Analysis and Implementation of Economic Means of Environmental Protection in China

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Abstract. Since the reform and opening up, China has been adhering to the extensive economic growth model, which has led to serious environmental damage, energy depletion, global warming and environmental pollution and other environmental problems have been increasingly prominent. The root of environmental problems lies in external diseconomy. Environmental pollution has obvious negative external effects, as environmental resources are public goods, enterprises will not increase their own costs in using or consuming public goods, but the society has to bear the marginal cost in providing the goods, which will lead to the inconsistency between social cost and private cost, thus causing excessive damage to the domestic environment. In the past, our country mainly governs by administrative means, and the shortcomings such as high management cost and poor effect in the implementation process are increasingly obvious. Combined with the treatment process of environmental pollution in western countries, economic measures have a good effect on the external diseconomy of environmental problems. According to the current environmental problems and governance status in China, environmental governance means in urgent need of transformation. Based on the literature, this paper analyzes the current situation of environmental pollution in China and the mechanism of economic means in environmental protection, puts forward the means of environmental governance and protection from the economic level, and discusses the future direction of environmental governance.

Keywords: environmental protection, economic means, environmental tax, new energy, environmental industrialization, information technology.

1. Introduction
Ecological environmental problems refer to the global environmental pollution and ecological destruction caused by human's improper behaviors in the process of industrialization, which pose various practical threats to human survival and development. Global climate change, biodiversity reduction, land desertification, ozone layer destruction and water shortage are ecological and environmental issues affecting the whole world, affecting the politics, economy, science and technology and people's way of life of all countries to a certain extent. However, human's
unreasonable exploitation and utilization of natural resources in the process of industrialization has caused environmental pollution and ecological destruction. China is a big industrial country, with the rapid development of industrial industry, China's ecological environment problems are facing a severe test. At present, China's environmental carrying capacity has reached or is close to its limit. The transformation and upgrading of the economy and the formation of a new way of green, low-carbon and circular development have become a major practical problem that the Chinese government needs to solve urgently.

At present, China's environmental management work mainly adopts command-and-control means, that is, administrative and legal means, which force enterprises to carry out production according to environmental standards by laws, regulations or administrative orders, and punish violators by administrative punishment. However, this method has exposed many defects. Firstly, it is difficult to accurately measure the degree of pollution and the difficulty of governance. As a result, it can not eliminate the occurrence of pollution, and the governance effect is not very ideal; Secondly, the main body of environmental governance lacks enthusiasm in investment in environmental protection and cannot effectively guarantee the source of funds. In the supervision and inspection, a large amount of manpower and financial resources are consumed, with large implementation cost and poor effect; moreover, in order to facilitate unified management and saving implementation, the government usually ignores the specific conditions of environmental conditions and governance costs in formulating environmental standards. In the end, the high social waste will be caused by adopting the "one size fits all" way. And the economic means of environmental protection is more effective than the administrative means.

Economic means of environmental pollution control is the result of economic studies "the enterprise externalities" and "internalization" theory and practice, is refers to the use of law of value, using the price, tax, credit and other economic leverage, control the producers within the resources development, with damage to the environment of social and economic activities, in order to reward positive pollution units, to promote conservation and rational utilization of resources, give full play to the leverage of the law of value in environmental management. Compared with the "external constraints" of the traditional environmental administrative measures, the environmental economic policy is an "internal constraint", which has more advantages in promoting the innovation of environmental protection technology, enhancing the market economic power and reducing the cost of environmental governance and administrative monitoring.

The advantages of economic means are that, firstly, they provide the parties concerned with a sustained incentive to reduce pollution below the prescribed level; Economic instruments can provide governments and polluters with regulatory and policy implementation flexibility; It is always easier and quicker for a government agency to modify and adjust a fee than to adjust a law or regulation; For the polluter, it is possible to make a budget based on the relevant charges and to make a choice of behaviour based on that. In addition, economic means can provide a certain amount of financial revenue for the government, which can be directly used for the relevant environmental and resource protection projects, and can also be incorporated into the government's general budget.

