

# Current Situation and Development Suggestions for Environmental Economic Policies in Power Industry in China

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**ABSTRACT.** *There have been mainly five promulgations of environmental economic policies in power industry in China: Environmental protection electricity price subsidy policy, pollution charge and environmental protection tax, preferential tax policy, industrial policy, pollution rights trading and carbon emission right trading. In recent years, environmental economic policies have made great achievements in promoting pollution reduction and industrial structure optimization and upgrading in power industry. However, the environmental economic policies in power industry remain imperfect in the formulation and implementation from a practical point of view. To explore how environmental economic policies further promote environmental protection and green development in power industry, the present situation of environmental economic policies in power industry was combed. As a result, aiming at the problems and challenges facing current power industry, development suggestions for improving environmental economic policies were put forward from four aspects: Environmental protection comprehensive electricity price, environmental protection tax, industrial policy and fully compliant discharge requirement.*

**KEYWORDS:** *Environmental economic policies; power industry; environmental protection; green development*

## 1. Introduction

Environmental economic policy is a type of policy tool that uses economic policy tools such as fiscal, tax, price, finance, and transaction to regulate environmental behavior, and promotes the transformation and upgrading of enterprises by internalizing environmental costs. In 2009, positive progress was made in environmental and economic policies such as environmental fiscal policies, environmental taxes and fees, and emissions trading. Although the process of implementation of various policies is different, in general, the environmental economic policy system has been basically established.

At present, the environmental economic policies in my country's environmental management mainly include the paid use of pollution rights and the transaction of

pollution rights, the pollution discharge charging system, Ecological compensation mechanisms, urban sewage treatment fees, public financial funds and incentive mechanisms, etc. The paid use of emission rights and the transaction of emission rights means that the government transfers the emission rights to polluters with compensation and allows the emission rights to be traded on the secondary market. The pollutant discharge fee system is a system for polluters who discharge pollutants to the environment or discharge pollutants in excess of the prescribed standards, and pay according to national laws and relevant regulations. This system has been terminated on December 31, 2017, and since 2018 The Environmental Protection Tax Law will be implemented on January 1. The ecological compensation mechanism is mainly aimed at the areas of regional ecological protection and environmental pollution prevention, such as compensation for cross-border sections of river basins, and compensation for the withdrawal of heavily polluting enterprises[1-3].

In the "Opinions on Innovating and Improving the Price Mechanism for Promoting Green Development" (hereinafter referred to as the "Opinions"), the sewage treatment charging policy was revised to establish a differentiated charging mechanism for corporate sewage discharge. Increase the expenditure of public financial funds on environmental protection and establish an environmental protection incentive mechanism that can encourage environmental protection and resource conservation.

## **2. Environmental and economic policies in the power industry**

Compared with other polluting industries, the power industry has its uniqueness. First, our country power industry is a government-controlled industry. Although we are discussing how to effectively promote marketization, the power industry's own economic and technological characteristics, natural monopoly, and externalities generated by the power industry determine that the government must control it. Through government control, the efficiency of the power industry can be improved and the industry's sustainable and stable development can be promoted; from the perspective of national pollution control strategies, as an important basic industry and an important part of the national economy, pollution control of the power industry will affect the overall efficiency of the industry. Second, compared with other industries, pollution reduction in the power industry is relatively simple. The main types of pollutants are soot, sulfur dioxide, nitrogen oxides in waste gas and COD and ammonia nitrogen in waste water. Currently, my country's power industry environmental economic policies mainly include: environmental protection electricity price subsidy policy, pollution discharge fee system environmental protection taxes, preferential tax policies, industrial policies, and emission rights trading and carbon emissions trading[4-5].

