

Research on the Transformation and Development Path of Shanxi Iron and Steel Industry under the Background of Carbon Peak

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Abstract: The iron and steel industry occupies an important position in the entire industrial sector and is one of the material foundations for social and economic development. Shanxi Province is rich in energy, coke, electricity and other resources with low prices, which provides resource guarantee for the local iron and steel industry. This paper investigates and analyzes the current situation and existing problems of the iron and steel industry development at home and abroad and in Shanxi Province, and puts forward the general idea of the transformation and upgrading of the iron and steel industry in Shanxi Province under the background of “double carbon”.

1. Introduction

Through the investigation of typical iron and steel enterprises in Shanxi, this paper finds that the problems of iron and steel in Shanxi Province mainly include: Overcapacity in steel production, mismatch between output and demand; unreasonable industrial structure, low industrial concentration, weak technological innovation capability, and poor policy implementation; Enterprises lack awareness of energy conservation and emission reduction, and carbon emission supervision and punishment mechanisms are not perfect. Shanxi Province has just started to promote the high-quality development of the iron and steel industry, and the endogenous power to achieve innovative development is still insufficient.

Based on this, this paper puts forward the following policy suggestions: establish a low-carbon standard system for the steel industry; build a regional raw material procurement and sharing platform; build a logistics processing and distribution platform for the steel industry; build a global iron ore resource guarantee system.

2. Introduction

2.1 Research Background

In recent years, Shanxi Province has vigorously integrated the steel industry and promoted ultra-low emission control. Steel enterprises in Shanxi Province, represented by China Baowu Taigang Group, reduce energy consumption and carbon dioxide emissions by continuously improving steelmaking technology and upgrading steelmaking equipment. The implementation of these energy-saving and emission-reduction measures has led to a large reduction in the comprehensive energy consumption per ton of steel in Shanxi Province. Despite this, the contradiction of small carbon emission rights and large carbon emission in Shanxi Province still seriously restricts the governance and optimization of climate in the province. Shanxi and other places belong to the areas with insufficient carbon emission weights, showing obvious characteristics of “high emissions and low quotas”. From the current situation, they all face extremely serious carbon emission deficits. The extensive use of high energy consumption is the cause of their carbon emissions. However, the relative shortage of their respective forest resources has greatly restricted the distribution of their carbon emission rights.

2.2 Significance

The “Double Carbon” strategy advocates a green, environmentally friendly and low-carbon lifestyle. Accelerating the pace of reducing carbon emissions will help guide green technology innovation and improve the global competitiveness of industries and economies. At present, the iron and steel industry is not only facing major opportunities in adjusting industrial structure, upgrading energy structure and policy orientation, but also facing severe challenges such as overcapacity, capital loss, low innovation ability, lack of high-quality steel, and difficulties in enterprise operation. How to realize the transformation and upgrading of the iron and steel industry, effectively improve economic benefits, and enhance the international competitiveness of China's iron and steel industry has become an urgent problem to be solved in my country in the next decades. Especially in terms of environmental energy, the iron and steel industry bears a huge burden of energy conservation and emission reduction. Therefore, it is imperative to increase the research and implementation of iron and steel industry production technology, energy conservation and emission reduction technology, management, and circular economy promotion. Regional low-carbon transition and development of low-carbon economy.

3. Analysis on the Status Quo of Iron and Steel Industry and Carbon Emissions in Shanxi Province

3.1 The Overall Development Status of the Iron and Steel Industry

The iron and steel industry is one of the important pillar industries in Shanxi Province. With the continuous adjustment of Shanxi's economic structure in recent years, the proportion of the iron and steel industry has declined, but it still occupies an important position. According to the Shanxi Statistical Yearbook, in 2020, the total energy consumption of the ferrous metal mining and dressing industry in Shanxi Province will reach 1.7419 million tons of standard coal, an increase of 47.57% over 2019. It can be seen that Shanxi has huge energy consumption potential, rapid development, and prospects for the steel industry. At present, Shanxi Province has initially formed a group of leading iron and steel enterprises represented by Taigang Group. At the same time, the innovation system of the iron and steel industry in Shanxi Province has been gradually improved, and a number of important innovation platforms such as enterprise technology centers and industrial engineering technology centers have been successively established.

