

# Exploration of the Path of Green and Low-carbon Development in Counties in Northern Anhui under the Dual Carbon Target

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## ABSTRACT

Green water and green mountains are gold and silver mountains. The 20th National Congress of the Communist Party of China proposed to accelerate the transformation of social green development and promote green, low-carbon and high-quality development. Realizing regional green development is an important connotation of high-quality economic development. County towns are key nodes for urban-rural integrated development and important carriers for promoting urban-rural green development. The "dual carbon" target is a necessary choice for my country to promote high-quality development. This project first sorts out the research results of green and low-carbon construction and development in counties at home and abroad, systematically analyzes the basic theories of green and low-carbon, and summarizes the basic characteristics of green and low-carbon development in counties; secondly, an indicator system is established to measure and evaluate the level of green and low-carbon construction and development in counties in northern Anhui, classifies the resource endowments and development levels of different counties from multiple perspectives, and studies the characteristics of green and low-carbon development construction in counties and towns under different types.

## KEYWORDS

Low-carbon development; Carbon emissions; Northern Anhui; Industrial structure

## 1. INTRODUCTION

In order to consolidate and expand the results of poverty alleviation and effectively connect with rural revitalization, the Central Committee of the Communist Party of China and the State Council issued a development goal: by 2025, the ecological environment will be improved; by 2035, there will be a more significant progress to promote common prosperity for all. An important part of the rural revitalization strategy is to adhere to the harmonious coexistence of man and nature, take the path of rural green development, and achieve the goal of "dual carbon".

The county economy in northern Anhui has rich resource endowments. Studying the green and low-carbon development path of underdeveloped areas in northern Anhui under the "dual carbon" goal is conducive to enriching and developing the theory of green and low-carbon development in counties, and provides new ideas for reducing carbon emissions. It has important reference value for the realization of the "dual carbon" goals and the realization of the rural revitalization strategy in northern Anhui, and also provides data support for the formulation of development countermeasures.

## 2. LITERATURE REVIEW

The construction of green and low-carbon counties is an inevitable trend to promote high-quality development of counties under the background of "dual carbon". At present, many county-level areas

in my country have actively explored green and low-carbon construction and achieved excellent results. As of 2023, my country has named 330 national ecological civilization demonstration areas. 17 departments in Sichuan Province use the concept of green and low-carbon to lead the high-quality development of counties. Combined with the situation in the province, they issued the "Implementation Opinions on Strengthening Green and Low-carbon Construction in Counties", promoting the green and low-carbon development of counties from three aspects: creating a green and livable living environment, vigorously developing green and low-carbon buildings, and building green and intensive infrastructure. Pan'an County, Zhejiang Province, created the first "zero-carbon county" in Zhejiang Province, and issued the "Zero-carbon County Creation Action Plan and Suggestions", with the goal of total control and intensity control, to promote the creation of clean production enterprises and green and low-carbon enterprises, and gradually promote the construction of charging piles, distributed photovoltaics, and large pumped storage power stations. Anhui Province insists on continuous exploration in the field of county-level ecological civilization construction and green and low-carbon development. Since the launch of the ecological civilization demonstration creation work in 2017, it has accumulated 19 national ecological civilization construction demonstration areas and 8 "Green Water and Green Mountains are Gold and Silver Mountains" practice and innovation bases, which are among the top in the country. Malaysia selected 6 main indicators and launched the Green Township Index (GTI) as a sustainable township rating tool. However, there are still certain problems in the low-carbon development of counties. Chen Guangjiu believes that low resource utilization efficiency and large regional policy support are still the weak links in the construction of green and low-carbon development in counties. Zhang Mengzhuo established an indicator system at the three levels of production, life, and ecology. By comparing with other provinces and cities, production development, social life construction, clean energy use and waste emissions are regarded as the construction bottlenecks of green and low-carbon development in Henan Province. Wang Kunyan pointed out in the process of discussing my country's green, low-carbon and circular development system that there is regional imbalance in my country's green, low-carbon and circular development system, and there is a large gap between the east and the west.

