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Research on Carbon Emission Governance in a City in Southern Jiangsu Under the Goal of High-Level New-Type Industrialization

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Abstract: This paper focuses on the research of carbon emission governance in a city in southern Jiangsu under the goal of high-level new-type industrialization. With the increasingly severe global climate change, achieving green and low-carbon development has become the focus of attention of governments and academic circles around the world. As one of the regions with the highest industrialization level in China, southern Jiangsu has made remarkable achievements in economic development, but at the same time, it is facing enormous carbon emission pressure. Especially under the background of new-type industrialization, how to effectively control and reduce carbon emissions while maintaining high-quality economic development has become an important issue to be solved urgently in a city in southern Jiangsu. This paper first analyzes the current situation and characteristics of carbon emissions in a city in southern Jiangsu. Secondly, under the goal of high-level new-type industrialization, it conducts an in-depth study on carbon emission governance in the city, explores its governance experience and challenges in aspects such as policy and regulation guidance, industrial transformation and upgrading, construction of a green industrial system, digital intelligence R&D investment, and improvement of public environmental awareness, and puts forward operable policy suggestions and practical paths.

Keywords: High-level new-type industrialization; Carbon emission governance; Southern Jiangsu

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1. Introduction

In recent years, the direction and paradigm of the deepening of the international division of labor have been changing, and new trends have emerged in the evolution of the global value chain [1]. The Report to the 20th National Congress of the Communist Party of China proposed the goal of basically realizing new-type industrialization by 2035, and emphasized adhering to focusing on the real economy in developing the economy, promoting new-type industrialization, and building a manufacturing power [2]. In the process of new-type industrialization, strengthening carbon emission governance is not only an inevitable requirement for addressing

climate change but also an important way to promote economic transformation and upgrading and achieve high-quality development [3]. The industrial sector is a key field of energy and resource consumption and the main source of carbon emissions in China [4]. Driven by the goal of profit maximization, enterprises have a strong motivation to transfer carbon emissions to the upstream and downstream of the industrial chain by reducing product quality and restructuring product manufacturing models, which is inconsistent with the goal of promoting China's high-level new-type industrialization and high-quality economic development. Promoting high-level new-type industrialization, forcing enterprises to adopt high and new technologies to reduce carbon emission levels, and guiding industrial structure upgrading are the necessary paths to help achieve carbon peaking and carbon neutrality [5,6]. Focusing on carbon emission governance under the goal of high-level new-type industrialization, this paper takes a city in southern Jiangsu, an industrially developed city, as the research sample, aiming to explore effective governance strategies and paths by in-depth analyzing the current situation and problems of carbon emissions in the current industrialization process, and provide theoretical support and practical guidance for achieving high-quality economic development.

2. Current Situation of Carbon Emissions in a City in Southern Jiangsu

Carbon emissions in a city in southern Jiangsu mainly come from energy production and consumption. As an economically developed city, it has a large energy consumption, and the combustion of high-carbon resources (such as coal, oil, and natural gas) is the main source of carbon emissions. According to the characteristics of the industrial structure of the city, the industrial distribution of carbon emissions is mainly concentrated in: the industrial sector, including traditional industrial industries such as iron and steel, chemical industry, electric power, and textiles; the transportation sector, including transportation methods such as highways, railways, and aviation. With the increase in traffic flow, carbon emissions in the transportation sector are also increasing; the construction sector, including the production of building materials, construction processes, and energy consumption during building operation.

To address the problem of carbon emissions, the Three-Year Action Plan for Improving the Basic Governance Capacity of the Ecological Environment in a City in Southern Jiangsu (2022-2024) clearly proposes the goal of reducing carbon dioxide emissions per unit of GDP by more than 13% by 2024 compared with 2020. In response, the government of the city has taken a series of emission reduction measures, including: optimizing the industrial structure, promoting the transformation and upgrading of traditional industries, developing green and low-carbon industries, and reducing the proportion of high-energy-consuming and high-emission industries; improving energy efficiency, promoting energy-saving technologies and equipment, improving energy utilization efficiency, and reducing energy consumption and carbon emissions; developing renewable energy, actively developing renewable energy such as solar energy and wind energy, and increasing the proportion of renewable energy in energy consumption; strengthening policy guidance, introducing relevant policies and measures to encourage enterprises and individuals to participate in carbon emission reduction actions and promote green and low-carbon development [7,8].

