

# Analysis of China's New Energy Industry Development from the Perspective of Low-Carbon Economy

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**ABSTRACT:** At present, the world is experiencing a serious climate change problem, and the consumption of high-carbon energy sources such as coal and oil undoubtedly brings great harm to the environment. In this context, some European and American countries have promoted a low-carbon revolution with high energy, high efficiency and low carbon emissions, focusing on developing low-carbon technologies. This paper mainly discusses the new energy industry from the perspective of low-carbon economy in China, and believes that China should also make a deep thinking on low-carbon economy and makes improvements of the industrial energy of some enterprises. This paper hopes to offer some references for the development of small and medium enterprises.

## 1. INTRODUCTION

Development of low carbon economy is an important requirement of sustainable development in China, this paper mainly analyzes the development of China's new energy industry from the perspective of low carbon economy, in view of the problems existing in the energy industry, this paper puts forward relevant opinions and suggestions on improving the present situation, and hopes that through the development of low carbon economy, the government can better adjust the industrial structure, better optimize the energy structure, and eventually bring better living environment.

### 1.1. The current development status of new energy in China

#### 1.1.1. Hydropower

Since the founding of the People's Republic of China, conventional hydropower generation accounts for 10% to 33% of the total output, occupies an important position in the power industry, and is the mainstay of China's national economic development [1]. Hydropower plays an extremely important role in both global energy supply and greenhouse gas emission reduction. China has made unprecedented improvements in the development of the hydropower industry chain. In the future, hydropower development will be an important field of energy development. Although China's hydropower started late, but the development speed is rapid, whether in the survey, design, planning, construction and operation, we have our own set of management experience, and China has many large hydropower projects, the establishment of these

hydropower stations marks China's hydropower technology can not be underestimated. However, in China, there are still many problems that have not been completely solved. For example, the uneven spatial and temporal distribution of water resources leads to less per capita occupancy. Overall, China's water resources conditions have not reached an extremely superior state, which leads to difficult and heavy development of hydropower. Secondly, China's river system is complex, and the difference between the north and the south is large. In addition, China is a developing country, with a large population density base and a complex human-water relationship, which determines the difficulty of river governance in China. And the development of hydropower restrictions significantly more than biofuels, although water obviously cleaner, inexhaustible, but water distribution by hydrology, climate, landform, can only in a specific location construction of water conservancy facilities, and other hydropower is completely dominated by the country, the core technology often not exist in the form of invention authorized patents, there cannot be a lot of patent transfers [2]. China clearly stated in the 13th Five-Year Plan that China needs to vigorously develop hydropower to deal with global warming, energy conservation and emission reduction problems. However, many power companies carry out vicious wars for their own interests, which is extremely unfavorable for the development of hydropower. Therefore, we should guide the leaders to compete correctly to ensure the normal and stable development.

#### 1.1.2. Wind power

China's current wind energy resources are abundant, in terms of resource reserves, China's total wind energy resources are about 3.326 billion kilowatts, the high power,

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and about 31.33% of the wind energy resources can be used, and some of this is wind energy in the ocean, for the majority of the wind energy resources, about 75%; some of the wind energy resource is on land, taking up 25% of the available resources. Therefore, the total amount of wind energy resources in China is large, but it is very difficult to use it, and most of the country's nearland marine areas need extremely high mechanical equipment. And with a very high strength and a very good corrosion resistance, this allows the use of wind energy resources in the ocean, so as to better alleviate China's energy crisis and sustainable development of the strategic goal of [3]. In the development of wind power, China has unique advantages because of China's vast territory, long coastline, and very rich onshore and offshore wind power resources. But due to the complex and changeable terrain conditions, China's wind power resources spatial distribution is extremely uneven. At present, the target of cumulative installed capacity exceeding 100GW in the 12th Five-Year Plan has been successfully completed. In addition, in this period, its installed capacity and generating capacity are growing at an annual rate of 29%. In 2014, China's total power generation and wind power generation increased by 3.2% and 9.49% respectively compared with the previous year, reaching 5.46 trillion KWH and 153.4 billion KWH respectively. This data is only about 2.78% of the total national power generation. The national wind power grid power reached 97.7 billion KWH in the first half of 2015. Due to China's rich resources and the government's attention, the wind power industry has grown rapidly since 2005. The current wind power installed capacity has ranked first in the world, from the initial foreign introduction to now domestic machine, and has experienced rapid changes, but there are some imbalances on the core technology, on the industry layout. And technological innovation, policies and regulations still exist insufficient, still need to be further improved. Laws and regulations are a strong guarantee for the development of industrial norms. The reason why China can develop rapidly in the wind power industry is that the government has gradually improved the relevant laws and regulations and formulated effective policies.

