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Research on Carbon Tax in China under Carbon Neutrality

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Abstract: Carbon neutrality has become one of the main goals of addressing climate change on a global scale. As an economic means in China, a carbon tax can promote the transformation of energy structures and reduce greenhouse gas emissions by imposing a certain fee on carbon dioxide and other greenhouse gas emissions. This paper studies how to carry out the energy transition and realize the sustainable development of the country. This paper establishes a theoretical framework for carbon neutrality, carbon tax policy, and energy transition, and elaborates on the reasons for energy transition, the impact of energy transition on the market, the path to carbon neutrality, and China's carbon tax policy. Evaluate China's energy consumption structure from economic, environmental and policy perspectives. This article found that the biggest impact on China's energy consumption structure is the industrial growth rate, followed by GDP, and then carbon dioxide emissions. In order to achieve the long-term goal of global carbon neutrality, the government needs to introduce relevant policies.

Keywords: carbon neutrality, carbon tax, energy transition, literature reference method

1. Introduction

At present, Chinese research on carbon tax in the context of carbon neutrality mainly focuses on the carbon tax system, the legal approach to constructing a carbon tax system, and the impact of carbon tax collection on energy companies. Zhang Yuhao pointed out that China’s carbon tax policy is still in the exploratory stage, Jiang Ting proposed to construct China’s carbon tax law from the perspectives of determining the legislative model, clarifying the elements of a carbon tax, building a collection and management system, and setting up support systems [1, 2, 3]. This paper summarizes the existing research and finds that there are few researchers in the field of energy transition. The carbon tax system in the context of carbon neutrality will affect the energy structure and transformation to a certain extent. Based on the circumstances , this paper conducts in-depth research on how carbon tax affects the production and consumption of various energy sources, and how to promote the development of clean energy. Aiming at this topic, the issues that need to be discussed in this article include the impact of the carbon tax on the economy, what is energy transition, why is it important, how to achieve it, the impact on the energy market, and how to balance economic development and energy consumption. Evaluate research findings from environmental, policy, and economic aspects and draw conclusions. With the intensification of environmental issues such as climate change, carbon neutrality has become a global consensus, and energy transition is the key to achieving carbon neutrality. Therefore, studying the necessity and

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urgency of the energy transition will help us better understand the importance of the goal of carbon neutrality.

2. The Development Status of Carbon Tax Policy under the Background of Global Carbon Neutrality

2.1. Chinese Research

Many domestic scholars have studied China's carbon tax policy from the perspective of carbon neutrality and carbon peaking. Scholar Li Shuxia conducted a detailed comparative analysis of carbon tax and carbon emissions trading, pointing out that these two mechanisms are effective means to reduce greenhouse gas emissions, but different factors need to be considered in the implementation process [4]. For a carbon tax, the emission reduction effect depends on the setting of the tax rate and the year-by-year increase regulations. However, a carbon tax could increase costs for businesses and individuals, especially for high-carbon-emitting industries. To balance the economic impact, governments can promote economic growth and job creation through the redistribution of tax revenues and incentives for clean technology innovation. At the same time, the government needs to conduct reasonable communication and explanations to gain the support of the public and stakeholders. At present, China is promoting the implementation of a carbon tax policy and establishing the basis of the carbon market. When implementing carbon tax policies, China needs to consider domestic economic, social, and environmental factors to achieve a balance between emission reduction effects, economic impact, and fairness. At the same time, China is also strengthening carbon emission data monitoring and reporting to fulfill its commitment to carbon neutrality.

2.2. Overseas Research

The European Union is one of the first regions in the world to implement a carbon tax system. Since 2005, the European Union has implemented the Carbon Emissions Trading System (EU ETS), which aims to reduce greenhouse gas emissions by charging companies for carbon dioxide emission permits. In addition, some countries in the EU member states have also implemented their carbon tax systems, such as Sweden, Finland, and Norway. In addition to the EU, Canada has also implemented a carbon tax system. Canada's carbon tax will be implemented in 2019 at a rate of 20 Canadian dollars per ton and will increase by 5 Canadian dollars per year until it reaches 50 Canadian dollars per ton in 2022. The purpose of this policy is to encourage Canadian businesses and individuals to adopt more environmentally friendly practices. In addition, countries such as Australia, New Zealand, Switzerland, and Japan have also begun to implement carbon taxes or carbon emission trading systems to reduce greenhouse gas emissions and achieve carbon neutrality goals.

