Understanding the Utility of Public Private Partnerships in Resilience Investments

KEY MESSAGES

• Massive, capital-intensive investments in resilience are required to address vulnerability to climate change-related hazards.

• There are numerous compelling benefits for the public sector to securing private sector participation in public infrastructure projects. These include attracting private capital, sharing of project-related risks, tapping private expertise and technology, and optimizing the use of public resources.

• Public-Private Partnerships (PPPs) can offer resource-efficient solutions to a variety of public and private requirements to facilitate infrastructure investments in a changing climate.

• Key PPP considerations for public officials include ensuring sufficient returns for private investors, protecting public welfare, ensuring the functionality of infrastructure, and managing costs and risks.

• Many different types of PPPs exist with various combinations of responsibility-sharing between parties. This brief provides a concise overview of a number of these options and their suitability for different contexts.
Introduction

According to the Inter-American Development Bank, the world will spend $90 trillion on new infrastructure investments by 2030. In the United States alone, the Global Commission on Adaptation has found that repairing existing bridges, roads, ports, sewers, runways, and other vital public works to bring them back to full functionality will cost an estimated $4.5 trillion, even before considering additional capital required for climate-proofing. In the EU, infrastructure investments also need substantial investments, which prompted the bloc to approve a new climate adaptation strategy earlier this year to substantially expand its resilience and adaptation efforts. The U.S. federal government, the European Union, and other large-scale funders of public infrastructure are increasingly focused on integrating climate resilience into all their investments.1

For these new infrastructure investments to become climate-resilient (i.e., able to withstand climate hazards, such as increasingly intense storms, sea level rise, etc.), they require that climate considerations be integrated throughout all phases of the infrastructure lifecycle including within the enabling environment, upstream, and downstream phases.2 A public-private partnership (PPP) can serve as a mechanism to mobilize the financial and other resources necessary for such safeguarding, while also providing benefits to both public and private investors, distributing risk between both parties, and providing multiple societal benefits for the public, the economy, and the environment.

Benefits of Securing Private Sector Participation

The public sector has much to gain from securing private sector participation in public infrastructure projects, even as the private sector’s awareness of the materiality of climate risks is growing. Benefits of leveraging the private sector in public investments include sharing costs, distributing risk, augmenting limited in-house expertise, tools, and investment capital, and optimizing the use of public sector resources.

1. Bridging the financing gap: Public funding alone in many cases will be insufficient to cover the cost of adapting infrastructure to the expected impacts of climate change. Creative approaches to project finance and design as well as innovative financing instruments can enable the public sector to attract private developers to implement large-scale projects. For example, to finance Maryland’s $5.6 billion Purple Line – a 16-mile light rail project designed to reduce vehicular traffic, carbon emissions, and miles of new roadway infrastructure – the State partnered with the private sector to design, construct, operate, maintain, and partially finance construction of the line.3 The project is funded in part by the federal government, qualified private activity bonds4, and equity by the private partner, thus bridging gaps in state public infrastructure funds.5

2. Sharing risk: Infrastructure investments can have significant risks for both private and public sector investors. PPPs present an opportunity for private investors to share risk with the public sector – including construction risk, operating risk, legal risk, environment and social risk, market risk, financial risk, and climate risk – and transfer some risks to maximize public benefit. These risks, such as those mentioned above, can manifest themselves in the form of delays and disruption to project development, financial losses to the asset owner or manager, litigation, damage to property, public goods, or habitats, loss of life, or any combination thereof. Depending on the PPP arrangement, the degree of responsibility and risk borne by the public sector can be minimized and transferred to private partners. For example, Portugal formed a private company, Aguas de Portugal (AdP Group), to build and maintain water and wastewater infrastructure throughout the country. The company is majority owned by the Portuguese state and serves 80% of the population using a multi-municipal structure in which municipalities hold equity shares in the group or its subsidiaries. This multi-municipal structure allows the Government of Portugal and municipalities to transfer risk while giving AdP Group economies of scale and the ability to leverage its customer-base with its fixed-cost water infrastructure assets.6

Not all effective financing partnerships between the public and private sectors are, or need to be structured as, formal PPP arrangements. For example, DC Water issued an Environmental Impact Bond, the first of its kind, to finance large-scale green infrastructure installations as a part of its DC Clean Rivers project. This arrangement allowed DC to share financial and project performance risk with bond investors by using a “Pay for Success” model where returns are based on project performance. If the project underperforms (performance is measured in terms of volume of stormwater reduced) interest paid to investors is reduced, and if the project overperforms, interest paid is increased.7 Following the first installation of 25 acres of bioretention, the project successfully reduced stormwater runoff by 20%, thus achieving goals set by the partnership.8
3. **Accessing untapped resources and expertise:** Many governmental jurisdictions run lean operations that have constrained technical and project management capabilities. PPPs may be desirable due to these constraints in public agencies, a need for specialized knowledge, or simply competing priorities for time, money, and other resources. Additionally, both national and subnational governments frequently face statutory, political, and market-driven obstacles to tapping capital markets through direct debt issuance. To overcome these challenges, PPPs can engage private sector partners who can leverage their sector-specific experience, ability to tap capital markets, and access to cutting-edge innovation and expertise, to bring value to public infrastructure projects. For example, the City of Barcelona leveraged the expertise of Suez group, a global leader in environmental infrastructure, to design and construct a desalination plant. The plant – the largest in Europe – used reverse osmosis and ultrafiltration technologies to turn seawater and wastewater into potable water thus reducing draws on drinking and surface water reserves.

