

# Research on haze mode countermeasures of PPP comprehensive treatment in the whole process

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**Abstract.** This paper designs third party governance market, carbon cycle trading two kinds of PPP governance haze model. Analyse the tasks of each stage (Source control, process control, end control) and the relationship between the three main bodies (government, public, haze governance corporation).In order to ensure the normal operation of PPP mode, five guarantee mechanisms have been established(Policy guarantee mechanism, Contractual credit mechanism, Negotiation competition mechanism, Win-win mechanism and Subsidy supervision incentive mechanism).The function and running process of each mechanism are determined, and the haze mode of the whole process of PPP is innovated, which has a good reference significance for the comprehensive management of haze.

## 1. Introduction

At present, the main focus of haze governance is the government. The government is responsible for formulating the emission standards of various pollutants, formulating control goals, doing well the planning objectives for each stage, adjusting and optimizing the existing energy structure, and optimizing the industrial layout. To achieve the goal of steadily decreasing the total concentration of particulate matter; The government is responsible for supervising the degree of implementation of various laws and regulations, and avoiding the phenomenon of lawlessness. According to the development of the economy and society, the government should coordinate the balance between economic development and pollution control so as to ensure the rapid development of the economy. Also ensure the health of the environment, and regional governments need to work together, haze governance is not a single, but mutual cooperation, because air pollution is cross-regional. However, because of the high cost and excessive dependence on subsidies in the actual implementation process, local fiscal pressure exists, so the limitation of subsidy policy and the sustainability of haze governance are greatly affected.

With the wide application of PPP and the problems existing in the field of haze pollution, we can popularize the cooperation model of government and social capital through PPP model, and introduce the sufficient funds and advanced technology of environmental protection enterprises into the field of haze pollution control. In order to stimulate the investment of environmental protection enterprises and the enthusiasm of equipment technology innovation, promote the haze pollution treatment to marketization, industrialization, specialization, and realize the final treatment of haze.

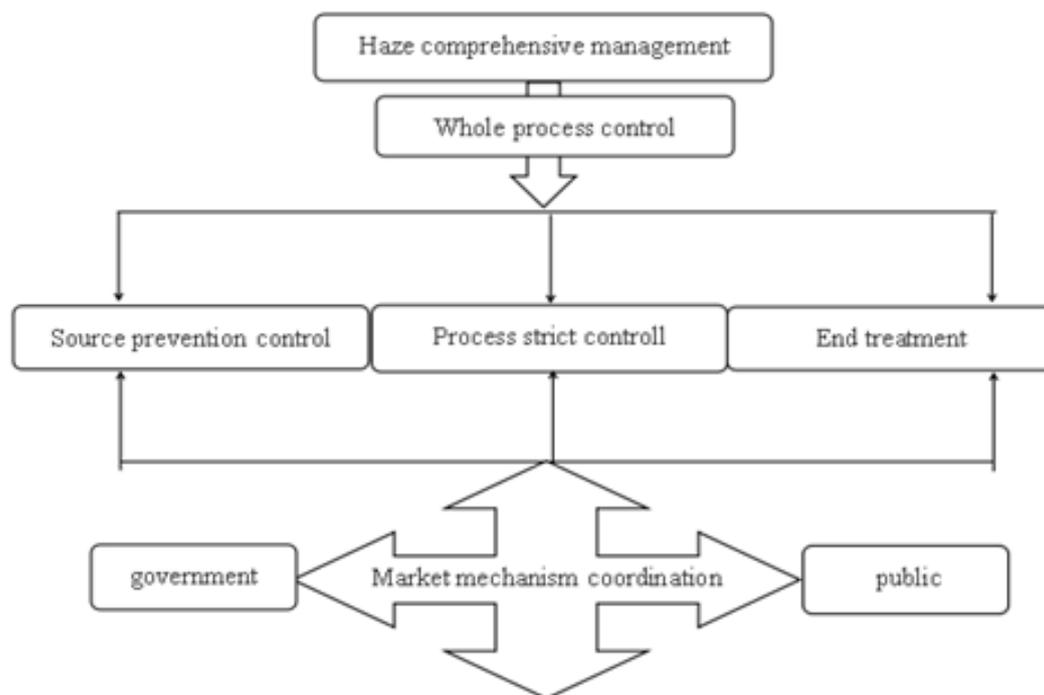
Research on the model design of managing haze by using the whole process of PPP.



## 2. Overall design and analysis

### 2.1. Overall pattern design

For design ideas, see figure 1:



**Figure 1.** General design idea

### 2.2. Analysis of tasks and three main bodies in each stage

Source control mission:

(1) The source analysis is carried out to determine the main sources of pollution, and the prevention and control measures are made from the source according to the emission characteristics of different pollution sources.

