Study on the Development Path of Green Low-Carbon Environmental Protection Industry under the New Situation

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Abstract: This paper aims to study the development path of green, low-carbon and environmental protection industries under the new situation. Currently, the green, low-carbon and environmental protection industry has become an important field for economic and social development. This paper proposes two key development paths, namely strengthening policy guidance and promoting technological innovation, by outlining the current status of the green, low-carbon and environmental protection industry. In terms of policy guidance, it is recommended that the government develop supportive policies and regulatory measures to guide and promote industry development. In terms of technological innovation, it is recommended that enterprises strengthen independent innovation and technological cooperation to promote the innovation and application of green, low-carbon and environmental protection technologies. Through comprehensive analysis and empirical research, new ideas and references can be provided for the development of the green, low-carbon and environmental protection industry.

Keywords: green, low-carbon, environmental protection industry, development path, policy guidance, technological innovation

1. Introduction

With the increasingly severe global climate change and environmental pollution, the green, low-carbon and environmental protection industry has become an important field of global economic development[1,2]. Under the new historical conditions, exploring the development path of the green, low-carbon and environmental protection industry and promoting its healthy and rapid development are urgent issues to be solved. This paper aims to study the development path of the green, low-carbon and environmental protection industry under the new situation and propose actionable recommendations to promote its development.

2. Opportunities for the development of green, low-carbon, and environmentally friendly industries

2.1 Global action on climate change

Global climate change has seriously threatened ecosystem security and economic and social development. According to the World Meteorological Organization's "Global Climate Status Report (2022)", the annual average land temperature in the world in 2022 was 1.67℃ higher than that of 1850-1900. China even experienced a large-scale heat wave for 79 consecutive days[3]. To actively fulfill international agreements such as the United Nations Framework Convention on Climate Change and the Paris Agreement, China has strengthened its national contributions, continued to promote carbon peaking and carbon neutrality actions, integrated them into the overall economic and social development, key areas of transformation, technological innovation, comprehensive improvement of carbon sequestration capacity, and governance system reform, and taken multiple measures to strive to achieve the strategic goal of carbon peaking and carbon neutrality, and make due contributions to global climate change.

2.2 Global biodiversity conservation cooperation

Currently, the earth is undergoing the sixth mass extinction of species. According to the World Wildlife Fund's "Living Planet Report 2020 - Bending the Curve of Biodiversity Loss," we are destroying biodiversity at an unprecedented rate. In the future, only climate change will still cause about 1/5 of wild species to face extinction risks in the 21st century, and by 2070, 1/3 of plants and animals may face extinction[4]. Biodiversity plays a crucial role in maintaining ecosystem stability. As a species permanently disappears, nature's ability to sustain us will also be weakened. China practices multilateralism, actively carries out international cooperation in biodiversity conservation, actively fulfills the Convention

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on Biological Diversity, and promotes the synergistic effectiveness of biodiversity-related conventions.

2.3 Concept of the Fourth Industry of Ecological Products Proposed

Chinese and foreign experts jointly proposed the concept of the Fourth Industry of ecological products. Compared with the traditional three-industry classification, the emergence of the Fourth Industry of ecological products can help us understand the relationship between green development, green economy, green industry, ecological economy, ecological industry, and environmental protection industry, understand the development status of China's ecological and green industries, and bring about an unprecedented wave of industrial structural reform and upgrading[5].

From the current situation in China, thermal power, steel, construction, etc. are the main sources of carbon emissions. Some studies have shown that the carbon emissions from the sewage treatment industry account for only 1%-2% of the total carbon emissions in the country[6]. Many people wonder whether the sewage treatment industry still needs to vigorously transform towards green and low-carbon directions? From the perspective of industrial layout, the essence of the traditional three industries is a dissipative structure, reflected in the "entropy increase" of a large amount of resource consumption and pollution emissions, which can only be reduced as much as possible through green and low-carbon circulation technologies but cannot be reduced to zero[7]. However, the Fourth Industry of ecological products, due to the involvement of the ecological production process, most of the industrial activities are based on natural solutions, so it is "negative entropy" or "zero entropy" for the biosphere and the ecological environment, with a very small or even positive impact. This means that some high-energy-consuming and high-polluting industries such as industry, can be transformed into ecological industries, realizing the transformation of industrial structure and promoting sustainable development.

