



SEPTEMBER 2021

Understanding Utility of Public-Private Partnerships in Resilience Investments

KEY MESSAGES

- Massive and 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. Chief among these are attracting private capital, sharing of project-related risks, tapping expertise and technology in the private sector, and optimizing the use of public resources.
- Private sector actors are increasingly aware of the importance of [investing in climate resilience and sustainability](#), while new models are emerging to generate profitable revenue streams attractive to the private sector that are linked to infrastructure projects for climate resilience.
- Various Public-Private Partnership (PPPs) models can offer resource-efficient solutions to a variety of public and private requirements to facilitate infrastructure investments in a changing climate.
- Key considerations of PPPs 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.

Interested in learning more about this initiative, contact us: eu-usca@climate-fa.com or visit: climatefinanceadvisors.com/eu-usca/

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. This massive expenditure demonstrates the capital-intensive nature of investing in infrastructure. In the EU, economic losses from extreme weather already average over €12 billion per year, which prompted the block 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 of their investments.¹ These smart planning practices are expected to reduce costs over the middle to long term – sometimes even sooner.

For these new infrastructure investments to become ‘climate-smart’, i.e., able to withstand the increasing intensity of storms, wildfires, and other climate hazards, they increasingly require concerted planning, management, and, in some cases, additional resources for capital investment and operations & maintenance. 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, distribute risk between both parties, and provide multiple societal benefits for the public, the economy, and the environment. **This brief is directed toward infrastructure investors within the public sector and describes the benefits of securing private sector participation, specific PPP models, and key considerations when designing PPPs.**

Benefits of Securing Private Sector Participation

The public sector has much to gain from securing private sector participation in public infrastructure projects. 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, public financing sources such as revenue bonds or general obligation bonds can attract private investors for climate adaptation financing. In the District of Columbia, the DC government [issued revenue bonds](#) to finance construction costs for the undergrounding of powerlines in partnership with private utility Pepco. In turn, Pepco minimally increased customer rates over time to cover costs. In this case, the public sector utilized investment capital from private investors to cover the upfront cost of increasing the resilience of electricity infrastructure while aligning the costs over the long-term of this resilience benefit. Municipal bond issuances, which frequently have long tenors, or the time period for servicing the resilience bond debt, and revenue from a small increases in user fees represent two mechanisms that can facilitate long-term financing of the capital investment.²
- 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 – including construction risk, operating risk, legal risk, environment and social risk, market risk, financial risk, and climate risk – and exchange different types of risk to maximize public benefit. Risks, such as those mentioned above, can manifest themselves in the form of delays 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.
- 3. Accessing untapped resources and expertise:** Many governmental jurisdictions run lean operations that have limited technical and project management capabilities. Outsourcing to the private sector may be desirable due to human resource constraints in public agencies, need for specialized knowledge, or due simply to 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.

- 4. Optimizing use of government resources:** Outsourcing mechanisms to the private sector 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 issued capital to construct the park, private investment 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 leveraged for start-up costs and additional revenues from residential and commercial developments that benefit from the resilience provided will sustain the park's existence.³

Private sector actors are increasingly aware of the importance of investing in climate resilience and sustainability and recognize PPPs as an opportunity to maximize benefits for society. Many private sector companies understand the financially material climate risks that affect profits and asset valuation. Companies around the world are using climate risk frameworks to assess impacts to their business and improve future strategy and decision making. For example, a growing number of engineering and construction firms invest in controlling leaks in existing water infrastructure and building new infrastructure to access water from alternative sources (e.g., re-use of [wastewater](#) and [desalination](#)) in global cities where drought risk is high. Similar goods and services provided by private firms are emerging to climate-proof infrastructure and pursue emerging low-emissions and resilient economic opportunities in other spheres where services are commonly provided as public utilities such as the transportation, buildings, and electricity sectors, among others.

Specific Public-Private Partnership Models

PPPs can be designed to accommodate a variety of combinations of public sector and private sector responsibility, as outlined in the overview tables below. Options include public or private design, construction, financing, operations & maintenance, ownership, and risk-bearing/insurance. Below are some examples of structures, although there are several options in the balance between public and private responsibility for a project.

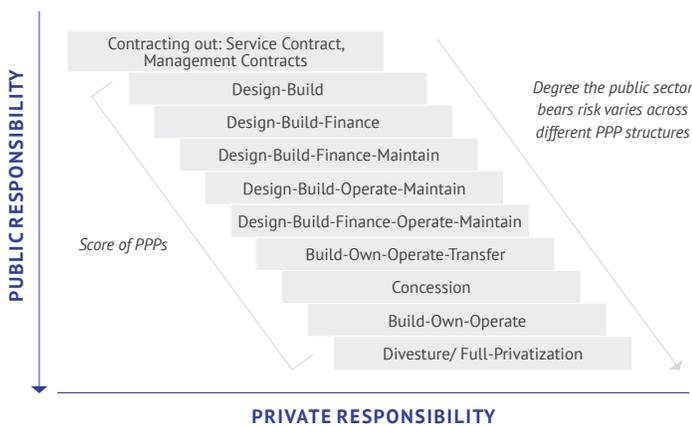
- 1. Design-Build:** This model assumes high public sector responsibility. In this model, the private sector partner assumes responsibility for the project design and construction for public infrastructure for a project financed, operated, maintained, and owned by the public sector. This arrangement is best for projects with a low 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. Divestiture/Full Privatization:** This model entails the highest degree of private sector responsibility: the physical asset is wholly transferred from a government entity to a private one. The private sector partner purchases government-owned infrastructure 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

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 profitability. As with concessions, the profit motive of the asset owner in delivering the public service, when coupled with the displacement of direct accountability from public agencies to private companies, frequently requires careful regulatory oversight (Figure 1 outlines more PPP examples on this continuum).

