



Module 1

PPP Basics What and Why

The module provides an overview of PPPs, and discusses projects and contracts where there is a public interest in the provision of services and where the project involves long-life assets linked to the long-term nature of the PPP contract. *Section 1.1 - What is a PPP: Defining “Public-Private Partnership”* outlines the variety of contract types, and the terminology used to describe them. This section also presents types of partnerships to which the definition and guidance material in this Reference Guide would generally not apply. Some of them present similitudes to PPPs, others are significantly different.

Section 1.2 - Infrastructure Challenges and How PPPs Can Help discusses opportunities brought by PPP procurement, and the pitfalls practitioners may experience. PPPs are presented not only as a way of bringing needed additional investment to public infrastructure but also as a mechanism for improving infrastructure planning and project selection. It is also a mechanism for enhancing project management and guaranteeing adequate maintenance, avoiding cycles of construction followed by persistent neglect and then high-cost reconstruction. Well-structured PPPs bring private capital for investment, private-sector expertise, and commercial management incentives needed for enhancing service provision to users.

Therefore, private sector financing provides two key functions in a PPP. First, it complements public sector financing and allows projects to go forward that otherwise would have been discarded due to fiscal constraints. Second, it creates an incentive mechanism aligning private and public interests. *Section 1.3 - How PPPs are Financed* describes the various finance structures utilized for PPPs, and how governments can adjust contractual provisions to the financial environment, help develop markets, mitigate risks, and enhance credit.

1.1 What is a PPP: Defining “Public-Private Partnership”

The introduction to this *Reference Guide* provided a broad definition of a PPP:

A long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility and remuneration is linked to performance.

This section fleshes out this definition with more detail, describing PPP contract types (*Section 1.1.1 - PPP Contract Types and Terminology*), the terminology used to describe them; and clarifying related types of partnership between public and private sector parties to which the definition and guidance material in this *Reference Guide* would generally not apply (*Section 1.1.2 - What PPP is Not: Other Types of Private Involvement*).

1.1.1 PPP Contract Types and Terminology

This section describes in more detail the range of PPP contract types under the definition of PPP used in this *Reference Guide*; and some of the common terminology used globally to describe PPPs.

Most PPP projects present a contractual term between 20 and 30 years; others have shorter terms; and a few last longer than 30 years. The term should always be long enough for the private party to have an incentive to integrate service delivery costs considerations into the design phase of the project. This includes maintenance considerations as well, in order for the trade-offs between initial investment cost and future maintenance and operation costs to be optimized. The “whole-life” approach, considering whole-life costs and whole-life benefits, maximizes the efficiency of service delivery. It is at the core of the rationale for using PPPs for the delivery of public services. The precise length of the contract depends on the type of project and policy considerations. Policy makers need to satisfy themselves that the demand for the services delivered by the project will be sustained over the whole life of the contract; the private party should be able to accept responsibility for service delivery over its term; and the procuring authority should be able to commit to the project for its term. The availability of finance, and its conditions, may also influence the term of the PPP contract.

PPP contract types

Throughout the *Reference Guide*, PPPs are described in terms of three broad parameters: first, the type of asset involved; second, what functions the private party is responsible for; and third, how the private party is paid.

Many PPPs involve new **assets**—often called *greenfield* projects. For example, the United Kingdom’s PPP program—the Private Finance Initiative (PFI)—involved private companies in financ-

ing, building, and managing new public assets, from schools and hospitals to defense facilities. PPPs can also be used to transfer responsibility for upgrading and managing existing assets to a private company—or *brownfield* projects. In either case, a key feature of a PPP is that the assets or services provided are specified in terms of outputs rather than inputs—that is, defining what is required, rather than how it is to be done.

A central characteristic of a PPP contract is that it bundles together multiple project phases or functions. Nonetheless, the **functions** for which the private party is responsible vary and depend on the type of asset and service involved. Typical functions include:

- ♦ **Design** (also called *engineering work*)—involves developing the project from initial concept and output requirements to construction-ready design specifications.
- ♦ **Build, or Rehabilitate**—when PPPs are used for new infrastructure assets, they typically require the private party to construct the asset and install all equipment. Where PPPs involve existing assets, the private party may be responsible for rehabilitating or extending the asset.
- ♦ **Finance**—when a PPP includes building or rehabilitating the asset, the private party is typically also required to finance all or part of the necessary capital expenditure, as described further in *Section 1.3 - How PPPs Are Financed*.
- ♦ **Maintain**—PPPs assign responsibility to the private party for maintaining an infrastructure asset to a specified standard over the life of the contract. This is a fundamental feature of PPP contracts.
- ♦ **Operate**—the operating responsibilities of the private party to a PPP can vary widely, depending on the nature of the underlying asset and associated service. For example, the private party could be responsible for:
 - Technical operation of an asset, and providing a bulk service to a government off-taker—for example, a bulk water treatment plant
 - Technical operation of an asset, and providing services directly to users—for example, a PPP for a water distribution system

Table 1.1 Infrastructure Contract Nomenclature

Contract Nomenclature	Overview Description and Reference	Type of Asset	Functions Transferred	Payment Source
Design-Build-Finance-Operate-Maintain (DBFOM); Design-Build-Finance-Operate (DBFO); Design-Construct-Manage-Finance (DCMF)	Under this nomenclature, the range of PPP contract types is described by the functions transferred to the private sector. The <i>maintain</i> function may be left out of the description (so instead of DBFOM, a contract transferring all those functions may simply be described as DBFO, with responsibility for maintenance implied as part of operations). An alternative description along similar lines is Design-Construct-Manage-Finance (DCMF), which is equivalent to a DBFOM contract.	New infrastructure	As captured by contract name	Can be either government or user pays
Build-Operate-Transfer (BOT), Build-Own-Operate-Transfer (BOOT), Build-Transfer-Operate (BTO)	This approach to describing PPPs for new assets captures legal ownership and control of the project assets. Under a BOT project, the private company owns the project assets until they are transferred at the end of the contract. BOOT is often used interchangeably with BOT, as Yescombe (Yescombe 2007) describes. In contrast, a Build-Transfer-Operate (BTO) contract, asset ownership is transferred once construction is complete. As Delmon (Delmon 2015, 20–21) describes, ownership rights mainly affect how handover of assets is managed at the end of the contract.	New infrastructure	Typically, design, build, finance, maintain, and some or all operations Under some definitions, BOT or BTO may not include private finance, whereas BOOT always includes private finance	Can be either government or user pays
Rehabilitate-Operate-Transfer (ROT)	In either of the naming conventions described above, <i>Rehabilitate</i> may take the place of <i>Build</i> where the private party is responsible for rehabilitating, upgrading, or extending existing assets.	Existing infrastructure	As above, but <i>rehabilitate</i> instead of <i>build</i>	As above
Concession	<i>Concession</i> is used for a range of types of contract, as described in Delmon (Delmon 2010, Box 1 on page 9). In some jurisdictions, concession may imply a specific type of contract; while in others it is used more widely. In the PPP context, a concession is mostly used to describe a user-pays PPP. For example, in Brazil, the Concession Law applies only to user-pays contracts; a distinct PPP Law regulates contracts that require some payment from government. On the other hand, <i>concession</i> is sometimes used as a catch-all term to describe a wide range of PPP types—for example, all recent PPPs in Chile have been implemented under the Concession Law, including fully government-pays contracts.	New or existing infrastructure	Design, rehabilitate, extend or build, finance, maintain, and operate—typically providing services to users	Usually user pays—in some countries, depending on the financial viability of the concession, the private party might pay a fee to government or might receive a subsidy
Private Finance Initiative (PFI)	The United Kingdom was one of the first countries to introduce the PPP concept under the term <i>Private Finance Initiative</i> , or <i>PFI</i> . It is typically used to describe a PPP as a way to finance, build and manage new infrastructure.	New infrastructure	Design, build, finance, maintain— may include some operations, but often not providing services directly to users	Government pays
Operations and Maintenance (O&M)	O&M contracts for existing assets may come under the definition of PPP where these are performance-based, long-term, and involve significant private investment (sometimes also called performance-based maintenance contracts).	Existing infrastructure	Operations and maintenance	Government pays
Affermage	An <i>affermage</i> contract is similar to a concession, but with the government typically remaining responsible for capital expenditures. <i>Affermage</i> in particular may have a specific meaning in some jurisdictions. The World Bank’s explanatory notes on water regulation (Groom et al. 2006, 36–42) describe lease contracts, as well as concessions. Such contracts may or may not come under the definition of PPP, depending on the duration of the contract.	Existing	Maintain and operate, providing services to users	User pays—private party typically remits part of user fees to government to cover capital expenditures

Contract Nomenclature	Overview Description and Reference	Type of Asset	Functions Transferred	Payment Source
Management Contract	The state retains asset ownership, and capital expenditure is the responsibility of the public sector, whereas operation and maintenance is the handled by the private sector. These types of contracts are 3-5 years in duration.	Existing	Operations and maintenance	Management fees extended to the contractor
Franchise	<i>Franchise</i> is sometimes used to describe an arrangement similar to either a concession or a lease or affermage contract, as described in Yescombe (Yescombe 2007).	Existing or new	May include design, build, and finance, or may be limited to maintaining and operating an asset	User or government pays

- Providing support services, with the government agency remaining responsible for delivering the public service to users—for example, a PPP for a school building that includes janitorial service

For the provision of these services, the private party typically creates a PPP company, a **Special Purpose Vehicle (SPV)**. A dedicated SPV allows for the segregation of all assets and liabilities linked to the private provision of services.

The PPP **payment mechanism** is a third defining feature. The private party can be paid by collecting fees from service users, by the government, or by a combination of the two—with the common, defining characteristic that payment is contingent on performance. The options for a payment mechanism can depend on the functions of the private party:

- Under *user-pays* PPPs, such as toll roads, the private party provides a service to users, and generates revenue by charging users for that service. These fees (or tariffs, or tolls) can be supplemented by government payments—for instance, complementary payments for services provided to low-income users when the tariff is capped; or subsidies to investment at the completion of construction or specific construction milestones. The payments may be conditional on the availability of the service at a defined quality level. The social returns generated by user-pays PPPs may benefit the broader population, not only those who directly use the asset. For example, the value of real estate near the PPP project may rise as economic activity increases in the area. Non-users are then free-riding unless property taxes are adjusted.
- In *government-pays* PPPs, the government is the sole source of revenue for the private party. Government payments can

depend on the asset or service being available at a contractually-defined quality (availability payments)—for example, a free highway on which the government makes periodic availability payments. They can also be volume-based payments for services delivered to users—for example, payment from hospital care effectively delivered.

These characteristics can be combined in various ways to create a wide range of PPP contracts. These contracts can be thought of as a continuum between public and private provision of infrastructure—transferring increasing responsibilities and risk to the private sector.

The payment mechanism should be structured in such a way that the **net remuneration of the private party is linked to performance**. For the private party to have the right incentives to deliver services at the performance levels intended by the procuring authority, its remuneration, net of costs, should increase when approaching these levels. Additionally, sustained significant deviations from the intended performance levels should lead to contract cancellation, with termination payments designed so that quitting the project is never an easy solution for the private party.

PPPs are not the only way the private sector can be involved in infrastructure. These adjacent arrangements are described further in *Section 1.1.2 - What PPP is Not: Other Types of Private Involvement*.

PPP terminology

This *Reference Guide* uses the term *PPP* to describe the wide range of contract types, regardless of the terminology in any specific country or jurisdiction. While PPP contracts can be categorized using the parameters above, there is no consistent, international standard for naming and describing these different types of contract.

This varying terminology can create confusion when comparing international experience.

Some governments define PPP in their PPP policies or laws to mean a specific range of contract types, as described in *Section 2.1 - PPP Policy*. Other terms are sometimes used as synonyms for PPP, or refer to particular types of PPP—either in law or in common usage. For example:

- ♦ Brazilian law distinguishes between user-pays and government-pays projects—the Concessions Law governs PPP projects fully paid for by users; other PPP projects are governed by the PPP Law. Accordingly, only the latter are commonly referred to as PPPs. In France, the term *PPP* is restricted to government-pays contracts implemented under the PPP Law; user-pays contracts are referred to as *concessions*.
- ♦ In the United Kingdom, government-pays PPPs for new assets are known as *Private Finance Initiative* or *PFI projects*, while PPPs for existing assets (such as hospitals or railways) are sometimes known as *franchises*.
- ♦ In some jurisdictions, the term *concession* is used to refer to specific types of PPPs. For example, in Brazil, a concession is a fully user-pays PPP. In Chile, all PPPs are called *concessions* and implemented under the country’s Concessions Law.
- ♦ The process of entering into a PPP is sometimes referred to as *privatization*, or for the resulting assets to be termed *private*—

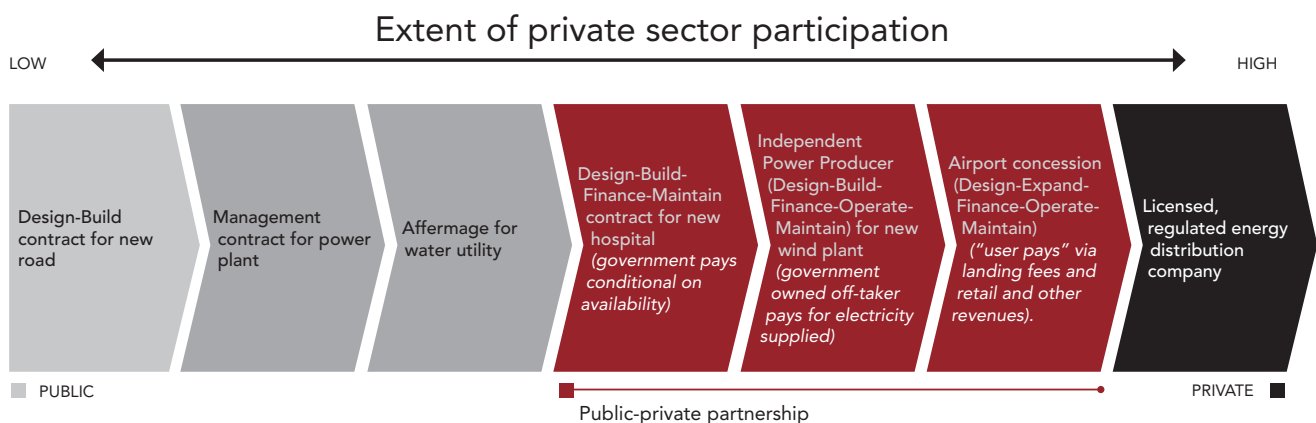
although this *Reference Guide* makes a distinction between PPP and privatization, as described further in the following section.

