Optimize the Spatial Layout of Pollution-Intensive Industries and Promote the Legal Construction of Ecological Environment

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Abstract. Pollution-intensive industries are pillar industries of the economic development of our country, and the important parts of the national industrial safety system. China’s treatment of pollution-intensive industries has achieved notable results. However, the total amount of pollutants emitted and the contribution were still considerable. Unreasonable spatial layout of pollution-intensive industries has caused great harm to the ecological environment. Optimization of the spatial distribution of such industries and preservation of the ecological environment are internal requirements of the expectation of building a high-quality ecological environment in the new era as proposed by President Xi. To this end, the management system of the spatial distribution of pollution-intensive industries should be energetically improved, with specific measures as follows: make the national spatial layout of pollution-intensive industries; starting from environmental protection, combine the cluster layout and the scattered layout; improve the system of environmental public interest litigation and the construction of ecological rule by law.

1. Remarkable Results Seen in the Governance on the Industrial Sources-based Environment Pollution Since the 18\textsuperscript{th} National Congress of CPC

Since the 18\textsuperscript{th} National Congress of the Communist Party of China (CPC), the ecological civilization and the system on environmental protection & governance have been increasingly improved in our country, with the continuously enhanced governance capabilities. The Central Leading Group has, after deepening reforms on a comprehensive scale, held several themed meetings on ecology and environment to devise the top-level design and develop the framework for ecological and environmental protection. The State Council issued three action plans to prevent and control air, water and soil pollution in 2013, 2015 and 2016 respectively, with the relevant authorities to draft and amend various laws and regulations on environmental protection. In 2018, the former Ministry of Environmental Protection was reorganized into the Ministry of Ecology and Environment, which unified the functions of ecological and environmental protection, and exercised vertical leadership over the monitoring, supervision and law enforcement agencies of environmental protection institutions below the province-level. Environmental protection functions are in the position to conduct comprehensive inspections of environmental protection in the provinces, autonomous regions and municipalities, and strengthen the supervision on the environmental protection.

Industrial source, as one of the three major sources of pollutant discharge and damage to the ecological environment, has become an important realm in the treatment of pollutant discharge and protection of the ecological environment whereas pollution-intensive industries have become the key of pollution control. The governance on the industrial pollution since the 18\textsuperscript{th} National Congress of CPC has helped downsize the industrial pollutant emissions on a gradual basis.
2. Arduous Task for Governance of PIIS Environment Pollution

Pollution-intensive industries (Pollution-intensive industries, PIIS) refer to the industries with relatively great hazards to the environment and human health, the coverage of which is defined by the scholars from different perspectives, including the costs of emission reduction, the scale of pollution emissions, the intensity of pollution emissions, and the comprehensive pollution intensity index. Despite of certain differences in the coverage of pollution-intensive industries, most industries still share the same coverage.

In the 1st Batch National Pollution Source Survey Plan published in 2007, the State Council started with the actual situation of pollutant emissions from industrial pollution sources in China, specifying 11 industrial sectors as heavy pollution source industries. For the ease of relevant data collection, the heavily polluting industries mentioned are equivalent to the PIIS hereunder. The pollutant emissions by pollution-intensive industries in China are, as a good tendency, declining year by year. The remarkable results of the overall emission reduction of our society are inseparably contributed to the control of pollutant emissions, and the reduction of waste water, waste gas and major hazardous substances in the PIIS per annum. Despite the great efforts exerted to the treatment of pollution-intensive industries seen in recent years, as well as remarkable results achieved, the aggregate size of pollutants discharged in the industrial sectors is of a large scale, with a high proportion.

3. Unreasonable Spatial Layout is one of the Factors Causing PIIS to Jeopardize the Ecological Environment

PIIS as one of the important parts of the industrial sectors would cause relatively serious damage to the local ecological environment while promoting the economic growth in the region. From the perspective of reducing pollution emissions and protecting the ecological environment, PIIS in China are found with the following issues in relation to the spatial layout.

3.1. Relatively Underdeveloped Regions in East China are the Major Clusters of PIIS

The economic development in East China started earlier than that of the central and western regions, seeing the early concentration of PIIS. The publication of rules and regulations on environmental protection as well as improved standards on pollution discharge in East China has forced certain PIIS to relocate to other regions, but no large-scaled out-flow to other regions is seen in these pollution-intensive industries. In 2003, PIIS in East China accounted for 70.61% nationwide. Since then, the absolute geographic concentration index of PIIS in China has been showing a downward trend. After 2011, the absolute geographic concentration index of PIIS in China saw a bit renounce. In 2013, PIIS in East China accounted for 61.7% nationwide, indicating that East China is still the main clustering area of PIIS. [1]

Regarding East China, a new trend of geographical spatial distribution is seen in PIIS, and relatively underdeveloped regions in East China have become new clusters of PIIS. [2] In the Yangtze River Delta region, PIIS and their pollutant emissions are showing a trend of geographical spread, namely spreading from the core cities in the region to other cities. [3] In the relatively developed provinces in East China, PIIS are also showing a trend of inter-spread at the provincial-level. In Guangdong Province, PIIS are relocated from the Pearl River Delta to Northern Guangdong. In Shandong Province, PIIS are relocated from Jinan and the eastern coastal areas to the western and southern regions of Shandong. [4] PIIS in Southern Jiangsu are relocated to Northern Jiangsu. [5] The average concentration of PIIS in Zhejiang, Jiangsu, and Guangdong has shown a continuous decline.

