

# Reflections on the Green Transformation and Development of Resource-Based Regions - Taking Shanxi Province as an Example

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**Abstract** - As a typical resource-based province and economically backward province in China, Shanxi Province faces a dual task of accelerating economic development and improving environmental quality. Under the background of vigorously promoting the construction of ecological civilization, how to realize the green transformation and sustainable development of resource-based regions is one of the key issues for China to realize green development. Taking Shanxi Province as an example, this paper explores the idea of green transformation in resource-based areas from views of provinces, cities, counties, and enterprises. It puts forward that fully implement the concept of green development, planning guides urban green development, implement "one county, one policy" to promote county green development and green environmental protection concept promotes the green development of resource-based enterprise.

**Keywords:** Resource-Based Regions, Economic Transformation, Environmental Protection, Green Development.

## 1. Introduction

The economic development in various regions of China is extremely unbalanced. Shanxi Province, located in the central and western regions of China, is an important supply base of energy and raw materials, and made great contributions to the development of national economy, especially to the development of heavy industry and national strategic security. However, Shanxi Province is also a relatively underdeveloped area in China with a large number of poverty population and is facing an urgent task of accelerating economic development. Due to the resource-dependent economic development mode, Shanxi Province has faced with some issues such as excessive consumption of resources, serious ecological damage and large economic fluctuations while continuing its sustained economic growth in recent years. It causes great obstacles to sustainable development of the region. Since 2013, General Secretary Xi Jinping has proposed a series of expositions on the concept of ecological civilization construction and green development, and made it clear that "green water and green mountains are treasures". How to get rid of the "resource curse" and ensure the common development of economic and ecological environmental protection are the keys and difficulties of the green transformation in resource-based regions. This paper will take Shanxi as an example to explore new ideas of green development in resource-based regions.

## 2. The Characteristics and Problems of Shanxi's Resource-Based Economy

### 2.1. Status and Characteristics of Shanxi's Economic Development

Economic development relies heavily on coal mining. Shanxi Province is rich in mineral resources, especially in coal for the most. In 119 counties (cities and districts), there are about 98 coal-producing counties, which 60 are listed as key coal-producing counties. Since the foundation of the People's Republic of China, a total of 12 billion tons of coal has been mined in Shanxi, of which more than 9 billion tons were transferred to other regions, respectively representing about 1/4 and 4/5 of the national total, which has made tremendous contributions for Shanxi's and national economic growth.

Shanxi's industrial structure is mainly based on coal, dominated by the energy raw materials and highly dependent on coal. About 4/5 of provincial economic development mainly depends on the expansion of coal capacity, which forms a typical model of resource-based economic development.

The problem of abnormal economic structural is outstanding. Shanxi's industrial development shows an imbalance between high industries and heavy industries. The ratio of light industries to heavy industries was 24.7:75.3 in 1985. Shanxi has been committed to promoting industrial transformation in recent years, but the ratio of light industries to heavy industries was still 8.5:91.5 in 2015, and heavy industries still strongly dominate the industrial economy. In 2015, the output value of the coal, coke, electric power, metallurgy and chemical industries accounted for more than 80% of Shanxi's industrial added value. The industry is characterized by coal mining and coal-based processing and conversion.

The single industrial structure leads to the backward economy. Shanxi's GDP grew year by year over the last 30 years since the reform and opening-up, but the fluctuation of economic growth was large. The single industrial structure leads to weak resilience to economic risks. Coal prices have become a barometer of Shanxi's economy. Since 2012, Shanxi has significantly seen slow GDP growth affected by the decline in coal prices and showed a negative growth in 2015. However, coal mining did not bring prosperity to Shanxi. In 2015, the urban per capita disposable income ranked in 20 place in the country.