In some cases, PPPs are described by the functions transferred to the private party. For example, a Design-Build-Finance-Operate-Maintain, or DBFOM contract would allocate all those functions to the private party. Other nomenclatures such as Build-Operate-Transfer (BOT) focus instead on the legal ownership and control of assets.

The asset may be property of the public or private partner—usually decided by the legal constraints in place in any given country. The relevant factor for PPPs is not who the legal owner of an asset is, but who holds the economic rights to exploit that asset. The SPV may use an asset as collateral or simply use the flow of funds generated by the operation of the asset. Therefore, a BOT may not be significantly different from a BTO, in which transfer occurs immediately after construction. For example:

- ♦ In France, the roles governing the *domanialité* (defining the public domain) stipulate that the public domain can never be sold, seized by a tribunal, or subject to statutes of limitation. Consequently, the assets built on public land belong to the public authority, although the private partner in a PPP can be granted specific economic rights to those assets.
- ♦ In other countries, public land can be leased to private operators who built and own the asset on that land until its ownership is transferred to government at the end of the contract. The ownership is not significant for accounting and statistical

Figure 1.1 Examples of PPP Contract Types



purposes—IPSAS, the International Public Sector Accounting Standards, focuses on who controls the use of the infrastructure instead of who owns it to determine whether the asset should be consolidated on the government’s balance sheet.

- ♦ The **2016 Eurostat Guide to the Statistical Treatment of PPPs** (EPEC 2016) states that asset ownership does not influence statistical classification—but ownership of the asset following the expiration of the PPP contract may.

Table 1.1 - Infrastructure Contract Nomenclature explains common PPP terminology, and how each relates to the description by asset type, functions, and payment mechanisms described above.

The following resources provide more information on PPP contract types and nomenclature:

- ♦ **Delmon’s paper on understanding options for PPPs in infrastructure** (Delmon 2010) provides the most detailed discussion. Delmon classifies PPPs by five factors similar to the characteristics described above: (1) whether the PPP is a new or existing business or asset; (2) the responsibility of the private party for construction; (3) the level of private finance involved; (4) the nature of the project company’s service delivery obligations (bulk supply or retail level); and (5) the source of revenue stream.
- ♦ **Yescombe chapter “What are Public-Private Partnerships”** (Yescombe 2007) also describes the range of PPP structures and how these are classified.
- ♦ **Farquharson et al chapter “Defining Public-Private Partnerships”** (Farquharson et al. 2011, 9–14) focuses on how PPPs differ from privatization and management contracts; and describes user-fee and availability-based PPPs.
- ♦ **The World Bank explanatory notes on key topics in water sector regulation** (Groom et al. 2006, Note 4) describe common contract types for managing existing assets in the water sector: concession, lease or affermage, and management contracts.
- ♦ **The World Bank’s PPP in Infrastructure Resource Center website** (PPPIRC) describes a spectrum of PPP types based on the extent of private sector’s participation.

Section 3.3 - Structuring PPP Projects provides guidance and hyperlinks on PPP contract structures, and how governments can decide which to use for a particular project.

1.1.2 What PPP is Not: Other Types of Private Involvement

Besides defining the essence and the main features of PPPs, it is also helpful to clarify what they are *not*. This is useful to help us understand why the various features of the PPP model all contribute to generating efficient, affordable, and sustainable projects, and why deviation from the standard PPP model can cause project failure. This does not mean that projects and contracts developed as variants of the PPP model are not useful. On the contrary, they may be very useful in certain circumstances; however, often, when projects and contracts that are structured as a PPP fail, the cause(s) can be tracked to deviations from the defining characteristics of a PPP. This can be seen in the **UK Audit Office’s report on the failure of a PPP to upgrade London’s underground transportation infrastructure** (NAO 2009a).

Other types of contract for providing public assets and services

Governments enter into a wide range of contracts with private companies. Some of these contract types share some of the typical PPP characteristics—such as being long-term, output based, or performance-related—but they are not PPPs as defined above. For example, these include:

- ♦ **Management contracts** do not share the long-term characteristic of PPPs, the significant private capital investment, and the high level of responsibility for long-term performance brought by investment in infrastructure assets. However, they typically include similar performance indicators and requirements to PPPs. Performance incentives are created primarily through payment and penalties schemes. Being performance-based, they have a role to play where the private sector is not willing to invest, or where government is not willing to make a long-term commitment. The **World Bank’s explanatory notes on water regulation** (Groom et al. 2006, 36–42), for example, describe how management contracts are used in the water sector. Operations and Maintenance (O&M) and performance-based maintenance contracts may also fall outside the definition of PPP

where they are of short duration and lack substantial investment by the private operator.

- ◆ **Affermage contracts** are contracts under which a government delegates management of a public service to a private company in return for a specified fee. For example, in an affermage contract in the water sector, the remuneration of the operator is a fixed amount per cubic meter of water sold, although this amount can be adjusted over the years based on inflation and the operator’s performance. Affermage contracts also have no infrastructure investment by the private operator—again, they have been the solution when appetite for investment is low, or when government is able to invest and does not wish to transfer so much management responsibility to a private party.
- ◆ **Design-build or turnkey contracts** include similar output-based specifications; however, as shorter-term contracts that do not include maintenance or operation, they do not create the same long-term performance incentives as PPPs. For complex infrastructure, these contractual requirements in a design-build contract may not result in optimal design, allowing contractors to cut corners, leading to additional maintenance and operational costs. Design-build contracts are short-term contracts, with no long-term responsibilities allocated to the private party. They are commonly used for simple projects, or for projects where the performance is credibly expected to keep at the same level with proper maintenance, and therefore corner-cutting is not relevant.
- ◆ **Financial lease contracts** are long-term contracts for providing public assets. However, these contracts transfer significantly less risk to the private party than PPPs because government maintains a larger proportion of risk than it normally would in a PPP. Financial lease contracts do not transfer significant responsibility for management and performance to the private party. They are not expected to produce significant improvements in service performance, or to reach efficiency savings.

While the material in this *Reference Guide* focuses on PPP arrangements, the references provided in this *Guide* may also be useful for governments considering these related contractual arrangements; conversely, some references concerning these contract types may provide applicable lessons for PPPs. However, practitioners should bear in mind that differences in risk allocation will likely trigger

differences in bidding and operational behavior from the private party.

Other concepts of “public-private partnerships”

The expression *public-private partnership* is commonly used for several other types of arrangements between public and private entities—all of which differ significantly from the contracts we discuss in this *Reference Guide*.

A few examples of arrangements not covered in this *Guide*:

- ◆ Public-private partnerships for innovation—the U.S. Food and Drug Administration (FDA) and the University of Rochester initiated a so-called public-private partnership to improve pain treatment called Analgesic Clinical Trial Innovations, Opportunities, and Networks (ACTION) in 2011—this multiyear initiative aims to promote and accelerate the development of novel analgesics by identifying faults in the design of clinical trials.
- ◆ Public-private partnerships for environment protection—the petroleum industry has a long history of so-called public-private partnerships aimed at finding cooperative solutions to environmental, educational, and community issues—these partnerships are voluntary activities aimed at ensuring that oil and natural gas companies are perceived as an integral and contributing part of society and the communities in which the industry operates.
- ◆ Public-private partnerships for public health or against neglected diseases—in 2010, COTCO, the oil firm that operates the Chad-Cameroon pipeline in Cameroonian territory, initiated a so-called public-private partnership project to control malaria (a major public health problem in the area) along the pipeline corridor.
- ◆ Public-private partnerships for terrorism insurance—in the aftermath of the 9/11 attack, the Terrorism Risk Insurance Act, also known as TRIA, was approved, creating a so-called public-private partnership with the purpose of stabilizing the insurance market, ensuring that private terrorism coverage would be widely available and providing for an orderly recovery in the event of future catastrophic losses. Under the program, insurers would have to absorb significant losses—approximately \$30

billion in industry-wide deductibles—before the government would step in to provide additional coverage.

- ♦ Public-private partnerships against health care fraud—a voluntary, collaborative partnership between U.S. federal and state governments, private health insurance organizations, and health care anti-fraud groups designed to share information and best practices to improve fraud detection, prevent payment of fraudulent health care billings, and find and stop scams.
- ♦ Public-private partnership against terrorism—the United Nations Global Counter-Terrorism Strategy encourages “public-private partnerships”; the G8 launched a Global Forum for Partnerships between States and Businesses to Counter Terrorism (Moscow 2006) which resulted in the G8 Strategy for Partnerships between States and Businesses to Counter Terrorism.

This *Reference Guide* does not address these types of contracts. Their characteristics and properties are too different from the PPPs referred to in the *Guide*. In particular, they do not exhibit the link between high capital investment and strong performance commitments that we witness in the PPPs we are addressing—some of those agreements do not have significant capital investment, others do not have any kind of credible commitment on performance, but simply a commitment to apply an entity’s best efforts towards a certain goal.

1.1.3 How PPPs Are Used: Sectors and Services

PPPs have been used in a wide range of sectors to procure different kinds of assets and services. In all cases, the PPP project contributor contributes to the provision of public assets or services; and it involves long-life assets.

The definition of *public services* may vary across countries, and over time. The material presented in this *Reference Guide* is neutral to this definition; considering as a *public service* any service that the government considers its responsibility to provide or ensure is provided. The focus on long-term assets highlights the long-term nature of a PPP contract. PPPs generally involve fixed assets but projects may also include related long-life assets that are purpose or site-specific, such as train rolling stock. *Table 1.2 - PPPs by Sector—Examples and Resources* provides a few examples of the types

of assets and services that can be procured by PPPs together with some references providing more in-depth analysis on the range of worldwide experiences with PPPs.

Some countries focus their use of PPPs on certain sectors only, as described in *Section 2.1 - PPP Policy*. The rationale for such narrow focus can include the desire to support the government’s investment priorities; to improve service delivery; or give precedence to sectors in which PPPs are expected to be most successful.

Conversely, some countries define certain sectors or services within sectors, for which PPPs may not be used. These are sometimes called *core services*—that is, services that should be provided exclusively by government. The definition of core services varies across countries, depending on local preferences and perceptions. For example, in the healthcare sector in the United Kingdom, PPPs have been used to construct hospitals and provide ancillary services such as maintenance, but the core medical services remain publicly-run (McKee et al. 2006). On the other hand, in a PPP hospital project in Lesotho, the private operator provided the full range of health-care services ().

Useful resources providing cross-sector overviews of PPP experience in developing countries include:

- ♦ **Farquharson et al’s** book on PPPs in emerging markets (Farquharson et al. 2011) provides a broad range of case studies. These include a greenfield hospital in Mexico, an upgraded hospital in South Africa, a water concession in the Philippines, a water and electricity services concession in Gabon, a new metro line in Sao Paulo, Brazil, an airport expansion in Jordan, and a review of the PPP program in national highways in India.
- ♦ The **Uongozi Institute’s** case studies on PPPs in Sub-Saharan Africa (Yescombe 2017) present projects in the water, road, rail, energy, health, and accommodation sectors.
- ♦ The **Caribbean PPP Toolkit** (Caribbean 2017) includes references to projects in a broad range of sectors, utilizing various PPP models.
- ♦ **Yong’s chapter on PPPs in Commonwealth countries** (Yong 2010, 87–104) includes 11 case studies in the water, transport, power, and health sectors in Africa, Asia, and the Caribbean.

Table 1.2 PPPs by Sector—Examples and Resources

Sector	Project Types	Overview Sources
Transport	Roads, tunnels, and bridges Rail Mass transit systems Ports Airports	The USDOT Case Studies of Transportation PPPs (US 2007) reviews international PPP experience with PPPs in transport, including case studies on bridges and highways from the United Kingdom, Europe, Australia, China, India, Israel, and Argentina. Menzies and Mandri-Perrott’s publication on private sector participation in light rail (Menzies and Mandri-Perrott 2010, Annex 1) includes detailed case studies of PPPs for 12 light rail systems in the United Kingdom, Malaysia, the Philippines, Thailand, Canada, and South Africa.
Water and waste	Bulk water treatment Water distribution and sewerage systems Solid waste management services	Marin (Marin 2009) reviews in detail experience with PPPs for urban water utilities in developing countries, drawing from over 65 PPPs. An IFC report on lessons learned (IFC 2010) presents lessons from several water PPPs.
Power	Generation assets Distribution systems	Eberhard and Gratwick (Eberhard and Gratwick 2010) describes the experience with Independent Power Producers (IPP) in Sub-Saharan Africa. Eberhard et al (Eberhard et al. 2016) present five country cases in the same region. Eberhard et al (Eberhard et al. 2014) focuses on renewable energy IPPs in South Africa. Maria Vagliasindi (Vagliasindi 2013) examines power sector reforms that led to PPPs in China, Peru, Brazil, and Mexico. An IFC report on lessons learned (IFC 2010) presents lessons from several power PPPs.
Social and government infrastructure	Education—school facilities and services Health—hospitals and other health facilities and services Prisons Urban regeneration and social housing projects	A Deloitte report on how PPPs can help close the infrastructure gap (Deloitte 2006, 19–28) provides a helpful overview of PPP experience in a wide range of sectors, particularly social infrastructure. IFC’s Handshake (WB 2015c) publication presents examples and cases on health care and other economic and social infrastructure PPPs. LaRocque’s paper on contracting for the delivery of education services (LaRoque 2005) includes examples of PPPs in the education sector.