3. Current Status of Carbon Neutrality

Carbon neutrality refers to balancing the amount of carbon emissions produced by humans with the carbon absorbed or stored in the natural environment so that the net carbon emissions are zero. Specifically, carbon neutrality means achieving a state of net zero carbon emissions through measures that reduce greenhouse gas emissions and increase greenhouse gas sequestration or storage. Carbon neutrality is regarded as one of the important strategies to deal with climate change. By achieving carbon neutrality, the rate of global warming can be slowed down, the impact of greenhouse gas emissions on the earth's system can be reduced, and the foundation for sustainable development can be provided. Many countries and organizations have formulated carbon-neutral

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goals and adopted corresponding policies and measures to promote the realization of carbon neutrality.

3.1. The Necessity of Energy Transformation

First of all, energy transformation can reduce greenhouse gas emissions, reduce negative impacts on the environment, protect the ecological environment, and address climate change and environmental pollution. Second, the energy transition can reduce dependence on finite fossil fuel resources, improve energy security, and reduce geopolitical risks. Third, energy transformation can promote the optimization, transformation, and upgrading of the economic structure, promote the development of emerging industries, and bring about economic growth and employment opportunities. At the same time, energy transformation can also promote the fair distribution and sustainable use of energy resources, improve the popularity and accessibility of energy supply, and promote social equity and sustainable development.

The impact of the energy transition on the energy market is manifold. First of all, energy transformation can reduce greenhouse gas emissions, reduce negative impacts on the environment, protect the ecological environment, and address climate change and environmental pollution. Second, the energy transition can reduce dependence on finite fossil fuel resources, improve energy security, and reduce geopolitical risks. Third, energy transformation can promote the optimization, transformation, and upgrading of the economic structure, promote the development of emerging industries, and bring about economic growth and employment opportunities. At the same time, energy transformation can also promote the fair distribution and sustainable use of energy resources, improve the popularity and accessibility of energy supply, and promote social equity and sustainable development. To sum up, the impact of the energy transition on the energy market is multifaceted, including positive impacts on environmental protection, energy security, economic development, and social equity.

3.2. China's Carbon Tax Policy

The carbon tax policy refers to the collection of certain taxes or fees on the emission of carbon dioxide and other greenhouse gases to guide enterprises and individuals to reduce greenhouse gas emissions, thereby reducing the global concentration of greenhouse gases and mitigating the impact of climate change. Such policy measures are usually implemented in high-emission industries such as energy, industry, and transportation to encourage these industries to adopt more energy-saving and emission-reduction measures to promote sustainable economic development. The specific forms of carbon tax policies include the taxation of fuel for energy consumption, the taxation of emissions from energy production, and the collection of emission permit fees for large carbon-emitting companies. This policy has been gradually promoted and applied around the world and has become one of the most important means for the international community to deal with the challenge of climate change.

China's carbon tax policy is mainly implemented for enterprises in energy industries such as oil, natural gas, and coal, and industrial industries such as steel, cement, glass, and nonferrous metals. The pilot scope includes Beijing, Tianjin, Hebei, Shanghai, Chongqing, Sichuan, and Guangdong. Provinces and cities, and will gradually expand to the whole country. The specific tax rate is 10 yuan per ton of carbon dioxide emissions. At the same time, a carbon emission trading system is introduced to encourage enterprises to implement emission reduction measures by introducing a carbon emission trading market. The carbon tax policy adopts the model of "collection first and return later", that is, carbon tax is first collected from enterprises, and then certain tax rebates are given according to the emission reduction of enterprises. The policy aims to guide enterprises and

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individuals to reduce greenhouse gas emissions, promote sustainable economic development, and accelerate China's energy transformation and ecological civilization construction, to achieve economic structural adjustment and green and low-carbon development.

