

Exploring the Green Economy Development of Industrial Enterprises in the Context of Carbon Neutrality

-- Taking Bengbu as an Example

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Abstract

In 2020, China vowed to peak its carbon dioxide emissions by 2030 and achieve carbon neutrality by 2060. Achieving the "double carbon" target is the main task to promote green and high-quality economic development in the coming period. This paper analyzes the current situation of carbon emissions in Bengbu and combines the development characteristics and actual situation of Bengbu to propose practical suggestions for the development of enterprises in Bengbu based on the green economy, providing a template for the green and low-carbon transformation of enterprises in other cities and exploring a new path for low-carbon development in China.

Keywords

Carbon neutral; Green economy; Bengbu industry.

1. INTRODUCTION

1.1. Background of the study

For more than 100 years, social development and productivity progress have brought about severe ecological problems such as extreme weather and river pollution. With a deeper understanding of the environment, people find it undesirable to exchange short-term economic benefits at the expense of the natural environment and resources. The introduction of the "double carbon" goal is not only a commitment to the international community as a responsible power but also a commitment to the people who yearn for a better life. Carbon dioxide emissions mainly come from the production and operation process of enterprises, and enterprises are responsible for energy-saving carbon emission reduction and green industrial transformation in the future.

1.2. Research significance

With the introduction of carbon peak and carbon neutral targets, there are both opportunities and challenges for industrial enterprises in Bengbu, and seeking a high-quality and sustainable development path is the way to transform and upgrade the enterprises. This paper theoretically studies and analyzes the green development of Bengbu's economy, and discusses the feasibility analysis and problems of implementing energy saving and carbon emission reduction and green development in Bengbu. Practically, it proposes the development of a carbon peak and green economy in Bengbu's industrial sector and summarizes the green transformation experience of Bengbu's industrial enterprises to provide a reference for the green development of enterprises in other cities.

1.3. Literature review

Wang Yong, et al. (2017) assessed the macroeconomic impact of carbon emission peaking in China under different future scenarios by constructing a CGE model and proposed that the earlier the carbon emission peaking time, the greater the impact on the social economy. Li Yongming and Zhang Ming (2021) analyzed the opportunities and challenges of the "double carbon" target for Jiangsu's industrial development in terms of the carbon emissions of the whole industry and key industries, and proposed to promote the key industries and regions to take the lead in carbon peaking to achieve industry-wide carbon peaking.

Through the analysis of domestic literature and policies, combined with the current situation of industrial development, the following conclusions are drawn: First, the scope of research is extensive, from the national level to domestic regions, and the diversified research methods lay a solid foundation for future research. Second, most of the existing studies on carbon emissions are based on the whole society level. There are fewer industry-specific studies in the industrial field, and there is a lack of operational policy recommendations that combine the actual situation of each industry.

2. CURRENT SITUATION OF INDUSTRIAL CARBON EMISSIONS IN BENGBU

2.1. The basic concepts of carbon peaking and carbon neutrality

Carbon peaking refers to the process of carbon dioxide emissions ceasing to grow and reaching a peak at a certain time and steadily declining after a plateau period. Carbon neutralization refers to the direct and indirect emission of carbon dioxide from human activities in a certain area within a certain period, which offsets each other with the carbon dioxide absorbed through afforestation and other forms to achieve a relatively "zero emission".

2.2. Industrial carbon emission situation

As an old industrial city, Bengbu has many industries such as machinery and chemical industries. In 2020, the regional GDP was 208.273 billion yuan, and the added value of the manufacturing industry accounts for 32.2%. Since the "Thirteenth Five-Year Plan", industry has been growing steadily, with 590 new industrial enterprises on the scale and an average annual growth rate of 7.6%. The "1+3" innovative industrial system has been formed with silicon-based new materials as the leader and biomanufacturing, intelligent equipment manufacturing, and high-end electronic devices as the leading ones.

This paper selects five kinds of energy consumption of Bengbu industrial enterprises on the scale of raw coal, coke, gasoline, kerosene, and diesel to calculate carbon dioxide emissions, and use the relevant coefficients and methods published in "2006 IPCC Guidelines for National Greenhouse Gas Inventory" to measure the carbon emissions of industry.

After calculation, the total industrial carbon emission in Bengbu was 28.3855 million tons in 2011 and 33.8589 million tons in 2021, which is about 1.2 times more. Although carbon emissions decreased from 2013 to 2017, Bengbu still shows an increasing trend in carbon emissions from an overall perspective. The growth rate of carbon emissions fluctuated in 2015-2018, and there was negative growth in 2016 and 2020. The carbon emissions generated by industrial coal-based energy consumption in Bengbu account for more than 80% of the total carbon emissions. The consumption of 2.441 million tons of standard coal in 2021 compared with 3.1463 million tons in 2005, decreased by 706300 tons, showing a downward trend. From 2015 to 2020, Bengbu's electricity, heat production, supply industry, chemical raw materials, chemical products manufacturing industry, and non-metallic mineral products industry, the three major industries consumed 10000 tons of standard coal, accounting for about 85% of the

total. Among them, the proportion of energy consumption in the above three industries in 2020 was 62.02%, 14.12%, and 12.97% respectively.

