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Practical Path of Green Development of Enterprises Driven by Science and Technology Innovation under the Goal of carbon peaking and carbon neutrality

Song Jia *, Hong Wan

College of finance and economics, Guangxi Normal University of Science and Technology, Laibin Guangxi, 546199, China
*** Corresponding author:** Song Jia (Email: songjia2020@yeah.net)

Abstract: Under the carbon peaking and carbon neutrality goals background, green development of enterprises has become the focus of global attention, and science and technology innovation has become an important support for promoting the construction of ecological civilization and achieving high-quality economic development. This paper firstly describes the background and construction of the carbon peaking and carbon neutrality goals, secondly analyses the importance of science and technology innovation to drive the green transformation and upgrading of enterprises, and finally puts forward the specific practical path of implementing science and technology innovation to drive the green development of enterprises. This paper aims to promote the green development of enterprises under the carbon peaking and carbon neutrality goals and make positive contributions to global sustainable development.

Keywords: Carbon Peaking and Carbon Neutrality Goals; Science and Technology Innovation; Green Development.

1. Introduction

Against the backdrop of the global response to climate change, achieving peak carbon and carbon neutrality has become a key guideline for global sustainable development strategies. Enterprises, as the core of economic activities, are intrinsically required to use science and technology innovation for green transformation. This requires enterprises to use cutting-edge technologies to improve their business processes and implement green economic models, rationally plan and reduce their carbon emissions and inject strong corporate power into the realization of global green and sustainable development.

2. Background and Construction of Carbon Peaking and Carbon Neutrality Goals

2.1. Background to the Carbon Peaking and Carbon Neutrality Goals

In the traditional economic system, enterprises often focus only on high-speed economic development, ignoring the impact of carbon emissions on the global ecological environment. As a result, global climate change has become increasingly severe and extreme weather events have occurred frequently, posing a great threat to the human living environment and economic development. In response, countries have signed international agreements to regulate global carbon emissions in order to achieve carbon neutrality and peak carbon. Enterprises, as the core body of economic activities, need to incorporate environmental protection into their development strategies in response to the general trend of climate change. By driving green development through scientific and technological innovation, enterprises can achieve carbon peaking and carbon neutrality goals to fulfill their social responsibilities and comply with international development trends.

2.2. Construction of Carbon Peaking and Carbon Neutrality Goals

At the international level, international agreements promote carbon peaking and carbon neutrality goals globalization that stems from the international community's consensus on the environmental hazards of excessive carbon emissions and its shared responsibility to combat climate change. To achieve this goal, countries must adopt more effective methods and innovate on the level of existing science and technology.

At the national level, policies and regulations should be adopted to promote the low-carbon development of enterprises, encourage investment in research and development, and utilize advanced technologies to achieve green transformation. Policies should guide and support the low-carbon transformation of industries, do a good job of carbon emission testing and assessment, and promote the adjustment of carbon emissions of various sectors according to the standard to protect their development and help the global green low-carbon development [1].

At the enterprise level, firstly, enterprises should actively explore the introduction of energy-saving raw materials and technologies, increase investment in green technology research and development, and develop more environmentally friendly products and services. Secondly, enterprises should optimize production with digital technology to reduce costs. Finally, enterprises should also strengthen supply chain management, reduce carbon emissions in logistics and other links, incentivize the green development of themselves and their supply chain enterprises, and enhance the competitiveness and sustainable development of enterprises in the carbon peaking and carbon neutrality goals era.

3. The Importance of Science and Technology Innovation in Driving Enterprises' Greening Transformation and Upgrading

3.1. Science, Technology and Innovation Drive Carries Important Environmental Protection Mission

First, science and technology innovation can reduce environmental pollution and ecological damage. Traditional industrial production methods may produce a large amount of emissions or wastes, which have irreversible effects on land, air and water [2]. Through science and technological innovation, enterprises can use advanced pollution control technology, such as efficient waste treatment technology, which can reduce not only the degree of land pollution but also the land 'fertilizer'. For chemical and chemical enterprises, the use of science and technology innovation means to deal with chemical waste has become an inevitable trend. Enterprises can extract the useful components of chemical waste and recycling again, which can not only improve the utilization rate of raw materials but also may be beneficial to improve the geology of the land 'fertilizer'; An efficient exhaust gas treatment system can reduce the production process of harmful gases and carbon dioxide emissions, reduce its ecological damage; New wastewater treatment technology can also purify the production of sewage, so that it meets higher environmental standards before being discharged, reducing the pollution of the water environment.