2. Pigou tax and its implementation in China

Pigou tax is a kind of economic means to control environmental pollution which is a negative externality behavior proposed by the welfare economist Pigou. According to the views of pigou, lead to market failure reason is resource allocation in the economy the private cost and social cost of the parties is not consistent, to correct the external causes of loss of social welfare, the government should take corresponding policy, follow the principle of "who pollution, who pays", namely the marginal private cost less than the social cost of tax department to implement; Reward or subsidize sectors whose marginal private benefits are less than marginal social benefits. The adoption of tax and subsidy can promote the agreement between private cost and social cost, correct market distortion and improve the efficiency of resource allocation.
Since 1993, China has levied a resource tax on units and individuals that produce mining products, and levied a pollutant discharge fee for units that produce environmental noise pollution exceeding the standard. In 2002, we introduced a collection system for urban garbage, increased the collection of sewage treatment fees, and gradually raised the collection standards for water resources fees. At the same time, we introduced a subsidy system, strengthened the management of financial subsidies for the promotion of energy-efficient products, and set up special funds for the reduction of major pollutants. During the "12th Five-Year Plan" and "13th Five-Year Plan", China's environmental problems are mainly manifested as large energy and chemical projects cluster in regions, with obvious superposition effect, significant increase in atmospheric particulate pollution, increasing environmental load and serious structural pollution; Industrial development low scale, small, scattered and high emission, high consumption, low efficiency coexist. The tax system implemented in China during this period mainly includes: improving the sewage treatment fee policy; Reforming the charging method for waste disposal; We will increase the collection of pollutant discharge fees and raise the standards for pollutant discharge fees in due course. We will stop collecting fees for the discharge of sewage from Marine projects and replace them with an environmental protection tax. Subsidies implemented at the same time mainly include financial incentives for projects to implement energy-saving technology renovation of existing production processes and equipment; Consumers will be given a one-time quota subsidy of 3,000 yuan to buy energy-saving vehicles. We will improve the support mechanisms for replacing subsidies with subsidies and promoting governance with rewards, promote the use of government subsidies to promote energy-efficient products and contract energy management, and strengthen the guiding role of government funds.

Although the implementation of taxes and subsidies in China has achieved some success, but overall, the effect is not very obvious, there are still some deficiencies need to be adjusted, such as our country has not established in the nationwide implementation of the tax standards, taxes are too low can't increase the stimulation of polluters to reduce pollution, tax rate is too high, influence the economic development of the society as a whole; Taxes are also vulnerable to resistance from polluters; The regional control difference is big, easy to lead to the polarization of pollution problem; At the same time, the subsidy system violates the polluter pays principle, leads to unfair competition and weakens the initiative of enterprises. Subsidizing the government is also costly. Therefore, China should improve the tax system, the implementation of environmental tax should keep pace with other means of environmental protection, and timely update the new tax categories, considering regional differences, formulate targeted policies and measures to ensure the integrity of ecological tax, form a sound tax system, and promote the sustainable and healthy development of China's economy.

3. Coase means and its implementation in China
According to the Coase Theorem, economic externalities or inefficiencies can be corrected through negotiations between the parties, so as to maximize social benefits. The fundamental means of environmental protection is to realize the optimal allocation of natural resources. Coase Theorem is the concentrated embodiment of modern property rights economics about the relationship between property rights arrangement and resource allocation. Therefore, the clarity of property rights is an important prerequisite for the implementation of Coase Theorem.

The implementation of Coase Theorem has been well practiced in western countries. The "Coase Method" centered on the establishment and protection of property rights has more advantages than the "Pigou Method" centered on the government. For example, the implementation cost is lower. The scarcity price of environmental resources is reflected in a clear way of property rights and is traded in the market. It can overcome the problem of insufficient information, realize the unity of government and enterprise behavior, and maximize the value of assets.