(2) There are many methods of source analysis, different regions combined with industrial structure development.

(3) The haze control adopts the whole channel control, opens the pollution prevention channel between the different areas, realizes the cross-regional joint prevention and control.

By using positive matrix factor analysis (PMF) model, four kinds of pollution sources which contribute more to haze in Jinan are analyzed as follows: fire coal, raise dust, Industrial production pollution, Motor vehicle exhaust, according to the emission characteristics of four pollution sources, the corresponding source control measures are established.

Process control task:

Make corresponding measures for each stage of pollution source. Coal and fossil fuels produce only carbon dioxide in the case of complete aerobic combustion, but in incomplete combustion there is carbon monoxide in addition to carbon dioxide. According to the analysis of particulate matter composition, carbon monoxide is one of the main contributing factors in haze pollution.

Similarly, in the process of industrial production, a variety of dust will be produced, which is the main source of dust, strict control of each process of production, in each stage of the corresponding measures to reduce dust production will greatly reduce the amount of dust.

Terminal management task:

(1) Develop new technology and equipment for pollution control.

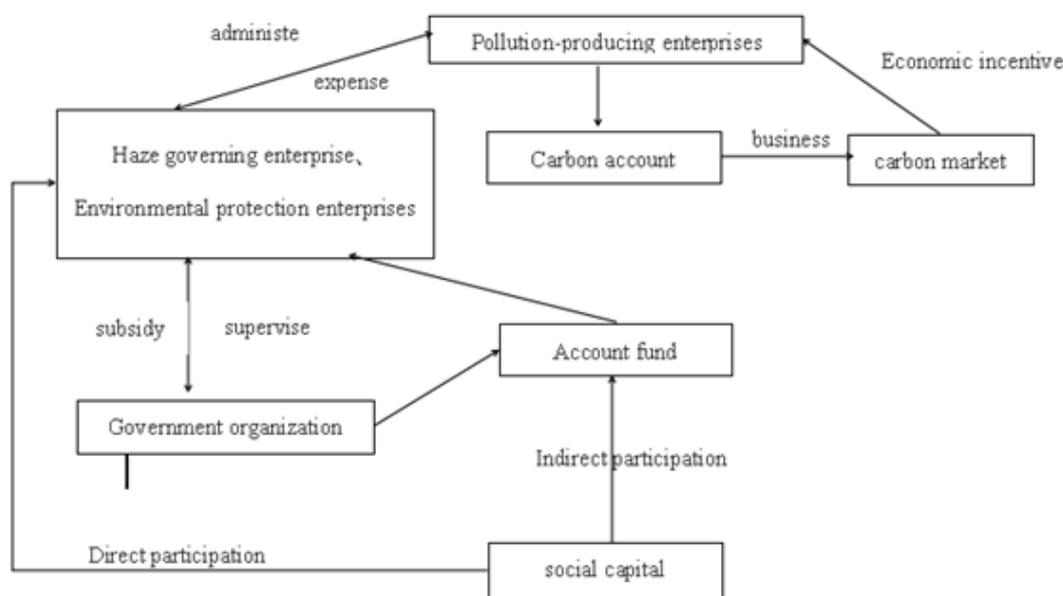
(2) Strict end emission reduction measures, At present, terminal emission reduction measures are mainly used in industrial emission reduction and traffic emission reduction. Traffic emission reduction is mainly reflected in the installation of exhaust gas filtering devices on vehicles to reduce the amount of pollution from moving sources. The emission reduction at the industrial end is mainly reflected in improving the treatment level of waste water and waste gas, developing new treatment equipment, and adjusting the industrial structure at the same time. Follow the cleaner production route.

(3) Regular sprinkling of urban roads, greening of gardens and changing the old working methods of construction sites are innovative measures to control dust from the end of buildings and roads.

### 2.3. Design of PPP pattern in haze Governance

PPP model will be used to develop the third-party intermediary organization pollution control market, through the market operation of haze governance company and centralized emission reduction and pollution control, effectively control the pollution source, and then reduce the particulate matter in the air pollution and reduce the occurrence of haze. At the same time, the PPP model is applied to the carbon cycle market, carbon trading is taken as an effective measure for energy saving and emission reduction, and economic incentives are adopted to encourage polluters to reduce emissions voluntarily and control pollution. The establishment of the PPP Fund to supplement the funding gap.

The PPP operating model and the participation of the Fund are shown in the figure2.