Secondly, science and technology innovation can reduce carbon emissions. Science and technology innovation is conducive to the optimization of the energy structure of enterprises, promoting the adoption of cleaner energy technologies. Enterprises can use photovoltaic, wind, hydrogen and other power generation equipment to meet some of the energy needs and gradually build out a green, low-carbon technology system, thus reducing dependence on traditional fossil fuels. Meanwhile, in terms of energy use efficiency, through the precise control of big data analysis IoT technology and other innovative technologies, real-time monitoring and adjustment of equipment energy use are used to reduce energy consumption and indirectly reduce carbon emissions. This green and low-carbon energy structure reduces the negative externalities generated by enterprises in the production process and lays the foundation for improving the construction of ecological civilization.

Finally, science and technology innovation can improve the efficiency of resource utilization. Science and technology innovation can develop new production processes and achieve the recycling of resources. For enterprises with more raw material extraction, new production processes can reduce the enterprise's dependence on non-renewable resources and increase the proportion of renewable energy in the energy supply. At the same time, the commitment to building a green and low-carbon industry promotes the sustainability of the enterprise's economy so that the enterprise's economy and the construction of ecological civilization move towards a win-win situation of prosperity.

3.2. Science, Technology and Innovation as an Important Part of Achieving the Carbon Peaking and Carbon Neutrality Goals

Industrial upgrading is a core aspect of achieving the carbon peaking and carbon neutrality goals. A shift from traditional high-carbon industries to low- and zero-carbon ones is imperative. Industrial upgrading can prompt enterprises to adopt cleaner production technologies, thereby reducing carbon emissions. For example, the technological upgrading of the traditional iron and steel industry can effectively reduce carbon dioxide emissions by utilizing advanced energy-saving technologies and low-carbon processes. By optimizing the industrial structure, high-carbon industries can also adapt to the times and contribute to the development of green and low-carbon industries.

Energy consumption reduction is of great significance to the carbon peaking and carbon neutrality goals. By applying innovative technologies in the production process, enterprises can achieve energy savings and emission reduction. For example, enterprises can reduce the energy consumption of production equipment and the consumption of raw materials in the production process through analysis reports provided by high-tech technologies such as big data. At the same time, enterprises can develop renewable energy on a large scale, and the use of solar photovoltaic and wind power can reduce production costs and draw a constant flow of power for energy supply. The development of renewable energies minimizes the company's dependence on fossil fuels, thus enabling a reduction in energy consumption throughout the entire process.

Resource reuse is an integral part of achieving carbon peaking and carbon neutrality goals. As a sustainable development practice, resource reuse can play an active role in achieving the carbon peaking and carbon neutrality goals in many dimensions, including resource conservation, economic transformation and environmental protection. The fullest utilization of resources is the conversion of waste into value-creating resources, which not only indirectly reduces carbon emissions but also greatly improves the efficiency of resource utilization.

4. The Practical Path of Green Development of Enterprises Driven by Science and Technology Innovation

4.1. Introduction of Advanced Green Automation Technology

In the wave of positive global response to green development, green automation technology has become the key to achieving green development in enterprises. Green automation technology is an innovative technology system that integrates automation technology, environmental protection, and energy saving. While improving efficiency through automation technology, it places more emphasis on environmental friendliness and sustainable use of resources.

Green automation technology has a positive impact on pollution prevention and control. Various types of environmental detection sensors, such as exhaust gas composition monitoring sensors and wastewater pollutant concentration sensors, can be installed when the production line is producing products. The introduction of such

automation technology can grasp the real-time emission of pollutants, once the set environmental standards are exceeded, the automated management system will immediately start to improve the removal efficiency of pollutants, thus effectively reducing the impact of enterprise production activities on the environment.

Green automation technology is excellent in resource utilization. In terms of energy, green automation technology can accurately control energy consumption in the production process through intelligent detection and control systems. In the case of the motor starting system, green automation technology can automatically optimize the speed according to the load change level, which reduces the consumption of electricity. In some industries that rely on high-carbon energy to survive, green automation technology can significantly reduce energy consumption in the production process and improve economic efficiency. In terms of materials, green automation technology has reached the level of fine control. The automatic batching system can accurately transport raw materials to the production line according to the number of products to be produced and process requirements. Compared with traditional manual batching, automation technology not only speeds up the production of batching but also achieves accurate batching. This process not only reduces the cost of manual batching but also avoids the waste of raw materials due to manual batching errors. At the same time, green automation technology is conducive to the recycling of resources through the automatic sorting and recycling of production process waste and trimmings and re-invested into more valuable production or other aspects of resource recycling can be improved.

