

# Resilient Infrastructure PPPs

Contracts and Procurement: The Case of Japan

Solutions Brief  
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**Japan is highly exposed to natural disaster risks ranging from earthquake, tsunami, cyclones, floods, and landslides to volcanic eruptions. Japan's experience in structuring resilient infrastructure public-private partnerships (PPPs) offers insights on how disaster and climate risks can be managed under PPPs.**

## Key Challenges in Incorporating Resilience into Infrastructure PPPs

Resilient economic infrastructure plays an increasingly significant role in mitigating natural disaster risks, including hydrometeorological and geophysical hazards, especially in the contexts of climate variability and change. Most of the countries face the following key challenges in incorporating resilience into infrastructure PPPs: (a) contractual allocation of natural disaster risks between the public and private sectors; (b) management of long-term contracts under uncertainty; and (c) commercial viability and uncertainty in the cost implications of resilience investments.

Building on the theoretical approaches outlined by Public-Private Infrastructure Advisory Facility (PPIAF)<sup>1</sup>,

the World Bank's Global Infrastructure Facility (GIF) and the Tokyo Disaster Risk Management (DRM) Hub have initiated a knowledge project on "Resilient Infrastructure PPPs—Contracts and Procurement" to harness the knowledge and expertise gained from PPP projects in selected countries to help the governments of low- and middle-income countries to prepare and structure disaster-resilient infrastructure PPPs.

## Policy and Legal Frameworks for PPPs and Disaster Risk Management in Japan

### Underpinning Resilient Infrastructure PPPs with DRM Policy and Legal Frameworks

To promote infrastructure development via PPP, the Japanese government enacted the Act on Promotion of Private Finance Initiative (PFI Act) in 1999 and established a PPP/PFI Promotion Office, which has developed guidelines on risk allocation and contracting. Although the PFI Act does not specifically focus on DRM, public authorities embed the DRM legislations in bidding documents and technical specifications to ensure

<sup>1</sup> <https://ppiaf.org/activity/globalemerging-trends-mainstreaming-climate-resilience-large-scale-multi-sector>

development of risk-informed infrastructure (figure 1). Instead of standardization, the bidding documents of each project and their contracts provide detailed DRM specifications considering the nature of each project and its geophysical and hydrometeorological characteristics. Also, when DRM policies and legislations are amended, private operators are required to comply with such amendments.

**Figure 1. Policy and Legal Frameworks for Resilient Infrastructure PPPs**

	DRM	PPPs
Cabinet Office or line ministries	<ul style="list-style-type: none"> <li>✓Basic Act on Disaster Countermeasures</li> <li>✓Building Standard Act</li> <li>✓Acts related to public works</li> </ul>	<ul style="list-style-type: none"> <li>✓PFI Act</li> </ul>
	<ul style="list-style-type: none"> <li>✓Infrastructure sectoral guidelines (water, transport, energy)</li> <li>✓Hazard maps</li> </ul>	<ul style="list-style-type: none"> <li>✓PPP standard contract</li> <li>✓PPP contracting guideline</li> <li>✓PPP risk guideline</li> </ul>
Municipal governments	<ul style="list-style-type: none"> <li>✓Municipal DRM ordinances</li> <li>✓Municipal DRM plans</li> <li>✓Regional hazard maps</li> </ul>	<ul style="list-style-type: none"> <li>✓Municipal PPP guidelines</li> </ul>
Project parties	<ul style="list-style-type: none"> <li>✓DRM plan</li> <li>✓Emergency preparedness and response plan</li> <li>✓Business continuity plan</li> </ul>	<ul style="list-style-type: none"> <li>✓Bidding documents</li> <li>✓Technical specifications</li> <li>✓Project contract</li> </ul>

Resilient Infrastructure PPPs

Note: PPP = public-private partnership. PFI = private finance initiative.  
DRM = disaster risk management.

### Understanding Risks and Open Data

Sharing disaster risk information from the public sector in the form of hazard maps and local DRM plans can reduce uncertain risk factors for private operators and facilitate effective disaster risk assessment by insurance companies. Also, Sendai City innovatively considers disaster risks and resilience when conducting a value for money (VfM) analysis in terms of the efficiency of disaster response and recovery (box 1).

**Box 1 Case of Sendai City: Accounting for Disaster Risks in a Value for Money Analysis**

The choice of a conventional public works model or PPP is decided considering the legal regulations, urgency, and characteristics of each project, including bankability. In addition, Sendai City considers resilience and business continuity in VfM analysis by comparing two scenarios: (a) where the project is handled by a public administrator, and (b) where a

private operator builds and operates the facility under the build-operate-transfer (BOT) scheme. In the first case, disaster response would require time and human resources from Sendai City to evaluate damage, apply for a contingency budget, and submit documents to the municipal assembly. As a result, Sendai City considers the BOT model to have more advantages than traditional public works for the municipal administration, in terms of the municipality’s personnel and time saving in response to a natural disaster.