## **2.2. The Resource-based Industries Lead to Severe Ecological and Environmental Issues.**

Atmospheric environment is a significant issue. The coal-based industrial structure has led to the serious coal-burning environmental pollution in Shanxi. In 2015, the emissions of major pollutants such as dust and sulfur dioxide in Shanxi ranked the top in the country. These coal-using industries such as electric power, coke, chemical engineering, building materials and steel account for 70% of pollutant discharge. Ambient air quality is poor and especially haze days appeared during the heating period. The severe atmospheric environmental issues have become the weak-link and bottleneck which restricts the harmony of economic and social development and the environment.

The water environment quality offers a depressing picture. According to experts' estimation, extracting one ton of coal in Shanxi causes the loss of 2.48 tons of water, and almost 2.4 billion tons of water will be destroyed every year. Some important rivers have decayed into seasonal rivers, and more than 80% of the rivers have been polluted. The mother river, the Fenhe River has been polluted seriously.

The ecological environment is seriously damaged. The exploration of mineral resources, such as coal, bauxite and iron, causes land subsidence, which seriously damages the ecological environment. According to incomplete statistics, the mine-out area in Shanxi is almost 5,000 km<sup>2</sup>. Approximately 2.3 million people are affected thereby. The provincial forest coverage rate was about 20.3% and the lowest in North China.

## **3. The Thought for Promoting Green Development of Resource-Based Economy**

China is the first nation in the world to present a national strategic measure for building ecological civilization, and has been recognized by many countries. Green development is the choice of transformation patterns and strategy decisions, which is to lead with the construction of ecological civilization, in order to realize the resource saving, environmental friendliness, ecological balance and harmonious development of the human, nature and society [1]. Ecological civilization is the spiritual connotation of green development, and green development is the main support of ecological civilization in turn [2]. In process of promoting green transformation of resource-based economy, the government plays an important guiding role. When governments at provincial, city and county levels formulate green development policies and carry out green transformation referred to international and domestic experiences, they should not only follow the general rule of green development, but also adapt to the local conditions and take countermeasures against different subjects.

### **3.1. Fully Implement the Green Development Concept**

On the provincial level, on the one hand, the government should actively advance the concept of green development and transform it into specific policies and actions. Since the beginning of 1990s, successive Shanxi

provincial and provincial governments have actively explored the way of transformation and development, in order to solve the single industrial structure of resource--based economy. However, the concept of development is always the diversified development carried by industrial chain extension based on coal. Now, Shanxi provincial government has put forward that Shanxi province should get rid of the excessive dependence on coal, promote the economic and social development with the concept of global ecological civilization, and lead to a low carbon life, in order to promote the development of industrial ecology and industrialization of ecological construction as well as to promote resource conservation and environment-friendly in the 13th Five-Year period. The relevant measures and requirements on green development have been carried forward in the 12th Five-Year, 13th Five-Year and other major planning which guide the province's economic and social development.

On the other hand, in order to implement the decision of the Party Central Committee and the State Council on speeding up the construction of ecological civilization, Shanxi province needs to build a system of evaluation and assessment in accordance with the requirements of ecological civilization, especially the establishment of strict accountability and a clear system of rewards and punishments, and to improve the weight of environmental protection in local government performance appraisal, and to actively explore the tracking assessment system of the implementation of ecological civilization, and to support, promote and guarantee the implementation of green policies of government departments with related systems. For example, the evaluation and assessment of the objectives of Shanxi's ecological civilization construction, the accountability of the party and government leaders on damage to the ecological environment, and the auditing system of leading cadres' natural resources and assets departure should be established, so as to promote the local Party committees and governments to implement green development decisions. The supervision system of ecological environment protection should be further stricter by speeding up the reform of the management of environmental protection institutions.