- ♦ A **paper by Farlam on PPP experience in Africa** (Farlam 2005) presents lessons learnt from eight PPP projects in the transport, prisons, telecommunications, water, power, and tourism sectors.
- ♦ The **World Bank’s review of lessons learned from Output-Based Aid projects** (Mumssen et al. 2010) summarizes the experience accumulated to date from infrastructure projects involving private sector participation and output based aid provisions—including PPPs—in the communications, roads, energy, water, health, and education sectors.
- ♦ The **Asian Development Bank’s scoping study on irrigation and drainage** (Varma et al. 2013) identifies the areas where private sector participation can be envisaged in consonance with India’s policy framework.
- ♦ The **World Bank Group’s Handshake** series (WB 2015c) comprises quarterly publications, each focusing on the use of PPPs in a different sector or context.
- ♦ The **PPIAF website** (PPIAF-Resources) includes reviews of PPP projects in several developing countries. For more information on how PPPs have been used in developed markets, see the **European Investment Bank’s European PPP reports** (DLA Piper 2009), which provide a detailed review of country experience and list of PPP projects throughout the region.

Key References: What is a PPP?

Reference	Description
Delmon, Jeffrey. 2010. "Understanding Options for Private-Partnership Partnerships in Infrastructure: Sorting out the forest from the trees: BOT, DBFO, DCMS, Concession, Lease...." Policy Research Working Paper 5173. Washington, DC: World Bank.	Describes in detail the different PPP contract types and nomenclature, and which also introduces a new classification of PPP contracts intended to clarify and facilitate comparison
Yescombe, E.R. 2007. <i>Public-Private Partnerships: Principles of Policy and Finance</i> . Oxford: Butterworth-Heinemann.	Chapter 1: "What are Public-Private Partnerships" describes the range of PPP structures and how these are classified.
Farlam, Peter. 2005. <i>Working Together: Assessing public-private partnerships in Africa</i> . NEPAD Policy Focus Series. Johannesburg: South African Institute of International Affairs.	Reviews PPP experience in Africa, with detailed case studies of eight projects in the transport, prisons, telecommunications, water, power, and tourism sectors.
Groom, Eric, Jonathan Halpern, and David Ehrhardt. 2006. "Explanatory Notes on Key Topics in the Regulation of Water and Sanitation Services." Water Supply and Sanitation Sector Board Discussion Paper 6. Washington, DC: World Bank.	Note 4: "Regulation and Private Sector Contracts" describes typical features of concession, lease, and management contracts in the water sector.
Yong, H.K., ed. 2010. <i>Public-Private Partnerships Policy and Practice: A Reference Guide</i> . London: Commonwealth Secretariat.	Section 7 reviews PPP experience in Commonwealth developing countries. Annex 5 presents case studies of 11 PPP projects, in the water, transport, power, and health sectors in Africa, Asia and the Caribbean.
Dobbs, Richard, Herbert Pohl, Diaan-Yi Lin, Jan Mischke, Nicklas Garemo, Jimmy Hexter, Stefan Matzinger, Robert Palter, and Rushad Nanavatty. 2013. <i>Infrastructure productivity: How to save \$1 trillion a year</i> . New York: McKinsey Global Institute.	Describes the deficit in infrastructure investments, and makes the case for improved project selection/management as well as more efficient usage of existing infrastructure.
Woetzel, Jonathan, Nicklas Garemo, Jan Mischke, Martin Hjerpe, and Robert Palter. 2016. <i>Bridging Global Infrastructure Gaps</i> . New York: McKinsey Global Institute.	Describes state of global infrastructure needs and opportunities to mitigate the spending deficit.
Farquharson, Edward, Clemencia Torres de Mästle, E. R. Yescombe, and Javier Encinas. 2011. <i>How to Engage with the Private Sector in Public-Private Partnerships in Emerging Markets</i> . Washington, DC: World Bank.	Chapter 2: "Defining Public-Private Partnerships" focuses on how PPPs differ from privatization and management contracts; and describes user-fee and availability-based PPPs. Several case studies throughout the book provide examples of PPPs in developing countries.
Mumssen, Yogita, Lars Johannes, and Geeta Kumar. 2010. <i>Output-Based Aid: Lessons Learned and Best Practices</i> . Directions in Development Finance. Washington, DC: World Bank.	Reviews experience with private participation in infrastructure projects supported by output-based aid, in the communications, roads, energy, water, health, and education sectors.
DLA Piper. 2009. <i>European PPP Report 2009</i> . London: DLA Piper.	Provides an overview of the status and direction of PPP in Europe, detailed reviews by country, and a list of projects in the pipeline and implementation in the report year.
US. 2007. <i>Case Studies of Transportation Public-Private Partnerships Around the World</i> . Washington, DC: United States Government, Department of Transportation, Federal Highway Administration.	Reviews international PPP experience with PPPs in transport, including case studies on bridges and highways from the United Kingdom, Europe, Australia, China, India, Israel, and Argentina.
Menzies, Iain, and Cledan Mandri-Perrott. 2010. "Private Sector Participation in Urban Rail: Getting the structure right." Gridlines Note No. 54. Washington, DC: Public-Private Infrastructure Advisory Facility.	Annex 1 provides case studies of light rail PPP projects from the United Kingdom, Malaysia, the Philippines, Thailand, Canada, and South Africa.
Marin, Philippe. 2009. <i>Public-Private Partnerships for Urban Water Utilities: A Review of Experience in Developing Countries</i> . Trends and Policy Options No. 8. Washington, DC: World Bank.	Reviews the experience of 65 PPPs in the water sector in developing countries, finding consistent improvements in efficiency and service quality.

Reference	Description
Eberhard, Anton, and Katharine Nawal Gratwick. 2010. <i>IPPs in Sub-Saharan Africa: Determinants of success</i> . Washington, DC: World Bank.	Reviews experiences of Independent Power Producers (IPP) in Sub-Saharan Africa, including a comprehensive list and details of all IPP projects in the region.
Deloitte. 2006. <i>Closing the Infrastructure Gap: The Role of Public-Private Partnerships</i> . New York: Deloitte.	Page 5 provides a succinct description of different PPP contract types. The report also briefly reviews international PPP experience in transport, water and waste, education, housing, hospitals, defense, and prisons.
IFC. 2011. "Health and PPPs." <i>Handshake, A Journal on Public-Private Partnerships</i> . Washington, DC: International Finance Corporation.	The issue on Healthcare examines international experience in healthcare PPPs, particularly in developing countries, and draws lessons for how successes can be replicated. Features the Lesotho Hospital PPP and reviews experience in Ghana, India, and Mexico.
LaRoque, Norman. 2005. "Contracting for the Delivery of Education Services: A Typology and International Examples." Paper presented at the PEPG and World Bank Conference, "Mobilizing the Private Sector for Public Education." Cambridge, MA, October 5-6.	Describes the different ways in which the private sector is engaged in education, including through PPPs. Pages 20–24 focus on international PPP experience in schools.
Yescombe, E.R. 2017. <i>PPPs in Sub-Saharan Africa: Case Studies for Policymakers</i> . Dar es Salaam, Tanzania: Uongozi Institute.	Presents ten case project studies examining the practical policy issues and lessons from each case.
Caribbean. 2017. <i>Caribbean PPP Toolkit</i> . Washington, DC: World Bank, Inter-American Development Bank and Caribbean Development Bank.	Each module presents several project examples and case studies illustrating best practices in the PPP project cycle.
APMG. 2016. Accessed March 19, 2017. <i>PPP Certification Program Guide</i> . In eight chapters. APMG-International. Website.	Chapter 1 Section 2 of the PPP Certification Guide discusses the definition of PPPs and the variety in interpretation that exists.
Reyes-Tagle, Gerardo, and Karl Garbacik. 2016. <i>Policymakers' Decisions on Public-Private Partnership Use: The Role of Institutions and Fiscal Constraints</i> . Washington, DC: Inter-American Development Bank.	Evaluates the criteria that governments utilize when deciding to procure a project using a PPP.

1.2 Infrastructure Challenges and How PPPs Can Help

Infrastructure is critical for economic development, reducing poverty and inequality, creating jobs, and ensuring environmental sustainability. Infrastructure generates high social returns and is welfare enhancing. Governments are ultimately responsible for the provision of public services and the infrastructure required for their delivery. Infrastructure investment is often part of the social compact between a government and its citizens.

Inadequate infrastructure is a constraint on growth and impacts quality of life, particularly in developing countries. When the demand for infrastructure services outstrips supply, congestion or service rationing occurs; the quality of service delivery is low or

unreliable, and some areas are simply not served. As of 2016, it was estimated that:

- ◆ Over 2.4 billion people lacked access to improved sanitation
- ◆ At least 663 million people lacked access to safe drinking water
- ◆ Over one billion people lived without access to electricity
- ◆ At least one-third of the world's rural population was not served by an all-weather road

Degradation of infrastructure also implies that actual economic growth will be lower than forecasts, as forecasting methodologies typically assume stable infrastructure performance.

Infrastructure investment poses pervasive challenges to governments. First, agency problems involving different actors and taking different forms throughout the project cycle require complex governance arrangements. The agency problems are compounded by the fact that infrastructure projects typically involve large sums of money and are therefore susceptible to corruption and bribery. For example, the politicians and public servants who decide on project selection and implementation as agents of taxpayers and users may be tempted to buy votes with the promise of new infrastructure, even if this means following unsustainable fiscal policies. Gains from the announcement of a project are immediate, whereas the pain will only be felt by electors long after they have cast their vote. Flaws in the incentive framework, and more generally, the rules governing agency problems throughout the project cycle, are a major reason why infrastructure projects often fail to meet their timeline, budget, and service delivery.

Second, most countries are not spending enough to provide the infrastructure needed to reach universal access and meet **the Sustainable Development Goals (SDGs)** (UN SDG) as defined by the United Nations. Moreover, the quality of infrastructure delivery is often disappointing—construction of new assets costs more and takes longer than expected, and service delivery is poor. Finally, infrastructure assets are often poorly maintained, increasing costs and reducing benefits. These issues are discussed further in the report on **Barriers to Infrastructure Service Delivery in Sub-Saharan Africa and South America by Castalia** (Castalia 2014).

How PPPs Can Help

PPPs can help overcome some of these pervasive challenges, as illustrated in *Figure 1.2 - The Challenges with Infrastructure and How PPPs Can Help*. For example:

- ◆ Under the right circumstances, PPPs can mobilize additional sources of funding and financing for infrastructure.
- ◆ By subjecting potential projects to the test of attracting private finance, PPPs can enhance project selection.
- ◆ The incentives of the private sector can be aligned with the interests of the contracting authority throughout the entire life cycle of the project, including the implementation phase. This alignment occurs by tying-in the private operator's revenue to a

set of pre-agreed performance indicators and by requiring the latter to invest significant, long-term capital.

Thus, the incentive framework embedded in PPP contracts can foster efficiency gains and those gains should outweigh the additional cost of private finance. When the decision to implement a PPP is based on the government's perceived inability to deliver the service by other means, the PPP route will at least ensure that the service is delivered—but at a higher cost than under efficiency conditions (see *Section 3.2.4 - Assessing Value for Money of the PPP*). The PPP may still be effective, though not efficient.

Countries with relatively long PPP histories have found that PPPs manage construction relatively better than traditional public procurement, with projects coming in on time and on budget more often. This is because of the incentives created by the PPP structure, which give the private party more control over project design and implementation while simultaneously preventing the reward of cost overruns.

The long-term investment horizon of PPP contracts can also help ensure that assets are maintained in a good, serviceable condition.

In fragile and conflict-affected states (FCS), PPP-like structures can help attract private investment and increase service delivery. This is discussed in greater detail in *Section 1.2.5 - Infrastructure in Fragile and Conflict-Affected States*.

The mechanisms by which PPPs can improve infrastructure delivery are often called *value drivers*—that is, instruments to maximize value for money. These value drivers—as described in *Box 1.2 - PPP Value Drivers* are often integrated into PPP policies.

PPP limitations, pitfalls, and complementary measures needed

There are problems that PPPs cannot solve, or that PPPs may exacerbate. First, PPPs may appear to relieve funding problems more than is the case, as government's fiscal commitments to PPPs can be unclear. This can lead to governments accepting higher fiscal commitments and risk under PPPs than would be consistent with prudent public financial management, particularly when PPPs are treated as off-balance sheet. While PPPs can contribute to better project analysis and adoption of innovative solutions that foster

Box 1.1 The Sustainable Development Goals and PPPs

World leaders gathered at the International Conference on Financing for Development in 2015 and adopted the 17 Sustainable Development Goals (SDGs) and related 169 targets. The 2030 Agenda for Sustainable Development and the Addis Ababa Action Agenda on Financing for Development (FfD) provide the framework for the SDGs. They are intended to galvanize policy makers across the world through concrete targets for the 2015–30 period for poverty reduction, food security, human health and education, climate change mitigation, the construction of resilient infrastructure, and a range of other objectives across the economic, social, and environmental spheres. The SDGs are ambitious—they will require a step change in the level of both public and private investment in all countries. Creative solutions are needed to mobilize private sector investment and innovation, and blend commercial financing with public funding.

The IISD blog on infrastructure's role in the SDGs highlights that infrastructure is both an explicit and implicit component of the SDGs' goals and targets. Hence, the SDGs may be useful in articulating and rallying support for infrastructure development policy. Goal 9: 'Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation' is particularly relevant. The Addis Ababa Action Agenda emphasizes in paragraph 44 the role of PPPs in support of the 2030 Agenda. Moreover, the SDGs may help clarify the goals, targets, and indicators around which a country will frame its development priorities, including the delivery of public services through PPPs.

Governments can use the SDGs as a framework to foster an enabling environment for infrastructure investment and set important targets to trigger changes in project selection and

design. To meet the SDGs, infrastructure investments must be prioritized based on their environmental, social and economic sustainability. The private sector needs to be incentivized in finding cost-efficient solutions to solve sustainable development challenges. Involving the private sector can help not only to increase the stock of infrastructure assets but also strengthen their resilience, create more sustainable solutions and improve access to infrastructure services. Incorporating sustainability considerations into procurement processes, through project specifications and award criteria, for example, can also enhance the impact of infrastructure investments. The SDGs can also help mobilize high-level political action behind an infrastructure project.

SDG targets often reflect the aims of a specific goal while also reaching across other goals and targets. Thus, a PPP project may address one primary goal and several secondary goals and targets. For example, when considering a potential water PPP, alignment with government strategy to achieve Goal 6 will strengthen the project; at the same time, the project may contribute to reducing the number of deaths and illnesses from hazardous water pollution (Target 3.9), and the proportion of untreated wastewater (Target 6.3). Upgrading an existing wastewater infrastructure should contribute to resource-use efficiency and adoption of environmentally sound technologies and industrial processes (Target 9.4).

