

THE NON-COAL ECONOMIC DEVELOPMENT OUTLOOK FOR SHANXI PROVINCE DURING THE 14TH FIVE-YEAR PLAN PERIOD EXECUTIVE SUMMARY



Executive Summary

Shanxi Province is a national pilot zone for the reform of resource-based economic transformation. The development of non-coal economy is the only way for Shanxi Province to transform its coal resource-based economy, and is also the key to promoting the transformation of its energy consumption structure and curbing the growth of total coal consumption. Since China announced its goal to peak carbon emissions and achieve carbon neutrality, the 14th Five-Year Plan period constitutes a critical period for Shanxi Province to ensure carbon dioxide emissions peak before 2030 and lay a solid foundation for achieving carbon neutrality by 2060. To achieve high-quality economic development, not only the industrial restructuring of coal and non-coal economy, but also the mitigation of carbon dioxide emissions should be taken into consideration.

From the perspectives of industry linkage¹ and carbon emissions reduction², this report starts by classifying input-output sectors and industries of the national economy, and measuring the influence of various industries and carbon emissions. Then, based on full consideration of the industrial boundaries and industrial characteristics of Shanxi Province, the research defines the scope of non-coal economy, and probes into the status quo and outstanding problems of non-coal economic development. Furthermore, pathways and measures are proposed to promote the development of key non-coal industries, strategic goals and indicator systems are constructed, and a dynamic mechanism that advances the development of non-coal economy is analyzed.

Main Conclusions

1. The non-coal economy of Shanxi Province mainly includes industries in ten sectors

Based on the analysis of the intrinsic relationship between the coal industry and other industries from the perspective of industry linkage and carbon emissions reduction, this report incorporates various industries corresponding to the

¹ Industry linkage refers to the intrinsic relations between input and output and between supply and demand in various industries of the national economy. In essence, it reflects the supply-demand relations among industries.

² As a major province of energy, Shanxi Province has much higher carbon emissions per 10,000 yuan of GDP than the national average. In pursuing the carbon emissions peak and carbon neutrality goals, Shanxi Province faces severe challenges in restructuring its energy mix that relies heavily on fossil fuels, transforming its industrial structure that is dominated by heavy industries, and achieving a new round of carbon emissions reduction goals in a short period, which makes the work concerning carbon emissions reduction more significant.

ten sectors with an industry influence coefficient greater than 1³ and carbon emissions influence coefficient lower than the average (2.379) into the research scope of non-coal economy. The development of these industries can, to a certain extent, reduce total carbon dioxide emissions while maintaining stable growth of China's economy.

Sectors and Industries of Non-Coal Economy

No.	Sector	Industry
1	Textiles	The textile industry, the textile, clothing and apparel industry, and the industry of leather, fur, feathers, their products and footwear
2	Culture, sports and entertainment	The industry of journalism and publishing, the industry of radio, television, film and audio production, the industry of culture and arts (literary and artistic creation and performance, art performance venues, libraries and archives, the protection of cultural relics and intangible cultural heritage, museums, public cultural and sports activities, and other cultural and artistic industries), the sports industry, and the entertainment industry
3	Instrumentation	The industry of instrumentation manufacturing
4	Communication devices, computers and other electronic devices	The manufacturing industry of computers, communication and other electronic devices
5	Transportation facilities	The manufacturing industry of automobiles, railways, ships, aerospace and other transportation facilities
6	Accommodation and catering	The accommodation industry (tourist hotels, general hotels, economical chain hotels, other general hotels, B&B services, campground services, and other accommodation industries), and the catering industry
7	Food	The food manufacturing industry, the manufacturing industry of alcohols, beverages and refined tea, and the industry of farm and sideline food processing
8	Transport, warehousing and postal services	The railroad transport industry, the road transport industry, the water transport industry, the air transport industry, the pipeline transport industry, the industry of multimodal transport and transport agency, the loading, unloading, handling and warehousing industry, and the postal services industry
9	Integrated technical services	The industry of special technical services, and the industry of sci-tech promotion and application services
10	Finance	The monetary financial service industry, the capital market service industry, the insurance industry, and other financial industries

³ An industry influence coefficient greater than 1 suggests that the influence of the industry is higher than the average of all industries; that is, the industry provides a strong impetus for the production demand of all industrial sectors of the national economy.



