Research on Transformation Strategy of Energy Industry: Taking China as an Example

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Abstract. Energy is the material basis of people's life for a long time, and the energy issue has become an important influencing factor for the economic development of every country that cannot be ignored. Over the past few decades, China's economy has achieved remarkable growth and progress and has formed a set of energy structure system with Chinese characteristics. However, many energy problems have emerged in the process, which have a negative impact on the future sustainable development of China's economy and environmental protection. The transformation and upgrading of the energy industry will be of great importance to China today. This paper starts from the condition of China's energy in today, starting from China's energy structure, energy use ratio, the direction of new energy utilization, focusing on the problems of serious imbalance of energy ratio, excessive reliance on imports of oil and gas resources, low efficiency of energy use, and low proportion of new energy resources development and utilization. By combining domestic and foreign academic research and the successful methods of the United States and other countries, this paper propose corresponding transformation methods and strategies: vigorously developing new energy sources, implementing structural upgrading of energy use in some industries, promoting innovative research in the energy industry, and promoting international cooperation.

Keywords: Energy Industry, China, Transformation Strategy.

1. Introduction

With the continuous progress of economic globalization, countries have closer economic ties, more intense economic competition and more serious dependence energy. The energy problem has caused a series of economic and trade disputes, and the excessive use of energy has also caused a huge impact on the environment. Faced with these problems, many countries have started strategies for new energy transformation and upgrading, reducing dependence on traditional energy sources such as oil, and developing and using green new energy. The most prominent feature of the new era is the transformation from high-speed development in the past to high-quality development. This also means that China, the most energy-consuming country, must Only by accelerating the transformation and transition to the new energy industry to achieve both economic and environmental benefits can this article gain a place in the increasingly fierce international energy issues and achieve the goal of green and sustainable development.

Scholars at home and abroad have contributed a lot of research on the new energy industry and its transformation. Most of the foreign research on the energy industry focuses on energy efficiency, energy structure, the relationship between energy and the environment, and energy prices. For example, John Humphre (2002) proposed four ways of industrial upgrading. Domestic scholars have also conducted research on the relationship between energy and the environment, energy conservation and emission reduction, and energy prices [1]. The idea of "carbon neutrality" has also attracted the attention and research of many scholars. Xu Qinhua (2014) pointed out as early as 2014 that China needs to optimize its energy structure, promote the transformation and upgrading of industrial structure, and enhance the public's awareness of emission saving [2]. Based on the scenario analysis, Lin (2022) pointed out the importance of energy restructuring to achieve the "double carbon" target [3]. Lu et al. (2021) proposed a comprehensive model of solar PV power potential and its cost competitiveness for 2020-2060 under the "double carbon" target, which provides a useful reference for today's energy restructuring and upgrading of new power systems [4]. By sorting out the relevant literature, this article can find that most of the research on the transformation strategy of the new

energy industry by domestic and foreign scholars focuses on the industrial upgrading of the energy industry, from low added value to high added value, from high energy consumption and high pollution to low energy consumption Low pollution, upgrade from extensive type to intensive type, etc [5].

Among these existing studies, there are many single literatures but lack of compound research results. How to comprehensively analyze these existing energy problems, use effective means to balance and solve the problems in the energy industry, and realize the overall upgrading and transformation of the new energy industry is the main research direction of this article. This paper will draw lessons from foreign experience and practices, mainly using the method of systematic analysis and comparative analysis, which is different from the previous research on the transformation of the new energy industry in a certain region or industry in China, but a comprehensive summary of China's new energy transformation and upgrading [6]. The current situation and development obstacles faced, and relevant countermeasures and suggestions are put forward for the transformation of China's new energy industry as a whole.

2. Case Description

Energy is one of the power sources of economic development. Since China changed its development strategy, a number of reform measures have been implemented to give China's economic development a huge boost, and a multi-energy supply system including coal, oil, natural gas, and non-fossil energy has been established. The largest energy consumer, at the same time, many problems such as environmental pollution and damage have also emerged. At present, China's energy system has several major problems: the excessive proportion of coal, the excessive dependence on overseas supply of oil and natural gas, high carbon emission intensity, insufficient energy supply and low utilization rate, and imperfect management system. Only by finding ways to solve these problems this article comprehensively realize the transformation and upgrading of my country's energy system to a sustainable development system dominated by new energy, and achieves sustainable and healthy economic growth [7].