### *1.1.3 Biomass energy*

China's bio-energy storage volume is particularly rich, so bio-energy is very good for the development and utilization value. In order to solve the problem of rural energy, in the 1970s to 80s, the government has introduced a series of policies, including 1979 on the current rural construction report, in 1984 the report on further development of biogas, in 1986 the opinions on strengthening the construction of rural energy, into the 90s, with the renewable energy outline and planning, biomass energy began to enter the stage of industrial development [5]. At present, there are many forms of bio-energy in China, mainly using straw and charcoal forest land, which can make extensive use of bio-energy, with wide energy distribution and high utilization rate, and bio-energy can be easily formed in infrastructure construction. Therefore, bio-energy does not need the support of high-tech level,

but needs a high-level management system [6]. In the face of domestic environmental pressure, China attaches great importance to the adjustment of energy structure and the development of clean energy. With the encouragement of the sustainable development of renewable resources in China, the investment enthusiasm of biomass power generation is rapidly rising, showing a comprehensive accelerated development state.

At present, the proportion of biomass energy in renewable resources is gradually expanding. From the perspective of the energy structure and its status changes, with the continuous growth of power generation, its status is constantly rising, and it is gradually becoming a new force in the utilization of renewable energy in China. Biomass energy has always been an important energy source for human survival. It is currently the fourth largest total energy consumption in the world after coal, oil and natural gas, and occupies an important position in the entire energy system. Biomass energy is the energy stored in biomass, a renewable energy source that burns easily and has a low ash content. In order to alleviate China's energy shortage problem, it is important to manage environmental problems and protect ecological security, the state should vigorously support the development of biomass energy. In relevant national funds, especially with the support of strategic pilot technology, the Chinese Academy of Sciences and the subversive Chinese Academy of Sciences Chemical Technology for preparing biological jet fuel from wood fiber raw materials, support the development of national fuel ethanol and biomass fuel industry, and make breakthroughs in key technologies and industrial demonstration with the production technology of agricultural waste alkanes as the core [7].

### *1.1.4. Ocean energy*

On the whole, China is very rich in Marine energy resources. Marine energy is a kind of renewable energy contained in the ocean. Marine energy includes tidal energy, wave energy, temperature difference energy, sea current energy, salt difference energy, offshore wind energy, etc. The ocean energy utilization is not high, in most of the form of ocean energy, people can only use a small part of it, because of a variety of weather conditions in the ocean, prone to corrosion, and because the waves are violent, power generation device in the ocean must have enough strength, which leads to the ocean development difficulty greatly enhanced, so ocean development has a high threshold, need strong economic enterprises and national subsidies to jointly develop [3]. China has a coastline of 18,000 kilometers and 6,960 islands with a total area of 6,700 square kilometers, which are far away from the land and lack of energy supply. Therefore, to achieve the sustainable development of the coast and islands, it is necessary to vigorously develop marine energy. The most abundant tidal energy resources in China are concentrated in the coastal areas of Fujian and Zhejiang, and China's wave energy is mainly distributed in the coastal areas of Fujian and Guangdong provinces and the coastal areas of Shandong. China's temperature difference energy resources occupy the first

place among all kinds of marine energy with the exploitable resources of more than 1.3 billion kilowatts, and China has a large number of oil-rich algae population, which is suitable for the development of marine energy. However, at present, there is still a certain gap compared with the world level, the total amount is huge but with uneven distribution, the one-time investment is large, the policy is unclear and the talent structure is unreasonable. At the current stage, the main tasks of marine energy development and utilization research in China focus on the commercial operation of tidal power stations and the research and development of wave energy and tidal power prototype demonstration projects and related equipment. To this end, China has specially formulated the 12th Five-Year Plan and 13th Five-Year plans for the development of marine renewable energy, implemented and completed a series of marine energy projects and achieved certain results. However, compared with the top countries in the world, there are still problems such as weak basic research, less original technology, reliability, stability and efficiency of the device.