3. Challenges Facing the Development of Green, Low-Carbon, and Environmental Protection Industries

3.1 Insufficient Policy Support

The development of green, low-carbon, and environmental protection industries faces the challenge of insufficient policy support. On the one hand, some regions and departments have not established a complete environmental policy system, which leads to a lack of attention and support for these industries. On the other hand, some regions and enterprises have lagged behind in implementing policies, resulting in the insufficient effectiveness of policies. In terms of resource utilization, the government's determination to promote and support is not strong enough[8]. Resource utilization involves multiple technological fields, and there are certain bottlenecks in technology. The government's support for technological research and development and application promotion of resource utilization is insufficient, which is also one of the factors that restrict the development of resource utilization. However, even after solving technological bottlenecks and economic issues, resource utilization technology still faces the difficult challenge of marketization[9]. The government's comprehensive management ability, including supervision, means, and other aspects, urgently needs improvement. Resource utilization involves waste disposal, energy utilization, and other aspects. Insufficient supervision can easily lead to resource waste, environmental pollution, and other problems. In addition, resource utilization requires a significant amount of investment, but the current government's financial support for resource utilization is insufficient, making it challenging to support large-scale resource utilization projects.

3.2 Low Rate of Technology Commercialization

A low rate of technology commercialization is a significant challenge facing the field of technological innovation in China. A low rate of technology commercialization means that technological innovation results are difficult to implement and cannot effectively contribute to economic and social development. The main reasons for the low rate of technology commercialization are as follows: (1) insufficient investment in innovation. Although China's investment in technological innovation has increased year by year, there is still a gap compared to developed countries, especially in the field of basic research. This results in inadequate support and protection for researchers during the research process, making it difficult to produce transformable technological innovations. (2) insufficient technological innovation capability. China's technological innovation capability and level are still relatively backward, and there is still a certain gap compared to developed countries. This has led to relatively fewer breakthroughs and achievements in innovation, resulting in a low rate of technology commercialization. (3) inadequate mechanism for technology commercialization. China's mechanism for technology commercialization still needs improvement, including technology transfer, intellectual property protection, and support from the capital market. These deficiencies make the commercialization of technological innovation difficult and also undermine the confidence of companies and investors in technology commercialization[10].

3.3 Low initiative on the part of the enterpris

Currently, the imperfect carbon trading mechanism in China is characterized by varying carbon emission standards among different countries or regions, making it difficult to achieve unified measurement and comparison of carbon emissions, thereby hindering the realization of carbon trading. Furthermore, the unreasonable allocation of carbon trading quotas may lead to market supply-demand imbalance and price volatility, making it difficult for companies to formulate long-term development strategies. Inadequate supervision may result in fraudulent or fake practices, affecting the fairness and

transparency of the market and lowering market credibility. In addition, the small scale of the carbon trading market, the lack of trading entities, and insufficient market liquidity, make it difficult to establish an effective price discovery mechanism, thereby impacting market development[11]. These factors have contributed to low market activity in China's carbon trading market, with an average price of CCERs of only 55 yuan, far below the price of 187 euros for European CERs, making it difficult to stimulate companies to actively invest in carbon sequestration projects, leading to a more wait-and-see attitude.

4. Green, low-carbon, and environmentally friendly industry development pathway

4.1 Transformation of water and environmental protection processes and technologies

The transformation of water and environmental protection processes and technologies mainly involves the following aspects: firstly, promoting the application of clean energy. Clean energy is one of the keys to achieving the dual-carbon goals. The water and environmental protection industry can reduce carbon emissions by adopting clean energy such as solar and wind power. Secondly, promoting green, low-carbon processes. Green, low-carbon processes are another key to achieving the dual-carbon goals[12]. The water and environmental protection industry can reduce carbon emissions and chemical oxygen demand by promoting green, low-carbon processes such as membrane separation technology and biotreatment technology. Thirdly, achieving the recycling and utilization of wastewater resources. The recycling and utilization of wastewater resources is an effective way to achieve the dual-carbon goals. The water and environmental protection industry can reduce energy consumption and carbon emissions by achieving the recycling and utilization of wastewater resources such as water reuse and energy recovery. Fourthly, promoting digital transformation. Digital transformation is another key to achieving the dual-carbon goals. The water and environmental protection industry can improve resource utilization efficiency and reduce carbon emissions by promoting digital transformation such as intelligent monitoring and data analysis.