### **3.2. Planning Guides Urban Green Development**

At the municipal level, local governments should integrate the green development concept into the research and formulation of strategic decisions such as the national economic and social development plan and the overall planning of urban development, as well as highlight the role of environmental protection in the strategic planning system of urban economic and social development. It realizes that involvement of ecological environmental protection in government decision-making and regional spatial planning, guiding urban development strategy and promoting the transformation of economic and development pattern as well as the urban green development. The development course of Linfen City in Shanxi Province fully reflects that in the regional economic development, strengthening environmental protection will effectively promote to get double wins on the development of environment and economic, otherwise, it will face the double influence of economic downturn and environmental deterioration.

Since 2002, China entered into the "golden decade" of coal industry development. Linfen City relied on abundant coal resources to achieve rapid development but also caused serious pollution. In 2005 and 2006, it was rated as one of the "Top Ten Polluting Cities in the World". In view of the current situation of pollution, through the EIA of national economy and social development 11th five-year planning, Linfen City has adjusted industrial distribution so that the environmental quality was significantly improved. In 2009, the air quality ranked from the last up to 49th among the 113 air quality monitoring cities. Since 2011, with new development strategy implemented, the new government paid more attention to economic growth but ignored the improvement of the regional environmental quality, Linfen has experienced a decline in the environment while it is undergoing economic development. In early 2017, the emission of sulfur dioxide and other pollutants were over standard seriously. Linfen was required to implement the regional restricted approval policy (It is a policy that the construction project of the total amount of new pollutant emission is suspended in the area of serious environmental pollution.) by the Ministry of Environmental Protection and prohibit the approval of new construction projects. Now its economic development is stagnant, and it has to control environmental pollution.

### **3.3. Implement "One County One Policy" to Promote County Green Development**

There are 96 counties (cities) in Shanxi Province, including 60 resource-oriented industrial counties. Different counties (cities) have different development stages, different problems and different thoughts of transformation. Therefore, through the theoretical exploration in recent years, we have pointed out the strategy of "one county one policy", and have explored a path to green development of resource-based county matching with the action conditions of Shanxi Province. Based on actual social and economic development and environmental protection, in view of the main environmental problems of the county, resource-based county can be divided into key-harnessing counties, optimized counties, ecological-restoration counties and well-protected counties. For characteristics of regional sustainable development, we have carried out the practice in the Xiaoyi City, Liulin County and Loufan County.

Xiaoyi City, as a typical resource-based industrial city in Shanxi Province, has formed a series of ecological and environmental problems such as unbalanced industrial structure, deterioration of air quality and ecological destruction. In 2006, the regional restricted approval policy has been implemented firstly in Xiaoyi City by Shanxi Provincial Environmental Protection Bureau. Since then, Xiaoyi City adopted environmental management and industrial optimization measures, and took the environmental quality improvement and the upgrading of the coal-based industrial structure as the central work of government. After 2010, Xiaoyi City was awarded the honor of "environmental protection model city of Shanxi Province", and became a leader in the transformation and development of resource-based counties.

Liulin County is abundant in coal resources. The coal-bearing area is 1,000km<sup>2</sup>, accounting for 77.9% of its national territorial area. The identified coal reserve covers an area of 5000km<sup>2</sup>, the recoverable geological reserve is 5.4 billion tons and the future reserve is 10 billion tons, of which the 4 # high-quality coking coal known as the "national treasure" accounted for more than 60%. Liulin City is one of the three high quality coking coal bases in the country. However, like the majority of counties rely on resources, Liulin County has risen and declined due to coal. The contribution of coal enterprises to Liulin County's GDP was increasing year by year, and the heavy pressure from mine mining to the local ecological environment was followed. With the help of green GDP accounting, the local government has realized the great loss caused by the depletion of resources and environmental degradation in this economy, build a green performance assessment mechanism, gradually promote industrial upgrading, ecological restoration and livelihood improvement, and step out of a new green development path that is different from the traditional model.