The research on the level of green and low-carbon development is inseparable from the construction of the indicator system and the level measurement. Regarding the construction of the indicator system, in terms of international organizations and policies, the World Commission on Environment and Development has constructed an urban evaluation indicator system, and the United Nations Environment Program has established a green economic measurement framework that includes four aspects: resource efficiency, economic transformation, social progress, and human well-being; the Organization for Economic Cooperation and Development has established five first-level indicators based on natural assets and the elements in economic activities as the radiation points. Based on natural assets, a green growth indicator system covering the environment and resource productivity in economic activities, environmental factors of quality of life, policy response and economic opportunities as first-level indicators has been established, covering 14 second-level indicators and 23 third-level indicators. Domestic government departments and relevant institutions have also accelerated the research on the green and low-carbon development indicator system. In 2011, relevant national departments issued the "Evaluation Indicators for the Construction of Green and Low-carbon Key Small Towns (Trial)"; in 2016, the National Development and Reform Commission, the Ministry of Environmental Protection, the National Bureau of Statistics and the Central Organization Department jointly formulated the "Green Development Index System", which mainly covers seven aspects, including resource utilization, environmental quality, environmental governance, growth quality, ecological protection, green life, and public satisfaction. Regarding the construction of the indicator system in county areas, Cui Xiaojun proposed that the low-carbon strategy of cities cannot be simply copied and pasted, but must be targeted.

For level measurement, some domestic scholars have started from the provincial level, choosing the three levels of economy, environment and society to build an indicator system and conduct empirical research. For example, Long Ruyin et al. conducted an empirical analysis of the green economic

development of Inner Mongolia and Jiangsu; Zhang Mengzhuo measured and evaluated the level of green economic development in Henan Province and proposed an optimization path. There are also scholars who measure the level of green development and spatial evolution characteristics of provinces across the country.

There have been many studies on green and low-carbon development paths at home and abroad. Among them, domestic research mainly focuses on agriculture, energy, transportation and other fields. At the same time, some studies focus on building a diversified market trading system and exploring the market-oriented path of green and low-carbon development from multiple perspectives. Research trends in recent years show that the carbon emission rights trading market is an important carrier and manifestation of green and low-carbon development in county areas. Using market-oriented paths to reduce carbon emissions in county areas has become a future trend for achieving green development. Tu Xiaoling proposed measures such as promoting industrial optimization, transformation and upgrading, optimizing production methods, changing lifestyles, and improving the institutional system to promote the development of Jiangxi Province. Zou Nian believes that the path of green, low-carbon and circular development of my country's agriculture should be achieved from three aspects: improving rural infrastructure construction, optimizing rural industrial structure, and increasing the publicity of green, low-carbon and circular development.

In general, in the context of low-carbon development becoming an important demand of countries around the world, academic research on it has also been continuously deepened. There are many studies on green, low-carbon and circular economy indicator systems in the past literature, but there are few related literatures that correlate the three and analyze the similarities and differences. At the same time, scholars' research mainly focuses on the green and low-carbon construction and development of the secondary industry, and there is insufficient research on the exploration of green and low-carbon paths in the counties of northern Anhui. Therefore, promoting the green and low-carbon construction and development of counties in northern Anhui is an inevitable trend for my country's low-carbon development.

### **3. BASIC OVERVIEW OF CARBON EMISSIONS IN THE 16 CITIES OF ANHUI PROVINCE**

Northern Anhui is located in the northern part of Anhui Province, consisting of Fuyang, Huaibei, Huainan, Bengbu, Bozhou and Suzhou. Its land area accounts for 33.3% of the province, and its GDP reached 785.017 billion yuan in 2017.

The overall net carbon sink in Anhui Province showed a significant upward trend from 688.79104t in 2000 to 1262.10104t in 2020, an increase of 83.23% in more than 20 years, with an average annual growth rate of 6.01%. Specifically, the carbon sink volume increased from 1053.22 104t in 2000 to 1765.12 104t in 2020, an increase of 67.59%, with an average annual growth rate of 3.63%; while carbon emissions increased from 364.43 104t in 2000 to 503.02 104t in 2020, an increase of 38.03%, with an average annual growth rate of 1.67%. From the data changes in the carbon sink level, it has also increased from the initial 2.89% fluctuation to the current 3.51%. It can be seen that the carbon sink volume, carbon emissions and net carbon sink volume have all increased in the past 21 years, and among the reasons for the change in net carbon sink volume, the increase in carbon sink volume is much faster than the increase in carbon emissions.