## **2. EXISTING PROBLEMS IN CHINA'S NEW ENERGY INDUSTRIAL POLICY**

### **2.1. The policy system is not perfect enough**

With the rapid rise of low carbon economy, consumers' low carbon environmental awareness is also improving, enterprises' traditional mode of production to produce higher carbon emissions of ordinary products have been unable to meet the diversified demand of consumers in the market, in order to have low carbon preference consumer market share, enterprises need to increase investment in carbon reduction business and low carbon production [8]. Industrial development lacks corresponding planning and management is not systematic enough. Although many laws and regulations have been formulated, these laws and regulations are not specific and perfect due to a wide range of new energy involved. The management of the new energy industry is not organized enough, and the planning is not reasonable enough. Some enterprises blindly follow the trend and invest blindly, leading to the destruction of the market system. Therefore, the state and government departments need to improve the policy system and promote the steady development of new energy.

### **2.2. High cost**

New energy in China starts relatively late, development speed is not fast, no stable mature industrial chain and industrial structure, production scale is low. For present, many engaged in new energy enterprises, need to invest a lot of money to develop operation, which makes the product price slightly higher, and the role of new energy for environmental protection, may not see obvious effect in the short term, so the market makes more priority to cheaper conventional energy, refuses to high prices of new

energy and related products, from which the development of new energy is limited.

### **2.3. Scarce human resources and underdeveloped technology**

Talent is a necessary support for the long-term development of the new energy industry, but at present, universities are extremely scarce in talent training in this field, which leads to the shortage of human resources and restricts the development of new energy. Therefore, the state should formulate corresponding policies and encouraging measures to encourage colleges and universities to actively open relevant majors, strengthen cooperation with enterprises, cultivate forward-looking and professional new talents, and make a strong guarantee for the new energy development in the future. Strengthen the training of professional and technical personnel, improve their professional skills and comprehensive quality, in order to better serve the industry.

### **2.4. The market is not perfect, and the industrial chain can not meet the standard**

The new energy industry has not formed a stable and mature market, which is also one of the reasons for the high cost, but in other words, the high cost limits the development of the industry, and the two restrict each other. As the new energy industry is an emerging industry and the market regulation capacity is limited, China should not only focus on the layout planning, but also give support and affirmation in the policies, taxation and employment, establish a large industrial base, reduce the costs and improve the market competitiveness.

## **3. SUGGESTIONS AND OPINIONS ON IMPROVING RURAL NEW ENERGY POLICIES**

With global warming, a low-carbon economy emerges. In order to prevent environmental pollution, we advocate reducing carbon dioxide gas emissions, advocating low-carbon technologies for energy saving and consumption reduction, and developing a virtuous cycle. At present, the development of rural new energy is not perfect, and the country is gradually paying attention to the development of rural new energy. In rural areas, there are many resources that can be effectively used, and the development of rural new energy sources can achieve sustainable development and low-carbon economic development more efficiently.

### **3.1. The government should improve the publicity and support for rural new energy**

New energy in rural popularity is far less than the city, in order to further the rural development of new energy, promote the rapid and sustainable development of low carbon economy, the government departments should pay attention to the development and utilization of rural new

energy, strengthen the support and publicity of new energy industry, according to the current development situation and trend according to a series of supporting measures for development and transformation. We can also provide help to them according to their financial needs, increase preferential systems, improve technological innovation, and encourage people to actively develop new energy and implement a low-carbon life. We will promote the employment of local rural residents and optimize the industrial structure. At the same time, the government can encourage the development and construction of rural new energy industry through relevant preferential policies, capital policy and technology innovation policy, absorb and introduce diversified investment subject for new energy technology research, resource development and innovation, promote rural local farmers employment, arouse the enthusiasm and initiative of farmers to develop and use new energy, so as to optimize the rural industrial structure, make the development of rural economy more low carbon and sustainable [9].