Demonstrating infrastructure policy alignment with SDGs may also help governments attract attention and financing from multilateral development banks and funds.

Sources: (UN 2015); (Casier 2015)

efficiency, responsibility for planning and project selection remains primarily with the public sector—moreover, the unclear fiscal costs and contractual inflexibility of PPPs can render these tasks more delicate. The advantages of private sector participation in constructing and managing infrastructure, including improved incentives to carry out regular maintenance, also depend on effective PPP contracting and procurement by the government.

These limitations mean that **PPPs are not a panacea or a remedy for all** infrastructure performance problems. *Figure 1.2 - The Challenges with Infrastructure and How PPPs Can Help* highlights important ingredients for improved infrastructure delivery. Sound public decision-making based on comprehensive analysis and a

governance framework fostering transparency and accountability are prerequisites for successful public investment projects. Evidence suggests that improved management can reduce infrastructure shortfalls by making better use of existing infrastructure facilities and more efficient use of public resources on greenfield projects. Ultimately, many governments may need to commit more resources to deliver quality infrastructure projects.

The four problems with infrastructure project implementation shown in *Figure 1.2 - The Challenges with Infrastructure and How PPPs Can Help* will be described in this section as well as whether and how PPPs may be able to help, and PPP limitations or pitfalls that may exacerbate the problem.

Box 1.2 PPP Value Drivers

PPP value drivers are the mechanisms that can be used to improve value for money in infrastructure provision. They include the following:

- **Whole-of-life costing**—full integration, under the responsibility of one single party, of up-front design and construction with ongoing service delivery, operation, maintenance and refurbishment, can reduce project costs. Full integration incentivizes the responsible party to complete each project phase (design, build, operate, maintain) in a way that minimizes total costs and maximizes efficiency.
- **Risk transfer**—risk retained by the government in owning and operating infrastructure typically carries substantial, and often, unvalued, hidden cost. Allocating some of the risk to a private party which can better manage it, can reduce the project's overall cost to government and minimize risk to the taxpayer.
- **Upfront commitment to maintenance, and predictability and transparency of whole-of-life costs**—a PPP requires an upfront commitment by the private operator to the whole-of-life cost of providing adequate maintenance for the asset over its lifetime. This commitment strengthens budgetary predictability over the life of the infrastructure, and reduces the risks of funds not being available for maintenance after the project is constructed.
- **Focus on service delivery**—allows a contracting agency to enter into a long-term contract for services to be delivered when and as required. The PPP firm can then focus on service delivery without having to consider other objectives or

constraints typical in the public sector.

- **Innovation**—specifying outputs in a contract, rather than prescribing inputs, provides wider opportunity for innovation by the private partner. Competitive procurement of these contracts incentivizes bidders to develop innovative solutions for meeting these specifications.
- **Asset utilization**—optimizing the utilization of assets for delivery of additional services leading to multiple revenue streams for the project. For example, the utilization of space in bus terminals for private vendors or unused space for advertisements.
- **Mobilization of additional funding**—charging users for services can bring in more funding, and can sometimes be done better or more easily by private operators than the public sector. Additionally, PPPs can provide alternative sources of financing for infrastructure, where governments face financing constraints.
- **Accountability**—government payments are conditional on the private party providing the specified outputs at the agreed quality, quantity, and timeframe. If performance requirements are not met, service payments to the private sector party may be abated.

The Partnerships Victoria's Practitioner's Guide (VIC 2001) published in 2001 clearly set value drivers as the basis for the State of Victoria, Australia's PPP program. PricewaterhouseCoopers (PWC)'s paper on the "PPP promise" (PWC 2005, 13–34) and Deloitte's paper on PPPs (Deloitte 2006, 5–9) both succinctly describe these benefits of PPPs.

1.2.1 Insufficient Funds

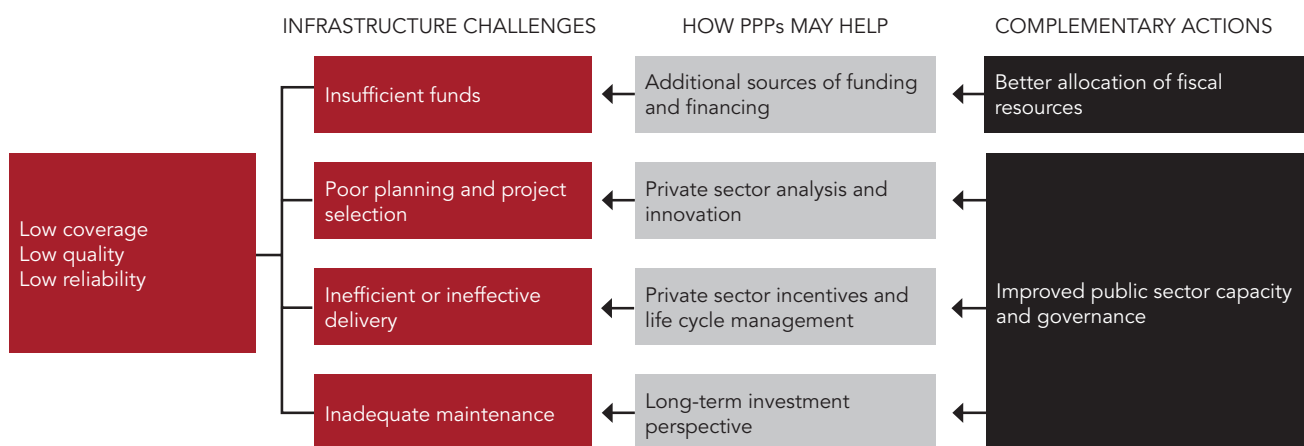
Infrastructure investment is typically under-funded—that is, most countries are not investing enough to meet strategic objectives, such as universal access or poverty eradication. This suggests that many economically beneficial projects are not being implemented.

This problem is particularly prevalent in developing countries, as noted in the **World Bank report: Closing the Infrastructure Gap** (UN 2016).

Various studies have identified and tried to quantify this funding gap, for example:

- ♦ In 2010, the **World Bank's diagnostic study of infrastructure in Africa** estimated that Sub-Saharan Africa needed to spend \$93 billion a year on infrastructure, of which only \$45 billion was already being met through existing sources—such as government spending, user charges, private sector investment, and other external sources—creating a total funding gap of \$48 billion (Foster and Briceño-Garmendia 2010, 6–9, and 65–86).

Figure 1.2 The Challenges with Infrastructure and How PPPs Can Help



- ◆ According to the **2013 Inter-American Development Bank's infrastructure strategy**, the additional investment needed in infrastructure in Latin America amounted to \$100 billion per year—two percent of regional GDP over an extended period (IDB 2014).
- ◆ This funding gap is not unique to developing countries—a **2007 OECD report on Infrastructure to 2030** identified a widening gap between the infrastructure investment needed for the future and the capacity of the public sector to meet those requirements from traditional sources (OECD 2007a, Chapter 1).
- ◆ **2013 McKinsey Global Institute report on infrastructure productivity** (Dobbs et al. 2013) estimated \$57 trillion (updated to \$49 trillion in 2016) in infrastructure investment would be globally required until 2030—simply to keep up with projected global GDP growth. The amount required for investment is more than the estimated value of today's worldwide infrastructure stock.
- ◆ The **2016 McKinsey Global Institute report: Bridging Global Infrastructure Gaps** (Woetzel et al. 2016) updates data on global infrastructure needs and provides a look at infrastructure investment trends since the global recession. The report also outlines opportunities to alleviate the spending deficit from

increased productivity to actions that can help increase public finance despite fiscal constraints.

As noted in the **World Bank Africa infrastructure diagnostic study** (Foster and Briceño-Garmendia 2010, 65–86) referenced above, the funding gap can be a symptom of other problems in infrastructure delivery. The authors found that \$17 billion, or 35 percent of the funding gap, could be attributed to inefficiency in existing spending due to poor governance, poor planning of investments, under-investment in maintenance, under-charging for services, and operating inefficiencies.

How PPPs can help—infrastructure funding and finance

Many governments turn to PPPs because they recognize that more investment in infrastructure is needed to meet their strategic objectives, but face fiscal constraints or high gearing ratios that limit their ability to undertake additional projects through traditional public procurement. Although fiscal space is one of the most common motivations for using PPPs, it is also among the most debated. The extent to which PPPs genuinely enable governments to increase spending on infrastructure depends on the nature of the project in question. User-pays contracts create long-term fiscal space for the government, while contracts that include availability payments create fiscal space only in the short-term.

Governments often call for private **financing** for infrastructure projects, ignoring the need for sufficient **funding** (from user fees or government budgets) for serving private operator debts and rewarding equity holders. Some development analysts refer to a funding gap instead of a financing gap for infrastructure—private capital will not flow into projects that do not present adequate potential returns. Obtaining additional private finance will always require increased funding over time, to recover and remunerate that private finance—PPP operators may help generate additional commercial revenue, but user fees and government payments will always be the main source of funding.

In general, there is scope to increase funding streams for public infrastructure projects by modeling user charges where appropriate, capturing property value, or selling existing assets. The proceeds from the sale of assets can also be recycled for financing new infrastructure.

The possibility of collecting user fees should not be, by itself, the reason for establishing a PPP—fees may also be collected in publicly-financed projects, as happens in many toll roads around the world. Nevertheless, PPPs can sometimes help **increase the funding available for infrastructure**—that is, bring in more revenue to pay for infrastructure services, including:

- ♦ **Increased revenue from better implementation of user fees** by introducing targeted user charges, or reducing leakage in the collection of charges. For example:
 - The N4 Toll Road in Mozambique and South Africa was developed as a toll road under a PPP, since neither government had the funds to invest otherwise. A single cross-border operator allows for cross-subsidization from the South African side to the Mozambican side, making tolls affordable for users; the PPP model has created pressure for operators to maintain the road, serving users, and for governments to prevent overloading (Farlam 2005, 9–10), and (PPIAF 2009).
 - The Fertagus suburban rail service in Lisbon, Portugal provides an example on the role of PPPs in increasing revenues. The PPP contract does not require the operator to charge specific user fees. The operator is simply contractually bound by a cap on the average fee per passenger per kilometer. This means that it is free to use commercial criteria in establishing a range of rates within the cap, such as providing off-peak

discounts, passes for frequent users, combinations of train and bus tickets, and even special off-peak passes for unemployed persons. In practice, this freedom, allied to commercial expertise, attracts a larger pool of users, increasing project revenue.

- ♦ **New revenue streams from greater asset utilization**—raising revenues from alternative uses for infrastructure assets can reduce the net cost of the infrastructure to government or users. For example, developing a commercial area inside of an airport, or even a bus terminal. Typically, the private partners have a greater ability to identify and utilize assets and increase project affordability.
- ♦ **Customizing projects to maximize user utility and increase cost recovery**—Private partners may adapt a project design to improve asset utility to users. As users receive additional value from the asset, they are more willing to contribute toward cost recovery. Fertagus rail service, in Portugal, is a good example of this innovative approach—by combining the rail transportation project with a bus transportation network in the neighborhood of each station, together with parking facilities at each station, the PPP operator was able to convert the project into a profitable commercial venture, eliminating the previous need for government subsidization.

Governments can also implement user charges, collect revenues effectively, or find innovative alternative uses for infrastructure—as described in **Engel, Fischer, and Galetovic’s paper** *PPPs: When and How* (Engel et al. 2009, 7–13) and in their book (Engel et al. 2014). PPPs therefore do not increase the resources available for infrastructure over the alternative of traditional government provision if users are charged the same for the service and those charges are collected. However, the authors note that governments can sometimes find it difficult to charge users a cost-reflective tariff for publicly-provided services.

The availability of private funds to invest in PPP projects should not be a reason for implementing a PPP—the decision should involve a cost/benefit, value-for-money assessment of the PPP, as described in *Section 3.2.4 - Assessing Value for Money of the PPP*. The cost of transferring risk and responsibility to a private party may be too high, considering alternative implementation modes. Investors’ interest should be directed to those projects where the impact on service delivery and value to society will be the highest.

Box 1.3 Funding versus Financing

The terms funding and financing are often used synonymously, however, there is a technical distinction that is important to understand:

Financing: Money required at project outset to begin implementation, primarily for asset construction

Funding: Money required to meet repayment obligations and remunerate the project financiers, namely debt and equity holders

In many languages, the same word is used for financing and funding. For example: *financiamento* in Spanish and Portuguese, *financement* in French.

Some governments use PPPs as a financing mechanism to **overcome short-term cash budget constraints** by spreading the capital cost of a project over its lifetime. Governments implementing cash-based accounting systems only recognize an expenditure when it is incurred. Thus, the capital costs of traditionally procured infrastructure are charged as expenditure when the construction payments take place (typically two to three years), even if the asset is financed by borrowing. PPPs, by contrast, create cash outflows over a long period of time. A **PWC paper on PPPs** (PWC 2005, 17–19) illustrates how the payment profile for a PPP differs from that of a traditionally-financed project. This practice can enable governments facing short-term cash budget constraints to undertake infrastructure investment sooner. The accounting advantage for PPPs disappears under a full accrual accounting system, in which capital investments are depreciated over time.

Finally, PPPs may be able to help governments **overcome public sector borrowing constraints**. Governments often face a borrowing constraint which may arise from prudent public financial management policies or contractual obligations with multilateral institutions. This constraint may prevent commercially viable, fully user-pays infrastructure projects to be implemented in the public sector. Under a PPP, the project is financed by private sector rather than public sector borrowing and in some circumstances this may enable a government to overcome its borrowing constraint (although as noted in *Section 2.4 - Public Financial Management Frameworks for PPPs*, such projects typically create contingent li-

abilities that may also affect the sustainability of the government's debt and fiscal position).

Engel, Fischer, and Galetovic's paper (Engel et al. 2009, 9) suggests the extent to which PPPs can help relieve borrowing constraints depends on the nature of the constraint. PPPs can help relieve short-term liquidity constraints, enabling commercially viable user-pays PPPs to be built. Engel, Fischer, and Galetovic argue, however, that PPPs are less likely to help when a government is considered insolvent—in this case, it may be difficult for the government to credibly enter into a long-term contract giving up a potential source of future revenue. So a PPP may not be considered viable by investors. On the other hand, in a **2011 paper on Chile's PPP Experience** (Fischer 2011, 17–18, and 27–28), Fischer describes how multilaterals' involvement in a PPP can improve the credibility of the government's commitment to the contract—increasing the potential of PPP to help governments overcome debt constraints.