### Project Structuring: Contracting and Disaster Risk Allocation

#### Defining Force Majeure

Defining force majeure—recognized as a large-scale disaster in a PPP project—and contractually allocating the disaster risks between the public and private entities are essential for structuring a resilient infrastructure PPP. The “Guidelines for Contract: Points to Consider for PPP Project Contracts” released by Japan’s PPP/PFI Promotion Office provides a standard definition of force majeure. However, the final definition is not confirmed until both public and private entities agree by taking into account the characteristics and site conditions of each project. For example, Sendai City has iteratively clarified the contractual force majeure provisions based on lessons learned from the 2005 Miyagi Earthquake and 2011 Great East Japan Earthquake as well as the accumulation of project experience (box 2).

**Box 2 Case of Sendai City: Iterative Processes to Enhance Risk Sharing**

In Sendai, force majeure events were listed as examples in the earlier projects and defined as foreseen phenomena under normal circumstances and for which no concerned entity was responsible. Based on lessons learned from the 2005 Miyagi Earthquake, the 2011 Great East Japan Earthquake, and other disasters, force majeure provisions specified the seismic intensity, and by taking into account historical disaster damages, Sendai City also added a numerical standard that regarded an event of at least a certain level as a force majeure event. Such clarification of force majeure provisions resulted in

- Fewer questions and uncertainty on the DRM responsibility of the public and private sectors;
- The private sector’s clear consideration of disaster risks during the project planning stage; and
- Prompt emergency responses by the private sector.

## Risk Sharing between Public and Private Sectors

Under the traditional public procurement in Japan, the costs of force majeure risks are 99 percent borne by the public sector. Japan's PPP projects of the first generation—mainly build-transfer-operate (BTO) projects with availability payment (governments pay unitary charges to operators)—adopted the same risk sharing as in the traditional procurement. However, as both the public and private entities accumulate PPP experience, disaster risks that the private sector can reasonably manage have been transferred to the private sector depending on the project type and characteristics (figure 2). For example, Sendai City PPPs were mostly BOT projects that transferred ownership of the assets to the private sector and elaborated upon the definition of force majeure to share risks with the private sector, if the private sector can bear these risks. In addition, profitable BOT projects allocate force majeure risks mainly to the private sector.

Among the still-limited number of concession projects, risk sharing varies between road projects (with low profitability and high public nature) and airport projects (with high profitability). For example, in the case of Aichi Toll Road Concession Project, standards for disaster recovery projects in public works were referenced to determine how additional costs resulting from natural disasters that fall under force majeure should be allocated between the public and private entities (box 3).

### Box 3 Case of Aichi Road Concession Project: Risk Sharing Policy by Circumstance

Force majeure events for which additional costs are borne by the public sector are listed in table B3.1. The public sector shall bear the cost if the concessionaire cannot foresee or cannot be reasonably expected to establish measures to prevent additional costs.

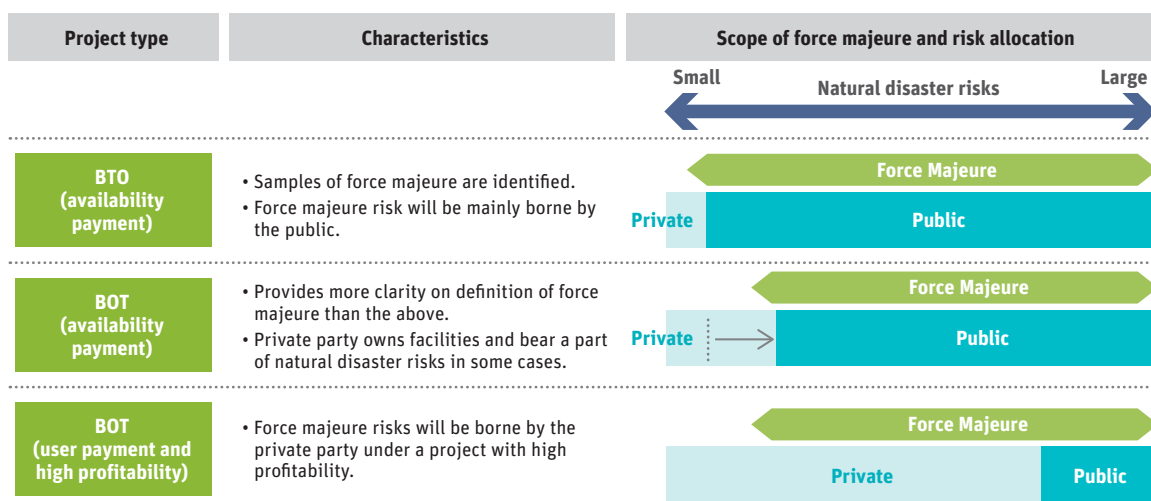
**Table B3.1 Risk-Sharing Policy, by Disaster Type, for Aichi Toll Road Project**