3.2 The Status Quo of Carbon Emissions in the Iron and Steel Industry in Shanxi Province

The carbon emissions of the iron and steel industry in Shanxi Province are generally on the rise. From 2015 to 2016, the total carbon emission increased by about 1.8Mt. In 2017, there was a short-term slight decline. However, in 2018, the growth rate of total carbon emissions was relatively large, with an increase of 18.5%. In 2019, it returned to 4.13%. The rising trend of carbon emissions in the iron and steel industry shows that iron and steel enterprises in Shanxi Province are in overall energy consumption and energy consumption. There are still many problems in the energy structure. Judging from the proportion of the iron and steel industry in the province's total carbon emissions, the overall change has not changed much. Therefore, Shanxi Province should actively resolve the problem of overcapacity, improve the utilization rate of production capacity, and promote energy conservation and emission reduction of iron and steel enterprises in the context of the national “capacity reduction”, so as to realize the sustainable development and green development of Shanxi Province.

4. Problems Existing in Shanxi Iron and Steel Industry

Shanxi Province has just started to promote the high-quality development of the iron and steel industry, and the endogenous power to achieve innovative development is still insufficient. Through the above analysis of the current situation of iron and steel industry development and carbon emissions in Shanxi Province, the problems that restrict the low-carbon development of the iron and steel industry are summarized as follows:

4.1 Steel Overcapacity, Production Does Not Match Demand

In recent years, the external demand faced by Chinese enterprises has weakened significantly. At the same time, domestic market demand continued to be weak, and the steel industry was experiencing excess capacity. Yield is the main reason for the high carbon emissions. When there is a serious mismatch between the production capacity and the market, there may be vicious competition between markets, corporate losses and environmental pollution. Therefore, it is necessary for the Shanxi provincial government to adhere to the goal of reducing overcapacity under the guidance of policies, actively resolve excess capacity, and reverse the unfavorable situation of vicious competition in steel products.

4.2 Unreasonable Industrial Structure and Low Industrial Concentration

Shanxi's iron and steel industry has improved its industrial concentration through policies such as adjusting its industrial structure and corporate mergers and acquisitions, but it is still lower than the national average. At present, only one steel company in the province has a production capacity of more than 10 million tons, and the remaining 20 steel companies have low production capacity, do not have competitive advantages, and have weak anti-risk capabilities. At the same time, the quality of steel produced by most enterprises is low, and the output of steel with long service life and high added value is far from enough. The development of new products is slow, and most enterprises in the province have not formed distinctive leading products that are different from other enterprises, and the competition is fierce.

4.3 The Ability of Scientific and Technological Innovation is Not Strong, and the Policy Implementation Effect is Not Good

From the urgent needs of economic transformation and innovation driven by the new normal and compared with the national average level, the overall innovation vitality of enterprises in Shanxi Province is obviously insufficient. Except for TISCO, the iron and steel enterprises have weak scientific and technological innovation ability and less investment in scientific and technological research and development, which seriously affects the technological progress and innovative development of enterprises. Lack of innovative talents and low level of technological equipment have become the main reasons for the difficulty in innovation. In terms of policy implementation, Shanxi Province lacks advanced experience in energy conservation and emission reduction, and cannot apply the experience of low-carbon steel development from other provinces and the country to its enterprises, resulting in high carbon dioxide emissions.

