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Research on the Coupled and Coordinated Development and Optimization Path of Low Carbon Economy and New Urbanization

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Abstract

Currently, China has entered a stage of high-quality development, and urbanization is an important issue in China's modernization process. Urbanization faces many challenges such as food security, resource and energy shortages, and environmental pollution. To solve this problem, we must take a new path of sustainable development towards urbanization. The new type of urbanization adheres to the principle of people-oriented, taking the path of green, circular, and low-carbon. It can unleash huge domestic demand potential and is an important driving force for the healthy and high-quality development of China's economy and society. A low-carbon economy emphasizes increasing energy output, reducing energy consumption and pollution, thereby reducing emissions and improving economic benefits. Low carbon economy is not only a new economic form and development model in the era of ecological civilization, but also the best economic form and development model for the construction of new urbanization.

Keywords

Low-carbon economy, New urbanization, Path optimization.

1. Introduction

The research objective of this project is to comprehensively explore the relationship and mutual influence between the two, using the "China Energy Statistical Yearbook" and referring to the "National New Urbanization Plan" and the research of scholars such as Ding Bin and Liang Wen, combined with the latest data released by the National Bureau of Statistics and various cities, to reflect the coordinated development level between low-carbon economy and new urbanization, The purpose is to provide a more precise and optimal path for new urbanization under the background of low-carbon economy, and further study and explore the dynamic relationship and changing trends between low-carbon economy and new urbanization, in order to find a balance point between economic development and green ecology.

2. Literature review

At present, in the literature on the coupling relationship and impact effects of low-carbon economy and new urbanization by domestic and foreign scholars, it has been found that low-carbon economy has a significant positive impact on the promotion of new urbanization. As early as 2011, Tang Yajiao[1] and others proposed a strategic analysis of promoting new urbanization in the Changsha Zhuzhou Xiangtan urban agglomeration under the low-carbon path. Based on this research analysis, it is believed that new urbanization under the low-carbon path is the only way to lead a new round of economic development nationwide. However, there are many institutional and institutional obstacles, and there are huge challenges in institutional innovation. This requires strong policy support and strong talent and technological support capabilities. In 2012, Liu Shaohua[2] and others believed that low-carbon economy was an inevitable choice for new urbanization. However, the government's one-sided pursuit of urban GDP growth, excessive attention to land urbanization and economic urbanization, and neglect

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of population urbanization, led to China's land urbanization being faster than population urbanization, neglecting the coordination between economic and social functions, resulting in low resource utilization efficiency, serious environmental pollution, and affecting the process of sustainable development. In 2016, Cheng Ziteng[3] sorted out based on decoupling theory that economic growth and energy carbon emissions have not been decoupled, and the growth rate of energy carbon emissions is higher than the economic growth rate, and the per capita ecology is at a deficit level. He believes that some regions urgently need to change their economic development mode, adjust their industrial structure, and develop a low-carbon economy. Yan Jinming[3] believes that strengthening macroeconomic regulation of the energy system and implementing an ecological compensation system for carbon emissions can fundamentally improve it. In 2022, Liang Wen[4] et al. pointed out the impact of new urbanization and logistics coordinated development on low-carbon economy based on the analysis of synergy theory. The results show that energy intensity and carbon emission intensity have a positive impact on each other, but the two cannot promote sustained economic growth. Synergy can effectively reduce energy intensity and carbon emission intensity, promote sustainable economic growth, and thus facilitate the realization of a low-carbon economy. In the same year, Liu Chao[5] analyzed the current development status of China's low-carbon economy, studied how to construct regional low-carbon economic development strategies and frameworks, and formulated feasible models for how to achieve regional low-carbon economic development in underdeveloped and developed regions of China.In 2023, Zhang Mingdou[6] et al. used the double difference method to examine the impact and mechanism of low-carbon strategy on the coordination between urban economic development and ecological environment. They found that low-carbon strategy can significantly enhance the coordination between urban economic development and ecological environment by promoting green technology innovation, optimizing industrial structure, and improving energy utilization efficiency through three paths. Wang Jinli[7] believes that green development has a dual effect of "economic effect" and "emission reduction effect". The low-carbon economic transformation exhibits time inertia effect and spatial spillover effect, which have a significant positive impact on the local and surrounding areas. However, it is found that the impact in the eastern, central, and western regions is heterogeneous, and the degree of industrial coupling in the western region is weak, and the emission reduction effect is not yet obvious.