2. Shanxi Province should focus on five major areas in the future development of its non-coal economy

Based on the definition of the scope of non-coal economy, the above-mentioned ten sectors are classified into corresponding fields. Considering Shanxi Province's industrial base, resource endowment, location advantages and other positive factors that bolster non-coal economic growth, five major areas for non-coal economic development of Shanxi Province during the 14th Five-Year Plan period are identified. They are advanced manufacturing, digital economy, cultural tourism and healthcare, modern logistics, and intensive processing of agricultural products.

(1) Advanced manufacturing. From 2015 to 2019, the main business income of the advanced manufacturing industry in Shanxi Province grew at an average annual rate of 12.4 percent, and the sales income of new products grew at an average annual rate of 24 percent. Over 100 innovation platforms at the provincial level or above dedicated to such fields as rail transit, coal mining machines and equipment, and general aviation also provide support for the advanced manufacturing industry in its industrial digitization, basic capability improvement and industry chain modernization. During the 14th Five-Year Plan period, it is essential that Shanxi Province focuses on the industrial application of advanced technologies in various industries, and intensifies research and secures breakthroughs in core components, advanced basic techniques and complete machine equipment, especially in such industrial fields as rail transit equipment, new energy vehicles, electronic information equipment and general aviation equipment.

(2) Digital economy. In 2020, the value added of the digital economy accounted for 24.64 percent of Shanxi Province's GDP, with major breakthroughs secured in the digital transformation of traditional industries, big data and information technologies application and innovation as well as other high-growth industries emerging and developing from scratch, and cyber security, data labeling and other industrial segments developing at an increasingly faster pace year by year. During the 14th Five-Year Plan period, the Province should make overall planning for digital industrialization and industrial digitization. On one hand, efforts are needed to speed up the development of data collection, storage, cleansing, labeling, trading and other industries with the focus on information technologies application and innovation and big data. On the other hand, relying on economic development zones, high-tech zones and industry gathering areas, steps should be taken to build a batch of industrial clusters of digital economy boasting complete industry chains, as well as a comprehensive range of supporting businesses and products.

(3) Cultural tourism and healthcare. As a national comprehensive tourism demonstration province, Shanxi Province boasts over 80,000 intangible cultural heritages, 890 historical and cultural sites protected at the provincial level or above, and healthcare resources with obvious regional comparative advantages. Especially, the three tourism sectors of the Yellow River, the Great Wall, and the Taihang mountains stand out as China's landscape cultural totems, covering 65 counties (county-level cities and districts) of ten cities. With these resources, Shanxi Province has great potential in cultural tourism development, which is expected to generate huge tourism benefits. Therefore, while promoting the protection, re-planning and re-development of cultural heritages, Shanxi Province should pay more attention to developing featured, high-quality tourist attractions in an interconnected way, optimizing the three tourism sectors, and expanding the space of ecological tourism, thus building the brand reputation of "Great Healthcare in Shanxi, Summer Rehabilitation in Shanxi."

(4) Modern logistics. From the northern to the southern part of Shanxi Province, there are three land-port national logistics hubs successively located in Datong City, Taiyuan City and Linfen City. Shanxi Province's logistics industry is mainly based on outbound highways and railways, with the annual freight volume exceeding 2.1 billion tonnes. As one of China's pilot areas of the comprehensive reform to reduce logistics costs and increase efficiency, Shanxi

Province enjoys advantages of space in developing modern logistics across the board. During the 14th Five-Year Plan period, efforts should be devoted to leveraging the capability of Taiyuan City, Linfen City, Datong City and other logistics central cities in driving the growth of surrounding cities, promoting smart logistics, green logistics, multimodal transport, supply chain management, e-commerce logistics and other projects as demonstration zones, and advancing the clustering and integration of trunk transport and logistics service resources.