3. Characteristics and Advantages of Carbon Emission Governance in a City in Southern Jiangsu

A city in southern Jiangsu has actively responded to the national major strategic decision of carbon peaking and

carbon neutrality, formulated and implemented a series of local carbon emission reduction policies [9], such as the Carbon Peaking Implementation Plan of a City in Southern Jiangsu and the Innovation Pilot Work Plan for Synergistic Improvement of Pollution Reduction and Carbon Reduction in a City in Southern Jiangsu, which have further refined specific carbon emission reduction measures and goals, provided a clear policy orientation and planning blueprint for carbon emission reduction work, and offered clear policy guidance and strategic planning for total carbon emission control. The city has set quantitative specific emission reduction goals in its carbon peaking implementation plan, such as reducing energy consumption per unit of regional GDP by 14% by 2025 compared with 2020, and reducing carbon dioxide emissions per unit of regional GDP by more than 65% by 2030 compared with 2005. These goals provide a quantitative basis for total carbon emission control. As an important economically developed city, it has a strong economic foundation and comprehensive strength, providing sufficient financial support and material basis for the implementation of carbon emission reduction policies.

A city in southern Jiangsu has strong strength in technological innovation, and can continuously promote the research and development and application of low-carbon technologies, such as energy efficiency improvement technologies, clean energy technologies, and carbon capture, utilization, and storage technologies, providing technical support and solutions for total carbon emission control. By introducing and cultivating low-carbon technology enterprises and R&D institutions, the city has continuously improved its own low-carbon technology level, providing strong technical support for the implementation of carbon emission reduction policies. It has also studied the use of advanced technical means such as big data and cloud computing to build a carbon emission monitoring and management system, conduct real-time monitoring of carbon emission data, and analyze carbon emission trends and characteristics.

At present, a city in southern Jiangsu is accelerating the construction of a green and low-carbon industrial system, building a high-level new-type industrialized city, and promoting the transformation and upgrading of traditional industries and the development of strategic emerging industries [10]. It has actively promoted energy structure adjustment and green and low-carbon transformation, and the construction of a new energy industrial chain has initially achieved results. The city has implemented a series of emission reduction measures for high-energy-consuming and high-emission industries such as iron and steel, chemical industry, and building materials, such as ultra-low emission transformation and energy efficiency improvement. The implementation of these measures has not only reduced the carbon emission intensity of these industries but also set an emission reduction model for other industries [11]. The government of the city has introduced a series of supportive policies to promote the development of the new energy industry and increase the proportion of clean energy consumption. It has performed excellently in the development of the new energy industrial chain, forming a relatively complete industrial chain layout. In 2023, the operating income and industrial output value of the new energy industry in the city both achieved significant growth, injecting strong momentum into the development of the modern industry of the city.

A city in southern Jiangsu has favorable conditions in policy, economy, technology, society, environment, and other aspects to promote the implementation of carbon emission reduction policies [12]. It has taken the lead in exploring the carbon inclusive mechanism in the province and built a carbon fashion public welfare platform. By quantifying emission reduction behaviors and endowing them with certain value, it encourages more people to participate in carbon emission reduction actions. With the popularization and improvement of environmental awareness, the understanding and support of citizens in the city for carbon emission reduction are also constantly improving [13]. They have begun to pay attention to their own carbon emission behaviors and actively participate in various energy-saving and emission reduction activities. The formation of this social atmosphere provides a good

mass foundation for the implementation of carbon emission reduction policies.

4. Experience and Challenges of Carbon Emission Governance in a City in Southern Jiangsu

4.1 Summary of Carbon Emission Governance Experience in a City in Southern Jiangsu

(1) In terms of carbon emission governance, the city has very clear industrial preferences and plans. It regards new energy as an important direction for promoting new-type industrialization and an important aspect for cultivating new quality productive forces, and is committed to building a "capital of new energy equipment" [14]. This clear industrial positioning and planning have pointed out the direction for the development of the new energy industry in the city.

(2) The government of the city has strong forward-looking in policy formulation, and after years of operation, has transformed and formed a new industrial chain layout.

(3) The city has a strong industrial foundation and enterprise clusters. For example, it is home to well-known enterprises such as Suntech Power, Lead Intelligent Equipment, and Longi Hydrogen Energy. These enterprises have a leading position in their respective fields, providing strong support for the city to achieve the goal of high-level new-type industrialization.