Scholars at home and abroad have conducted some research on the impact and connection between low-carbon economy and new urbanization, which provides a more solid foundation for the research of this project. However, currently these studies only focus on the unilateral causal analysis of low-carbon economy and new urbanization. This project will sort out the existing achievements, explain the contribution of low-carbon economy to economic development, the impact of low-carbon economy on new urbanization, and propose optimization paths.

3. Development status

3.1. Current situation of new urbanization development

China has made significant progress in the construction of new urbanization, with the urbanization rate of permanent residents increasing from 53.10% in 2012 to 66.16% by the end of 2023. This is the national average, and there is still great potential for urbanization construction in the central and western regions; There is still a big gap between the urbanization rate of the registered residence population and the permanent population, and China's overall urbanization rate also has much room for improvement.

Firstly, highlight the people-oriented approach and accelerate the urbanization of agricultural transfer population. According to a survey by the National Bureau of Statistics, there are still

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170 million migrant workers and their accompanying families who have not yet settled in urban areas. The primary task of urbanization is to orderly promote the urbanization of this group of people. The government will deepen the reform of the registered residence system, fully implement the cancellation of restrictions on settlement in cities with a permanent resident population of less than 3 million in urban areas, and open wider to the outside world except for some megacities. The key is to solve the problems of education, housing security, and social insurance for the children of agricultural migrant workers, and promote the equalization of basic public services for permanent residents.

Secondly, collaborate to promote new industrialization and urbanization. In areas with high levels of industrialization, the level of urbanization development is generally high, but there are still many areas that are still in the process of industrialization. There is still great potential to drive urbanization development through industrialization. Regions with low urbanization rates and large rural populations should rely on local industrial resource endowments and industrial foundations, and accelerate the cultivation of characteristic industrial clusters according to local conditions; Promote the integration and upgrading of homogeneous and inefficient industrial parks, and concentrate resources to build high-level specialized industrial parks; Accelerate the filling of infrastructure and public service gaps in county towns, effectively improving the comprehensive carrying capacity of county towns.

Thirdly, cultivate and build modern urban agglomerations. Urban agglomeration is an effective way to promote the transformation of the development mode of mega cities and the coordinated development of large, medium, and small cities. Taking the radiation of the central city as the direction to drive the common development of surrounding cities and counties, accelerating the cultivation of a number of modern urban agglomerations can effectively build a new type of urbanization. Strengthen the interconnection of transportation infrastructure in urban areas, steadily promote the construction of rail transit networks, and accelerate the smooth flow of unconnected highways and bottleneck sections; Strengthen industrial division of labor and cooperation, and promote the transfer of some industries in mega cities to the surrounding areas; Promote the co construction and sharing of high-quality public services within urban areas.

Fourthly, enhance the resilience level of urban safety. In recent years, urban flooding, fires and other problems have occurred frequently, and urban safety resilience has become a shortcoming that urgently needs to be addressed. The central urban areas with high population density and key areas with wide impact should do a good job in urban livelihood engineering construction, with a focus on steadily implementing urban renewal actions, promoting the renovation of old urban communities, promoting the construction of affordable housing, strengthening urban flood control, accelerating the construction of underground pipelines and other engineering projects, and creating livable, resilient, and smart cities.