4.4 Insufficient Awareness of Energy Conservation and Emission Reduction in Enterprises, and Imperfect Carbon Emission Supervision and Punishment Mechanism

Some iron and steel enterprises in Shanxi Province lack the awareness of energy conservation and emission reduction, and fail to implement relevant national policies on energy conservation and emission reduction in the production process. In addition, the carbon emission statistical methods and systems are not perfect, and the supervision is weak. Enterprise behaviors that seriously violate carbon emission-related policies Insufficient punitive measures have resulted in a continuous upward trend in carbon dioxide emissions from the iron and steel industry in Shanxi Province.

5. Conclusion

5.1 Accelerate Green Transformation and Develop Low Carbon Steel

Enabling an efficient, green and recyclable steel manufacturing process. If iron and steel enterprises want to be environmentally friendly, they must take green as their main goal, aim at typical cases of environmental protection in the world, increase environmental protection policies and suggestions, transform and upgrade the environmentally friendly equipment of enterprises, adopt advanced technologies to reduce emissions, and accelerate the research and development of related low-carbon industrial technologies. , optimize the production process and achieve ultra-low

emissions.

5.2 Create “Digital Intelligent Manufacturing” and Develop Intelligent Steel

Improve the intelligent level of the industry and promote the standardization of intelligent manufacturing. Build and strengthen the research and development of key common technologies such as whole-process product process quality control and optimization technology, equipment condition monitoring and intelligent management technology, whole-process energy and environmental protection management and optimization technology, intelligent manufacturing standard control key technology, intelligent equipment and intelligent robot key technology , in order to improve the intelligence level of the iron and steel industry and speed up the promotion and application of automation and “unmanned” operation mode.

5.3 Establish a Low-Carbon Standard System for the Iron and Steel Industry

Focus on key areas such as carbon emission accounting and verification, energy efficiency improvement, low-carbon evaluation, monitoring and management, and carry out the construction of carbon dioxide emission peak and carbon-neutral standard systems. Led by industry associations, relying on industrial alliances, leading enterprises and other organizational units to accelerate the establishment and improvement of a low-carbon standard system for the iron and steel industry in Shanxi Province. The whole industry should be guided by standards, improve the basic standards of steel industry rules under the dual carbon goal, and standardize the production system of the steel industry.

5.4 Create a Regional Raw Material Procurement Sharing Platform

With the steel industry base as the center, build a scrap steel recycling service network, build a comprehensive utilization platform for scrap steel resources and a regional raw material procurement sharing platform with upstream and downstream enterprises in the industrial chain, and timely and effectively reflect the information of recyclable scrap steel, forming online information flow and funds. The closed-loop development model of logistics, offline logistics and commercial flow. At the same time, a multi-mode management method is created, and the relevant information of scrap steel is reflected in the platform in a timely and effective manner, so as to improve the recycling efficiency of scrap steel.

5.5 Build a Logistics Processing and Distribution Platform for the Iron and Steel Industry

Explore professional logistics processing and distribution and industrial cluster logistics processing and distribution models, comprehensively consider the market layout of iron and steel enterprises and terminal products, coordinate market layout and logistics distribution models, improve the closeness of upstream and downstream enterprises in the industrial chain, and improve the logistics efficiency of the iron and steel industry. Actively introduce well-known enterprises at home and abroad, and establish long-term and stable cooperative relations with the steel industry in Shanxi Province. Build a logistics processing and distribution center with the iron and steel industry as the core, and create an independent logistics processing and distribution system for the iron and steel industry.

5.6 Build an Iron Ore Resource Guarantee System

Joint domestic and foreign leading enterprises to build an iron ore resource guarantee system, encourage large enterprises to play a leading role, and promote the timeliness and transparency of iron ore resource circulation. Establish and improve the iron ore resource trading system, and continue to enhance the iron ore transaction pricing power of Shanxi iron and steel enterprises. Guide and promote the integration and reorganization of iron ore enterprises in Shanxi Province, promote the synchronous adjustment of iron ore enterprises and iron and steel enterprises, realize large-scale operation, ensure the effective supply of iron ore resources, and promote green mining and processing.

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