

Risk Reduction and Optimization of Fund Procurement Required in PPP Projects

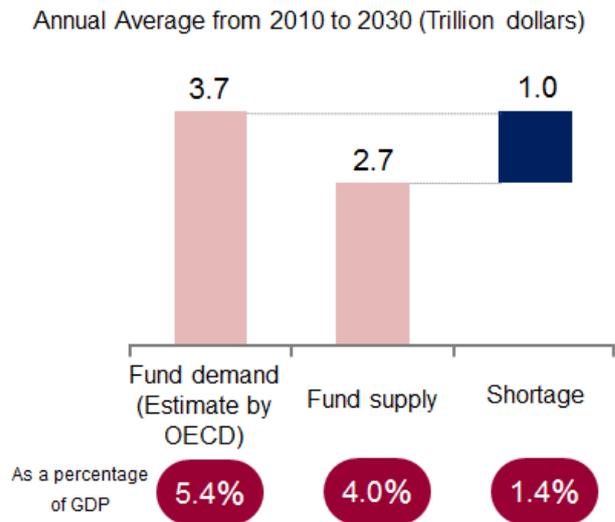
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While the demand for development and maintenance of social infrastructure (hereinafter, “infrastructure”) is globally expanding, the governments that are supposed to assume the role of developing and maintaining the infrastructure are facing revenue shortfalls, and as a result, more infrastructure has been developed with funding by private funds such as Public Private Partnership (hereinafter, “PPP”) projects. Hitachi Research Institute has been working on the research of PPP projects from the perspective of challenges in business establishment such as reduction of business risk and fund procurement.

1. Fund Shortfall in Infrastructure Development and Maintenance and Search for the Use of Private Funds

The demand for development and maintenance of infrastructure is globally expanding due to economic growth, increasing population, urbanization, and aging existing infrastructure. On the other hand, the governments that are supposed to assume the role of developing and maintaining infrastructure are facing revenue shortfalls for infrastructure development and maintenance due to the increase in social security costs such as pensions and medical costs.

According to an estimate by the World Economic Forum (annual average from 2010 to 2030), OECD countries require 3.7 trillion dollars per year (5.4% of GDP) for infrastructure development and maintenance. On the other hand, actual funds will remain at 2.7 trillion dollars per year (4.0% of GDP) which means a 1 trillion dollar (1.4% of GDP) shortfall is expected (Fig. 1).

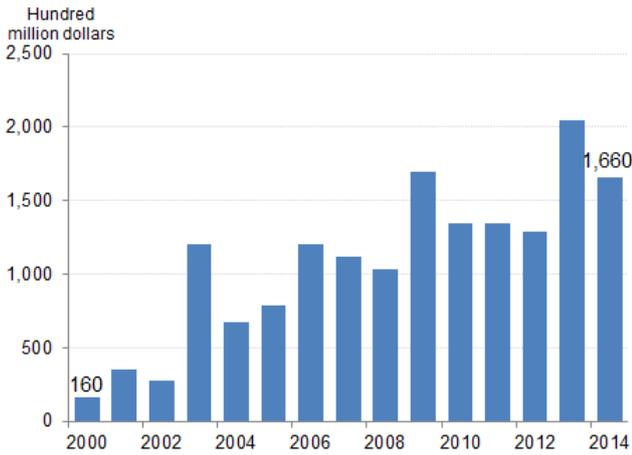


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Figure 1 Demand and Supply of Funds for Infrastructure Development and Maintenance

Mainly advanced countries are actively searching for infrastructure development and maintenance using private funds in the format of PPP projects, etc. due to the shortage of funds for infrastructure development and maintenance.

In PPP projects, the private sector has the broadest responsibility among the business formats of infrastructure development and maintenance with private funds. Here the private sector covers fund procurement, design, construction, management, and maintenance, and in many PPP projects, the private sector is engaged in the infrastructure projects for an extended period of time over several dozens of years. The scale of PPP projects around the world has been expanding from 16 billion dollars in 2000 to 166 billion dollars in 2014, which shows business opportunities for private operators are expanding (Fig.2).



Note: Subjects are transportation, water supply and sewerage systems, disposal centers, and entertainment facilities

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Figure 2 Total Project Costs of PPP Projects

2. Reduction of Business Risks Required for PPP Projects

2.1 Avoidance of Demand Risks with Availability Contracts

Since the scale is large and the length is long for PPP projects, striving to reduce business risks by contracts and improvement of profitability is important for private operators.

The contract method between the government (the ordering party) and private operators is a key for reducing business risks. Contract methods for PPP projects are roughly divided into real toll model contracts and availability payment contracts (Table 1). In the real toll model contract, the private operators even forecast demand and collect fees, while in availability payment contracts, private operators do not assume demand risk and they obtain revenue regardless of an increase or decrease in demand according to the service level and condition of the facility. That is why availability payment contracts are generally considered less risky for private operators than real toll model contracts.