3.2. Current status of low-carbon economic development

At present, there is relatively little research on low-carbon economy in China by scholars and direct description of low-carbon economy by relevant government departments. However, this article finds some answers through the energy consumption and pollution treatment published by some local governments in public articles. Since 2000, local governments have gradually shifted their economic development model from high energy consumption to low energy consumption and low pollution. Taking Hefei City, Anhui Province as an example, according to public data, from 2013 until the end of 2022, the gross domestic product of Hefei City has been steadily increasing with a certain trend, and the per capita gross domestic product and disposable income of residents have also steadily increased. However, Hefei City's industrial nitrogen dioxide emissions and industrial wastewater emissions have been decreasing year by year, The industrial water purification rate has been increasing year by year since 2000 and

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will remain at a relatively high level by the end of 2022, which to some extent reflects the effective measures taken by Hefei City to develop a low-carbon economy. Moreover, according to publicly available energy yearbooks and other data, the power source in Hefei has gradually shifted from traditional petrochemical energy to clean energy, with the usage of zero carbon energy increasing year by year. The proportion of zero carbon energy in total energy consumption has also shown an increasing trend year by year. Due to the relatively small pollution caused by zero carbon energy, the degree of environmental pollution damage is also not significant. Therefore, in terms of environmental pollution caused by energy consumption, Zero carbon energy has almost no cost, and in terms of economic benefits, it seems to be better than traditional energy.

Moreover, Hefei City has also introduced a series of measures in terms of policies. As a famous city for new energy vehicles in China, Hefei's development in the field of new energy has received unanimous praise both domestically and internationally in recent years. This not only depends on the market for new energy vehicles, but also reflects a series of strong protection policies and low-carbon economic development policies in the field of new energy vehicles in Hefei, which also ensure the favorable development of new energy vehicles. Not only Hefei, but also throughout Anhui Province, coal resource-based cities mainly in Huaibei and Huainan are gradually transitioning towards new energy industries. These cities have already transitioned from traditional coal mining industries to new energy directions. Zaozhuang City in Shandong Province is also a traditional coal resource-based city. In recent years, Zaozhuang City has been seeking development and transformation, shifting from a traditional resource-based city to a new energy source. In recent years, Zaozhuang City has been committed to laying out the lithium battery industry and doing a good job in the upstream industry of new energy vehicles. From lithium mining, positive and negative electrode material processing to diaphragm production and electrolyte production, Zaozhuang City has developed a complete lithium battery industry chain and attracted many large and medium-sized lithium battery and new energy enterprises both domestically and internationally to layout in neighboring cities such as Xuzhou and Jining centered around Zaozhuang, This also fully reflects the rapid development of the new energy industry under the support of low-carbon economic policies.

4. Path optimization

4.1. Measures for optimizing the development of new urbanization

Fundamentally speaking, new urbanization is a process in which the quality of life of the people continuously improves with the increase of income. This phenomenon is achieved through the continuous gathering of population and active economic activities. To achieve new urbanization faster and better, it is necessary to continuously promote it through high-quality economic activities. High quality economic activities not only bring about employment expansion and income increase for residents, but also often lead to population aggregation on a certain scale and more active and advanced economic activities. The agglomeration of population size is necessary for economic activities to generate economies of scale, thereby creating more employment opportunities and increasing household income, thus forming a good virtuous cycle. The second is to enhance the complementary development and positive interaction between urban and rural areas. According to investigations and research by relevant scholars, as well as government work reports and relevant documents in recent years, it has been proposed that urban areas should adopt an intensive development path, while rural areas provide products, services, and production factors for urban areas. Through such complementary development, it can effectively drive the coordinated development of urban and rural areas, accelerate the integrated construction of urban and rural areas, and fundamentally accelerate the process of new urbanization. The third is to make extensive use

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of existing scientific achievements. Transforming scientific research achievements into the lives of residents can effectively improve their quality of life and technological content, providing convenience to a certain extent and laying a solid foundation for better new urbanization. The fourth is to accelerate infrastructure construction. The construction of infrastructure will not be limited to large and medium-sized towns alone, but will gradually shift the resources of infrastructure construction towards small towns and townships with relatively backward infrastructure, including elderly care, medical care, education, public transportation, etc. This can also better narrow the gap between urban and rural areas, and to some extent, accelerate the process of new urbanization.