3.2. PIIS in Central and Western Regions Continue to Cluster

With the economic development and the modernization of the industrial structure in East China, most PIIS have been gradually relocated to the central and western provinces. Different PIIS are not simultaneously relocated to the central and western regions. It is found by scholars that from 2005
to 2014, 14 provinces in the central and western regions are receiving provisions of PIIS. Relocation of PIIS can be obviously found between different regions in the country, which helped reshape the spatial layout of PIIS in our country. It can be seen from the proportion of the PIIS output value in the output value of such industry, the proportion of the PIIS output value in the central and western regions is increasing. In 2003, it accounted for 29.39% in the central and western regions, but in 2013, it accounted for 38.34%. The geographical relocation of PIIS will inevitably lead to the regional transfer of pollutant emissions.

Many areas in the central and western provinces are featured by relatively underdeveloped industrial structures, where PIIS are the main choice for economic development. Local governments would adopt an inclusive and protective attitude towards PIIS, which would in turn facilitate the increasing growth of PIIS. The relatively low economic development in the regions, the lack of financial funds for pollution control, and the lack of pollutant treatment technology and facilities all contributed to the increased discharge of pollutants, heavily jeopardizing the local ecological environment.

3.3. Certain PIIS are Distributed in Regions with Fragile Ecological Environment or Ecological Protection Zones

PIIS such as chemical industry, paper industry and food processing industry are seen in the Haihe River Basin where ecological resources are relatively poor and pollution carrying capacity is relatively low. The excessive pollutants discharged by these industries have severely jeopardized the environment of the Basin. In the Huaihe River Basin where ecological resources are relatively poor, PIIS such as the chemical industry, paper industry and food processing industry can be found, and the excessive pollutants discharged have an adverse effect on the local ecological environment. In the Dianchi Lake Basin where the ecological environment is fragile, PIIS such as the chemical industry, pharmaceutical manufacturing and paper industry set foot and the pollutants discharged exceed the carrying capacity of the water and the river flowing into it, causing great damage to the local ecological environment.

4. Optimize the Governance System of PIIS Industrial Layout

4.1. Construct the Spatial Layout Planning of PIIS at the National Level

Developing the PIIS is not in contradiction with the strategy of green development and ecological civilization development in China. We shall not completely ban the survival and development of PIIS in our country as these industries should also be granted the geographical bearing space for development. Our strategy on ecological and environmental protection shall be in essence for the purpose of solving the environmental pollution issues of PIIS while realizing the compatible and coordinated development of industrial development and environmental protection. One of the important actions we need to take is to build a scientific and reasonable geospatial pattern for PIIS, so as to reduce their pollutant emissions as possible, recycle pollutants as possible, and restrict the pollutant emissions as possible within the carrying capacity of the ecological environment, minimizing the pollution and damage to the ecological environment.

At the national level, PIIS shall be given a suitable geographical space for development and our understanding on the spatial distribution of PIIS shall be deepened. Subject to the needs of economic and social development, whether in developed or underdeveloped regions, PIIS of a proper scale shall be deployed. The spatial planning of specific industries in terms of PIIS must comprehensively take into consideration such factors as market demand, resource availability and environmental tolerance to establish the spatial layout models for different PIIS. According to the different sectors of PIIS, the guidance planning on the spatial layout of PIIS shall be established to guide and restrict the local governments on their investment attraction and the environmental assessment agencies on the environmental assessment of major industrial projects.
4.2. Starting from the Protection of Ecological Environment, Take into Consideration the Clustered and Distributed Layout

From the perspective of economic efficiency and technical efficiency, PIIS should take the path of cluster development.\(^8\) The clustering of PIIS would facilitate the technological innovation and knowledge spillover in terms of the production and environmental protection. The clustering of industrial spaces would be beneficial to the promotion and use of advanced production processes and technologies, as well as of the environmental pollution control technology in different sectors of the industrial chain. The research conducted by Cui Lizhi and Chen Qiuyao shows that the clustering development of industries has a positive externality to reduce environmental pollution to a certain extent. As a result, the pollution emissions of industrial clusters increase at a decreasing rate, and beyond the threshold, the reduction caused by environment pollution is more notable.\(^9\)

PIIS should be appropriately concentrated in areas with high ecological environment carrying capacity. Seriously polluting industries, mainly non-local life service industries, shall not only be concentrated in a few regions, but shall be concentrated in each cluster at the most appropriate extent based on the relationship between the cluster scale and the ecological environment, so as to match the pollutants discharged to the carrying capacity of the ecological environment.

4.3. Continue to Perfect the System on Environment-related Public Interest Litigation, and Strengthen the Legal Construction on Environment Laws

In September 2015, the Central Committee of CPC and the State Council published the *Comprehensive Plan on the Reform of Ecological Civilization System*, and clarified six basic concepts, six basic principles and eight important systems, which were implemented through a number of coherent regulatory documents. The 2018 Constitutional Amendment incorporated the ecological civilization in the preamble, and ecological security, as one of the values on national security, has once again been pushed to a new historical height. Thus, a new normal for ecological and environmental protection shall be achieved by improving and perfecting the legal system on environmental protection, launching the strict environmental protection system, and gradually strengthening the construction of environmental laws.

A series of laws and regulations, including the *Civil Procedure Law* amended in 2012, the *Pilot Plan* published in 2015, and the *Decision* passed in 2017, established the system of environmental litigation in China, stipulating that legal institutions and related organizations can file lawsuits with the people's courts to challenge environmental pollution and other actions that endanger the environment. It establishes a three-dimensional framework for the authorities that the prosecutors, social organizations, governments and their functions shall have the right to initiate litigation related to the public environment. The environmental damages system in connection therewith has also been implemented at the national level, stipulating that relevant provinces, municipalities and functional departments shall have the right to claim environmental damages.\(^{10}\) These two systems are interconnected and coordinated, making full preparations for actively promoting the judicial guarantee for the construction of ecological civilization.

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References


