

## Application of PPP Model in Sponge City

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### Abstract

**This paper analyzes the meaning of PPP financing model based on government and social capital cooperation projects and the application status of PPP in sponge city construction, and summarizes the PPP model in sponge city through the analysis of Jinan City in the sponge city construction pilot. In order to enable China to better deal with the problem of rain and flood, and better promote the construction of sponge city, this paper sums up research status and puts forward corresponding suggestions.**

### Keywords

**Public-Private-Partnership; sponge city construction; present situation analysis.**

### 1. Meaning of PPP Mode

PPP (Public-Private Partnership) refers to the establishment of a partnership between the government and social capital to jointly invest in infrastructure construction. The PPP financing project refers to the cooperation of the government and social capital enterprises to make the infrastructure projects better through risk sharing and benefit sharing. The PPP project can give full play to the advantages of government department policy formulation. The addition of private enterprise capital eases the financing pressure of government departments, and provides technical personnel and experience support for the construction of infrastructure projects. Therefore, the PPP model is conducive to the optimal allocation of social resources and the maximization of benefits.

### 2. Application Status of PPP Mode in Sponge City Project

In recent years, China has actively promoted the construction of sponge cities throughout the country. The following table is a part of the sponge city project. At present, the Sponge City project mostly adopts the BOT operation mode, that is, the social capital enterprise is responsible for design, investment, financing and construction, and handed over to the government after the expiration of the operation period. The reward mechanism is mostly government payment or government feasibility gap subsidy. The PPP model still has some problems in the application of sponge city construction. For example, in the construction process of the project, the government's supporting policies still need to be strengthened, the supervision efforts still need to be strengthened, and the exit mechanism still needs to be improved. Due to the PPP financing model and the construction of the sponge city, the relevant talents are scarce.

**Table 1.** Sponge City Construction PPP Project (partial)

Numble	Project location	Mode of operation	Return mechanism	The starting time	Project Overview
1	Qian'an City, Hebei Province	PPP	Government payment	2015	The project mainly includes pavement permeable pavement, underground pipe network construction and road greening road, and the reconstruction and expansion of the municipal construction of the new old city, urban village and development zone of Qian'an City.
2	Nanning Chuan Paijiang Upper Botanical Garden Section Project	DBFO (design-build-finance-operate)	Government payment	2015	River improvement, sewage treatment plant, sponge city and other projects.
3	Baicheng City, Jilin Province	PPP	Government payment	2015	Comprehensive remediation of the accumulated water points in the old city, PPP project of the urban underground integrated pipe gallery project. Sponge City is realized mainly through the management of water, green space, urban roads and building communities in the community.
4	Chongzhou City, Sichuan Province	PPP	Government payment	2017	Road reconstruction (including sidewalks and green belts). Municipal pipeline transformation (including water supply and drainage pipelines, gas pipelines). Renovation of the parking lot.
5	Nanning City, Guangxi Province	PPP	Government payment	2015	The project mainly includes: urban park construction, urban green space construction, water ecological restoration, public building construction and other sponge city related projects.

### 3. PPP Mode Application Case in Sponge City

Since the Ministry of Finance and the Ministry of Water Resources and other departments announced the sponge city pilots in April 2015, many sponge city pilots have adopted the PPP operation mode. This paper introduces the application of typical city-Jinan as a case.

#### 3.1. Jinan Sponge City PPP Case Background

Jinan, the capital of Shandong Province, is one of the first pilot projects for the construction of sponge cities in China. In recent years, due to the rapid development of urban construction in Jinan, the issue of ecological construction has not attracted enough attention, and the city has increasingly serious water environmental problems. In 2015, Jinan was listed as a pilot project for sponge city construction, and Jinan City actively promoted the construction of sponge cities. Thereby, the reduction of rainwater runoff and the comprehensive utilization of water resources will be strengthened, and the city's flood control capacity and drainage capacity will be improved [3].

#### 3.2. Construction Situation

The total area of the sponge city pilot zone in Jinan is 39 square kilometers, with a total of 44 projects with a total investment of 7.611 billion yuan. According to the principle of "package packaging and proximity integration", three water-sink areas were selected to operate in PPP mode. The total investment of sponge project in PPP mode was 3.85 billion yuan, accounting for 51.3% of the total investment in all sponge projects. The project cooperation period is 15 years (including 2 years construction period). The specific implementation agency is the Municipal Public Utilities Bureau, which selects social capital through public bidding. The asset management company establishes the PPP project company on behalf of the government and social capital units.

The sponge city PPP project in Jinan City divides the project according to the catchment area. Collaborate with a social capital with appropriate qualifications to manage the project throughout its life cycle. The main source of funding for the project consists of government infrastructure construction funds, social capital funds and project operating income. The government compensates social capital by performing performance appraisal on the project.

#### 3.3. Case Summary

This paper summarizes the typical case of sponge city - Jinan's technical and economic indicators, models and implementation points are as follows.

**Table 1.** Case Summary

Numble	project name	Technical and economic indicators	Pattern framework	Implementation points
1	Jinan Sponge City PPP project	The total investment is 3.85 billion yuan, accounting for 51.3% of the total investment of the pilot project, including 3 sinks.	BOT+TOT mode, Cooperation period of 15 years (including 2 years construction period)	River basin packaging; Funding project Company; Pay as much as possible

## 4. Suggestions on Increasing the Application of PPP Mode in the Construction of Sponge Cities in China

### 4.1. Reasonable Positioning of Government Powers And Responsibilities

In the PPP operating model, the role of the government has changed. Changed from the manager and fund provider to the leader, organizer and regulator in the sponge city construction project. In the process of changing roles, the government must rationally position itself and have clear rights and responsibilities. Risk sharing and benefit sharing with the company in the market mechanism. The government should establish a clear and effective supervision system to ensure the smooth development and completion of the project and ensure the progress, cost and quality of the project.

### 4.2. Building A Scientific Risk Sharing Mechanism

To achieve the successful application of PPP mode in sponge city. The scientific risk-sharing mechanism is crucial. If the risk is too much, it will easily lead to risk control imbalance and project failure. In the PPP operation mode, the risk sharing awareness and benefit sharing awareness of government and private enterprises must be established. This ensures that private companies can pay attention to the risks of the project while obtaining benefits, and ensure the smooth and high-quality completion of the sponge city construction project.

### 4.3. Cultivate High-Level Professional Teams

The sponge city theory and the PPP operation mode are still short in China. The biggest problem in the application process of the PPP model in the sponge city is the lack of professional talent team. The sponge city construction project requires complex talents involving pre-construction financing, management control and post-construction operations in the construction process. The current complex talents with complete knowledge systems are scarce. It is urgent to organize and carry out experience and technical exchange meetings and centralized training activities to cultivate a high-level professional team for sponge city construction.

## 5. Conclusion

The construction of "sponge city" is a new measure for urban water environment management in China, and it is of great significance for solving the problem of urban flood and rain flood in China. Applying the PPP model to the construction of the sponge city can not only solve the financing problems in the early stage of project construction, but also realize the complementary advantages of local governments and individual enterprises. Local governments should actively promote the effective combination of sponge city construction and PPP operation mode, while focusing on strengthening supervision during the construction process and actively promoting the construction of sponge cities.

## References

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