year Plan” and medium- and long-term development plans for new energy and renewable energy, and more policy support will be sought; a strict market access system and industry supervision for new energy industries will be established. The system objectively examines the mature industrial chain system of the new energy industry in Jilin Province, and conducts objective evaluation and reasonable investment to avoid the repeated investment or over-investment of new energy industry projects in response to the development of upstream and downstream industries.

Make Full Use of Policy Advantages to Promote New Energy Technology Research and Development

Actively strive for relevant state financial subsidies, directly serve the construction of new energy science and technology innovation platform, new energy key technologies and cutting-edge technology research and development; use provincial-level new energy finance special funds for industrial demonstration and promotion, supporting facilities construction, key core technologies Give priority to R&D; integrate existing technologies and team resources for renewable energy research, set up new energy technology research institutions in Jilin Province, solve key and common technical problems in industrial development, and promote industrialization of scientific and technological achievements; to Northeast Electric Power University, Agricultural University Based on the institutions of higher learning, establish provincial laboratories for wind, solar and new energy, and engage in basic research on renewable energy technology development; encourage enterprises to establish wind power, solar energy, new energy innovation or R&D centers, and engage in renewable energy technology development. Application research and system integration work.

Comprehensively Optimize the Regional New Energy Industry System

First, focus on financial support, tax reduction, talent cultivation, and promotion of listings to support park enterprises with outstanding main businesses, core technologies, and strong market competitiveness, and vigorously cultivate leading enterprises in the industry; Brand operation, technology input, management participation and other means to carry out mergers and acquisitions across regions and industries, to gather superior assets and achieve strong alliances; third, to clarify market positioning, product positioning, and cultivate "special, refined, special, new "Products, forming a group of "fist" products with unique competitive advantages, promoting the clustering of new energy products; Fourth, establishing renewable energy industries and industry organizations, giving play to the association in talent training, technical consultation, information exchange, international cooperation, etc. In terms of its role, a relatively sound new energy industry service system will be established.
Note the Development and Training of Specialized Talents in the Energy Industry

First, take effective measures to encourage science and engineering colleges and vocational and technical colleges with better education and teaching resources to open new energy-related majors, and train a group of advanced compound talents and technology research and development talents that are urgently needed for the development of new energy industries. Researchers, workers who have mastered the technology or process, and experienced managers of the company pay great attention to them, give play to their exemplary role, and adapt to the real needs of the market-oriented development of new energy industry in the province as soon as possible. Second, actively carry out international talent exchange. And the cultivation and introduction of compound talents, through the use of high-paying, technology-based shares and other means to attract international or foreign new energy elites, sea turtles and other talents to join, create a good academic platform and research atmosphere, build a high-end integrated platform for production, education and research, form a stable talent team; thirdly, actively support universities and related enterprises in Jilin Province to jointly run schools, build a qualification system for new energy companies, establish a teaching practice base for renewable new energy, and cultivate new energy fields based on market demand. Talent; fourth, establish Full related personnel training system and evaluation system, improve the new energy skilled in the art of qualification management system to comprehensively promote the training of vocational qualification certificate system and market mechanism.

Acknowledgement

The phased research results of the "13th Five-Year" Social Science Research Project of Jilin Province, "Study on the Strategy of New Energy Development in Jilin Province" (Ji Jiao Ke Wen He Zi [2016] No. 330)

References

[1] Shi-li Li. Research on the Incentive Regulation of the New Energy Industry in Jinlin Province, Changchun University Master's Thesis, 2017.

[2] Qing-hui Lin, Tao Wang, O New energy status and development methods in Jilin Province, Business Review, 532 (2016) 4-6.

[3] Zhen-dong Shang, Dong Gao, Zhi-peng Jiang, Yong Lu, Developing a new energy performance indicator for the spindle system based on power flow analysis, Proceedings of the Institution of Mechanical Engineers,2019(1687-1699).