4.2. Deep Mining and Analysis of Production Data Using Big Data and Internet of Things Technology to Provide a Scientific Basis for Production Decision-Making

A new technological revolution has quietly sprouted, big data and the Internet of Things, and other emerging technologies have begun to appear in the public's view [3], and their function is not to be underestimated. On the one hand, IoT technology can be used to connect with production equipment and production lines to collect real-time data in the production process, and then through the massive analysis of big data to detect the use of the machine, the enterprise user can observe the analyzed data to determine the operation of the equipment. If abnormalities occur, efficient professional judgment can be made in a timely manner. On the other hand, big data can integrate the data collected by IoT sensing technology to build failure prediction models. This allows managers to arrange maintenance plans in advance, reducing the probability of emergencies occurring during their production process and reducing resource waste while also extending the service life of the equipment. This process provides technical support for the green development of enterprises.

Big data analysis can provide managers with a more sophisticated production process. In the production process, big data can analyze the real-time parameters of the production process and identify the links and periods of energy waste. Business managers can then rationally adjust production beats to improve production efficiency. In terms of raw materials, big data can determine the optimal amount of materials to purchase and use, reducing inventory idleness and waste. Enterprises can also use big data to analyze market needs and produce products that are more in line with market needs on the basis of the original materials, thus making production decisions more in line with market changes and improving the economic efficiency of enterprises.

4.3. Strengthening Upstream and Downstream Cooperation, Promoting the Circular Economy Model, and Building a Synergistic and Complementary Ecological Chain and Industrial Chain

Upstream and downstream cooperation is important for the stable and efficient development of enterprises. Strengthening upstream and downstream collaboration can enable enterprises to obtain a more stable supply system, a stronger innovation impetus and more convenient information communication channels. Firstly, when choosing suppliers, enterprises should choose partners that are more inclined to take the green development path to ensure that the production and supply process of raw materials meets the green environmental protection standards and, at the same time, add new impetus to their green development. Secondly, relying on their core advantages, chain master enterprises have promoted the development of energy-saving and emission-reduction projects, shared technology and experience, and driven the green transformation of the entire supply chain [3]. The synergistic effect generated by the chain master enterprises can make the upstream and downstream smooth docking of environmentally friendly production processes and significantly reduce the energy consumption and pollution of the whole industrial chain. Finally, scientific and technological means can be used to build an information-sharing platform so that upstream and downstream communication is more timely and efficient and resource allocation is more reasonable [4].

The application of the circular economy model in the green operation of enterprises has become more and more widespread. In the production process, enterprises can use circular economy technology. It emphasizes the sustainable recycling of resources and the resourceful treatment of waste, aiming to reduce the environmental burden and the consumption of virgin resources while improving economic efficiency [5]. Secondly, enterprises can establish a circular economy industry chain to obtain renewable or recyclable materials upstream to reduce the waste of resources. In the consumption chain, enterprises can develop recycling channels to encourage consumers to return their waste products, such as providing old machine recycling services to facilitate the disposal of waste products. This process not only solves the problem of consumers not knowing where to dispose of their waste and the environmental pollution caused by littering but also realizes waste reuse from recycled waste products, which greatly improves the economic and environmental benefits of enterprises.

In the prevalence of the concept of green development, enterprises have also realized that the pursuit of economic benefits alone is not practical; In order to achieve economic development, it is necessary to do enough environmental protection work. In the industrial chain, enterprises must always implement the concept of green development. In the ecological chain, enterprises should pay attention to the harmonious coexistence of enterprise economy and ecological environment, and create a green future [6].

5. Conclusion

Under the carbon peaking and carbon neutrality goals, the green transformation of enterprises driven by science and technology innovation has become an inevitable trend. Firstly, enterprises should formulate a green transformation mode in accordance with their own industry characteristics, scale and development history. Secondly, they should pay close attention to international and domestic science and technology innovation to empower their green development. The green development of enterprises driven by science, technology and innovation is a road full of hope and challenges, and the realization of the long-term goal of green development is the core driving force and key support for the synergistic progress of economic development and environmental protection, which requires the concerted efforts of all parties, contributing to the high-quality development of enterprises and the sustainable development of the global.

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