4. **Optimizing use of government resources:** PPPs can be designed to optimize use of and leverage limited government resources. For example, Brooklyn Bridge Park in New York City transformed an out-of-use shipping pier into a riverfront park capable of withstanding sea level rise, storm surges, and major floods through 2045. While government agencies raised capital to construct the park, private investors arranged to provide the maintenance budget of $16 million per year through direct payments in lieu of real estate taxes for the residential and commercial sites along the park’s urban edge. In this case, government resources were provided for start-up costs. Additional revenues from neighboring residential and commercial developments, that benefit from the new resilient waterfront, will sustain the park’s existence.

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### Specific Public-Private Partnership Models

PPP can be designed to accommodate a variety of combinations of public sector and private sector responsibility. Options include public or private design, construction, financing, operations and maintenance, ownership, and risk-bearing/insurance. Below are some examples of structures, although there are several options that balance differing degrees of public and private responsibility for a project.

1. **Build-Finance:** This model assumes high public sector responsibility. In this model, the private sector partner assumes responsibility for the project construction and finance for public infrastructure that is maintained, operated and owned by the public sector. This arrangement is best for projects with a medium financial return, a high degree of non-financially quantifiable public benefit, and where the public sector partner has extensive experience owning and managing the infrastructure type.

2. **Design-Build-Finance-Operate-Maintain:** This model transfers more responsibilities and functions to the private sector. The private sector partner is responsible for the design, construction, financing, operations, and maintenance of infrastructure owned by the public sector. Often referred to as “concession” to manage a public service monopoly, such as a toll road or wastewater treatment plant, this structure works well for projects with a clear, sustainable revenue stream where the private sector partner is able to attract other investment and utilize its expertise from developing similar projects to enable the greatest efficiency in project development. However, the profit motive of the private concessionaire sometimes diverges from the public interest, requiring careful oversight by the responsible public agencies and meticulously designed legal arrangements to prevent such divergence.

3. **Concession:** This model entails the highest degree of private sector responsibility: the physical asset is wholly transferred from a government entity to a private one for a limited period of time. The private sector partner finances and undertakes ownership of the asset where there is a clear financial return, and the public sector partner does not have the expertise to optimize the management of infrastructure. This model leverages private sector expertise to operate and manage the
infrastructure asset and, depending on the terms struck by the parties to the transaction, transfers much of the risk to the private entity. The public benefits from the efficiency of the private company driven by its incentive to maximize profits. As with other models, careful regulatory oversight may be required to ensure public interests are advanced by the concession holder.

Key Considerations

Key considerations when contemplating and designing PPPs include ensuring sufficient returns for private investors, protecting public welfare, guaranteeing the functionality of infrastructure, and addressing challenges.

1. **Sufficient return profile:** Many infrastructure projects traditionally financed by the public sector – particularly those targeting adaptation and resilience, which frequently are not revenue-generating – may not include a financial return for the private sector. Project designs must meet sufficient return profile for investors, which may include embedding reliable revenue streams within projects.

2. **Public welfare:** As project sponsors, public agencies should ensure that infrastructure projects consider climate resilience throughout the entire project lifecycle so that assets withstand future impacts of climate change. Public agencies should also ensure that projects consider impacts to disadvantaged communities, racial equity and environmental justice, the social cost of carbon, environmental impact, and other social and environmental factors. In addition, public agencies must assess value for taxpayer funds delivered by private partners and must scrupulously protect the various public interests in setting or negotiating the terms of the partnership.

3. **Functionality of infrastructure:** It is crucial to incorporate considerations related to the intended use of the infrastructure, including performance and maintenance requirements and conditions for handover of the infrastructure to the public sector in the initial PPP agreements. This should also include penalties or other redress for non-compliance on the part of all parties involved.

4. **Climate risk assessment and management:** Public agencies should also ensure that project parties have thoroughly assessed and managed (either through mitigation, transfer, control, or acceptance) disaster and climate related risks to the project, while preserving profitability, public benefit, and minimal environmental impact.

For more information on how to integrate climate resilience in infrastructure planning, design, and development, please see [CFA Brief: Integrating Climate Resilience Through the Infrastructure Lifecycle](#).

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**FIGURE 1**

Outlines more PPP examples on this continuum.

Additional Resources

- Climate Finance Advisors (2021). *Integrating Climate Resilience Through the Infrastructure Lifecycle*.
- The White House (2021). *Executive Order on Tackling the Climate Crisis at Home and Abroad*.
- U.S. Department of Transportation Federal Highway Administration (2017). *Public-Private Partnerships (P3s)*.
- World Bank Group Public-Private-Partnership Legal Resource Center. *Climate-Smart PPPs*.