

---

# Implementation Status and Countermeasures of Urban Domestic Waste Treatment PPP Project in China

---

Benyue Zhang <sup>1\*</sup>, Mingyang Gao <sup>1</sup>, Jingjing Sun <sup>1</sup>

<sup>1</sup> School of Business Administration, University of Science and Technology Liaoning, Anshan 114051, CHINA

\* Corresponding author: zhangbenyue0720@163.com

---

## Abstract

The increasing amount of municipal garbage, the shortage of land use and the excessive government finance have become the bottleneck of the disposal of municipal solid waste (MSW). As an optimized financing model, PPP can not only relieve the government financial pressure, but also get rid of the difficulty of investment in professional technology and equipment. Based on the analysis of the current situation of management in the early, middle and late stages of PPP project construction, this paper puts forward some concrete suggestions for improvement in the light of the problems existing in the treatment of municipal solid waste.

**Keywords:** PPP model, municipal solid waste disposal, risk avoidance, cost control

Zhang B, Gao M, Sun J (2019) Implementation Status and Countermeasures of Urban Domestic Waste Treatment PPP Project in China. *Ekoloji* 28(107): 427-431.

---

## INTRODUCTION

PPP (abbreviation of Public Private Partnership, referring to the mode of cooperation between government and social capital, is also called the mode of public and private cooperation) model is a new financing mode in China in recent years, usually used in infrastructure and public services. Its purpose is to enhance the supply capacity of public goods and services, improve supply efficiency, through the use of franchising, purchase services, equity cooperation, etc., so as to establish a kind of benefit sharing, risk sharing and long-term cooperative relationship established by government and social capital. The model is to transform the infrastructure projects funded by government finance alone into diversified cooperation between government and social capital. The construction of municipal solid waste treatment plant using PPP mode is in the initial stage of exploration, but it is developing rapidly in our country. This model transforms the original single investment main body into the diversification of the investment main body. Zhang et al. pointed out that municipal solid waste treatment accounts for 60.9% of the environmental performance evaluation of the whole venous industry. The construction of a perfect municipal solid waste treatment system is conducive to the rapid improvement of the environmental performance of the venous industry (Zhang and Liu 2017). Meng et al. pointed out that the central government and local

governments have invested a lot of money in the construction of urban domestic waste treatment facilities. However, the investment effect is not obvious enough, coupled with poor management, some projects can not meet the design requirements of waste disposal. The “garbage siege” is still very severe. It is urgent to reform the investment model and management system, absorb private capital and strengthen management (Meng et al. 2014). PPP model will become the main mode of municipal solid waste disposal project construction in China. Therefore, this paper analyzes the problems existing in PPP project management through the analysis of the identification, preparation and procurement of the PPP project in the early stage, as well as the implementation and evaluation in the middle period, and puts forward some concrete suggestions for improvement in view of the above problems.

## PROBLEMS IN PPP PROJECT OF MUNICIPAL SOLID WASTE DISPOSAL

### The Imperfections of Relevant Laws and Regulations and their Policies

“Budget Law of the People’s Republic of China”, “Law of the People’s Republic of China on Government Procurement”, “Contract Law of the People’s Republic of China” and other relevant laws restrict and standardize PPP projects, and in 2017, the government introduced a series of policies on cooperation between

**Table 1.** Summary of the first three batches of declarations

Year	Number of declarations	Number of entries	Number of transfer-out	Current number	Investment (a hundred million ¥)	Landing number	Investment (a hundred million ¥)	Landing rate (%)
2014	279	30	8	22	714	22	714	100
2015	792	206	44	162	4861	162	4861	100
2016	1174	516	3	513	11933	413	9728	80.5
Total	2245	752	55	697	17508	597	15303	85.7

Data source: Ministry of Finance, PRC

government and social capital. However, the imperfection of current laws and regulations leads to the “reasonable means” for a few people to seek improper interests, which is also the reason for most enterprises to scramble for it. Zhou et al. pointed out that the practice of foreign PPP model proves that the effective implementation of the PPP model requires the protection of the social legal policy environment. At present, the imperfect system of laws and regulations restricts the operation of the PPP model (Zhou et al. 2015). Due to the influence of the existing PPP legislation, conflict and operability, the progress of municipal solid waste treatment project is sluggish. In addition, there are no corresponding management measures for the PPP project in the aspects of fine control. The local government has not yet provided regulations on its prior approval, in-process monitoring and post-assessment assessment in the process of PPP project construction.