4.2. Measures for prioritizing the development of low-carbon economy

Since the proposal of the "dual carbon" goal, China has accelerated the green transformation of its development mode, and the energy industry is also a key focus of green transformation. Developing a low-carbon economy has also become a new development model for China's green transformation. There are many ways to achieve a low-carbon economy. At present, there is relatively little research on low-carbon economy and new urbanization by domestic and foreign scholars. However, through mainstream perspectives and research on various regions in this article, it is found that China mainly adopts the following measures under the low-carbon economic development model. One is to do a good job in resource recycling. Promote the development of the waste recycling industry, promote the research and application of advanced technologies for energy conservation and carbon reduction, and accelerate the formation of a green and low-carbon supply chain. According to a survey, as of the end of 2023, the number of automobiles in China is about 340 million, and the number of major categories of household appliances such as refrigerators and washing machines exceeds 3 billion. There is a huge demand and potential for updates and replacements. By exchanging old for new or recycling, we can establish a recycling system or even a source system. At the same time, in the international market, the requirements for the proportion of recycled materials in exported products are becoming increasingly strict. By establishing a sound recycling system and developing a circular economy, we can not only improve China's economic vitality, but also improve the efficiency and level of resource recycling. The second is to do a good job in replacing green energy. We need to accelerate the construction of a clean and low-carbon energy system. Promote the integration of the diversified energy spectrum of coal, electricity, new oil, gas, hydrogen, and nuclear, accelerate the diversified, rapid, large-scale, efficient, and scientific development of new energy, innovate and promote the development of multiple types of projects such as complementary energy sources, grid load storage, offshore wind power, hydrogen ammonia coupling, and chemical coupling. The third is to do a good job in the development and research of zero carbon technology. Zero carbon technology is not only limited to exploring energy and achieving zero emissions during consumption, but also needs to fully utilize technology to achieve a purification rate of 99.99% after energy emissions pollution. This requires further investment in the higher education industry with zero carbon emissions as the main body, accelerating scientific research and development, and transforming technological achievements, so as to apply zero carbon technology to practice as soon as possible. The fourth is to issue reasonable policy regulations to support enterprises dominated by new energy to a certain extent, accelerate the elimination of outdated production capacity, accelerate the construction of nests to attract new energy enterprises to build factories and put them into operation, encourage emerging enterprises to use new energy dominated by low-carbon energy in policies, provide financial support to a certain extent, and encourage emerging enterprises to deeply cultivate the new energy industry.

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4.3. New urbanization and coordinated development of low-carbon economy

The coordinated development of new urbanization and low-carbon economy should be explored from their commonalities. The new urbanization is mainly aimed at improving the quality of life of residents, building urban-rural integration, and promoting a virtuous economic cycle. Low carbon economy aims to reduce energy consumption, lower pollution emissions, and prioritize high-quality economic development. It can be seen that the goals of both are focused on high-quality economic development. Therefore, based on the research of domestic and foreign scholars, as well as government work reports in various regions and through visits and surveys, this article finds that achieving the coordinated development of new urbanization and low-carbon economy requires high-quality economic activities. High quality economic activities include emerging industries with low energy consumption and pollution, achieving high-quality economic development through low pollution. The second is to do a good job in industrial layout, fully leverage local advantages, develop specialized and refined industries with rural areas as the main body, and then unify them for assembly and sales in urban areas. The division of labor in economic activities is conducive to the benign interaction between urban and rural areas, and also accelerates the flow of urban and rural population and the increase of resident income to a certain extent, which plays a crucial role in the construction of new urbanization.

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