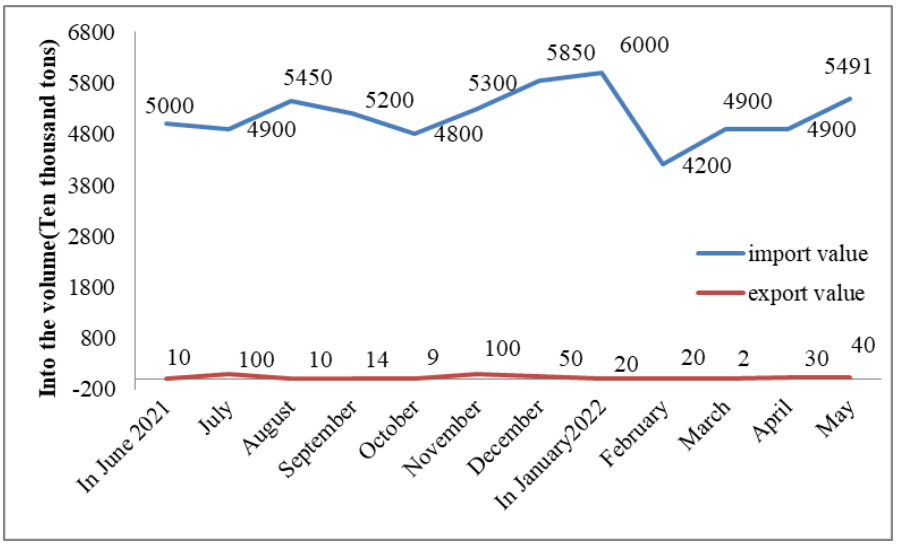

Figure 1. Volume chart of China's oil and gas imports and exports in the past year.

3. Analysis of problems

3.1. Unbalanced energy supply and use structure

The characteristics of China's energy structure are: more coal, less oil, and insufficient natural gas, so most of China's oil and natural gas need to be imported, and only coal can be self-sufficient. According to relevant data, coal, oil and natural gas account for 60%, 20%, and 20% of the proven world energy resources, respectively, while China accounts for 90%, 6%, and 4%. This has led to the

formation of a coal-based energy structure system in China, and the production and economic development of many enterprises depend on coal resources [8]. As shown in Figure 2, from 2017 to 2022, the proportion of new energy in China's energy consumption is still very low.

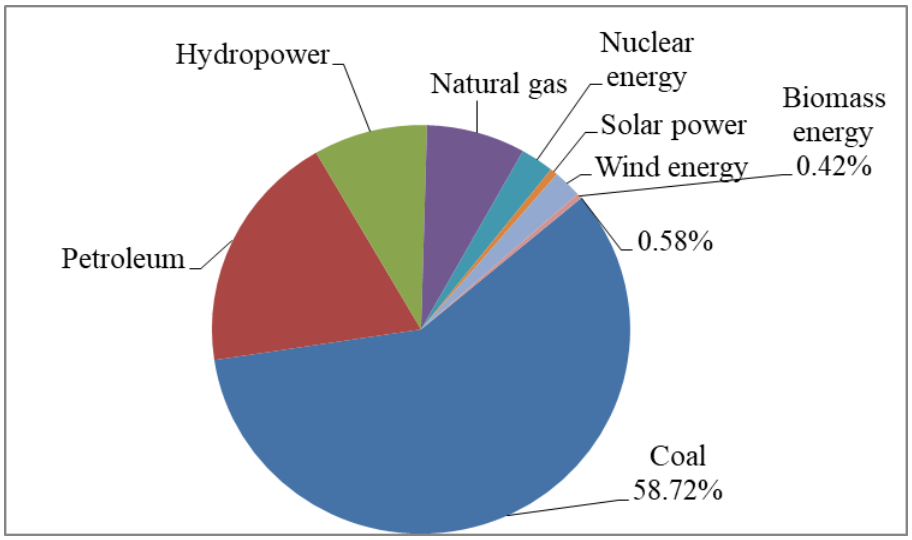

Figure 2. China's energy consumption.