According to the current status of ecological and environmental problems in China, there will be some challenges in the implementation of Coase method in China. Firstly, China does not have a good market economy and it is difficult to control transaction costs. At present, there are many problems in
the regulation of environmental resource property right in China. The regulation of setting scope and exercising mode of property right in law is too narrow, which leads to the inefficient allocation and use of resources, which is an essential obstacle to the implementation of Coase method. Moreover, incomplete information and asymmetry are the salient characteristics of China's market.

Therefore, China should first improve the market trading mechanism of ecological and environmental rights. We will open a nationwide market for environmental and resource property rights, continue to promote the trading of pollutant emission rights and resource rights, and establish and improve a natural resource property rights system with clear ownership, clear rights and responsibilities, and effective supervision. Second, perfect the information construction, construction of stationary sources unified database system, promote the information system integration, comprehensive screening, combing the existing information system and business data, on the ecological environment data resources for effective collection, storage, integration, management analysis, publish, promote the management of information assets, sharing and utilization, which break through the barriers between the data and eliminate information "island" phenomenon, improve the effective utilization rate of the data, strengthen the ecological environment information technology application ability.

4. Developing new energy and its implementation in China

Energy is the core issue of the environment, and the utilization of energy is a major cause of environmental change. It can be said that the development and utilization of any kind of energy will have an impact on the environment, among which the non-clean energy represented by fossil energy is the most serious. The serious environmental pollution caused by fossil fuel consumption includes the destruction of ozone layer, greenhouse effect caused by excessive CO2 emission, land desertification, acid rain caused by nuclear waste, water pollution caused by industrial development and oil pollution, etc.

New energy refers to the systematic development and utilization of renewable energy on the basis of new technologies, mainly including solar energy, wind energy, nuclear energy, clean utilization of coal, new energy vehicles, etc. In the past, China was the world's largest producer and consumer of coal, coal accounted for about 76% of the commodity energy consumption structure, has become the main source of air pollution in China; As a result, the concentration of suspended particulate matter in the air environment of Chinese cities is far above the standard, sulfur dioxide pollution is serious, nitrogen oxide pollution is increasing, and acid rain is also occurring in many parts of China. China's greenhouse gas emission intensity of energy consumption is more than 30 percent higher than the world average.

Since the 18th National Congress of the CPC, major changes have taken place in China's energy production and utilization mode, basically forming a multi-wheel driven energy supply system and comprehensively promoting energy conservation. With an average annual growth of 2.8% in energy consumption, China's national economy has achieved an average annual growth rate of 7%. Clean energy accounted for 23.4 percent of total energy consumption, an increase of 8.9 percentage points over 2012, and the accumulative installed capacity of hydropower, wind power and solar power all ranked first in the world. At the same time, the green development of energy has played an important role in the reduction of carbon intensity. In 2019, China's carbon intensity has been reduced by 48.1% compared with 2005, achieving ahead of schedule the 2015 target of reducing carbon intensity by 40-45%.

In the development of new energy vehicles, car exhaust emissions is also a major cause of air pollution, our country in recent years in the development of new energy vehicles has significantly increased, subsidies on new energy automobile policy, makes the new energy vehicles in China's domestic sales, has more than 1.3 million vehicles in chart 1 to 2020. The development of new energy vehicles has greatly reduced air pollution and noise pollution, saved the development of petroleum energy, and realized the recovery and utilization of energy through the power recovery function, which promoted the sustainable development. At the same time, the development of new energy vehicles will
also drive the development of related industries, such as fuel cell industry, new energy manufacturing industry, optimize the industrial structure, improve the industrial technology, and improve the economic benefits of the society.