In 2014, the National Development and Reform Commission and the Ministry of Environmental Protection jointly issued the "Environmental Protection Electricity Price and Environmental Protection Facilities Operation Supervision Measures for Coal-fired Generating Units" clearly stated that the on-grid electricity of coal-fired generating units shall implement desulfurization, denitrification, and dust removal

electricity prices based on the current on-grid electricity prices policy. At present, the price increase standard for desulfurization electricity price is 1.5 cents per kilowatt hour, the denitrification electricity price is 1 cent, and the dust removal electricity price is 0.2 cents, and there are corresponding subsidy standards for ultra-low emissions. In August 2014, the National Development and Reform Commission issued the "Notice on Further Diverting the Contradiction of Environmental Protection Electricity Prices" (hereinafter referred to as the "Notice"). The price reduction space is mainly used to ease the contradiction between denitrification and dust removal and environmental protection electricity prices. The denitrification and dust removal emissions meet the standards and passed the acceptance by the environmental protection department. Self-inspection of coal-fired power generation companies and power grid companies[6-7].

The electricity prices for denitrification and dust removal shall be paid 1 cent and 0.2 cents per kilowatt hour from the date of acceptance. In 2015, the Development and Reform Commission issued an ultra-low emission electricity price support policy. In order to encourage and guide ultra-low emissions, coal-fired power generation companies that have passed the inspection and acceptance of the local provincial environmental protection department and meet the ultra-low limit requirements are given appropriate on-grid electricity price support.

The pollution charge system is the earliest environmental economic measure in my country, and the power industry is a key industry for pollution charges. After the pollution discharge fee is changed to tax, the power industry needs to pay environmental protection tax. The "Announcement on the Implementation of Special Emission Limits for Air Pollutants in Beijing-Tianjin-Hebei Air Pollution Transmission Channel Cities" issued by the Ministry of Ecology and Environment in March (hereinafter referred to as the "Announcement") requires that from March 1, 2018, the In the urban administrative area of pollution transmission channels, industries that have specified special emission limits for air pollutants in the national emission standards and new boiler projects have begun to implement special emission limits. Therefore, if the tax reduction and exemption rate is determined according to the special emission limit, even though the electric power companies within the Beijing-Tianjin-Hebei region have installed ultra-low emission facilities, it will still be difficult to enjoy the preferential environmental tax reduction and exemption policy[8-9].

Starting from January 1, 2008, enterprises have implemented a catalogue of income tax preferential treatment for environmental protection, energy-saving and water-saving projects (for trial implementation), including public sewage treatment, public garbage treatment, comprehensive development and utilization of biogas, technological transformation of energy saving and emission reduction, and desalination In 2016, landfill biogas power generation was also included in the above preferential catalog. The Implementation Regulations of the Tax Law stipulates that the income of eligible environmental protection, energy-saving and water-saving projects shall be exempted from corporate income tax for the first year to the third year from the tax year in which the project obtains the first production and operation income, and the fourth to the fourth Corporate income tax will be halved for six years.

In 2019, the National Development and Reform Commission's Notice of the National Development and Reform Commission on the Adjustment of Grid Enterprises' Value-Added Tax Rates to Reduce General Industrial and Commercial Electricity Prices.

All the space for the reduction of the tax-included transmission and distribution price of power grid companies is used to reduce general industrial and commercial electricity prices.

The "Opinions" proposed to encourage localities to actively explore green price policies such as the price formation mechanism of ecological products, carbon emission rights trading, mandatory renewable energy quotas, and green certificate trading systems. Pilot work on the paid use and trading of emission rights, and the power industry emission rights trading and carbon emission rights trading have achieved initial results. According to the data in the National Environmental and Economic Policy Progress Assessment Report, as of December 2017, a total of 28 provinces across the country have carried out pilot projects for the use of emissions trading rights, of which 11 provinces are national pilot projects, and the rest are pilot projects by each province. Since 1991, the national carbon emission trading system has been launched with the power industry as a breakthrough, and the total quota transactions in 7 pilot provinces and cities.

The amount exceeds 200 million tons of carbon dioxide equivalent. Therefore, the power industry has played an important role in promoting the development of emissions trading and carbon emissions trading[10].

### **3. The effects of environmental and economic policies in the power industry**

My country's current environmental governance model is still based on administrative control, and environmental economic measures are in a supplementary position. However, environmental economic policies have played a major role in promoting green development and realizing the modernization of environmental governance. In recent years, environmental economic policies have achieved great results in promoting pollution reduction in the power industry and promoting the optimization and upgrading of the industrial structure. What needs to be emphasized is that the current effectiveness of the power industry is not only due to the effectiveness of environmental economic policies, it is the common result of all policies and measures. As showed in Figure 1.