### **Deficiency of Standards related to Project Implementation**

#### ***Lack of normative requirements for bid participating enterprises***

In the PPP project argumentation, the government made public bidding social capital. However, poor management and the qualification of related personnel can not meet the requirements of the project, resulting in some government decision-making mistakes. Also companies overestimate their own strength and can not complete the project construction, giving rise to incalculable losses of the government or investors. After the State Council began fully implementing the PPP model in 2013, the country began the first batch of PPP projects declare storage in 2014, as shown in **Table 1**.

Through the analysis of the first three projects in 2014–2016, it can be seen that while the number of applications continues to increase, the landing rate of the projects is declining. The drop in the landing rate reflects the low entry threshold and the low feasibility of the PPP project, filling a post without real qualifications, thus obtaining state financial subsidies and preferential policies.

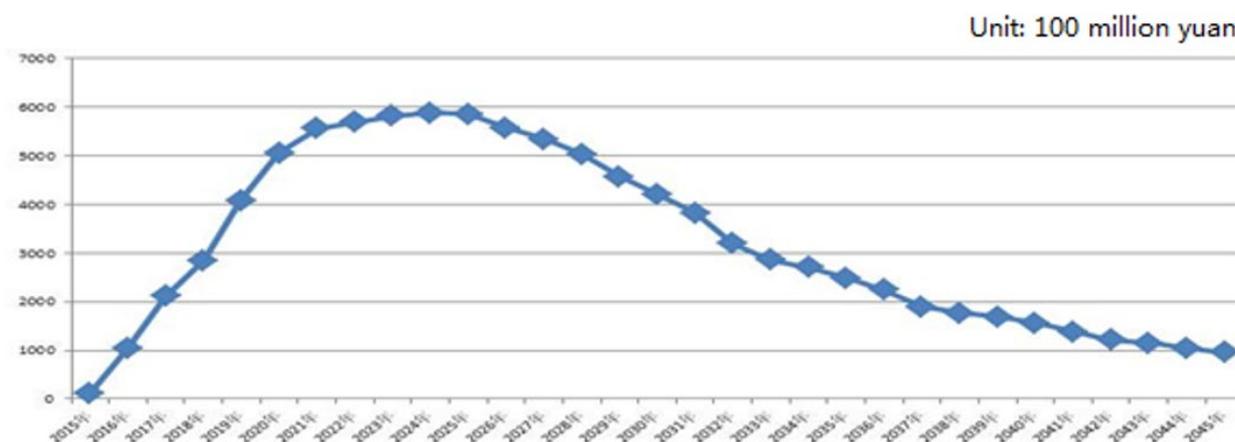
#### ***Lack of evaluation of project investment benefit***

The whole operation and management process of municipal solid waste treatment plant belong to long-term cooperative project, and the cooperation period is usually 10–20 years. However, during the period of cooperation, there is a lack of performance appraisal mechanism for enterprises, which makes it a mean and a tool for them to profit from what should have been a public infrastructure project.

#### **Weak Awareness and Ability to Avoid Risks**

##### ***Excessive implicit government debt***

The direct hidden debt of the PPP model stems from the moral responsibility of the government, public expectations or social pressure, and has long-term subsidies for PPP projects. During the operation of PPP projects, the public interests may be damaged for various reasons, and the government subsidizes these PPP projects for a long time out of political considerations (outside the legal provisions and the terms of the contract), thus forming the government debt (Dong 2016). From the establishment of municipal solid waste disposal project to the transfer of the project to the government, there has been no clear standard and definition of the government’s debt ratio. When the private capital withdraws from the project, it will cause a large or huge fiscal burden to the government, and even the fiscal deficit will be too large. At the same time, in the process of construction of garbage disposal projects, enterprises may threaten the government with “strike” and “bankruptcy” in order to obtain more tax relief, preferential policies or financial subsidies. The government made compromises and concessions under pressure from the public, politics and projects. This kind of “pressure” will affect the whole project operation cycle, as well as the project construction each link. Even enterprises may take advantage of the social responsibility of the government, people expect and other reasons to indirectly transfer their debts to the government, resulting excessive government debt ratio. As shown in **Fig. 1**, the total investment of PPP projects in recent years and the total investment of PPP projects in the next 30 years are predicted.