**Table 1.** Development status of China's new energy vehicle industry.

| Year | 2016 | 2017 | 2018 | 2019 | 2020 |
|------|------|------|------|------|------|
| Sales volume of new energy vehicles (unit: 10000 units) | 50.7 | 77.7 | 125.6 | 120.6 | 136.7 |
| Growth rate | 53% | 53% | 61.7% | -4% | 10.9% |

The development of new energy has positive significance to the environmental protection work of our country. Therefore, China should continue to vigorously develop new energy, increase the proportion of green GDP in China's total GDP, optimize the energy structure, and expand the proportion of clean energy and renewable energy in China's current energy structure. To improve the efficiency of energy use, change the composition of fuel, increase the efficiency of fuel use and reduce energy consumption by means of science and technology or other effective methods, and improve production processes and equipment to reduce the production of air pollution; Continuously promoting the development of hydropower and solar energy, the establishment of photovoltaic power stations can also drive the local economic growth and employment, and effectively improve the national economic construction.

5. **Environmental industrialization and its implementation in China**

Environmental industry is an emerging industry that meets the needs of The Times, almost penetrating into all fields of economic activities. It aims to effectively alleviate the bottleneck constraints of resources and environment faced by China's economic and social development, and to promote the upgrading of industrial structure and the transformation of economic development mode.

With the continuous and rapid development of China's economy, the increasing process of urban development and industrialization, environmental pollution is becoming more and more serious, and the state attaches more and more importance to environmental protection. In 2018, China supported 635.3 billion yuan in environmental protection and energy conservation, an increase of 13% over the previous year. With the continuous support of national policies and the continuous improvement of environmental protection demands of high-emission enterprises, China's environmental protection industry has developed rapidly, and the market size and output value have been increasing year by year. As can be seen from figure 1, the total output value of China's environmental protection industry increased from 4.5 trillion yuan in 2016 to 9.98 trillion yuan in 2020, with an annual growth rate of 18.3%.

**Figure 1.** Output value of China's energy conservation and environmental protection industry from 2016 to 2020. (Unit: trillion Yuan)
China's environmental industry also faces some challenges in the development process. First of all, although the industrial scale expansion is obvious, the market competitiveness is weak. The overall scale of core industry in the national economic structure is relatively low, accounting for only 3%, and there is still a certain gap with the requirements of pillar industries of the national economy. In addition, the energy conservation and environmental protection industry is dominated by small and micro enterprises, with low industrial concentration, unclear scale efficiency, lack of market competitiveness, and few large-scale comprehensive environmental service enterprises with integrated comprehensive solution ability. Secondly, with the gradual opening of the energy conservation and environmental protection market, the market entry barriers are reduced, but the corresponding supporting management mechanism is not perfect, resulting in the market competition order disorder; The technological level has been improved, but the original innovation capacity and motivation are insufficient, the original innovation of energy conservation and environmental protection technology is less, and the characteristics of industrial organization dominated by small and micro enterprises lead to the lack of motivation for technological innovation within the industry.

Future development of the industrialization of our country environment, can draw lessons from the successful experience of western developed countries, the first business take environmental problems into the core subject, reduce pollution emissions, which helps to ecological upgrade of the enterprise production technology and research and development of green products, to generate new added value for the enterprise, improve the ability of enterprise environmental management, achieve both production and environmental management, thereby gaining economic and social benefits; At the same time, the government should play a leading role and adopt powerful economic means to induce the development of environmental protection enterprises. Increasing financial support for renewable energy and energy-saving vehicles, leading environmental finance and green investment to promote the environmental protection industry to form a virtuous cycle, all of which play a vital role in the cultivation and development of the environmental protection industry.

6. Conclusions
Environmental protection is of positive significance to the sustainable development of China's economy. In the course of development, we should establish and practice the concept that lucid waters and lush mountains are invaluable assets, and realize the internal unity, mutual promotion, coordination and symbiosis of development and protection. To protect the environment means to protect human beings themselves. While implementing economic measures, we should also improve citizens' awareness of environmental protection, enhance their environmental literacy, and enhance their awareness of environmental distress, so that environmental protection will become the key word of the whole country.

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