The low utilization rate of new energy is mainly because China's coal-based energy system has existed for decades, and economic development is too dependent on traditional energy. Many industries are unable and unwilling to achieve innovative breakthroughs in energy utilization, and still use Traditional energy sources to reduce investment in R&D and facility construction. In order to solve this problem, it is necessary to fundamentally combine economic development to improve the dependence of all walks of life on traditional energy. Only by changing the energy consumption structure can the imbalance of the energy structure be fundamentally changed.

3.2. Excessive dependence on overseas oil and gas resources

Although China has put forward the development goal of "carbon neutrality", with the changes in the new normal of China's economy, the development and utilization of new energy cannot reach a new height in the short term, and the structural shortage of oil and gas resources will still be a problem for China. According to 2021 data from the China Petroleum Institute of Economics and Technology, China's foreign dependence on oil and natural gas has reached 73% and 43%. According to the forecast of the International Energy Agency, by 2030, China's dependence on foreign oil will increase to 82%, and most of China's oil demand will need to be maintained by imports.

Petroleum resources are a very important factor for the country's economic development and stability. People's lives and the development of many industries cannot be separated from petroleum resources. As China's economy and industrialization continue to move forward, the contradiction between oil supply and demand in China is increasing day by day. , directly reflected in the soaring oil prices, the international oil supply situation is not optimistic. Therefore, it is very important and urgent for China to adjust the supply structure of oil and natural gas and improve the strategic system of oil reserves [9].

3.3. low energy utilization

Low energy utilization rate is a common problem in China's energy use. The low utilization rate of traditional energy has led to a substantial increase in China's carbon emissions, resulting in waste of resources and environmental problems [10]. Many industries in China have not yet achieved transformation and still implement high energy consumption models. With the increasing problem of energy shortages in the world, if energy efficiency cannot be improved or the use of new energy sources cannot be transformed, these industries in China will inevitably face high costs in international competition was gradually phased out.

Due to the characteristics of its own energy structure, China's over-reliance on coal resources has led to a delay in improving energy utilization. The most effective way to solve the problem of low energy utilization is to vigorously develop and use new energy. Excellent results have been achieved in the research and development and promotion of energy vehicles, which alleviates the problem of low energy utilization to a certain extent.

4. Suggestions

4.1. Introduce relevant fiscal policies to promote the blossom of new energy industry.

As an economic power, the United States is also a big energy-consuming country, but the United States is the country with the most abundant coal reserves in the world, and its oil and natural gas reserves are also at the leading level in the world. Severe energy shortage problem, it can learn from the experience of the energy industry in the United States: attach importance to the role of regulations and policies in ensuring energy development, give financial subsidies to the new energy industry, and issue a series of laws, regulations and policy documents to support the use of new energy. For example, 30% of the cost of consumers purchasing solar energy equipment can be used for tax deduction, etc., to promote the use of new energy through economic means [11].

It is the general trend of modern energy and economic development to reduce the consumption of traditional energy by driving the blossom of new energy. In addition to the United States, Japan, the European Union and other developed countries are also alleviating their own energy industry problems by developing and utilizing new energy. As an island country, almost all of its coal, oil, natural gas and other energy sources rely on imports, so Japan has attached great importance to the development of nuclear energy in recent years. The development and utilization of new energy cannot only greatly solve the problem of unbalanced energy structure allocation, but also alleviate the existing environmental pollution to a great extent. Therefore, China's new energy industry has a lot of room for development, especially the shale gas reserves ranking first in the world. If it can be reasonably developed and utilized, China's new energy industry will enter a new stage.