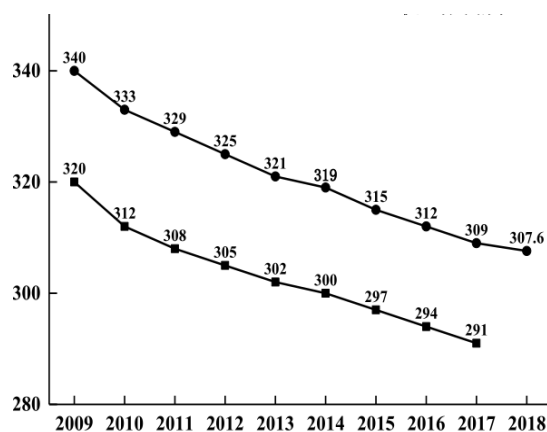


Figure 1. Standard coal consumption for power supply and power generation in the power industry in 2009

From the perspective of the most stringent emission limit standards for air pollutants, compared with the US "Performance Standards for New Pollution Sources" and the EU 2010/75/EU "Industrial Emissions Comprehensive Pollution Prevention and Control Directive", China's ultra-low emission limits are more stringent. At present, the ultra-low emission particulate matter emission standards are equivalent to the EU's strictest standards, accounting for 81.3% of the US emission standards; SO<sub>2</sub> only accounts for 23% of the EU's strictest emission standards and 25% of the US emission standards; NO<sub>x</sub> accounts for the EU's most stringent emission standards. 33%, 52% of the US emission standards.

From the perspective of the latest situation of air pollutant control and emissions, the pollutant emissions per unit power generation of SO<sub>2</sub>, NO<sub>x</sub> and soot thermal power in 2018 decreased to 0.2 g/kWh, 0.19 g/kWh, and 0.04 g/kWh, respectively. The latest situation of air pollutant control and emissions in the power industry. SO<sub>2</sub> control and emission. According to the "Annual Development Report of China's Electric Power Industry 2018", the capacity of coal-fired flue gas desulfurization units put into operation in 2017 exceeded 940 million kilowatts, accounting for 95.8% of the national coal-fired power generation capacity. From the perspective of pollutant emissions per unit of thermal power generation, SO<sub>2</sub> decreased from 2.7 g/kWh in 2010 to 0.2 g/kWh in 2018. NO<sub>x</sub> control and emission. According to the "Annual Development Report of China's Electric Power Industry 2018", the capacity of thermal power plant flue gas denitration units put into operation in 2017 was 1.02 billion kilowatts, accounting for 98.4% of the national thermal power unit capacity. From the perspective of pollutant emissions per unit of thermal power generation, NO<sub>x</sub> decreased from 2.8 g/kWh in 2010 to 0.19 g/kWh in 2018.

#### 4. Problems and challenges in the environmental and economic policies of the power industry

The implementation of desulfurization technology may cause gypsum rain and white plume pollution problems. The comprehensive environmental protection tariff for the power industry includes desulfurization tariff subsidies. Wet desulfurization is the main technology for desulfurization in coal-fired power plants. Large coal-fired units basically use wet desulfurization, and my country accounts for about 91%. The gypsum rain and white plume caused by the desulfurization process cause visual pollution, which has severely affected the surrounding environment and residents' lives. Green electricity prices have begun to adjust slightly. The "Notice" proposes that for coal-fired power generation companies that meet the denitrification and dust removal emission standards and have passed the inspection and acceptance by the environmental protection department, the power grid companies shall pay the denitrification and dust removal electricity prices of 1 cent and 0.2 cents per kilowatt hour respectively from the date of acceptance. Considering the cost of treatment of different pollutants, how to dynamically adjust the environmental protection electricity price after the cost of the enterprise drops, so as to truly reflect the cost of coal-fired power plants, and achieve the pollution reduction target at the minimum cost, has also become a problem facing the trend of environmental protection electricity prices in the future.