Disaster type	Events for which additional costs are borne by the public sector
Earthquake	•Damage based on normal social conventions
Heavy rain	•Maximum rainfall of 80 millimeters or more in 24 hours •Even if the rainfall is below the above standard, it is considered heavy rain if the hourly rainfall is significant (20 millimeters or more), provided that the hourly rainfall is observed at the nearest weather observation station (managed by the public corporation) from the damaged place.
Storm	•Maximum wind speed of 15 meters per second or more (average in 10 minutes)
High tide, storm surge, tsunami	•Extraordinarily high tide, storm surge, or tsunami caused by a storm or its aftermath with relatively nonminor damage

More precisely, additional costs resulting from natural disasters that fall under force majeure will be borne by the public sector if (a) the disaster recovery project is in accordance with the National Government Defrayment Act for Reconstruction of Disaster Stricken Public Facilities, and (b) the public sector agrees that there were no reasonable measures that the concessionaire could have taken to prevent the additional costs from being incurred because the event was unforeseeable.

Source: Contract documents, Aichi Toll Road Project.

**Figure 2. Transfer of Natural Disaster Risks in PPP Projects, by Project and Payment Type**



Note: BOT = build-operate-transfer. BTO = build-transfer-operate. PPP = public-private partnership. "Availability payment" refers to government payment of unitary charges to operators. "User payment" refers to payment to operators from user fees.

## Incentive Mechanisms in Procurement, Monitoring, and Payment

### DRM Tender Specifications and Evaluation Criteria during Procurement

In addition to compliance with the overarching legislations, private operators may be asked to follow the project-specific specifications defined by the contracting authorities during the procurement stage. The DRM specifications cover robust facility designs, resilient operation and maintenance (O&M), emergency preparedness, and response planning including emergency inspection and evaluation of damages. Also, during the procurement phase, the public and private entities discuss and agree on a final definition and a scheme of risk allocation that are commercially acceptable to private operators and investors.

Another approach adopted in Japan to incentivize private DRM initiatives and innovation is to request that private operators submit proposals for DRM and include DRM as an evaluation criterion when assessing proposals. For example, in the case of Sendai School Meal Supply Center PPP Project, Sendai City highly evaluated proposals on earthquake-resistant designs as well as institutional arrangements that enable prompt emergency response and recovery. When disaster struck, the project recovered about 2.5 months earlier than did facilities directly operated by the government, owing to the private operator's flexible selection of suppliers for emergency goods and equipment.

### Resilience-Linked Monitoring and Payment

According to the "Guidelines for Monitoring" released by the PPP/PFI Promotion Office, if the monitoring indicates that services have not been provided in accordance with the specifications or proposals, providing an economic motivation such as a reduction in the availability payment is considered an effective method for encouraging the appropriate performance of services.

Also, Sendai City developed a payment mechanism to incentivize the private sector's investment in DRM as a lesson learned from the facility defects in its previous Sports Facility Project, which were triggered by the 2005 Miyagi Earthquake. For the Astronomical Observatory PPP Project, Sendai City established a policy for reducing the private operator's contracted amount in case of facility defects that do not meet the specifications and performance standards, taking

into account the importance of the facility component, degree of defects, time required for corrective actions, or other factors.

## Insurance and Financial Institutions

### Insurance as a Risk Transfer Measure and Availability

In Japan, fire insurance covers damages caused by fire, winds, snows, lightning strikes, and the like but does not cover fire damages induced by disasters such as earthquakes, tsunamis, and volcanic eruptions. Therefore, business operators may be required to add an earthquake rider to the fire insurance for the O&M period (table 1). However, earthquake insurance is not easily available in Japan because of the limited capacity of the reinsurance market and the required high premiums. Hence, despite recognizing the need to obtain insurance, decisions are made by considering the risks and availability of insurance.

**Table 1. Insurance Typically Required of Private Operators in Japanese PPP Projects**

Phase	BTO project	BOT project	Concession project
Construction	•Construction insurance •Public liability insurance	•Construction insurance •Public liability insurance	•n.a.
O&M	•Public liability insurance	•Fire insurance (rarely, but sometimes private operators are required to add an earthquake rider) •Public liability insurance	•Fire insurance with an earthquake rider •Liability insurance for facility administrators

Note: n.a. = not applicable. BOT = build-operate-transfer. BTO = build-transfer-operate. O&M = operation and maintenance.

### Role of Financial Institutions in Resilience

As a requirement to secure financing from financial institutions including commercial banks, there are cases in Japan where private operators are asked by the lender's advisers (such as insurance or engineering consultants) to assess and evaluate disaster risks, develop a business continuity plan and DRM plan, and prepare a technical due diligence report to review the engineering designs of assets during the financing stage. Also, financial institutions do not set insurance as a requirement for approving a loan but take it into consideration in credit assessment. Early involvement of financial institutions is important to help incorporate the necessary financing structures.

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