3.3. The Path to Achieve Carbon Neutrality

Achieving the goal of carbon neutrality requires a variety of measures. Among them, carbon pricing is intended to guide enterprises and individuals to reduce greenhouse gas emissions by imposing a certain carbon tax or carbon emission fee on carbon dioxide and other greenhouse gas emissions. Emission quota trading divides the total amount of greenhouse gas emissions into several emission quotas, and issues corresponding emission permits to enterprises to encourage enterprises to take positive actions in reducing greenhouse gas emissions. At the same time, green technology innovation is also an important aspect. Increase investment in green technology research and development, promote the use of new energy, energy-saving, and environmental protection technologies, and reduce greenhouse gas emissions. Energy management is also key, to strengthening energy management, improving energy efficiency, and reducing greenhouse gas emissions. In addition, policy measures such as the establishment of a regulatory system, the formulation of greenhouse gas emission standards, and the promotion of low-carbon life should also be implemented. Taking these measures comprehensively can achieve the goal of carbon neutrality.

Carbon neutrality has certain economic, environmental, and social impacts. First of all, carbon neutrality will promote the development and application of green technology, which is conducive to the sustainable development of the economy. Second, carbon neutrality will encourage companies and individuals to reduce greenhouse gas emissions and promote the low-carbon transformation of the economy. However, carbon neutrality may also have a certain impact on certain industries, such as traditional high-carbon emission industries. At the same time, the implementation of carbon neutral policy also needs to take into account the issue of social equity to avoid further widening the gap between the rich and the poor. Finally, the impact of carbon neutrality on the environment is evident, reducing the risk of the greenhouse effect and climate change by reducing greenhouse gas emissions and protecting the stability of the environment and ecosystems.

4. Status Quo of Energy Consumption

4.1. From an Economic Perspective

Coal is still the main source of energy consumption in China, accounting for a relatively high proportion. This situation may reflect the abundance and relatively low price of coal resources in China. However, excessive reliance on coal may lead to issues such as energy supply security and environmental pollution. Therefore, China needs to increase the development and utilization of renewable energy to diversify its energy structure.

Compared with coal, the proportion of China's oil and natural gas consumption is relatively low, which means that China still has great potential for development and utilization in these fields. With the increasingly severe global climate change, China should increase investment in clean energy, reduce dependence on fossil fuels, and at the same time promote the upgrading and transformation of China's energy structure.

A diversified energy mix can improve the stability and sustainability of the energy supply. Through the development and utilization of renewable energy sources, such as wind energy, solar energy, water energy, etc., the dependence on traditional energy sources can be reduced while reducing the impact on the environment. In addition, a diversified energy structure can also promote the balance of energy production and consumption, and improve the efficiency and reliability of the energy system.

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4.2. From an Environmental Perspective

Carbon dioxide emissions are an important indicator to measure the environmental protection of a country's or region's energy structure. If the emissions are too high, it means that its energy structure has a relatively large negative impact on the environment. Therefore, reducing carbon dioxide emissions is an important task to address climate change and improve air quality.

In particular, the high proportion of traditional energy consumption, such as coal, can easily lead to a large amount of air pollution and greenhouse gas emissions. These pollutants will not only affect people's health and quality of life but will also further aggravate the speed and extent of global climate change. Therefore, switching to cleaner, more renewable energy sources may be key to reducing the environmental impact.In the process of realizing energy transformation, in addition to strong promotion and investment from the government, the public should also actively participate in raising environmental awareness and actions. For example, you can choose to purchase green energy products, reduce energy waste, encourage and support the development of clean energy, and so on. Only with the cooperation of the whole society can the transformation of energy structure and the realization of environmental protection goals be realized.

4.3. From a Policy Perspective

Specific energy policy measures cannot be directly seen from the data, but the government's efforts to promote industrial growth can be seen. However, it is necessary to pay attention to balancing the relationship between economic growth and environmental sustainability and to adopt corresponding policies to promote the transformation of energy structure and sustainable development.

5. Discussion on Possible Improvements

According to the above research results, given China's energy structure and environmental problems, the following measures can be considered to achieve energy transition and sustainable development.

5.1. Strengthen Investment and Support for Clean Energy and Promote the Construction of a Diversified Energy Structure

Li Xinlei pointed out that, in the context of global carbon neutrality, clean energy transformation is widely regarded as the core solution to the climate crisis and has become a green engine for economic recovery in the post-pandemic era [5]. Based on this, the government should use tax policies to guide enterprises to adopt clean energy. For enterprises that use traditional energy, they can increase the tax burden to a certain extent, and for enterprises that use clean energy such as solar energy and wind energy, they can provide relief or preferential policies. Secondly, subsidies and other means can also be used to encourage enterprises to use clean energy and reduce the cost of enterprises using clean energy. In addition, increase support for the development and utilization of renewable energy. Formulate relevant regulations and policies, strengthen the development, construction, and promotion of renewable energy, and encourage enterprises and individuals to actively participate in the use of renewable energy, to achieve the goal of sustainable development.