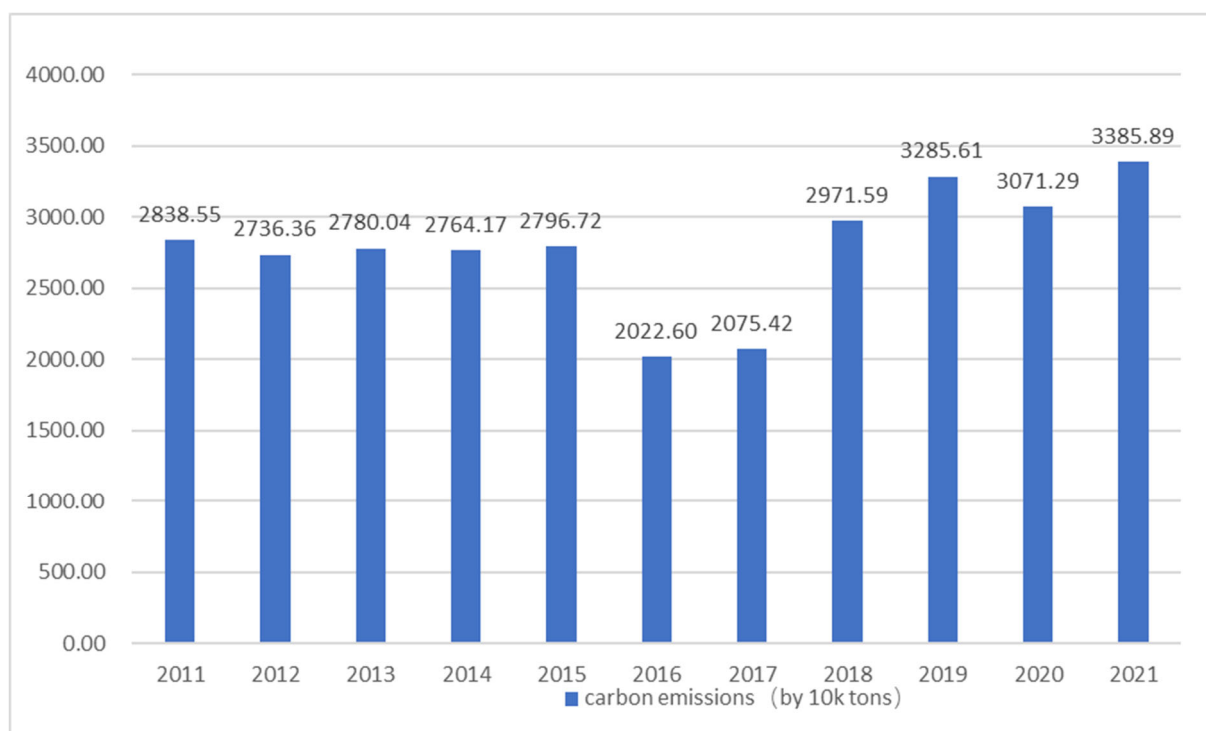


Figure 1. 2011-2021 Carbon Emissions from Bengbu's Above-Grade Industries

3. FEASIBILITY ANALYSIS OF IMPLEMENTING ENERGY-SAVING CARBON EMISSION REDUCTION IN BENGBU

3.1. Policy feasibility

In recent years, Chinese government has improved the laws and regulations on energy conservation and emission reduction and realized the mode of modulating and controlling the carbon emission behavior of enterprises in accordance with laws and regulations. Bengbu's government has established and improved the institutional mechanism for green development of enterprises and incorporated green development work into the performance assessment of target management so that the industrial enterprises can better modulate and control their own production and energy consumption behavior on carbon emission issues. The establishment of the Bengbu area of the Anhui Pilot Free Trade Zone and the implementation of major regional development strategies such as the integrated development of the Yangtze River Delta are conducive to the absorption and gathering of higher-level technology, talent, capital, and other resources in Bengbu, accelerating the green transformation of industries and providing a broader space for future development.