(5) Intensive processing of agricultural products. In 2020, the ratio of gross output of the agricultural product processing industry to total agricultural output in Shanxi Province stood at 1.4:1, and the output of ten major industrial clusters for intensive processing of agricultural products accounted for around 40 percent of the output of the agricultural product processing industry. As Shanxi Province improves its efficiency of agricultural resource utilization and shifts its household consumption patterns, it now enjoys a solid industrial foundation and favorable investment environment in terms of enhancing the capability of refined agricultural product processing, promoting the specialization of agricultural products in both product hierarchy and variety, and adding more value to the brand. Shanxi Province should focus on leveraging the advantages of the ten industrial clusters in their volume, resources and others, rely on the Jinzhong National Agricultural High-tech Industrial Demonstration Zone (Shanxi Agricultural Valley), the National Functional Coarse Grain Technology Innovation Center and other platforms, take steps to carry out scientific research projects, make new breakthroughs, develop new products, train more talents, and promote industrial application, so as to increase the added value and premiums of agricultural products.

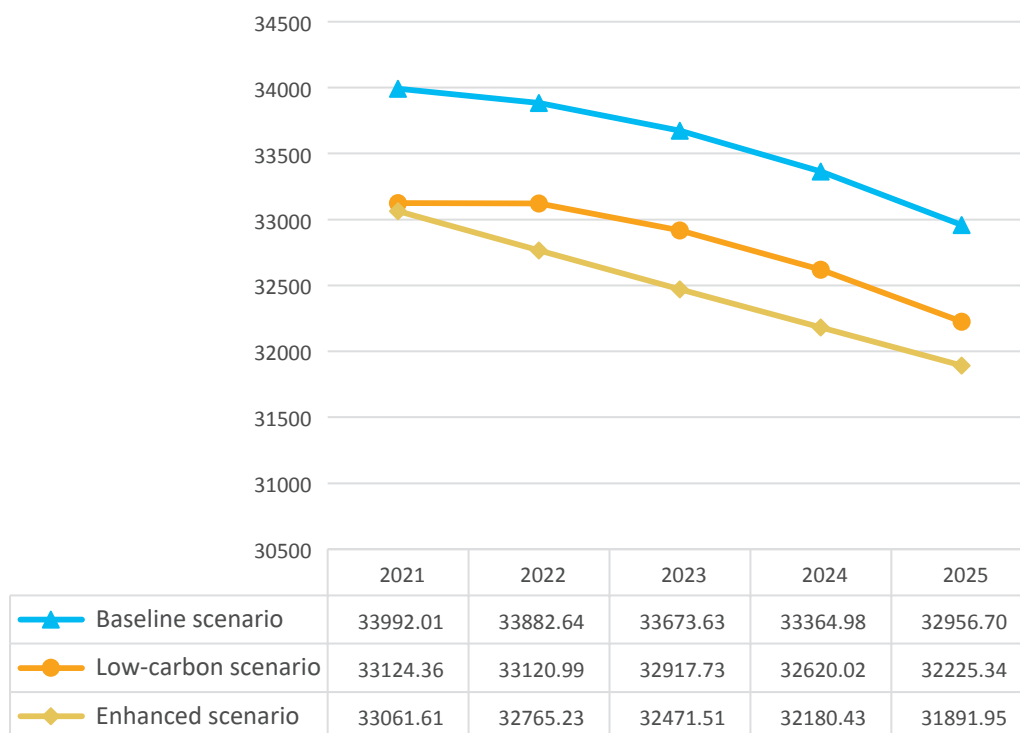
3. Coal consumption in Shanxi Province will clearly decline with the development of the non-coal economy

Based on the current industrial development model and coal consumption conditions of Shanxi Province (i.e. in the baseline scenario below⁴), the coal consumption of Shanxi Province will decline during the 14th Five-Year Plan period, and total coal consumption will be reduced to 329.567 million tonnes by 2025. Under the constraint of the carbon emissions peak and carbon neutrality goals (i.e. in the low-carbon scenario below⁵), the Province's total coal consumption will be kept below 322.2534 million tonnes by 2025. Against the backdrop where Shanxi Province continuously increases the proportion of the non-coal economy (i.e. the scenario of enhancing non-coal economic development⁶, the "enhanced scenario" in the figure below), the growth of coal consumption will be further limited, bringing total consumption down to about 318.9195 million tonnes in 2025.

⁴ In the baseline scenario, the total coal consumption of Shanxi Province over the past years is taken as basic data for a trend extrapolation and its coal consumption trend in the next five years at the current development speed and with the current development model is thus presented.

⁵ The low-carbon scenario mainly refers to the context where the constraint of "having carbon emissions peak before 2030 and achieving carbon neutrality before 2060" impacts the coal consumption of Shanxi Province.