Table 1 Contract Type Between Governments and the Private Sector in PPP Projects

Contract Type	Demand Risks to Bear		Risk Bearing					
	Fee Collection	Fee Decision	Design	Construction	Fund Procurement	Management & Maintenance	Demand Forecast	Charge Collection
Real Toll	User ↓ Operator	Decided by operators within the range of regulations	Private Sector					
Availability	User ↓ Ordering Party ↓ Operator	Agreement between the government and operators during contract conclusion	Private Sector → Government					

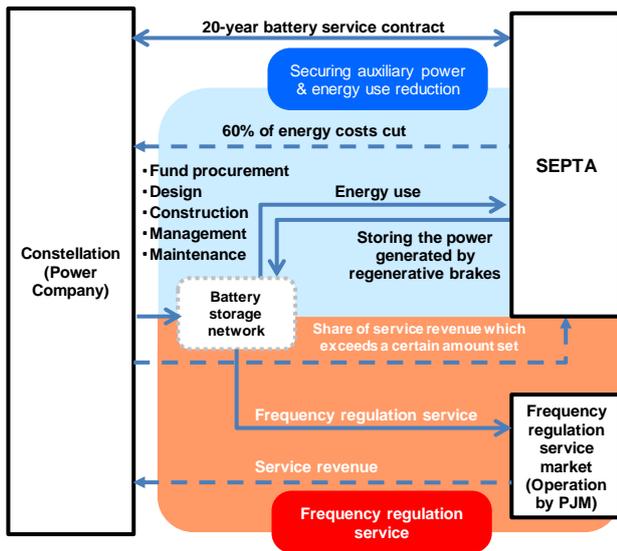
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2.2 Improvement of Profitability by Associated Businesses

To reduce business risks, measures to improve profitability by business associated to PPP projects are also necessary.

In PPP projects in the U.S., we have seen efforts to improve profitability in recent years. A typical example is the 20-year battery service agreement concluded in 2016 between the power company Constellation and Southeastern Pennsylvania Transportation Authority for the establishment of a battery storage network using a PPP project (Fig.3). Constellation funds, designs, builds, operates, and maintains the battery storage network. Constellation secures auxiliary power and reduces power consumption by storing and using the power generated by regenerative brakes.

In this project, in addition to a reduction of power consumption, Constellation uses the stored energy to provide a frequency regulation service for the power market operated by PJM, an independent system operator. Constellation improves profitability and reduces business risk by not only reducing electricity costs but also with revenue from the frequency regulation service.



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 Figure 3 Overview of Battery Storage Network System

3. Optimization of Fund Procurement by Governments and Private Funds

In fund procurement in PPP projects, long-term financing from banks has been the mainstream. However, due to the impact from financial regulations such as Basel III, business funds are becoming harder to procure with only financing from banks. For this reason, private operators need to use various fund procurement means such as financial assistance from governments in addition to financing from banks. At this time, what is important for private operators is comparing each funding procurement means in the aspects of interest rate, period and conditions of use, etc. and considering the combination of fund procurement methods based on their own business models.

For example, in the U.S., since banks rarely provide long-term financing, funds for PPP projects are procured by combining the private bond market and financial assistance from government. The methods to gather the funds for PPT projects are the TIFIA program, the WIFIA program, direct and indirect financial assistance by governments such as Private Activity Bonds by state governments and project bonds utilizing the private bond market and using specific business revenue as a repayment source (Table 2).

The TIFIA and WIFIA programs funded by the federal government provide low interest rates and super long-term

loans of 35 years; however, Buy American provisions apply. Private Activity Bonds by state governments target broader business fields compared to the federal government and federal income tax is exempted, making the interest rate lower than funds from the private sector. However, each state stipulates a maximum limit for issuance. For project bonds, although there are basically no restrictions in the target business fields and term of use and the financing term is relatively long, the interest rate is relatively high.

Table 2 Fund Procurement Methods and Characteristics in PPP Projects in U.S.

Fund Procurement Types	Target Business Fields	Interest rate	Period	Term of Use
TIFIA Program	· Transportation project overall	Low	Up to 35 years	· Buy American provisions
WIFIA Program	· Water and wastewater infrastructure project overall	Low	Up to 35 years	· Buy American provisions
Private Activity Bonds	· Transportation · Water and sewage facilities · Waste disposal facilities · Local district heating or cooling facilities · Educational facilities · Green building projects	Low	120 percent of the average reasonably expected economic life of the facilities	· There is a maximum on issuance depending on the state government. · Possession of the assets by the government is necessary depending on the business field.
Project Bonds	No specification	High	Usually more than 10 years	No restrictions

Note: TIFIA stands for Transportation Infrastructure Finance and Innovation Act. WIFIA stands for Water Infrastructure Finance and Innovation Act

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4. Future Efforts by Hitachi Research Institute

Japanese infrastructure equipment manufacturers and construction companies will increasingly become involved in PPP projects which are expected to expand, mainly in advanced countries. Hitachi Research Institute will research and study risk reduction and optimal fund procurement to contribute to global development of the infrastructure business of Japanese companies.