(4) From the government to enterprises, the city attaches great importance to technological innovation and continuously improves the technical level. For example, Lead Intelligent Equipment in the city continues to innovate in the field of new energy intelligent equipment, providing customers with comprehensive services from single-machine solutions to whole-line system integration and digital factories; Extreme Light Energy focuses on the industrialization of perovskite batteries, striving to solve technical problems faced by large-scale commercialization.

(5) The government of the city fully provides policy support and continuously optimizes the business environment to encourage and attract high-level new-type industrial enterprises to settle in the city [15]. For example, it has introduced a series of policies and measures to promote the development of the new energy industry, increasing support for new energy enterprises; at the same time, it optimizes the government service process, improves work efficiency, and creates convenient conditions for enterprises.

4.2 Challenges Faced by Carbon Emission Governance in a City in Southern Jiangsu

(1) Restricted by the negative impact of the domestic and foreign macro environment, the high-level new-type industrialization of the city is also facing certain impacts. High-level emerging industrial enterprises in the city need to continuously improve their competitiveness to remain invincible in the fierce market competition.

(2) After years of hard work, the city has initially achieved industrial transformation and upgrading, but the industrial chain coordination needs to be strengthened.

(3) Restricted by the trend of deglobalization, the city is facing high international environmental uncertainty, which has a certain impact on the green transformation and upgrading of its industries. It needs to spend more energy to actively respond to various risks, bringing considerable challenges to carbon emission governance.

5. Conclusion and Outlook

The actual impact of carbon emission governance on the high-level new-type industrialization of a city in southern Jiangsu is mainly reflected in: carbon emission governance requires the city to accelerate the elimination of high-energy-consuming, high-emission, and low-efficiency backward production capacity, continuously adjust and optimize the industrial structure, and promote the economy to develop in a more environmentally friendly, efficient, and sustainable direction; carbon emission governance requires enterprises to increase investment in technological innovation, reduce production costs and energy consumption levels, improve overall economic benefits, and enhance product added value and market competitiveness; carbon emission governance has promoted the adjustment of the energy structure of the city, reducing the consumption of traditional high-carbon resources such as coal; carbon emission governance has prompted the city to take renewable energy such as photovoltaic power generation and wind power generation as one of the key development directions through policy guidance and market mechanism innovation, promoting the rapid development of the renewable energy industry; carbon emission governance requires the city to increase investment in technological R&D in fields such as energy conservation and emission reduction and clean energy, encouraging enterprises in the city to strengthen cooperation and exchanges with universities, scientific research institutes, etc., to carry out joint technological innovation activities, providing strong technical support for high-level new-type industrialization; through a combination of policy support and market guidance, the city has actively promoted advanced energy-saving and emission reduction technologies and products, encouraging enterprises to adopt advanced technologies and equipment for transformation and upgrading to reduce energy consumption and carbon emissions; carbon emission governance is conducive to reducing pollutant emissions in the industrial process of the city. By implementing strict environmental protection standards and supervision measures, the city has effectively curbed the occurrence and development of environmental pollution problems.

In the future, to do a good job in carbon emission governance while pursuing the goal of high-level new-type industrialization, a city in southern Jiangsu needs to take a series of comprehensive measures to achieve a win-win situation between high-level new-type industrialization and environmental protection. The city should formulate clear and operable new-type industrialization and carbon emission governance goals in combination with its actual situation, and clarify phased tasks and long-term plans. Continuously improve relevant laws and regulations, clarify the responsibilities and obligations of enterprises in carbon emissions, strengthen law enforcement, establish and improve the supervision system, and ensure the effective implementation of various policies and measures. At the same time, introduce a series of policies and measures to support new-type industrialization and carbon emission governance, including financial subsidies, tax incentives, and green finance, to encourage enterprises to actively participate. Give key support to strategic emerging industries and high and new technology industries, such as new energy, new materials, and energy conservation and environmental protection, to promote the transformation and upgrading of traditional industries and gradually eliminate high-energy-consuming, high-emission, and low-efficiency backward production capacity. Vigorously develop renewable energy such as solar energy and wind energy, increase the proportion of clean energy in energy consumption, and gradually reduce dependence on high-carbon resources. Strengthen the collaborative cooperation of enterprises in the upstream and downstream of the industrial chain, promote the green and low-carbon development of the entire industrial chain, and form a green supply chain system. At the same time, improve the carbon emission trading mechanism, and naturally optimize the economic structure through market-oriented methods. Actively carry out international cooperation and exchanges, information disclosure and public participation, advocate a green and low-carbon lifestyle, and strengthen ecological civilization construction.

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