4.2. Improve the country's energy self-sufficiency rate while promoting international cooperation

For more than 40 years, leaders from all walks of life in the United States have pursued the goal of "energy self-sufficiency", and at the same time, its energy self-sufficiency rate is also increasing. The United States has mainly taken two measures to increase its energy self-sufficiency rate: one is to increase the amount of energy development; the other is to actively seek alternative energy sources [12]. For China, the proven energy storage is limited, so the most effective measure is to find alternative new energy for development and utilization, to stimulate the spirit of innovation in the transformation of the energy industry, and to reduce energy consumption to other countries rely. In addition, it is also very important to minimize energy consumption and waste in the process of use.

As the world's largest energy-consuming country, China is also faced with an increasing proportion of oil imports in the short term. In order to solve this situation, in addition to developing and utilizing new energy sources to improve the domestic energy self-sufficiency rate, it is necessary to develop a variety of energy trade relations in an all-round way. , and increase strategic cooperation with energy resource countries, energy consumption countries, and energy transit countries. For example, China has obtained a large amount of natural gas imports through its strategic cooperative relationship with Russia, alleviating the problem of insufficient domestic natural gas reserves.

4.3. Focus on energy conservation and emission reduction, and carry out technological innovation

China has proposed a "dual carbon" goal, that is, to achieve carbon peaking by 2030 and carbon neutrality by 2060. Driven by this goal, the Chinese government and many industries have actively promoted technological innovation and industrial upgrading. Technological innovation has greatly

promoted the transformation of the energy industry and the continuous development of the new energy industry, and is an important means to solve environmental problems and improve economic competitiveness. The United States has invested a lot of financial funds in energy technology innovation to promote the simultaneous development of various industries. This measure has also produced good results [13].

China's energy technology innovation and energy conservation and emission reduction can refer to the relevant experience of the United States, but it is more necessary to formulate relevant measures that are more in line with China's national conditions based on China's actual situation. As a large coal-consuming country, China relies too much on coal energy, so it can focus on the development and utilization of coal clean technology and give priority to finding relevant new energy to replace the use of coal energy, reduce the proportion of excessive dependence on coal energy industry, and further By optimizing the energy structure, on the basis of realizing energy conservation and emission reduction, energy efficiency can also be improved, and energy and environmental protection issues can be improved [14,15].

5. Conclusion

From the background of the times, this paper composes the relationship between China's economic development and energy development in recent decades and the related problems of China's energy system today, mainly focusing on the serious imbalance of energy structure, excessive overseas dependence on oil and gas resources, the problem of low proportion of new energy development and use, and high carbon emissions faced by China's energy industry, in the hope that the analysis of these problems, this article can solve the problems faced by the transformation and upgrading of China's energy industry. The United States, as a developed country, has many years of practical experience and successful realities in the development of energy industry. This paper compares some of the problems in China with the United States and Japan and other countries, and proposes methods to promote the development of new energy industry by means of fiscal policy, reduce the dependence on foreign energy, promote the industrial innovation of new energy, and improve the utilization rate of new energy by means of science and technology. The solution of these problems will be solved to a certain extent and help the society to achieve sustainable development. The successful use of new energy will also help society and enterprises to reduce some of the costs of energy and improve the competitiveness of Chinese enterprises in the international market, and the gradual replacement of traditional energy by new energy has become an essential factor for the efficient development of society and the economy.

China is accelerating its pace from an energy power to an energy power by continuously and deeply promoting the upgrading of its energy system. China has timely put forward the "double carbon" goal "to build a clean, low-carbon, safe and sustainable energy system in the future, China needs to adjust the relationship between short-term improvement and long-term upgrading, in the coal-based energy structure, reasonable adjustment of energy structure improvement, coal and other traditional energy withdrawal must be built on the basis of a safe and reliable alternative to new energy sources. Verification should pay attention to adjusting the energy structure from the whole perspective, not limited to a certain perspective or under a certain goal, to improve the efficiency of energy use in an integrated manner.

The research in this paper combines the situation faced by China nowadays and the possible impact on the future, with certain realistic significance and future meaning, hoping to provide some reasonable reference for scholars and institutions studying the transformation and upgrading of China's energy industry.

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