**Figure 2.** PPP mode of operation and the participation of the fund

#### (1) Third party governance market model

The government funded the introduction of social capital to set up the PPP Fund, which is used to ensure the healthy cycle development of environmental protection enterprises and carbon market players, as well as to provide economic subsidies and policy supervision to environmental protection enterprises, and to follow "who pollutes, who pays for it, " Comprehensive resource-based governance "principle, by sewage enterprises pay commissioned third party haze governance company governance. On the one hand, the comprehensive application of PPP mode can reduce the cost of pollution control, enable enterprises to concentrate their personnel and technical strength on the improvement of their own business, and avoid the repeated investment of pollution control equipment and the low utilization rate.

On the other hand, for the haze governance company, it can obtain the income of pollution control through its own equipment and professional technology, thus promote the upgrading and optimization of the pollution control equipment and improve the utilization ratio of the pollution control equipment. For the government, management costs can be greatly reduced, the government does not need to manage a large number of sewage enterprises, but only to supervise a small number of haze governance companies.

For the development of industrial economy, on the one hand, we can enjoy the benefits of environmental performance, on the other hand, we can cultivate new environmental service industries, and promote the optimization and transformation of industrial economic structure.

#### (2) Carbon cycle trading model

The development of the carbon market needs to be supported by sufficient funds, mainly for the establishment of exchanges, the review of carbon projects, the assessment of carbon emission standards, and the encouragement of low-carbon environmental projects.

### 2.4. *The Regulation Mechanism and measures of Market economy Mechanism*

Insist on market mechanism control, realize the whole process management of PPP mode, introduce social multi-agent, pluralistic cooperation, To coordinate the cooperation and coordination of the three main bodies of the government, enterprises and the public, combine the supply and demand relationship of the market, and carry out multi-channel cooperation models such as financing and financing, so as to ensure the circulation path of the fund, so as to ensure the normal and stable operation of the amount of the mechanism. Establish five guarantee mechanisms to maintain the haze governance behavior of the government, haze governance company and the public. five major mechanisms include: Policy guarantee mechanism, Contractual credit mechanism, Negotiation competition mechanism, Win-win mechanism and Subsidy supervision incentive mechanism.

The five mechanisms complement each other and restrict each other at the same time. The main body is different, but the goal is the same, which provides the most perfect market guarantee mechanism for the PPP mode in the whole process control of haze governance.

#### (1) Policy guarantee mechanism

PPP, the whole process control, haze control related environmental protection, financial policies are formulated by the government. With the urgent needs of the public for a clean environment, the government needs to further strictly control emissions standards, formulate sound incentives and punishment measures, at the same time increase the intensity of inspection, strengthen the implementation of the governmentundefineds own, so as to ensure the stability and comprehensive implementation of the policy. At the same time, because the management of haze is long-term, the government should do a good job in the long-term battle, and at the same time, combined with market changes, to establish a safeguard mechanism.

Recommendations are as follows:

A, In connection with the State Councilundefineds 2017 Legislative work Plan issued by the State Council in 2017, the state has explicitly included the "PPP regulations" in the 2017 government legislative work plan. This behavior not only improves the existing safeguard regulations, but also strengthens the original top-level construction. Improve social capital confidence in investing in PPP projects.

B, establish a perfect PPP asset trading platform and PPP asset securitization platform to eliminate the project financing and repayment concerns of haze governance companies and improve the expected value of project profitability.

C, establish a sound emissions trading market and tax reduction and tax policies to enhance profitability.

#### (2) Contractual credit mechanism

The contract credit mechanism includes two aspects, First, the relationship between the credit contract between the government and the haze governance company and strengthening the credit of the government and the haze company can reduce the wait-and-see nature of the haze company and actively

invest in the research and development of new equipment and the new technological innovation. For the government, It can greatly reduce financial expenditure, link financial pressure, and because of the good credit contract relationship with haze governance company, can greatly reduce the workload of government supervision.

Second, the credit contract relationship between haze governance company and sewage enterprise. The higher the credit degree of haze governance, the less attention will be paid to the maintenance cost, equipment level and technical level of haze governance company. Instead, more attention will be paid to the development of their own enterprises, which will greatly improve their own productivity.

The specific recommended measures are as follows:

A, Improve the responsibilities, rights and interests of each responsibility subject, clarify the specific rights and obligations of different subjects in the whole process of PPP governance haze process in the process of project output performance evaluation, improve the profitability of the project.

B, A series of internal, external, formal and informal institutional frameworks are constructed to align the individual interests of the participants with the stated goals of the government. Strategies that enable participants to run under self-interest can align results with expected goals.