5.2. Strengthen the Improvement of Energy Efficiency and Reduce Energy Consumption and Emission Intensity

With the progress of the economy and society, the relationship between human beings and the environment has become increasingly tense. Zhao Qiuyun and others believe that excessive energy consumption will lead to excessive carbon emissions and cause a series of environmental problems [6]. Therefore, the government needs to formulate stricter energy efficiency standards to regulate

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energy consumption and emission intensity in the production process of enterprises. At the same time, the government can also help enterprises reduce energy consumption and emission intensity through technological innovation and management measures, promote new energy-saving and environmental protection technologies, and promote the development of a green economy. Strengthen the management and support of energy efficiency and environmental protection technologies, and promote the formation of a common awareness of energy conservation and emission reduction in the whole society.

5.3. Establish a Sound Carbon Market Mechanism

The carbon market mechanism is a way to incentivize enterprises to reduce carbon emissions by buying and selling carbon emission rights. Zhao Tianyu and others proposed that, as the world's largest carbon emitter, China must actively use the mechanism of the carbon market to achieve the goal of carbon peaking before 2030 [7]. The government can set a certain carbon emission quota and supervise enterprises to ensure that enterprises do not exceed their specified carbon emission quota. If a business can reduce its carbon emissions, it can sell its remaining carbon allowances to other companies, thereby reaping economic benefits. In addition, the government can also incentivize companies to reduce carbon emissions by providing them with carbon emission permits. Businesses can reduce their environmental impact by purchasing these permits to comply with government carbon emission quotas.

5.4. Carrying out International Energy Cooperation

The Chinese government has actively joined international organizations such as the International Energy Agency and the International Clean Energy Organization and participated in a series of international cooperation projects. By learning advanced technology and management experience from international organizations, China can better respond to challenges in the energy sector and promote the transformation and sustainable development of China's energy structure. The Chinese government also needs to actively introduce the technical and management experience of foreign enterprises and cooperate with it to promote the innovation and development of China's energy field. At the same time, foreign companies can also take this opportunity to gain more opportunities and benefits in the Chinese market.

6. Conclusion

Carbon tax aims to encourage enterprises and individuals to reduce carbon emissions to reduce the risk of climate change. From an economic point of view, the implementation of the carbon tax will lead to an increase in the cost of certain industries, especially high-carbon industries, which will harm their competitiveness. Influence. But on the other hand, it will also promote the energy transformation of countries and regions, and promote the market to develop in a low-carbon direction. The energy transition is a transition process from a traditional high-carbon fuel energy system to a cleaner and more sustainable form of energy, which can play a positive role in promoting the global response to climate change, improving energy security, protecting the environment, and promoting sustainable development. However, in the process of energy transformation, we cannot ignore a series of impacts on the energy market. For example, traditional energy suppliers will face challenges, while emerging clean energy suppliers and technology providers will gain more opportunities in the market. Moreover, the energy transition will lead to fluctuations in energy prices. Due to the adjustment of supply and demand and technological progress, the price of traditional energy may rise or fall. The specific performance is that the progress of clean energy technology and the realization of the scale effect may reduce the cost of

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renewable energy and make it more competitive. On the other hand, reducing the use of traditional energy may reduce its supply, thereby affecting its price.

How do we balance economic development and energy consumption in the context of carbon neutrality? This paper proposed that it can be achieved by improving energy efficiency, developing clean energy, promoting technological innovation and research and development, and promoting sustainable production and consumption patterns. In this process, it is necessary to comprehensively consider economic, environmental, and social factors to achieve a balance among the three. For example, adopt economic instruments, such as energy pricing mechanisms, carbon taxes, and subsidy policies, to promote the market to better reflect the true cost of energy and environmental externalities.

The insufficiency of this research is that there is no data and model to support this paper because the collected data is relatively thin. To evaluate China's energy consumption structure from economic, environmental, and policy perspectives, more detailed and comprehensive data need to be collected, such as changes in energy intensity per unit of GDP, carbon emission quotas, and carbon market policies. It is planned that future research will mainly focus on the construction of carbon market mechanisms in China's carbon market pilot areas, such as Shanghai.

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