The extent to which using PPP can enable governments to overcome borrowing constraints also depends on how the PPP is accounted for. As described in *Section 2.4.4 - Fiscal Accounting and Reporting for PPPs*, while international norms and standards continue to evolve, PPP assets and liabilities are increasingly recognized in the government's accounts and financial statistics. If this trend is confirmed, financing of PPPs will become subject to the same accounting constraints as public borrowing for infrastructure projects—effectiveness and efficiency will then be the sole reasons for utilizing PPPs.

PPP pitfalls—using PPPs to bypass public financial management controls

While there are some instances in which PPPs can increase the fiscal space available for infrastructure, in practice these are limited. In the case of **government-pays PPP projects**, the cost of the infrastructure is ultimately met from the public purse. For a given project, the stream of availability payments under a PPP is not very different from the repayment schedule of a debt-financed public procurement scheme.

Absent real efficiency gains, this means the apparent fiscal advantages of PPP arise from accounting quirks—the limitations of cash budgeting, or the definition of public sector debt. At best, this can create budgeting issues; at worst, it can enable governments to use

PPP to bypass their own prudent public borrowing and budget limits—creating a temptation to spend more now, in response to political and other pressures to deliver new and improved infrastructure.

Abrantes de Sousa’s paper on Portugal’s PPP experience (Sousa 2011) describes how inadequate control of the PPP process allowed the Government of Portugal to take on significant fiscal exposure to its PPP contracts, contributing to its 2011 fiscal crisis. Abrantes de Sousa describes how the PPP program has created budget problems, and highlights the incentives faced by agencies to use PPPs simply to loosen budget constraints. The United Kingdom’s Private Finance Initiative (PFI—a large British PPP program) has also come under criticism for concealing the cost of the government’s obligations. **A United Kingdom House of Lords Select Committee inquiry into PFI** (UK 2009, 16–18) found that many witnesses imputed the choice to use PFI to the fact that the government’s commitments under these contracts were often not recognized as part of public debt.

Recognizing these challenges, the treatment of PPP in public sector accounts has evolved over time. The latest public sector accounting standards require most PPP assets and liabilities to be included in government balance sheets, as described in *Section 2.4 - Public Financial Management Frameworks for PPPs*. However, at the time a PPP project is approved, the future payment commitments may still not be included in budgets and expenditure plans, which often do not look more than one to three years ahead. *Section 2.4 - Public Financial Management Frameworks for PPPs* provides guidance on how governments can manage the fiscal implications of PPPs to help avoid these problems.

PPP pitfalls—fiscal risk

Even where a PPP is expected to generate additional resources—for example, by charging users for services—governments typically bear or share certain project risks. For example, governments may provide guarantees on risk factors such as demand, exchange rates, or certain costs; while PPP contracts often contain compensation clauses in case of termination of the agreement for a range of reasons. Even with no guarantees, every PPP contract will present implicit contingent liabilities. For instance, liabilities arising from the need to preserve the project in case of SPV bankruptcy, or resulting

from public expectations that must be satisfied. In addition, moral hazard may occur if the private investors perceive that the government cannot afford to let their PPP project fail. They may then force a renegotiation of the PPP contract to obtain a tariff revision or to force the government to shoulder the cost of an unexpected event, even though the general economic equilibrium of the contract is not in jeopardy.

Accepting these risks could be consistent with good risk allocation, as described in *Section 3.3 - Structuring PPP Projects*. However, doing so creates contingent liabilities for government—the cost of which can be harder to assess than the direct liabilities and upfront capital costs created by a traditional government investment project. As a result, governments often take on significantly more fiscal risk under PPP projects than they had expected, or than would be consistent with prudent fiscal management.

Fiscal risk can be compounded by the influence of optimism bias on project decision-making (see *Section 1.2.2 - Poor Planning and Project Selection*). For example, a government may agree to provide a demand guarantee for a project, as optimistic forecasts may suggest it has no cost. Contracting authorities can also have an incentive to overestimate demand to hide the need for subsidies and push through projects that are not viable. The cumulative impact over several PPP projects can create substantial fiscal risk. Moreover, public resources may go into projects that do not provide value for money, as costs turn out to be higher or benefits lower than initially expected.

All this may be exacerbated in contexts of poor fiscal transparency. Partial disclosure on the state of public finances may create distortions—for instance, disclosure of direct commitments, but not of contingent liabilities, may incentivize the adoption of costly projects, with low base-costs and very high contingent commitments.

Irwin’s book on government guarantees (Irwin 2007, Chapters 2 and 3) provides examples of how guarantees have been used, in some cases creating large exposure for the government, and describes some of the reasons governments make bad decisions regarding guarantees.

As noted above, in addition to the government’s explicit liabilities such as guarantees, PPPs can give rise to implicit liabilities—that is,

non-contractual liabilities that arise from moral obligation or public expectations for government intervention—that create further fiscal risk—see (Polackova 1998). Weak contracts and ineffective enforcement can mean that governments fail to really achieve risk transfer to the private sector. Again, this means that governments end up bearing significantly more risk than they had expected when projects were initially implemented.

Box 1.4 - Excessive Fiscal Risk—Examples from Colombia, Korea, Mexico, United Kingdom provides examples of PPPs for which the government ended up making large, unexpected payments, either as a result of called guarantees (i.e. guarantees which resulted in a claim) or realization of implicit liabilities.

Box 1.4 Excessive Fiscal Risk—Examples from Colombia, Korea, Mexico, United Kingdom

Governments often provide guarantees to PPP projects, which often cost more than expected. For example:

- In the 1990s, the Government of Colombia guaranteed revenue on toll roads and an airport, as well as payments by utilities that entered long-term power purchase agreements with independent power producers. Lower-than-expected demand and other problems required the government to make payments of \$2 billion by 2005.
- Also in the 1990s, the South Korean government guaranteed 90 percent of forecast revenue for 20 years on a privately financed road linking the capital, Seoul, to a new airport at Incheon. When the road opened, traffic revenue turned out to be less than half the forecast. The government has had to pay tens of millions of dollars every year.

PPP projects can also create substantial implicit liabilities for governments. When PPP projects are financially distressed, governments can be under significant pressure to bail them out to avoid disruptions in service. For example:

- Between 1989 and 1994, Mexico embarked on an ambitious road building program, awarding more than 50 concessions for 5,500 km of toll roads. The concessions were highly leveraged because equity contributions were made in the form of “sweat

1.2.2 Poor Planning and Project Selection

Scarce resources are too often spent on poorly-selected projects that fail to achieve benefits commensurate with their cost. The result can be under-used assets and poor service delivery at a higher cost than necessary. These systematic problems result from:

- ♦ **Poor planning and coordination**—good sector and cross-sector planning and coordination are needed to ensure that the best projects—those that represent good value for money, enable integrated regional development, and provide customers with the services they desire—are consistently selected. Without

equity” for the construction instead of in cash. Debt financing for the projects was on a floating-rate basis and provided by local banks—many of them government-owned—which might have faced government pressure to lend. By 1997, a combination of lower-than-forecast traffic volumes and interest rate rises pushed the government to restructure the entire toll road program and bailout the concessions. In total, the government took over 25 concessions and assumed \$7.7 billion in debt.

- The United Kingdom National Air Traffic Services (NATS) was partially privatized, to separate the air traffic control functions from the Civil Aviation Authority. Under a PPP arrangement, NATS was to be paid a fee based on airline traffic volumes. The PPP company took on considerable debt for its investments and operations. After the 9/11 attacks, airline traffic fell below forecasts and the company was in danger of not meeting its debt obligations. To reduce the perceived risk of a disruption in service, the United Kingdom government injected £100 million of equity into the project company.

Sources: (Irwin 2007); (Kim et al. 2011); (Ehrhardt and Irwin 2004)

sound plans, responsible agencies will not have the full view of potential projects that could be implemented, will not know the sequence in which to implement the projects to achieve the best value for money, and cross-sector coordination will be weak. *Box 1.5 - Mumbai Water—Example of Poor Planning in Infrastructure* provides an example of how weak infrastructure planning can mean projects fail to achieve value for money. **The 2016 McKinsey report on infrastructure investment** (Woetzel et al. 2016) identifies \$49 trillion required globally between 2016 and 2030 to approach fulfilling infrastructure needs. **The 2013 McKinsey Report on infrastructure productivity** (Dobbs et al. 2013) notes that scaling up best practice could save an average of \$1 trillion a year in infrastructure costs during that period.

♦ **Flawed analysis**—the analysis underpinning project selection is often flawed, so projects that appeared to be cost-benefit justified turn out not to be so in practice. Benefits are often over-estimated, resulting in projects that are larger or more complex than is justified by demand for services, while costs are often under-estimated. The **United Kingdom Government’s Green Book on project assessment** (UK 2011a, 29–30) acknowledges this as a systematic problem and highlights the need to correct for optimism bias in project analysis. **UK Treasury supplementary guidance on optimism bias** (UK 2015a) presented evidence on the extent of optimism bias dating from the early 2000s. A global series of studies of large transport projects by **Flyvbjerg**—(Flyvbjerg et al. 2002); (Flyvbjerg et al. 2003); (Flyvbjerg 2005); (Flyvbjerg et al. 2005)—found that costs are systematically underestimated, and benefits often overestimated:

- A study of 258 transport projects found that actual costs were on average 28 percent higher than planned costs—and 65 percent higher on average for projects outside Europe and North America.
- A study of 25 rail projects found traffic was heavily overestimated, at over twice actual traffic, on average. The accuracy of traffic forecasts for 183 road projects was also found to be highly variable, but without a tendency to overestimate.

Additional evidence and analysis on estimation bias is presented in **Australia’s report on overbidding for toll roads** (AU 2012).

- **Politics or personal gain** interfering with the project selection process; increasing costs, or diverting funds to less beneficial projects. An **IMF analysis of corruption in public investment in infrastructure** (Tanzi and Davoodi 1998) found corruption tends to create a bias towards capital spending projects, and increase their size and complexity—reducing the productivity of that investment.

The **IMF report on infrastructure efficiency** (IMF 2015a), focusing on the quality of investment, instead of its volume, identified average inefficiencies in public investment processes of around 30 percent across countries, according to their estimates, better public investment management could increase investment expenditure by as much as two-thirds of the estimated additional needs.

These factors often feed into each other. For example, weak analysis or poor planning can enable badly-chosen projects to be pushed through for political or personal gain, as described in the **World Bank’s sourcebook on deterring corruption in the water sector** (WB 2008, Chapter 6). **Flyvbjerg’s studies** (Flyvbjerg 2005) also emphasize that costs and benefits can be deliberately misrepresented, to push through projects for political or organizational reasons.

How PPPs can help—project assessment and design

Under the right circumstances, PPPs can help improve infrastructure project selection, by harnessing the analysis and ideas of private sector investors, whose financial returns depend on getting cost and revenue forecasts right.

Private investors and lenders undertake their own project analysis based on their experience and strong, profit-driven incentive to assess benefits and costs. Lenders to project finance transactions, in particular, carry out extensive project due diligence, as described in *Section 1.3 - How PPPs Are Financed*. A 2002 **Standard and Poor’s study** (Bain and Wilkins 2002) found that traffic forecasts for toll roads commissioned by banks tended to be less optimistic than those commissioned by other agencies, including developers and governments, although still biased on average. Guarantees on the debt of the private party, or lax termination payments, may reduce lenders’ due diligence efforts, therefore reducing this relevant source of value for the public sector.

The PPP tender process can therefore act as a filter for non-viable projects. As described by **Engel, Fischer, and Galetovic** (Engel et al. 2009), if the private sector sponsor and lenders are asked to shoulder revenue and cost risks under a PPP, a non-viable project may simply not attract private interest. For example, a **McKinsey report on infrastructure challenges in India** (Gupta et al. 2009, 25–27) notes that several of the National Highways Authority of India (NHAI)'s toll road projects did not attract bidders—in some cases demand forecasts were too high; in others, bidders found NHAI's cost estimates to be low, and the project not viable on more conservative cost assumptions. Conversely, **Engel, Fischer and Galetovic** (Engel et al. 2009) note that if the government is bearing a risk—for example, by providing a demand guarantee—then a non-viable project could still be profitable for the private partner, reducing the filtering ability of PPPs.

Experienced private companies can also be well-placed to identify infrastructure needs, and come up with innovative ideas to meet them. Accepting unsolicited proposals for PPP projects from private companies can be a way to capitalize on these ideas. While unsolicited proposals can be a useful source of ideas to improve project selection, they need to be subject to the same analysis and competitive procurement as other major government investments. *Section 3.7 - Dealing with Unsolicited Proposals* describes how some governments have introduced policies to encourage unsolicited proposals, while subjecting them to rigorous analysis and competition.

PPP limitations and pitfalls—poor planning and project selection

While the PPP process can provide more information and additional analysis to inform project selection, the government remains responsible for choosing which projects to implement and which procurement method to use. This limits the extent to which PPPs can help improve project selection. Indeed, PPPs may even distort investment priorities—low priority projects may go ahead simply because they are easier to do.

Foremost, PPPs do little to improve planning. Where PPP projects initiate from government, private companies can only respond by avoiding projects that do not appear viable, as described above. By then, considerable time and resources have already been invested in the planning phase. Where PPP ideas are generated by private investors, the projects may not be aligned with the government's

Box 1.5 Mumbai Water—Example of Poor Planning in Infrastructure

The experience of the Municipal Corporation of Greater Mumbai provides an example of weak planning in the water sector. The Corporation was looking for ways to improve the efficiency of its operations. Mumbai is short of water, with supply rationed to around four to six hours a day in most parts of the city. Corporation planners were working on new schemes to transport water from hundreds of kilometers outside the city. Consultants engaged through the World Bank analyzed the cost of achieving a 24-hour water supply in one ward (K-East) entirely with new supply, and compared this with the cost of achieving 24-hour water supply through improving the distribution system to reduce leakage and theft. The consultants estimated that the cost of distribution improvements would be one sixth or less of the cost of bulk supply increments, for the same level of service improvements. The size of the discrepancy suggests that the Municipal Corporations' planning had been biased toward large projects.