Overall, the transformation of water and environmental protection processes and technologies is one of the keys to achieving the dual-carbon goals. It needs to be comprehensively promoted, continuously innovated, and strengthened in terms of technology research and development and transformation application, so as to promote the sustainable development of the industry.

4.2 Development of Ecological Protection and Restoration Projects

The development of ecological protection and restoration projects includes the following aspects. Firstly, forest ecology protection and restoration: forests are one of the most important carbon sinks on Earth, and protecting and restoring forest ecosystems can help reduce carbon emissions. Ecological protection and restoration projects can include forest protection, restoration, afforestation, and other measures. Secondly, wetland ecology protection and restoration: wetlands are important ecosystems that can help reduce greenhouse gas emissions, absorb harmful substances, and prevent soil erosion. Ecological protection and restoration projects can include wetland protection, restoration, and other measures. Thirdly, ocean ecology protection and restoration: the ocean is one of the largest carbon sinks on Earth, and protecting and restoring ocean ecosystems can help reduce carbon emissions. Ecological protection and restoration projects can include ocean protection, restoration, marine ecological aquaculture, and other measures. Fourthly, urban ecological restoration: cities are one of the main sources of carbon emissions, and urban ecological restoration can help reduce carbon emissions and improve urban environmental quality. Ecological protection and restoration projects can include urban greening, urban park construction, and other measures.

In general, the development of ecological protection and restoration projects is one of the important ways to achieve the dual-carbon goals. It requires strengthening technological research and development, promoting technology transfer and application, enhancing policy support and funding, and promoting the implementation of ecological protection and restoration projects to achieve sustainable development of ecology, economy, and society.

The value realization paths for diversified ecological products can include the following aspects: firstly, promoting green and low-carbon products, which are an important way to achieve the dual-carbon target. This can be achieved by reducing product carbon emissions, chemical oxygen demand and other indicators to achieve low-carbon production and consumption. Green and low-carbon products include ecological agricultural products, low-carbon energy products, sustainable development products, etc. Secondly, promoting the development of a circular economy, which is another important way to achieve the dual-carbon target. This can be achieved by recycling resources, reducing waste, and processing waste to achieve a low-carbon economy. Diversified ecological products can be produced and consumed through promoting the development of a circular economy, such as waste recycling and utilization, ecological agriculture, etc. Thirdly, promoting digital transformation, which is a key factor in achieving the dual-carbon target. This can be achieved by intelligent production and management to improve resource utilization efficiency and reduce carbon emissions. Diversified ecological products can improve product quality and reduce carbon emissions by implementing digital transformation, such as intelligent production and digital marketing. Fourthly, strengthening brand value and cultural connotation, which can be achieved by enhancing brand image, brand story, cultural heritage, etc. This can increase product added value and market competitiveness, leading to sustainable development. In general, diversified ecological products are an important way to achieve the dual-carbon target, requiring strengthening of technological research and

development and transformation, as well as policy support and investment, to promote their implementation and achieve sustainable development in ecology, economy, and society.

5. Conclusion

Against the backdrop of global climate change and biodiversity degradation, to promote the deep development of the ecological and environmental protection industry, several actions should be taken. Firstly, a comprehensive policy system for resource utilization should be established, and policies should be promoted and disseminated to encourage enterprises and society to participate in resource utilization. Secondly, financial support for green and low-carbon projects should be increased, special funds should be established, and social capital should be guided to invest in resource utilization. Thirdly, research and development of ecological and environmental protection industry technology should be strengthened, a technology innovation mechanism should be established, and ecological and environmental protection technology should be continuously improved. Fourthly, the intelligent upgrading of the ecological and environmental protection industry should be promoted, and technologies such as the Internet of Things, big data, and cloud computing should be utilized to improve pollution control, environmental monitoring, and service efficiency, guiding environmental management and decision-making. Finally, efforts should be accelerated to improve and perfect the carbon trading market mechanism, encourage market participants to innovate and develop carbon financial instruments, and provide support for the subsequent development of the ecological and environmental protection industry.

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