### (3) Negotiation competition mechanism

The negotiation competition mechanism mainly manifests between the haze governance company, the emission enterprise, the third party intermediary. In selecting haze governance company, sewage enterprises need to select the appropriate governance company through bidding. Each haze governance enterprise needs to display its own experience level and technical equipment level for winning the bid, thus forming a strong competition mechanism and survival of the fittest. The perfect competition negotiation mechanism is advantageous to deal with the equipment renewal substitution, the enterprise reorganization optimization. The specific measures are as follows:

A, To establish the mechanism of PPP social capital intervention and negotiation in advance, strengthen the feasibility of the project, and provide reasonable and effective public goods and services.

B, Establish perfect docking platform, exchange platform and negotiation platform, the capital flow should be announced, the higher the exposure is, the stronger the legal compliance of PPP.

C, Public bidding, bidding should be open, fair, strictly prohibit collusion to win the bid, improve the dispute resolution mechanism, strengthen the importance of arbitration institutions.

### (4) Win-win mechanism

The win-win mechanism advocates the concept of "win-win or multi-win" cooperation. If one of the two sides only pay attention to the maximization of their own interests while compacting the otherundefineds interests, the cooperation will not last long. Therefore, it is essential to establish a sound mechanism for the distribution of benefits. The specific measures are as follows:

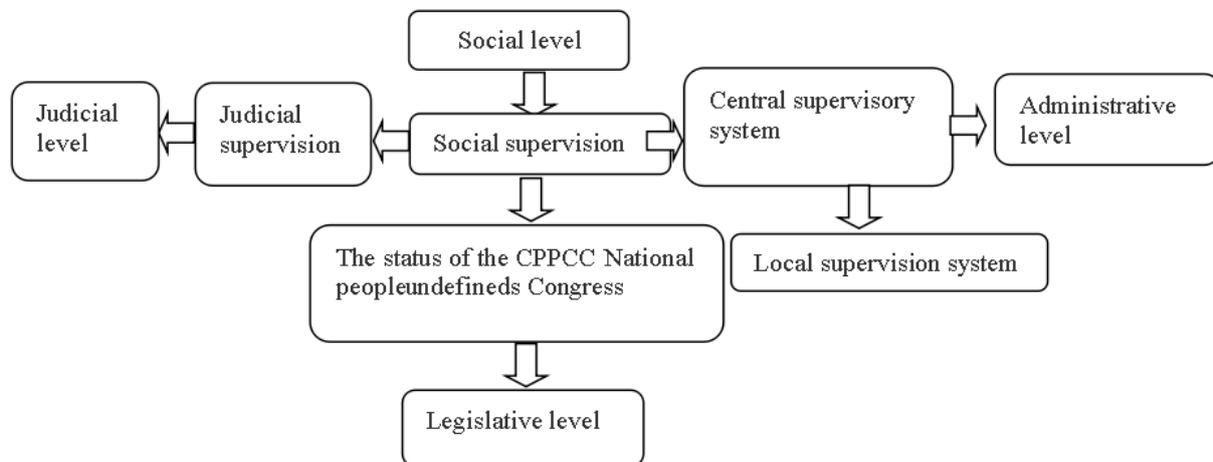
A, The Nash negotiation model is optimized, and the benefit distribution of the parties involved is optimized and analyzed by Lagrange function, and the quantitative judgment is made.

B, Design PPP revenue model.

### (5) Subsidy supervision incentive mechanism

To the public, we should encourage the whole people to supervise, supervise the executive power of the government, supervise whether the treatment effect of haze company is up to the standard, and supervise whether the sewage enterprises are energy-saving and emission-reducing. For the government, it is necessary to set up a sound subsidy system and a reward and punishment system, to give certain subsidies to small and medium-sized enterprises with tight capital turnover, and to give a certain amount of money to those enterprises that have done a better job of energy conservation and emission reduction. And for some of the larger emissions, but not to deal with the standard of enterprises to punish. The specific measures are as follows:

Improve the supervision and incentive system, integrate the supervision of the public, from the central supervision system layers of implementation, from the social level, administrative level, legislative level, judicial level four angles (Figure 3).



**Figure 3.** The interrelation of four levels

### 3. Conclusion

The Conclusion:

(1) This paper designs two kinds of PPP governance haze models: third party governance market, carbon cycle transaction, and analyzes the tasks of each stage (source control, process control, end control) and three main bodies (government, public, etc.). Haze governance company and mutual relationship, determine the source of the fund and the way to participate.

(2) In order to ensure the safe operation of haze in the whole process of PPP governance, this paper analyzes the establishment of five guarantee mechanisms from the angle of government, public, haze governance company and third-party intermediary: Policy guarantee mechanism, Contractual credit mechanism, Negotiation competition mechanism, Win-win mechanism and Subsidy supervision incentive mechanism. The five mechanisms cooperate to reduce the risk factors of PPP model in the whole process of haze governance and achieve multi-win.

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