Source: (Kulkarni 2008)

investment priorities and the unsolicited proposal may exacerbate weaknesses in planning and coordination between sectors or across regional boundaries. Also, in generating project ideas, private firms focus in those that are financially viable, but may not propose economically beneficial projects that would require government contributions.

If a PPP program is not well designed, the inflexibility of resulting PPP contracts may create sector planning challenges. As described in the **United Kingdom House of Lords' review of the PPP program** (UK 2009, 28–29), PPP projects constitute a long-term commitment, which can be expensive to change if needs change (or were misunderstood in the first place). Although changes in traditional public procurement also imply added costs, these are typically lower than under a PPP, since the absence of long-term contractual commitments allows easier recourse to the market and competitive pressure.

There are limitations on the extent to which PPPs can improve project analysis. First, the private sector is not immune to optimism bias. The **Standard & Poor's (S&P's)** (Bain and Wilkins 2002) analysis mentioned above shows lenders make more realistic assumptions

Table 1.3 Comparing PPP and Public Procurement in Australia

Source	Comparison	Average Over Budget (% of original cost estimate)		Average Time Overrun (% of original time estimate)	
		PPP	Public	PPP	Public
Infrastructure Partnerships Australia, 2007 (Duffield and Raisbeck 2007)	Original approval to final	12	35	13	26
	Contract to final	1	15	-3	24
Duffield review of PPP performance, 2008 (Duffield 2008)	Original announcement to final	24	52	17	15
	Budget approval to final	8	20	12	18
	Contract to final	4	18	1.4	26

than public agencies—nonetheless they still overestimate traffic forecasts. The more conservative traffic forecasts commissioned by banks still overestimate traffic by almost 20 percent—see (Bain and Polakovic 2005). In **Spain** (Vassallo et al. 2012), traffic estimates by concessionaires that were awarded several PPP toll road contracts have proven to be even more optimistic—revenue generated by the companies could barely cover the interest of the outstanding debt.

Secondly, where the private party to a PPP is not bearing traffic risk, or other project risks, the incentive for rigorous analysis is weaker. PPP structures can even weaken government incentives for rigorous analysis, by obscuring the costs and risks the government bears (see the pitfalls described under *Section 1.2.1 - Insufficient Funds*).

Finally, PPPs can provide an opportunity for corruption, which may bias project selection. Where project selection is not based on analysis but rather influenced by corruption or pursuit of political gain, PPPs are also likely to be affected. Guidance on assessing corruption risk, and mitigating it, is provided in a series of **World Bank sourcebooks on governance in the water** (WB 2008), **electricity** (WB 2009b), and **roads** (WB 2009c) **sectors**. Lack of a proper Public Investment Management system, as well as the existence of a parallel selection process exclusively for PPPs, create additional opportunities for mismanagement and corruption—**Anand Rajaram et al's book on the power of Public Investment Management**

(Rajaram et al. 2014) presents good practices in this field, and includes a chapter on PPPs (Chapter 7).

The policies and processes presented in *Module 2 - Establishing the PPP Framework* and *Module 3 - PPP Cycle* of this *Reference Guide*, and in the references listed, can help governments avoid the planning and project selection challenges that can undermine the effectiveness of PPP projects.

1.2.3 Weak Management

A common rationale for involving the private sector in infrastructure provision is that the private sector is more efficient and effective at managing infrastructure construction projects, and at managing service delivery once the assets are in place.

The quality of infrastructure service delivery by government entities is often constrained by limited capacity and weak management incentives. Training, retaining, and leading qualified professionals is often harder in the public sector. This increases the cost of infrastructure. For example, the **World Bank's Africa infrastructure diagnostic study** (IMF and WB 2016, 71–74) estimates that inefficiencies in state-owned utilities and infrastructure providers in Sub-Saharan Africa cost around \$6 billion a year. It also reduces the benefits users get from the service.

Studies comparing PPPs and publicly-procured or run infrastructure have found that PPPs can achieve better results in both construction of new infrastructure assets, and in infrastructure service delivery. Still, achieving these benefits, and ensuring they translate into lower infrastructure costs for taxpayers and users, depends on the government structuring, procuring, and implementing the PPP effectively; and could be undermined where weak government or private sector capacity results in poorly-run tender processes or poorly drafted contracts, and frequent renegotiation.

How PPPs can help—improved construction of new assets

PPPs have been found to reduce construction time and cost overruns for new infrastructure assets compared to traditional public procurement.

Evidence suggests that the proportion of PPP projects coming in over budget or late is lower than in traditionally-procured projects. In Australia, two studies have broken down the project development process to allow more detailed comparison. As evidenced in *Table 1.3 - Comparing PPP and Public Procurement in Australia*, PPPs consistently performed better in achieving lower project cost overruns. Comparing the timing of project delivery, both PPPs and traditionally-procured projects both took longer than expected. These studies support the claim that the cost estimates embedded in PPP contracts tend to be more accurate than those prepared for traditional procurement. However, they are inconclusive on whether the PPPs projects are necessarily more economical than traditionally procured projects. The studies suggest delays occur at different stages of the process. The complex contracting process means PPPs can experience delay at an earlier stage in the process, but tend to come in on time once contracted. Publicly-procured projects may be contracted more quickly, but this is more than offset, on average, by delays in implementation.

Some practitioners suggest that government agencies engaging in PPP procurement are improving their overall practices by focusing on whole-life cost and benefits. According to the **House of Lords' review of the PPP program** (UK 2009, 19–20), improvements in public procurement in the United Kingdom may be narrowing the gap with PPPs.

Construction companies interviewed by the United Kingdom National Audit Office indicated that PPPs “impose a greater discipline” on project cost. This is because PPPs usually do not allow for contract modification due to changes in costs, and private financiers have greater scrutiny over the specifications of the project. That is, private companies' returns on a PPP depend on completing the project on time and on budget—creating stronger incentives than under public procurement, where changes to project cost are often at the expense of the contracting authority. In turn, this means private companies make more careful and conservative estimates of costs in the first place, helping reduce the optimism bias described in *Section 1.2.2 - Poor Planning and Project Selection*.

How PPPs can help—improved service delivery and management

There have been relatively few studies on the impact of private sector participation on infrastructure operation. Nonetheless, available evidence suggests that private sector participation can improve service delivery and management efficiency, compared to government-run infrastructure services.

For example, a **comprehensive 2009 World Bank study** (Gassner et al. 2009) analyzed the effect of introducing private sector participation through concessions or full privatization of utilities. The study used econometric analysis to assess performance of over 1,200 water and electricity utilities, in 71 developing and transition countries. The study found significant efficiency gains when private sector participation was introduced—including reduced water losses and increased staff efficiency. These gains came alongside improvements in service delivery, with increased coverage and daily hours of service. A study by **Marin of private participation in urban water utilities** (Marin 2009), also in 2009, analyzed the performance of 65 large water PPPs and similar contracts (including management contracts) in developing countries worldwide. Marin also found that introducing a private operator consistently improved operational efficiency and service quality.

The **Transportation Research Board's report on highway life-cycle costs** (Flannery et al. 2016) discusses life-cycle cost analysis for highways and presents the approaches utilized by government agencies and PPP bidders/operators.

Box 1.6 When PPPs fail—The case of the 1993 water concession in Buenos Aires

In the 1990s Argentina implemented a major concessions program in the water sector. Water and sanitation concession agreements with private operators were signed in 28 percent of the country's municipalities covering 60 percent of the population. The more widely-known contract was the concession for public water and sewerage services for Greater Buenos Aires, signed in 1993 with a consortium led by the French firm Suez. The concession soon showed positive results—labor productivity almost tripled, service coverage increased, reliability and responsiveness improved, and the price of service fell. However, teething problems also appeared—poor availability of information to users and the public, lack of transparency in regulatory decisions, and the ad hoc nature of government interventions. Consumers were not reassured that their welfare was being protected, and the sustainability of the concession was in doubt.

There is evidence that the private operator increased investment, and that it expanded access—Suez claims it extended access to water to two million people, and access to sanitation to one million people. In 1999, it started programs to provide access to slums—but soon the Argentinian economic crisis disrupted the plans.

After the 2001 economic crisis, the Argentinian government froze water tariffs, condemning most concessions to renegotiation, and several of them to early termination—as was the case of the Buenos Aires concession, which was terminated in 2006.

Sources: (Crampes and Estache 1996); (Estache et al. 1999); (Alcazar et al. 2000)

PPP limitations and pitfalls—PPP implementation failures

PPPs can achieve efficiency improvements in the delivery of infrastructure, as described above. However, creating the incentives to achieve efficiency gains, and ensuring the public and users reap the benefit, depends on the government effectively structuring, procuring, and managing the PPP project over its lifetime. This achieves competitive tension, real risk transfer, and ensures anticipated performance improvements materialize in practice. This can be difficult where low public sector capacity means that governments lack the resources and skill to structure and manage PPPs well.

A PPP program may also present a short-term negative impact on public sector capacity—a **NAO audit report on the British prison PPP program** (NAO 2003a) notes that PPP prison directors were generally recruited from the ranks of experienced Prison Service governors, benefiting from the experience and skills of former public sector employees. Other PPP programs experienced the same effect. Implementing a PPP program requires active measures to create or retain enough expertise for managing the PPP contracts themselves.

Implementing a competitive procurement process for PPPs can be difficult. As described in detail in *Module 3 - PPP Cycle* of this

Reference Guide, governments need to approach the market with a well-structured PPP project under an appropriate tender process. Where this is not the case, bidders may simply not participate; or may make bids that are either incomparable with each other (as based on varying assumptions) or deliberately low, with a view to resolving uncertainties through post-bid negotiation. This can be a challenge even in countries with long PPP experience. For example, the **House of Lords' Review of PPPs** in the United Kingdom (UK 2009, 20–21) describes how negotiations at the preferred bidder stage led to price increases in many PPP projects.

Guasch's comprehensive review of PPP experience in Latin America (Guasch 2004) highlights a further challenge with achieving the benefits of competition—the incidence of renegotiation of PPP contracts. Of a sample of over 1000 concessions granted in the Latin America and Caribbean between 1985 and 2000, Guasch found that 10 percent of electricity concessions, 55 percent of transport concessions, and 75 percent of water concessions were renegotiated. These renegotiations took place an average of 2.2 years after the concessions were awarded.

Guasch suggests this high incidence of renegotiation soon after concession award may reflect flaws in the initial tender processes, weak regulation, or opportunism on the part of the private party or government. Most renegotiations were favorable to the operator—

for example, resulting in increased tariffs, or reduced or delayed investment obligations. In these cases, the efficiency savings from cost discipline may not have been passed on to the public sector.

Abrantes de Sousa's review of the PPP program in Portugal (Sousa 2011, 9–10) describes a similar tendency. Abrantes de Sousa notes that the government's apparent willingness to renegotiate contracts undermines the competitive process, with bidders engaging in strategic bidding to win the contract, to renegotiate it later without competition.

Moreover, effective management of a PPP transaction is only the start of the process. For a PPP to be sustainable over the long term requires a consistent level of commitment and capacity from the government and private parties over time. Where this is not the case, whether due to changing government priorities or external pressures, the PPP may ultimately fail—this is described in *Box 1.6 - When PPPs fail—The case of the 1993 water concession in Buenos Aires*.

1.2.4 Inadequate Maintenance

Infrastructure assets are often under-maintained, either because maintenance is poorly planned or because planned maintenance is deferred. Political consideration or pursuit of personal gain often biases infrastructure expenditure towards new assets over maintenance, as described in an **IMF analysis of corruption in infrastructure** (Tanzi and Davoodi 1998).

Inadequate maintenance increases lifetime costs while also decreasing benefits. Regular maintenance is usually the lower-cost way to keep infrastructure assets at serviceable standards, compared to the alternative of allowing quality to degrade until major rehabilitation work is needed. The **World Bank's Africa infrastructure diagnostic study** (Foster and Briceño-Garmendia 2010, 15) estimates that preventative maintenance for the roads sector in Africa could save \$2.6 billion a year in capital expenditures rehabilitation. In South Africa, a **review of road maintenance by the South African National Roads Agency** (ZA 2004b, 36) indicates that delaying road maintenance for three years leads to increased costs of six times the original costs of preventative maintenance. If road maintenance is delayed for five years, costs rise to 18 times the preventive cost.

The poor performance of under-maintained infrastructure can be costly for users. For example, a **U.S. Engineers' Association report**

(ASCE 2009, 1–4) estimates that poor road conditions cost motorists \$67 billion a year in repairs and increased operating costs, while leaking pipes lose an estimated seven billion gallons of clean drinking water a day. The **Infrastructure Report Card** website (ASCE-IRC) discusses several key criteria regarding infrastructure quality: level of maintenance, capacity, physical condition, funding, public safety, resilience, and innovation. It recommends that all projects greater than \$5 million use life cycle cost analysis and develop a plan for funding the project, including its maintenance and operation, until the end of its service life.

The **Pacific Region Infrastructure Facility**, after reviewing maintenance in their region, considered that a Build-Neglect-Rebuild approach was being used for infrastructure (PRIF 2013).

How PPPs can help—improved maintenance

PPPs can improve maintenance of infrastructure assets by improving incentives for both private contractors and governments to make quality maintenance a priority.

PPPs bundle construction or rehabilitation and ongoing maintenance into a single contract. This incentivizes the private company to build the asset to a high quality upfront, reducing the need for maintenance (resulting in a lower *whole of life* cost of the asset), as described in a **2010 United Kingdom National Audit Office report on PPP performance** (NAO 2010a, 8).

The private party then faces a strong incentive to carry out adequate maintenance. In the case where its revenue depends on user fees, the operator has an incentive to make sure the asset meets performance requirements and attracts users. Under government-pays PPPs, the operator's revenue typically depends both on the availability of the asset over time, and the operator's ability to meet specific levels of service quality. In this case, PPP contracting also forces governments to commit upfront to making adequate funding available to maintain an asset over time. This can help overcome the tendency to cut maintenance budgets down the line and thereby delay necessary maintenance and rehabilitation.

PPP operators not only have the incentive to maintain assets, but also the means to do so. A life-cycle approach, combined with private finance, forces bidders to prepare financial models that include allocations for maintenance—whereas government agencies are dependent upon appropriation of budgetary funds.