**Fig. 1.** Forecast of total investment of PPP project in 30 years  
Data source: Department of Finance, Ministry of Finance, PRC

#### ***Weak ability of avoiding risk***

The implementation time of PPP model is late with less successful experience. As there are many unpredictable risks in municipal solid waste disposal, such as government decision-making risk, government credit risk, market financing risk, project feasibility and safety grade risk, financial supervision is not transparent and a series of risks, it may affect the promotion of municipal solid waste disposal projects. However, because some PPP projects are eager to get started, they are unable to carry out risk assessment and forecast analysis in a timely, accurate and comprehensive manner. Under the influence of insufficient risk assessment in the early stage of implementation of the project, the financial burden of the government will be too large, the project cannot fall to the ground, and the problem of “rotten tail” project will occur.

#### **Lack of Management Mechanism for Project Cooperation Period**

##### ***Opaque stakeholder management***

In the planning period of municipal solid waste disposal construction, there is no clear management responsibility, power and obligation between the government and enterprises, which results in unclear responsibilities, lack of management and overlapping management of some local governments. During the period of project cooperation, the government, the enterprise and the public often fail to make the relevant information public, and the transparency is not high, which results in the asymmetry of the information.

##### ***Lack of sense of management responsibility in the later stage of enterprise***

After the transfer of the project, there is a lack of accountability system. The transfer of a project consists

solely of drawing up a transfer plan, conducting an asset evaluation, transferring relevant information and contracts, to the final preparation of the evaluation report. There is no related accountability system for municipal solid waste disposal after handover.

### **SUGGESTIONS FOR IMPROVEMENT OF PPP PROJECT FOR MUNICIPAL SOLID WASTE DISPOSAL**

#### **Improve the System of Laws and Regulations**

According to the existing laws and regulations, the relevant legal provisions should be issued as soon as possible to improve the level of PPP supervision. It is necessary to ensure that the PPP project is carried out under the perfect legal supervision system, to guarantee the legalization, standardization and standardization of its operation, and to avoid the loopholes of supervision. The introduction of relevant laws and regulations is conducive to the construction of government and enterprise cooperation protection mechanism. The relevant government departments should lower or remove the threshold of enterprise participation in the project based on the principles of fairness, fairness and transparency. Under the supervision of the PPP legal system, encourage the participation of skilled, funded and managed private capital, and provide low-interest loans, land concessions, green channels, and simplify the relevant procedures, put forward a series of preferential policies, such as tax-reduction and tax-reduction at the beginning of construction, so as to encourage enterprises to actively participate in them.

#### **Construct Life Cycle Cost Management Evaluation Model**

Calculate the total cost of the entire project lifecycle through  $LCC = CI + CO + CM + CR + CD$ , of

which, CI is cost of investments, that is, once or twice equipment purchase input costs; CO is cost of operation; CM refers to cost of maintenance; CR is cost of repair; CD is cost of waste disposal. From the formula, it can be concluded that the whole life cycle cost includes three stages of the PPP project cycle, that is, the pre-project preparation cost, the medium-term operating cost and the post-transfer cost. The formula obtained is:

$$C = C1 + C2 + C3$$

where  $C1 = CI$ ;  $C2 = CO + CM + CR$ ;  $C3 = CD$

Set  $K1 = C1/C$ ,  $K1$  represents the proportion of pre-investment in the total investment;  $K2 = C2/C$ ,  $K2$  represents the share of total investment during operation;  $K3 = C3/C$ ,  $K3$  represents the share of repo costs in total investment. Through the comparison of life cycle cost and PSC\* (Public sector comparison value), the necessity and feasibility of the project are analyzed, and the proportion of the project to expenditure in the whole government expenditure is forecasted, and the feasibility of the project is evaluated. Through the adjustment of project subsidies and tax preferences, the government's fiscal expenditure is strictly controlled below 10%, which is regarded as the red line of quota, thus avoiding the excessive financial burden.

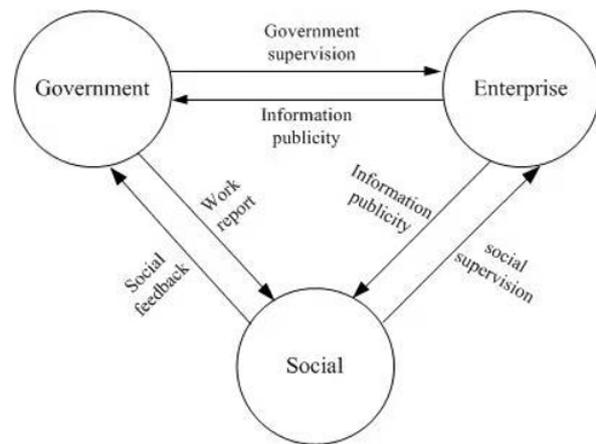
### Establish a Complete Project Assessment System

#### *Unify project bidding standards*

The government should make full use of the PPP project database and establish uniform and pluralistic bidding standards. It should be guaranteed from the source that only enterprises that meet standard requirements can participate in PPP projects. At the same time, the industry should also establish relevant industry standards to strengthen industry management. Meanwhile, the whole process of bidding should be open to the whole society so that the public can supervise the government and enterprises effectively.