On average, the agricultural carbon sink efficiency in northern Anhui is not very high in each year. Only in 2000 and 2020 did the provincial average reach an effective level. The remaining years were all below the effective level, showing an oscillating trend. This result is completely consistent with the changes in Anhui Province in the past 20 years. Looking at the development of Anhui Province in the past 20 years, the industry has risen rapidly, and the transformation and upgrading have been continuous. It has strived to "create something out of nothing and create something new out of

something", vigorously cultivate the electronic information industry, and seize the development opportunities of the digital economy. In the process of transitioning to a major industrial province, the importance of carbon sinks has not been highlighted. Since General Secretary Xi Jinping mentioned the need to achieve the dual carbon goals in his speech in 2020, Anhui Province has accelerated the transformation of its development mode, incorporated energy conservation and emission reduction into its development concept, and attached more importance to agricultural carbon sinks.

## **4. COUNTERMEASURES TO PROMOTE GREEN AND LOW-CARBON DEVELOPMENT IN COUNTIES IN NORTHERN ANHUI**

### **4.1. Enhance the Driving Force of Rural Industrial Integration Development**

Through the analysis in the previous article, it can be seen that the proportion of secondary industries in various cities in northern Anhui is still relatively high, which has a significant impact on the ecological environment and poses a challenge to the high-quality development of the green economy in the region. Therefore, optimizing the industrial structure, giving full play to regional industrial advantages and seeking entry points for industrial upgrading have become important tasks to promote the development of underdeveloped areas in northern Anhui.

The first is to create a brand effect. The key is to focus on improving the intrinsic value of rural product processing in various counties in northern Anhui to achieve the goal of improving quality and efficiency, thereby gaining a significant advantage in competition with other regions and industries. Encourage extensive innovative thinking, especially to improve the added value of rural products in northern Anhui, so as to form a unique brand effect and inject huge impetus into the integrated development of the three industries in rural areas of northern Anhui.

Second, it is necessary to cultivate the leading role of leading enterprises and enable them to play a leading role. To this end, it is necessary to conduct in-depth research on the actual situation of rural industries in northern Anhui, and use mature leading enterprises to promote the development of other relatively backward enterprises, so as to promote deeper integration between rural industries in northern Anhui.

Third, expand the scale of rural industries. With the help of "Internet +", use big data to collect and process information, and lay a solid foundation for the two-way integration of various industries. Finally, through cooperation and exchanges between different subjects, inject strong impetus into promoting the integrated development of rural industries in northern Anhui.

### **4.2. Build Green and Energy-saving Infrastructure**

According to the notice on the overall planning of the construction of modern infrastructure systems in various provinces, relevant government departments need to conduct market research to understand local agricultural needs and potential opportunities and determine what infrastructure is needed, such as irrigation systems, roads, storage facilities, etc. Then carry out detailed planning to ensure that the project is in line with the long-term development strategy of the agricultural industry. At the same time, consider the sustainability of infrastructure, including resource management and environmental protection. For example, irrigation systems should be designed to use water efficiently, reduce water waste, and reduce the risk of land erosion. In addition, a risk management plan should be formulated to consider natural disasters, market fluctuations and other risk factors, and establish an appropriate risk management plan to ensure the sound operation of agricultural infrastructure.

### 4.3. Improve Technological Innovation and Achieve Regional Linkage Development

Technological progress is an important driving factor for improving carbon emission efficiency. Through technological improvement, effectively reducing energy consumption and pollution emissions is the key. Cities in northern Anhui should actively promote technological innovation, provide necessary support for relevant enterprises, encourage them to develop clean energy, and strive to build low-energy consumption and high-output enterprises, and gradually eliminate high-energy consumption and low-output enterprises. At the same time, cities need to attach importance to the introduction of scientific and technological talents and strengthen enterprise management. As a whole, county areas should achieve cooperation and technology sharing, and enterprises should also support each other to promote the common development of cities and enterprises.

### 4.4. Improve the Quality of Foreign Investment

The level of opening up to the outside world has a suppressive effect on the carbon emission efficiency of counties in northern Anhui. This shows that the threshold for cities along the route to attract foreign investment is low, which may lead to the introduction of some high-energy consumption and low-tech enterprises, thereby increasing energy consumption and reducing energy efficiency, and ultimately affecting the local carbon emission efficiency. Among these cities, developed cities should appropriately raise the entry standards when introducing foreign investment to reduce the entry of high-energy consumption enterprises. At the same time, when attracting foreign investment, priority should be given to enterprises with technological innovation capabilities, and foreign advanced technologies should be fully utilized to improve the development level of local enterprises.

## ACKNOWLEDGMENTS

This study was supported by Entrepreneurship Training Program for Undergraduates of Anhui University of Finance and Economics (202310378137).

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