Box 1.7 Performance Based Road Contracts—Improving Maintenance of Infrastructure

Performance-based road contracts have proved successful in improving the quality of road maintenance—a pervasive problem in many countries. For example:

Chad suffers from poor maintenance of its road network because of poor design of maintenance contracts with private contractors, as well as lack of domestic funding. In 2001, Chad awarded a performance-based maintenance contract for 441 kilometers of unpaved roads (seven percent of the country's road network), which pays a lump-sum fee per kilometer of road maintained to pre-defined standards. The roads have since met and even exceeded performance standards.

Argentina also has experience with private-sector performance contracts on their road networks. The performance-based contracts have improved maintenance and reliability of the roads up to a specified standard agreed with the government, and have saved the Government of Argentina almost 30 percent in additional capital expenditures for rehabilitation.

Sources: (Hartwig et al. 2005); (Liataud 2001)

Some types of PPP or related contracts reward improved maintenance directly. For example, **Fraudendorfer and Liemberger** (Fraudendorfer and Liemberger 2010, 34–37) describe performance-based contracts for non-revenue water reduction. Infrastructure provides examples of performance-based maintenance contracts, which share many characteristics of PPP, and which have proved effective at improving maintenance in the road sector.

PPP limitations—need for effective contract design and regulation

In some circumstances, the ability of PPPs to create incentives to improve maintenance will be limited. This may be the case:

- ◆ In user-pays PPPs, where the PPP company is a monopoly provider, or for government-pays PPPs, if quality and safety standards are not carefully specified, monitored, and enforced.

Engel, Fischer, and Galetovic (Engel et al. 2009) note the importance of effective monitoring in achieving the potential benefit of improved maintenance.

- ◆ If the contractor does not have much equity or other financial stake in the project, meaning it would rather walk away from a contract than spend on costly maintenance. This risk is described further in *Section 1.3.2 - Considerations for Government*, on the danger of over-leveraged projects.
- ◆ Towards the end of the contract, when the contractor knows it will not reap the benefit of further maintenance investments. Well-designed contracts require specific clauses dealing with the handback during the final phase of the concession.

A 2008 OECD paper discusses maintenance in PPP projects and argues that effective transfer of risk and responsibility to the PPP operator will likely not happen in the absence of competitive procurement (OECD 2008a). These limitations can be mitigated through good contract design, as described further in *Section 3.4 - Designing PPP Contracts*.

1.2.5 Infrastructure in Fragile and Conflict-Affected States

Countries are classified as fragile and conflict-affected states (FCS) for diverse reasons. The **OECD Principles for Good International Engagement in Fragile States** (OECD 2007c) describe FCS as facing development challenges “such as weak governance, limited administrative capacity, chronic humanitarian crisis, persistent social tensions, violence or the legacy of civil war.” Conflict-affected states differ from post-conflict states, and fragility takes different forms depending on the strength of their institutions and their ability to enforce the rule of law. A legacy of corruption and cronyism, as described in **the Brookings paper on multinational engagement to support economic growth** (Nelson 2014, 10), hinders trust between the public and private sector.

These conditions create uncertain, high-risk business environments that the private sector is reluctant or even unable to engage with. More than 70 percent of FCS rank in the bottom quartile of the **World Bank Group's Doing Business rankings** (DB). In addition, essential infrastructure facilities are usually scarce and in poor condition; access to public services is limited; and the quality of service delivery is poor.

The **OECD report on service delivery in fragile situations** (OECD 2008b, 21) shows that the lack of government capacity to provide services creates a vicious cycle of poverty that reinforces fragility and may exacerbate or renew conflict.

These create challenges for PPPs, where the long pay-back phase for the private sector investor/lenders leaves them exposed to public sector risk over an extended period. This means that classic PPP models are not well suited to such situations and either

- ◆ More traditional government-pay models may be needed; or
- ◆ The normal PPP models will need to be heavily modified or underpinned; or
- ◆ A more limited ambition to create some form of private sector service provision (short of PPP) may be pursued as an interim phase of development.

More likely, a mixture of all three solutions will need to be considered as part of an overall program of reform. Additionally, in those situations in which private finance is obtained at a high-risk premium, it is important to include mechanisms within the contract to trigger refinancing as and when risk within the given FCS country decreases. Refinancing project debt is discussed in greater detail in *Section 1.3.2 - Considerations for Government*.

Private provision of public services can alleviate these sources of fragility and create economic opportunities to spur economic growth. Even where private investment is limited or contracts cannot be long-term, private involvement in the provision of services—managing operations and delivering service—can be critical to creating the conditions for the emergence of a virtuous cycle of peace, stability, growth, poverty alleviation, and shared prosperity.

As countries have varying degrees of institutional development, governance, or capacity already in place, private sector engagement should be tailored to each country's specific context. Various forms of private engagement can be used. Those that have lower capital requirements and short-term horizons, such as management contracts, affermage, lease contracts, and O&M contracts, are particularly appropriate. The affermage, lease contracts, and O&M contracts, are particularly appropriate. The **APMG PPP Certification Guide** (APMG 2016, Section 3.2) discusses each of these solutions. Business opportunities generating foreign currencies such as

ports and airports are also more likely to attract quality investors, as are telecommunications and energy projects, particularly in the generation sector.

The most common success factors in attracting the private sector are:

- ◆ Open and transparent procurement processes, free of bribery and corruption
- ◆ Rights of redress at international courts, especially in case of change in government and/or expropriation of assets or removal of concession rights
- ◆ Ability to collect revenues and tariffs
- ◆ Ability to ring-fence and expatriate foreign currency revenues
- ◆ Affordability of the tariffs for local users and if not, local government and donor support to bridge the gap
- ◆ Fairness of local employment laws
- ◆ Most importantly, security and the rule of law

Three examples of successful private sector engagement in the provision of services in FCS are set out below:

- ◆ Purely private investment – In **Somalia** (Feldman 2007), the collapse of the central government in 1991 resulted in the destruction of the telecommunications sector. Slowly, private operators began providing satellite communication devices to meet the demand. This ultimately culminated in the creation of a network of private operators in 1998. By 2007, despite the lack of a cohesive government in place, the country's telephone coverage reached 87 percent.
- ◆ Management contract – The World Bank-financed Power Recovery Project in **Guinea** (IFC 2016) brought in Veolia-Seureca, a private French consortium, to manage the operations of Électricité de Guinée. This management contract is designed to improve EDG's technical, commercial and financial performance and enhance the electricity services for approximately 300,000 households.

- ♦ O&M contract - In **Haiti** (Brault et al. 2015), the Rural Water Supply and Sanitation Project significantly increased access and sustainability of water services by utilizing O&M contracts with small, private operators throughout the Sud region.

These types of engagements may allow FCS governments to gain proficiency in negotiating contracts with private sector companies. They can also contribute to building trust and credibility with private sector partners.

Including the private sector in a reform dialogue that supports the implementation of transparent, inclusive, and efficient policies and regulatory practices may enhance the investment climate and incentivize private investment. **Cambodia** has regularly convened the Government-Private Sector Forum since 2001. The resulting reforms generated \$69.2 million in cost savings to the private sector as of 2015. **The CIPE article on public-private dialogue** (Bettcher et al. 2015) provides a methodology for conducting this dialogue.

FCS also often suffer from capacity deficits in the public and local private sector, making public-private engagement and collaboration challenging. It may be difficult to select an appropriate partner and design a good agreement—particularly when some firms are willing to pay bribes or when officials request bribes to influence procurement. Governments have benefited from the advice of experienced transaction advisors to design and implement competitive tender processes.

If, however, PPP-like structures as defined in this Guide are to be used, for instance in post-conflict countries, it may be necessary to include multilateral institutions that can provide guarantees and insurance products that reduce the risk for private investors. Likewise, mechanisms can be put in place to ringfence foreign revenues; arbitration can be moved offshore; profit repatriation can be regulated by treaties.

With the support of PPIAF, the World Bank and several academic institutions created the **Body of Knowledge on Infrastructure Regulation** (PURC 2012), a website which provides guidance and links to more than 500 references on regulation. The site helps governments define regulatory standards, and includes a section with specific guidance on infrastructure in FCS.

Several examples of project development organizations that may act as offer such products are:

- ♦ **IFC Infraventures** (Infraventures), a global infrastructure project development fund that provides early stage risk capital and experienced project development support (Infraventures 2015)
- ♦ **InfraCo**, comprised of (InfraCo Africa) and (InfraCo Asia), project developers in lower-income countries established by the Private Infrastructure Development Group (PIDG)
- ♦ **Pacific Region Infrastructure Facility** (PRIF), which supports infrastructure development and maintenance in Pacific Island

Box 1.8 The Pamir Private Power Project

In Tajikistan, the Gorno-Badakhshan Autonomous Region suffered from major energy shortages following independence from the Soviet Union in 1991 and a subsequent five-year civil war. Economic and human development were choked by this lack of energy.

To improve this situation, the Government of Tajikistan signed a 25-year PPP agreement with Pamir Energy to upgrade and operate the region's out-of-date hydroelectric utility with financial and technical assistance from the Aga Khan Fund for Economic Development, the World Bank, the Swiss Economic Cooperation Office and the IFC.

Although the project faced numerous challenges in implementation due to difficulty in securing contractors and materials, it was finished on time and on budget in 2006. It later faced issues with the population's adjustment to higher energy tariffs and a culture of non-payment but these challenges were overcome over time and Pamir was eventually even able to grow energy output enough to export to Afghanistan. As of 2016, the project is providing renewable energy for 226,000 people in Tajikistan and 28,500 in northern Afghanistan with an eye for expansion to a further 170,000 in Afghanistan over the next five years.

Sources: (Jumaev 2016); (WB 2012b)

- ◆ Countries through investment coordination, research and technical assistance

Some countries also find it useful to outsource contract enforcement to an independent party to attract quality investors. Although investing in the capacity of the public and private sectors should be the long-term goal, governments may use skilled intermediaries and transaction advisors in the short term to compensate for these deficiencies as recommended in the **Brookings paper on multinational engagement to support economic growth** (Nelson 2014, 11).

The diversity of situations in FCS countries does not allow for generalizations on the proper path for infrastructure delivery. Improving legislation, building capacity, and fostering a good investment climate may not be enough. In some cases, PPPs can survive very difficult conflict situations—as in Cote d'Ivoire where the PPP utility company continued to deliver electricity to its customers during its civil war. And PPP projects may be successful when the investment climate for private sector participation is sufficiently enhanced, as in the Pamir Private Power Project in **Tajikistan** presented in *Box 1.8 - The Pamir Private Power Project*.

1.2.6 Climate Change and Natural Disasters

The risk of natural disasters affects infrastructure projects and must be considered throughout the project cycle. Climate change introduces additional challenges by increasing uncertainty and the probability of extreme weather events. PPPs, as long-term contracts, require particular care in the identification, mitigation and allocation of risk. This section focuses on whether and how PPPs can be utilized when facing climate change and natural disaster-related risks.

Impacts of climate change on infrastructure are expected to worsen in the future. Therefore, climate change considerations should be factored into government decisions regarding infrastructure, irrespective of delivery or financing mechanisms. The scientific community predicts that the intensity and frequency of extreme weather conditions around the globe will increase in the medium term. Thus, the critical infrastructure at the foundation of basic economic activity is at risk. For example, in the energy sector, rising temperatures and extreme weather conditions can lead to unmet energy demand, rising costs for cooling and asset damage.

Traditionally, hazards from weather and disaster-related events were estimated through probability distributions of historic data and trends. However, today's changing climate is posing unpredictable risks. Incidence patterns of tropical storms, floods and heat waves cannot be extrapolated from past records nor can their severity. Many factors contribute to the uncertainty, including the path of future emissions and the sensitivity of the climate system to concentrations of atmospheric greenhouse gas (GHG) emissions. A changing climate not only represents a risk in terms of increased frequency and intensity of extreme weather events, but also through gradual, longer-term incremental changes.

As of 2017, the most sophisticated climate forecasting models are not reliable at the regional level, let alone the project level. For example, there remains a high degree of uncertainty regarding rainfall in western Africa; some models predict a significant increase, others a massive decrease. Faced with such uncertainty, governments need to build their infrastructure facilities to withstand scenarios that could derail their projects, rather than build for one specific scenario. The **World Bank report on Investment Decision-Making under Deep Uncertainty** (Hallegatte et al. 2012) outlines a path for practitioners to build robust infrastructure in the face of these highly uncertain outcomes, keeping the cost of being wrong about future events as low as possible.

A **World Bank study: The Costs of Adapting to Climate Change for Infrastructure** (WB 2010, 10) highlights how climate change poses a dynamic risk factor to multiple infrastructure investments. PPP policy frameworks and procurement processes need to be designed and managed to take account of climate-related uncertainties, especially in the case of large-scale infrastructure investments.

As PPP contracts are long-term and generally inflexible arrangements with lock-in effects, failure to address climate risks exposes stakeholders to long-term vulnerabilities over the life of the asset. If unaddressed at the beginning of the investment decision-making process, the public sector, by default, remains the party of last resort when an infrastructure asset delivering public services stops functioning properly because of a climate event. Private partners will seek redress from the public sector to compensate their losses unless the PPP contract stipulates otherwise.

Climate change and PPP policies

At the national level, good practice consists of incorporating climate change policies and commitments into PPP policy frameworks and/or Public Investment Management (PIM) guidelines. An **OECD policy paper** (OECD 2009) discusses how to mainstream climate change at the national, sectoral, project and local level. This is a critical step towards building a systematic institutional approach to climate change. The lessons from national level efforts in the UK and Australia are summarized in a **World Bank study on alignment of climate change policies in the PPP policy frameworks** (WB-Risk). They may provide guidance to policy makers in middle income and developing countries. Further, policy makers can utilize country-level climate change and disaster risk indices and screening tools to frame their sectoral infrastructure policies in line with the specific potential risks and impacts of their geographic zone.

Governments can seek policy, financial and technical support from multilateral institutions in many areas including screening for climate change and disaster risks. International financing instruments include the **Green Climate Fund** (GCF), which allocates resources to climate-resilient and low emission projects and programs. Also, several **Climate Investment Funds** (CIF) support governments at the development planning and project financing stages. These instruments can be used to finance infrastructure resilience and can potentially absorb the cost of adaptation.