3.2. Financial feasibility

In recent years, the financial revenue of Bengbu has been increasing, providing strong financial support for energy conservation and carbon emission reduction. As the dominant industry of Bengbu, the silicon-based and bio-based new material industry is subsidized by the Anhui Provincial Development and Reform Commission at a rate of 10% for R&D and equipment investment for projects that meet the evaluation requirements, with a maximum subsidy of 30 million yuan for a single project. Increasing government support has enabled

enterprises to focus more on industrial upgrading, injecting momentum into the green development of Bengbu's industrial enterprises.

3.3. Technical feasibility

Bengbu's Government through the purchase of services to carry out the sea control San-Xin and other industrial enterprises on the scale of 5,000 tons of standard coal per year, the key energy-using units of a full range of energy-saving diagnostic work, a comprehensive grasp of key energy-using industrial enterprises to achieve the basic information on the status of energy use and energy-saving way. To reduce pollution emissions and improve cleaner production, enterprises are encouraged to carry out cleaner production technology transformations. After transformation, the energy consumption of 46000 tons of standard coal can be reduced annually.

4. PROBLEMS IN THE PROCESS OF IMPLEMENTING ENERGY-SAVING CARBON EMISSION REDUCTION IN BENGBU

4.1. The transformation of development model faces uncertain risks

Bengbu is an old industrial city, and the main raw materials of energy consumption are still coal, oil, and other carbon-based fuels. The constraints of ecological and environmental factors in the development of traditional industries are increasingly tense, and the transformation of industrial development mode is imminent. The economic and trade friction between China and the United States, coupled with the impact of the COVID-19 outbreak, has brought great uncertainty and instability to economic and social development. Under the current environment of economic pressure, Bengbu is facing increasing uncertainty in breaking away from the traditional economic development model and transforming the conventional energy-intensive industries.

4.2. Insufficient reserve of professional and technical talents

To accelerate the realization of the "double carbon" goal, the introduction and training of high-level professional and technical personnel to help enterprises to innovate green technology, and strive to promote the development of industrial enterprises to comprehensive green transformation. However, the promotion and application of new technologies do not happen overnight, and the breakthrough of technical barriers is not a one-day effort. The breakthrough of technology requires talents, and how to attract talents, retain talents and stimulate the innovative vitality of talent in a third-tier city like Bengbu is also a major problem that needs to be faced today.

5. SUGGESTIONS FOR REALIZING ENERGY CONSERVATION AND CARBON EMISSION REDUCTION IN BENGBU INDUSTRY

5.1. Formulate the overall plan for carbon reduction in Bengbu and improve relevant systems

The government should strengthen cooperation with industrial enterprises, integrate resources from all parties, jointly discuss the path of green development of enterprises, formulate overall planning, and adjust industrial policies. Encourage enterprises to carry out independent innovation and reduce the backward production capacity of iron-making, cement, and paper-making. Develop a key work target responsibility system, closely integrate industrial development with the work assessment of various departments at all levels, and conduct regular inspections to ensure the smooth realization of the "double carbon" target.

5.2. Promote industrial transformation with green economic development and increase technological innovation

At present, coal, oil, and other carbon-based fuels are still the main raw materials for energy consumption in Bengbu. Only through the adjustment of the energy structure is it possible to achieve the goal of carbon reduction. Insist on taking the demand of leading industries as the guide, take the cooperation between industry, academia, and research as the breakthrough, and actively improve the mechanism of transforming innovative research results. Pursue the quality and efficiency of green economic development, and avoid the one-sided pursuit of speed and total amount. The development of the new energy industry will be a major driving force for the future development of industrial enterprises in Bengbu. Relevant enterprises should take this as a breakthrough point to reduce the use of carbon-based energy and help energy conservation and emission reduction.

5.3. Solve the funding gap through multiple channels and improve the fiscal revenue and expenditure system

In recent years, Bengbu's economic development has been relatively slow due to the impact of the epidemic, which has brought a certain impact on government departments' support for enterprises' green transformation. However, in the context of carbon neutrality, the structural transformation of traditional industries is imminent, and industrial enterprises and governments will face certain challenges. Government departments should adjust the fiscal revenue and expenditure in the field of carbon neutrality, make key subsidies for carbon sequestration and carbon reduction products, and adjust the taxation system in the field of low-carbon enterprises to reduce taxes, attract more social capital investment, and make up for the larger funding gap.

5.4. Strengthen talent development

At present, enterprises cannot ignore the cultivation of innovative talents in the process of industrial green transformation. The Bengbu government should rely on the existing innovative technologies and talents to accelerate technical breakthroughs in the field of carbon reduction in industrial enterprises, and strongly support the innovation of relevant enterprises. At the same time, it should establish a scientific talent cultivation plan for industrial revitalization, actively introduce all kinds of technical talents, improve the talent guarantee mechanism, eliminate the obstacles for talents in terms of settlement and children's schooling, stimulate the innovative vitality of talents, and promote the rise of low-carbon industries in Bengbu.

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