2. **Public welfare:** As project sponsors, public agencies should ensure that infrastructure projects consider racial equity, the social cost of carbon, evolving climate risks, 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. **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.

FIGURE 1.

Types of PPPs



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 private sector. Project designs must meet sufficient return profile for investors, which may include embedding reliable revenue streams within projects.

Public-Private Partnerships: Overview Table

The following tables are meant to serve as overview guides to help policymakers and state representatives navigate various PPP models.

The tables are intended as general guidance, as each PPP model can be amended for specific projects. Readers should be considerate of jurisdiction-specific and sector-specific circumstances when choosing a PPP model to pursue.

	OPERATIONAL OVERSIGHT: Entity with operational and management	PRIVATE FINANCE: Ability to attract and access private sector sources of capital	PUBLIC GOOD: Degree of integration and consideration of public benefit and incorporated throughout project stages	PRIVATE EXPERTISE: Degree of private sector efficiency / expertise incorporated throughout project stages
Contracting out: Service Contract, Management Contracts	Public	Limited	High	Limited
Design-Build (DB)	Public	Low	High	Low
Design-Build-Finance (DBF)	Public	Low	High	Low
Design-Build-Finance-Maintain (DBFM)	Public	Medium	High	Medium
Design-Build-Operate-Maintain (DBOM)	Private	Medium	Medium	Medium
Design-Build-Finance-Operate-Maintain (DBFOM)	Private	Medium	Medium	Medium
Build-Own-Operate-Transfer (BOOT)	Private	High	Low	High
Build-Own-Operate (BOO)	Private	High	Low	High
Divesture/ Full-Privatization	Private	High	Limited	High

	PROJECT DESIGN	PROJECT FINANCING	CONSTRUCTION	OPERATION	MAINTENANCE	OWNERSHIP	CONCESSION
Contracting out: Service Contract, Management Contracts	Public		Varies				No
Design-Build (DB)	Private	Public	Private	Public			No
Design-Build-Finance (DBF)	Private			Public			No
Design-Build-Finance-Maintain (DBFM)	Private		Public	Private	Public	No	
Design-Build-Operate-Maintain (DBOM)	Private	Public	Private			Public	No
Design-Build-Finance-Operate-Maintain (DBFOM)	Private					Public	No
Build-Own-Operate-Transfer (BOOT)	Private					Public	Temporary
Build-Own-Operate (BOO)	Public		Private	Public	Private	Yes	
Divesture/ Full-Privatization	Private					No	

Additional Resources

- Buson and Stenger (2018). [*Public-Private Partnerships as a Policy Response to Climate Change*](#).
- Design-Build Institute of America (2018). [*Design-Build Public-Private Partnerships*](#).
- European Commission (2021). [*EU Adaptation Strategy*](#).
- Gardiner, Bardout, Grossi, and Dixson-Declève (2015). [*Public-Private Partnerships for Climate Finance*](#).
- Global Commission on Adaptation (2019). [*Adapt Now: A Global Call for Leadership on Climate Resilience*](#).
- Inter-American Development Bank (2018). [*Inter-American Development Bank Sustainability Report 2017*](#).
- International Institute for Sustainable Development (2015). [*Risk Allocation in Public-Private Partnerships: Maximizing value for money*](#).
- McKinsey Center for Business and Environment (2016). [*Financing Change: How to Mobilize Private Sector Financing for Sustainable Infrastructure*](#).
- Public-Private Infrastructure Advisory Facility (2009). [*Toolkit for Public-Private Partnerships in Roads & Highways*](#).
- Roehrich, Lewis, George (2014). [*Are Public-Private Partnerships a Healthy Option? A Systematic Literature Review*](#).
- Schultz, Strazisar, and Swann (2019). [*Ready for Tomorrow: Seven Strategies for Climate-Resilient Infrastructure*](#).
- The White House (2021). [*Executive Order on Tackling the Climate Crisis at Home and Abroad*](#).
- United Nations Environment Programme (2016). [*The Adaptation Finance Gap Report*](#).
- U.S. Department of Transportation Federal Highway Administration (2017). [*Public-Private Partnerships \(P3s\)*](#).
- U.S. Department of Transportation Federal Highway Administration (2007). [*User Guidebook on Implementing Public-Private Partnerships for Transportation Infrastructure Projects in the United States*](#).
- United Nations Economic Commission for Europe (2008). [*Guidebook on Promoting Good Governance in Public-Private Partnerships*](#).
- World Bank Group Public-Private-Partnership Legal Resource Center. [*Climate-Smart PPPs*](#).
- World Business Council for Sustainable Development (2019). [*Business Climate Resilience: Thriving Through the Transformation*](#).

1 European Commission (2021). Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change. https://ec.europa.eu/clima/policies/adaptation/what_en

The White House (2021). Executive Order 14008 Tackling the Climate Crisis at Home and Abroad. <https://www.federalregister.gov/documents/2021/02/01/2021-02177/tackling-the-climate-crisis-at-home-and-abroad>

2 District of Columbia. Power Line Undergrounding Task Force Findings and Recommendations. <https://oca.dc.gov/page/dcplug>

3 Village of Hastings-on-Hudson New York. Brooklyn Bridge Park: Storm Resilience Through Design. https://www.hastingsgov.org/sites/g/files/vyhlif3241/f/uploads/bhp_storm_resilience_-_final.pdf