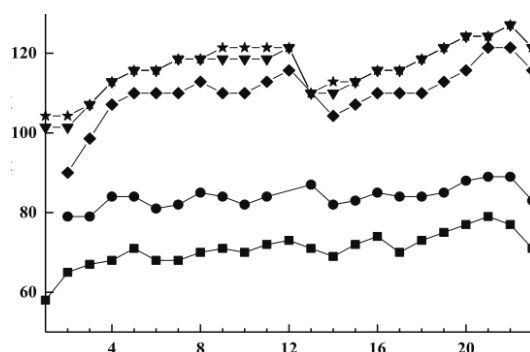


Figure 2. Changes in the compliance rate (five indicators) of the thermal power industry from 2016 to 2017

From the perspective of the over-standard rate of various pollutants in the thermal power industry, as shown in Figure 2, the SO<sub>2</sub>, NO<sub>x</sub> and soot and dust standards have all improved. Among them, the soot and dust indicators have improved the most, with the over-standard rate falling by 37.4% year-on-year; Although SO<sub>2</sub> and NO<sub>x</sub> have improved, the over-standard rate is still high and the improvement is slow.

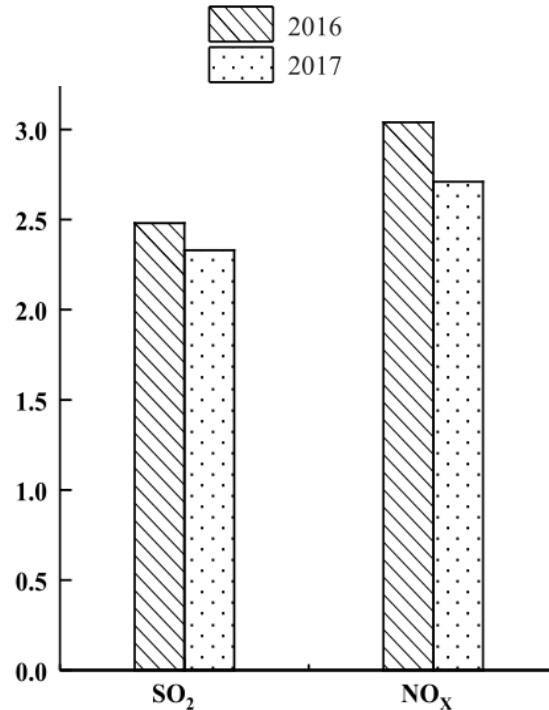


Figure 3. Exceeding standards of different pollutants in the thermal power industry from 2016 to 2017

## 5. Conclusion

It is suggested that the treatment of gypsum rain and colored plume should be included in the scope of environmental protection comprehensive electricity price subsidy. In response to the gypsum rain and white plume in air polluted areas, some provinces have issued relevant regulations, but have not formulated unified control measures related documents. In 2017, Shanghai issued the "Shanghai Coal-fired Power Plant Gypsum Rain and Colored Smoke Plume Test Technical Requirements (Trial)",

The test procedures and methods for rain and colored plumes are stipulated. In 2018, Zhejiang Province issued the "Emission Standards for Air Pollutants for Coal-fired Power Plants", which requires coal-fired power generation boilers located in urban main urban areas and environmental air-sensitive areas to adopt flue gas temperature control and other effective measures to eliminate gypsum rain and colored plumes And other phenomena, and appended the technical requirements for gypsum rain and colored plume testing. It is suggested that the gypsum rain and white plume treatment measures that have been introduced by the local government and

have achieved certain results should be used as a reference for formulating environmental protection comprehensive electricity price subsidies. The second is to establish a dynamic adjustment mechanism for corporate environmental protection costs. On the one hand, comprehensively consider the actual conditions of most regions, establish a regular assessment and dynamic adjustment mechanism of environmental protection costs, and achieve pollution reduction in the power industry and improvement of regional environmental quality at the minimum cost. Track the environmental protection costs of enterprises, establish a database related to enterprise renovation costs and operating costs, and form dynamic analysis reports based on scientific calculation methods to reflect the true governance costs of enterprises and further promote the reform of comprehensive environmental protection electricity prices. On the other hand, since the power industry is a key industry for air pollution control, analyzing the environmental damage caused by air pollutants and evaluating the value of environmental damage can also understand the cost of governance. By assessing the value of environmental damage, reasonably formulating electricity price subsidies, effectively reducing policy costs.

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