Loufan County, located in the northwest of Taiyuan City, is a representative of the counties for resource exploitation and ecological protection conflict. It is a poor county with difficulties in government financial and poverty alleviation task. Loufan County is rich in coal and iron resources, but is an important drinking water source and ecological barrier for Taiyuan-the provincial capital at the same time. So the contradictions between development and protection stand out. The methods similar to "blood transfusion" and "hematopoietic" were carried out simultaneously in Loufan City. On the one hand, eliminate the assessment of the GDP indicators of government departments, build the performance appraisal for ecological protection priority, and improve the ecological compensation mechanism. On the other hand, adhere to the ecological county strategy, adjust the layout of ecological industry projects, develop green and organic agriculture and eco-tourism, and improve the eco-economic system with the concept of green, low-carbon and recycling.

### **3.4. Green Environmental Protection Concept Promotes the Green Development of Resource-Based Enterprises**

The resource-based enterprises represented by coal enterprises occupy an important position in the Shanxi's national economy and play an important role in the economic and social development. The traditional resource-based industrial economy is developed in a predatory way, which leads to the decline in natural resources, the loss of developing ability of resource-based enterprises, as well as increased environmental pollution, and cause a situation where resources are not conserved and the environment is unfriendly [3]. Under the pressures on resource and environment, how to realize sustainable development of resource-based enterprises is an important issue for economic and social development in Shanxi.

Enterprises are entities of implementing green production methods, and also important subjects of implementing green development concepts and building the ecological civilization [4]. In order to realize green transformation, enterprises should coordinate the development of enterprises and environmental issues, and introduce the green environmental concept

into the whole process of construction, production and operation. Taking the demonstration area construction of ecological restoration in Pingshuo mining area as an example, international advanced green environmental protection idea was introduced at the initial stage of mining, and the ecological restoration of mines was put in the strategic position of the sustainable development. In the project construction process, Pingshuo mining area strictly implement the "three simultaneous" to achieve development and protection. Since the construction of the mine, Pingshuo mining area has invested a total of 1.2 billion yuan of greening reclamation funds and has reclaimed 6667 ha. Land. Mining land reclamation rate and drainage field vegetation coverage reached 50% and 90% respectively, far higher than 10% of the original vegetation coverage rate, and reached the advanced level in China.

#### 4. Conclusions

The green development of the resource-based region is the inevitable requirement of the ecological civilization construction, and it is also a necessary process of economic development. As a typical resource-based province, Shanxi Province has actively explored the transformation of green development and achieved positive results.

Firstly, from the decision-making level, the green development has been put into the government performance appraisal system, so that it can become the evaluation orientation of regional development and the conscious pursuit of leading cadres. At the same time, the implementation of green development strategy has been ensured by the establishment of the accountability of the party and government leaders on damage to the ecological environment, and the auditing system of leading cadres' natural resources and assets departure with environmental supervision and iron hand pollution control measures.

Secondly, from the implementation level, Shanxi Province has rationally planned the urban development, and has evaluated the environmental quality of the national economic development of the city. Based on the carrying capacity of resources and environment, the structure of industry and energy is optimized by coordinating the spatial distribution of industrial and urban development.

Thirdly, from the implementation level, the existing resources of counties have been divided into four types: key governance type, optimized development type, ecological remediation type and well protective type, with the county as the basic administrative level, full consideration of the differences in aspects of resources, environment and economic development of counties, and the guidance, characteristic as well as development principles.

Fourthly, with the enterprise as the grasp of the concept of green development, Shanxi Province has established the policy system of enterprise environment credit evaluation, and green finance, and set up the incentive and constraint mechanism for the green production of enterprises so as to guide the green development of the enterprises.

The formation of resource-based regions is a long-term historical process, and the economic green transformation cannot be accomplished at one stroke. As a typical resource-based province, Shanxi is confronted with the outstanding contradiction between economic development and environmental protection. In the future, Shanxi needs to actively explore new ways of transformation and upgrading, innovation and development, and to promote the green, low-carbon and recycling development of resource-based provinces. At the same time, it also provides a replicable and scalable institutional experience for the economic transformation of other resource-based regions.

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