#### *Establish performance appraisal system*

The government and the enterprise should establish the joint appraisal mechanism and the appraisal grade system. The government should regularly evaluate the business performance of the enterprises, give corresponding subsidies according to the grades of actual evaluation, rectify and reform the enterprises that do not meet the standards within a certain period of time, periodically re-check, and focus on the examination. Performance appraisal should adopt a combination of comprehensive appraisal, sampling



**Fig. 2.** PPP project supervision system

appraisal, and batch appraisal, and adhere to objective, fair and reasonable performance appraisal.

### Conduct Reasonable Risk Avoidance

Establish project risk management mechanism to avoid risk reasonably and effectively. It is necessary to manage the life cycle of the entire project, and to make pre-forecast, in-process control and post-event evaluation. The different types of government liabilities should be divided into different types of horizontal management, and the longitudinal management model should be developed for the hidden debts that may exist in each unit. At the beginning of the project construction, the responsibilities of each partner should be clearly divided, and the two sides should supervise each other. Third-party supervision should be established between government and enterprise to weaken the power and related functions of one party or department.

### Enhance the Transparency of Management and Strengthen Supervision

Through the tripartite supervision of government, business and society, the disclosure of information should be reviewed regularly during the project life cycle. As shown in **Fig. 2**, financial information, management information and liabilities are regularly published to the public for social supervision. The government should issue public notices regularly and adjust the operation and development of future projects according to social feedback. Therefore, in the aspect of PPP project management, the government must make full use of its own advantages, give full play to its functions, and become the main force to promote, manage and control the project, and at the same time, as the participant of cooperation, it should clearly define its own position, so as to facilitate the effective implementation of the entire PPP project.

### CONCLUSION

The PPP mode participates in the municipal solid waste disposal project, which alleviates the shortage of financial funds. However, due to the imperfect legislation and the imperfect management system in China, the normal implementation of the PPP project is affected. The government should avoid the hidden management risk and debt risk reasonably and reduce the impact on PPP project. While promoting the construction of PPP project, the local government should learn from the successful experience of foreign countries, and explore the feasible management mode according to the situation of our country. Under the background of accelerating the construction of

ecological civilization and deepening the reform of economic system, the application of PPP model in municipal solid waste disposal project will be a rare opportunity and challenge. The innovation of PPP mode and the rational use and standardization of PPP mode will make the PPP model play a greater role in the treatment of municipal solid waste (MSW) and achieve great progress.

### ACKNOWLEDGEMENT

This research is the stage achievement of Liaoning Social Science Planning Foundation (L17BJY012) and Liaoning Natural Science Foundation (20180550935).

### REFERENCES

- Barbour E, Deakin EA (2012) Smart growth Planning for Climate Protection: Evaluating California's Senate Bill 375. *Journal of the American Planning Association*, 78(1): 70-86.
- Dong ZP (2016) Analysis of the Types and Characteristics of Government Debt in China's PPP Model, *Local Finance Research*, (09): 61-66+87.
- Emst Ulrich von Weizsaecker (1995) Factor Four-doubling Wealth. Halving Resource Use. Wuppertal Institute, 26.
- Fons S, Achari G, Ross TJ (2003) Analyses of the Environmental Impacts of An Eco-industrial Park Using Fuzzy Cognitive Maps. *Proceedings. IEEE International Conference on Industrial Informatics*: 345-350.
- Meng C, Li XH, Zhang JF (2014) Innovative Practice of PPP Model in Urban Waste Treatment in China, *Research of Economic Research*, (38): 21-27+53.
- Mirata M, Emtairah T (2005) Industrial symbiosis networks and the contribution to environmental. *Journal of Cleaner Production*, 13(1/2): 993-1002.
- Rafione T, Marinova M, Montastruc L, Paris J (2014) The Green Integrated Forest Biorefinery: An Innovative Concept for the Pulp and Paper Mills. *Applied Thermal Engineering*, 73(1): 74-81.
- Zhang BY, Liu JN (2017) The Construction of Environmental Performance Evaluation System for Venous Industry, *Statistics & Decision Making*, (04): 74-76.
- Zhou ZX, Zhang XF, Zhang P (2015) Problems and Countermeasures of PPP Mode Application under New Normal, *China Soft Science*, (09): 82-95.