### 3.2. Improve the energy utilization efficiency in rural areas

At present, the utilization efficiency of rural crop straw is only about 70%, which is mostly used as fertilizer, feed and fuel, but the proportion of it as new energy materials accounts for less than half of the total utilization rate of crop straw [9]. On this issue, the government should pay attention to farmers to develop a series of solutions to the situation of low energy efficiency, guide people to make independent researches and innovation, stimulate their enthusiasm, so as to continuously improve the energy utilization rate. In the actual construction of rural new energy, the relevant departments can according to the actual living standard of farmers and the existing energy consumption structure, analyze and organize the distribution of energy, climate and light, and many other factors, so as to develop a more scientific and reasonable new energy development plan [10].

### 3.3. Strengthen the training of rural talents

With the continuous development of rural new energy construction in China, the demand for new energy technical personnel is also increasing. The training of rural new energy technical talents should be continuously strengthened, so as to lay a foundation for the application of new energy technology and promote the smooth development of low carbon economy in rural energy conservation and emission reduction work [11]. At present, there are very few professional and technical personnel engaged in the development of rural new energy, so it is very important to cultivate a large-scale and high-level professional team as soon as possible. All departments should formulate a series of talent training plans as soon as possible, set up rural energy majors in some colleges and universities, and reasonably arrange training classes according to the actual situation. Encourage the unit government to carry out consulting activities, for the vast rural people, do a good job in rural

energy science popularization work. In this regard, the relevant departments should pay attention to the unity of thought, do a good job in publicity and education, and promote the rural new energy undertakings to a better quality development. In the actual process, the relevant staff should study a series of publicity policies on new energy formulated by the party and the state, and pay attention to the construction of energy-saving economic growth mode and consumption structure, so as to lay a good foundation for the effective improvement of the utilization rate of new energy [10].

## 4. CONCLUSION

In general, the emergence of new energy has a profound significance for China's social development and environmental protection. This paper expounds the current development status from the following specific aspects: hydropower, wind power, biomass energy, ocean energy; and puts forward some suggestions on improving the rural new energy policies: the government should improve the publicity and support for rural new energy; improve the energy utilization efficiency in rural areas; strengthen the training of rural talents. Both the government and the general public should actively participate in the construction of new energy, practice the values of low-carbon and environmental protection, and make their due contribution to China's environmental protection.

## AUTHORS' CONTRIBUTIONS

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## REFERENCES

1. Orthosis. China Dam for 70 years [M]. Beijing: China Three Gorges Publishing House, 2021.
2. Ronggeng Li. Research on Chinese Technology Transfer Characteristic and Emission Reduction Effect of Low-carbon Energy [D]. Dalian University of Technology, 2021.
3. Ye Xin. The current status and prospect of new energy development in China [J]. Suzhou Electronic Information Technician College

4. China Electric Power Yearbook Editorial Committee, 2016 China Electric Power Yearbook [M]. Beijing: China Electric Power Press, 2016:18.
5. Cheng Daojun. Research on the Government Governance in China's New Energy Industry Development [D]. The Academic Degree Assessment Committee of Northeast Normal University. In March, 2020.
6. Yuxin Liu, Haifeng Wang, Ji Wang, Libo Chen. Thoughts on Accelerating the Development and Utilization of Marine Energy under the background of building a Marine Power [J]. Science and Technology Guide, 2018, 36 (14): 22-25.
7. Long Ma, Zhihua Tang, Congwei Wang, Yongming Sun, Xuefeng Lv, Yong Chen. The current situation of biomass energy research is the future development strategy [J]. Guangzhou Institute of Energy, Chinese Academy of Sciences Guangzhou, 5106402, Qingdao Institute of Bioenergy and Process, Chinese Academy of Sciences Qingdao 266101, 2019.
8. Lan Wang, Study on the impact of government carbon policies and consumer preferences on product line design [D]. Central China Agricultural University, June, 2021.
9. Sang meritorious. Development policy of rural new energy industry under low-carbon economy [J]. Win the Future, 2019.
10. Pang Rulin. Analysis of the problems existing in rural new energy development and their solutions [J]. Qinhuangdao City Funing District Bureau of Agriculture and Rural Affairs.
11. Makon. Problems and countermeasures of rural new energy construction and energy conservation and emission reduction [J]. Dongyang City Rural Energy Office, 2018(7).