⁶ The scenario of enhancing non-coal economic development mainly refers to the background whereas the proportion of the output of non-coal economy increases in Shanxi Province's total output, the trend of total coal consumption in Shanxi Province will be impacted.



Forecasts of total coal consumption of Shanxi Province during the 14th Five-Year Plan period (10,000 tonnes)

Policy Recommendations

1. Accelerating steps in breaking away from the thinking pattern of relying only on coal

Drawing on the success cases of economic transformation and development in resource-based regions such as Guizhou Province, Fuxin City of Liaoning Province, and Xiaoyi City of Shanxi Province, we suggest that Shanxi Province should compile a series of popular science brochures that can be distributed to a wider range of audiences. With respect to the strategic pathway of transformation and development for its non-coal economy and energy enterprises in Shanxi Province, experts and scholars should be encouraged to engage in in-depth research, repeated comparisons and full analysis.

2. Ramping up efforts to tackle the institutional problem of “domination by a single shareholder”

We suggest introducing strategic investors and encouraging all kinds of capital to participate in the mixed ownership reform of state-owned enterprises (SOEs). Meanwhile, an effective mechanism that promotes the growth of the private economy should be established and innovations should be introduced to the policy system to lower the operating cost of enterprises, address the financing difficulties of private businesses, and guarantee the supply of resource factors, among others.

3. Cultivating an innovation ecosystem for non-coal industries

A focus should be placed on the guiding role of fiscal investment in research and development (R&D), to guide enterprises to introduce policies on R&D reserves, as well as reward and compensation. It is also suggested that Shanxi Province should cultivate a batch of innovative leading enterprises that own core technologies and boast strong capability in integrated innovation, and set up platforms for the application of scientific and technological achievements and the circulation of venture capital.

4. Optimizing the tiered cultivation mechanism for non-coal enterprises

Shanxi Province should step up efforts to cultivate a batch of industrial bellwethers and support specialized small and micro businesses committed to certain market segments to develop unique strengths. Efforts are also needed to improve the synergy mechanism among large-, medium-, and small-sized enterprises, and support large-sized enterprises to lead technological R&D and innovation in collaboration with medium- and small-sized ones in certain industries, so that enterprises of all sizes can jointly shoulder the R&D responsibilities in the industry.

5. Consolidating talent basis for the development of non-coal industry

A batch of human resources industrial parks should be built. To curb the brain drain, Shanxi Province should encourage graduates from Shanxi-based higher education institutions and vocational and technical schools to enter local job markets, and grant fiscal incentives and subsidies to schools that exceed a certain ratio of graduates employed in local job markets as well as the graduates thus employed.

6. Giving full play to the role of urbanization in driving non-coal economic development

Shanxi Province should focus on supporting the Taiyuan metropolitan area to develop first and the city clusters in central Shanxi Province to develop in an integrated manner, intensify efforts in promoting the integration of urban areas and industries, advancing urban renewal, building smarter cities, and improving the quality of public services, so as to follow the urbanization strategy of success through quality.



7. Setting up a smooth financing mechanism to secure funds for emerging industries and industries of the future

The clusters of venture capital should be developed at a faster pace to create opportunities for the introduction of more high-end non-coal programs to Shanxi Province. The province should extend vigorous support to non-coal enterprises that seek finance by listing on the stock market and grant financial incentives to those successfully listed on the A-share, H-share and ChiNext markets. Active steps are also needed to develop supply chain finance.

8. Establishing and improving the institutions and mechanisms for green and low-carbon circular development

Shanxi Province should carry out top-level design and systematic planning for green standards systems, and further improve the trading mechanisms of the right to pollution discharge, energy use, water use, and carbon emissions. By resolutely curbing the tendency to develop coal-related projects and high-energy-consuming and high-emission projects, Shanxi Province can provide more space for the development of the non-coal economy. Moreover, efforts are called for to explore and establish the “carbon assessment” system for investment projects.

9. Planning in advance the guaranteed mechanism for the resettlement and re-employment of coal workers

In the short run, Shanxi Province should speed up revitalizing existing human assets, prioritize the mixed ownership reform of SOEs, and improve the business performance appraisal and evaluation system, as well as the professional manager system. In the long run, it is necessary to plan for the diversion of coal workers into other industries and vigorously develop emerging industries as large job creators.

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