Adaptation and mitigation measures

Mitigation and adaptation measures are needed when addressing climate change. **Adaptation** refers to the impact of climate change on infrastructure assets and what can be done to reduce their vulnerability, and enhance their resilience. **Mitigation** addresses strategies or actions taken to remove or reduce the level of GHG emissions. The **Intergovernmental Panel on Climate Change** (IPCC 2017) sets out strategic considerations for adaptation and global-scale mitigation, and presents near-term response options. **NASA** provides scientific data supporting this two-pronged approach. The **European Climate Adaptation Platform** (CLIMATE-ADAPT 2017) provides tools and methodology for addressing adaptation. Broad policy and institutional reforms integrating both mitigation and adaptation approaches into the PPP framework are critical to ensure that infrastructure projects are designed to consider costs and measures that provide a buffer from the consequences of ex-

treme weather conditions and natural disasters, including the occurrence of stranded assets.

The traditional measures to address climate change risks such as relief and compensation Agreements, *force majeure*, asset insurance, and other contractual provisions that trigger renegotiations are generally enforced at the project level. They are discussed in detail in the **World Bank Report on Recommended Contractual Provisions** (WB 2017e). These measures are mainly ex-post reactive measures. They seek to redress the impacts and damages to the infrastructure after the event. However, parties involved in the PPP contracts may use legal and other contractual loopholes such as uninsurable events and *force majeure* clauses to disclaim responsibility for the cost of repairs/rebuilding and leave the government with the burden of shouldering these costs. Embedding the systematic adoption of some type of insurance in the national infrastructure or PPP policy will increase the cost of infrastructure but reduce the fiscal hardships caused by extreme climate events and natural disasters.

Chile has addressed this issue by stipulating that earthquakes are not considered *force majeure* in the country because of their frequency; indeed, earthquakes are evidently not unexpected events there. The **Chilean PPP law** (CL 2010b) states that catastrophic risk must be covered by insurance—in practice exempting earthquakes from consideration as an event of *force majeure*. In the 1980s, Chile faced significant fiscal costs due to infrastructure damage following frequent earthquakes. However, in recent decades, Chile developed its road network utilizing PPPs, requiring mandatory insurance from private partners. As a result, the 8.8 magnitude earthquake in Chile in 2010, where infrastructure losses totaled \$21 billion, had almost no fiscal impact on roads built through PPPs. This is good practice—the Chilean approach should be emulated wherever possible.

Countries where the incidence of natural disasters is high should require insurance protection for major events. For example, as earthquakes are common in Chile, so are hurricanes in the Caribbean. For projects where insurance is not available, governments could consider protecting against disaster-related *force majeure* events by obtaining catastrophic protection through a Catastrophe Deferred *Section 1.3.4 - Third Party Risk Mitigation and Credit Enhancement*.

However, due to the unpredictability of low-probability, high-cost climate change-related events, this approach will not be feasible for such events as sea level rise or changing extreme weather patterns.

The costs of adaptation measures at the early stages of an infrastructure project are small compared to the future costs of rebuilding or repairing infrastructure. Retrofitting infrastructure, i.e. redesigning the asset after construction, is extremely expensive and sometimes impossible. A **World Bank study** (ESMAP, 5) estimates that adaptation measures cost no more than two percent of the total cost of infrastructure assets. This estimate may vary depending on the type of infrastructure, location, and other factors. However, preventive adaptation actions at an early stage of the project cycle can generally help avoid high future costs if climate conditions worsen. Moreover, the probability that an infrastructure asset will continue to provide its services over its intended lifespan is enhanced when it is financed and built with climate risk considerations. An academic study on **Climate Change and Infrastructure Impacts** (Schweikert et al. 2014) on roads shows how pro-active adaptation measures result in lower fiscal costs and higher connectivity rates as early as 2025. Examples of options, recommendations and best practices for adapting to climate change for infrastructure in the PPP context are set out further in this section.

Addressing natural disasters in PPP policy

Commercial insurance provides coverage for most natural disasters. However, some risks cannot be quantified and therefore priced by

the private sector. In these circumstances, risks cannot be transferred to third parties and must be faced by governments—PPP operators will not assume those risks. They will be explicitly allocated to government in the contract, or implicitly through *force majeure* provisions. As PPP operators do not bear the consequences of extreme risk events, their incentives to design resilient infrastructure will be limited.

When procuring PPPs, governments usually transfer responsibility for asset design to the private sector, which will obey economic rationality to satisfy the contractually-defined project goals. When significant risks affect government rather than the private sector, the contracting authority needs to play a more active role in defining minimum project characteristics to protect the public sector and the users from extreme risk events, for example, prohibiting project construction in flood or landslide prone areas or defining strict construction standards. More generally, climate change-related risks need to be identified specifically throughout the procurement process. This is described in greater detail in *Section 3.2.1 - Assessing Project Feasibility and Economic Viability*.

Finally, if mitigation is likely to require a costly and uncertain process of adaptation over time, such as evolving specifications or maintenance standards, then a PPP may not be the optimal solution.

Box 1.9 The Uruguay Weather Derivative

Uruguay's state-owned public electric company, Administración Nacional de Usinas y Trasmisiones Eléctricas (UTE) relies on hydropower to generate more than 80 percent of its energy needs. When rainfall and/or accumulated water reserves is low, UTE must purchase alternative fuels (mostly oil and natural gas) as inputs. When the price of oil is high, generation costs become expensive, affecting UTE's bottom line, and creating problems for both consumers and the national budget.

In 2012, water shortages increased UTE production costs to a record \$1.4 billion, far exceeding the company's original projections of \$953 million. To cover the gap, UTE borrowed funds from the market, drew from the country's \$150 million Energy Stabilization Fund, and increased consumer rates. The Government of Uruguay asked the World Bank for technical support to hedge UTE's financial exposure to low rainfall and high oil prices.

On December 18, 2013, the World Bank executed a \$450 million weather and oil price insurance transaction for UTE. The transaction insured the energy company for 18 months against drought and high oil prices. To measure the extent of a drought and potential insurance payouts to the company, the transaction measured and collected daily rainfall data at 39 weather stations spread throughout the two river systems on which Uruguay's hydropower is dependent: the Rio Negro and Rio Uruguay. If precipitation fell below the level set up as trigger of the contract, UTE would receive a payout of up to \$450 million based on the severity of the drought and oil price levels.

Source: (WB 2014)

Key References: Infrastructure Challenges and How PPPs Can Help - Problems with Infrastructure

Reference	Description
Foster, Vivien, and Cecilia Briceño-Garmendia, eds. 2010a. <i>Africa's Infrastructure: A time for transformation</i> . Washington, DC: World Bank.	Presents the results of the Africa Infrastructure Country Diagnostic (AICD) study, a comprehensive review of infrastructure sectors in Africa. Details the challenges facing infrastructure provision in Africa, with information on performance by sector. A French version is also available (Foster and Briceño-Garmendia 2010b).
OECD. 2007a. <i>Infrastructure to 2030: Volume 2: Mapping Policy for Electricity, Water and Transport</i> . Paris: Organisation for Economic Co-operation and Development.	Presents the results of a global infrastructure needs study, reviewing trends and challenges in the electricity, water, and transport sectors, and providing policy recommendations. Includes estimates of infrastructure needs in OECD economies, as well as considering the role of PPP in meeting those needs. A French version is also available (OECD 2007d).
Flyvbjerg, Bent, Mette K. Skamris Holm, and Søren L. Buhl. 2002. "Underestimating Costs in Public Works Project: Error or Lie?." <i>Journal of the American Planning Association</i> 68(3) 279-295.	This global study of 258 transport projects finds that, on average, actual costs were 28 percent higher than planned costs—65 percent higher for projects outside Europe and North America. The paper describes technical, psychological, and political explanations for this result.
Flyvbjerg, Bent, Mette K. Skamris Holm, and Søren L. Buhl. 2005. "How (In)accurate Are Demand Forecasts in Public Works Projects? The Case of Transportation." <i>Journal of the American Planning Association</i> 71(2) 131-146.	This study of 210 transport projects in 14 countries finds that traffic was over-estimated for nine out of ten rail projects, by an average of 106 percent. The accuracy of traffic forecasts also varies for roads, but on average road traffic was found to be under-estimated.
Flyvbjerg, Bent. 2005. "Policy and Planning for Large Infrastructure Projects: Problems, Causes, and Cures." World Bank Policy Research Working Paper 3781. Washington, DC: World Bank.	Summarizes the results and lessons from the above studies, and other similar work—why estimates of costs and benefits are inaccurate for large infrastructure projects.
Tanzi, Vito, and Hamid Davoodi. 1998. "Roads to Nowhere: How corruption in public investment hurts growth." <i>Economic Issues</i> 12. Washington, DC: International Monetary Fund.	Drawing on cross-country analysis, argues that corruption reduces growth, by increasing public investment while reducing its productivity—increasing investment expenditure, but with lower expenditure on operations and maintenance.
WB. 2008. "Deterring Corruption and Improving Governance in the Urban Water Supply & Sanitation Sector: A Sourcebook." Water Working Notes, Note No. 18. Washington, DC: World Bank.	Chapter 6 describes the problems of corruption in planning and implementing major capital projects.
ASCE. 2009. <i>Report Card for America's Infrastructure</i> . Washington, DC: American Society of Civil Engineers.	Assigns grades and describes the state of different types of infrastructure in the United States. Includes estimates of the cost to users and government of the poor standard of maintenance.
PWC. 2005. <i>Delivering the PPP Promise: A Review of PPP Issues and Activity</i> . New York: PriceWaterhouseCoopers.	Section 2 succinctly describes the advantages and disadvantages of using PPPs.
Deloitte. 2006. <i>Closing the Infrastructure Gap: The Role of Public-Private Partnerships</i> . New York: Deloitte.	Examines the case for PPPs, describing the typical benefits of PPP over traditional procurement. Also reviews how PPP markets typically develop, considering PPP experience in several sectors (with a focus on developed countries).
Engel, Eduardo, Ronald Fischer, and Alexander Galetovic. 2009. <i>Public-Private Partnerships: When and how</i> . Santiago: Universidad de Chile.	Describes the circumstances under which PPPs may provide better value than traditional public procurement, as well as examining some common but weak arguments for PPPs. Also describes institutional requirements for a successful PPP program.
Fischer, Ronald. 2011. "The Promise and Peril of Public-Private Partnerships: Lessons from the Chilean Experience." IGC Rwanda Policy Note Series - No. 1. London: International Growth Centre.	Uses the experience of Chile and other developing countries to examine the benefits and pitfalls of PPPs, also offering recommendations to address common problems.

Reference	Description
<p>Irwin, Timothy C. 2007. <i>Government Guarantees: Allocating and Valuing Risk in Privately Financed Infrastructure Projects</i>. Directions in Development. Washington, DC: World Bank.</p>	<p>Chapter 2 describes lessons from history of government guarantees to private infrastructure projects, with cautionary tales of governments thereby creating significant fiscal exposure. Chapter 3 describes why governments can make bad decisions on providing guarantees.</p>
<p>Sousa, Mariana Abrantes de. 2011. “Managing PPPs for Budget Sustainability: The Case of PPPs in Portugal, from Problems to Solutions.” <i>PPP Lusofonia</i> (blog). October 30.</p>	<p>Describes Portugal’s PPP experience, including the rapid adoption of PPP, without strong fiscal control, and the associated fiscal risk. Also considers how better management of PPPs could contribute to resolving Portugal’s external debt problems.</p>
<p>UK. 2009. <i>Government Response to Report on Private Finance Projects and Off-Balance Sheet Debt</i>. London: House of Lords, Economic Affairs Committee.</p>	<p>Sets out HM Treasury’s response to the Select Committee’s report, providing further detail and commentary on the practices and results of PFI in the United Kingdom.</p>
<p>Gupta, Prashant, Rajat Gupta, and Thomas Netzer. 2009. <i>Building India: Accelerating Infrastructure Projects</i>. Mumbai, India: McKinsey & Company.</p>	<p>Describes bottlenecks in infrastructure provision in India, and possible solutions, including highlighting some of the benefits of PPPs.</p>
<p>NAO. 2003b. PFI: Construction Performance. Report by the Comptroller and Auditor General, HC 371. London: National Audit Office.</p>	<p>Compares PFI projects in the United Kingdom with an earlier survey of publicly-procured construction projects, and found a higher proportion of PFI projects come in on time and on budget.</p>
<p>NAO. 2009b. <i>Performance of PFI Construction</i>. London: National Audit Office.</p>	<p>Updates previous report, adding experience to 2008.</p>
<p>Duffield, Colin, and Peter Raisbeck. 2007. <i>Performance of PPPs and Traditional Procurement in Australia: Final Report to Infrastructure Partnerships Australia</i>. Melbourne: The Allen Consulting Group and University of Melbourne.</p>	<p>Compares 21 PPP projects with 33 traditionally-procured infrastructure projects, finding that on average, PPPs have lower cost overruns and delays.</p>
<p>Duffield, Colin. 2008. <i>Report on the performance of PPP Projects in Australia when compared with a representative sample of traditionally procured infrastructure projects: National PPP Forum – Benchmarking Study, Phase II</i>. Melbourne: University of Melbourne, MERIT.</p>	<p>Compares 25 PPP projects with 42 traditionally-procured projects’ cost and time performance over a series of project milestones.</p>
<p>Gassner, Katharina, Alexander Popov, and Nataliya Pushak. 2009. “Does Private Sector Participation Improve Performance in Electricity and Water Distribution?” Trends and Policy Options No. 6. Washington, DC: World Bank.</p>	<p>A comprehensive econometric analysis of more than 1,200 utilities in 71 developing and transition countries. Found that private sector participation improved efficiency and service levels.</p>
<p>Funke, Katja, Tim Irwin, and Isabel Rial. 2013. “Budgeting and reporting for public-private partnerships.” OECD/ITF Joint Transport Research Centre Discussion Paper 2013 (07). Paris: Organisation for International Co-Operation and Development.</p>	<p>Reviews the experience of 65 PPPs in the water sector in developing countries, finding consistent improvements in efficiency and service quality.</p>
<p>Guasch, José Luis. 2004. <i>Granting and Renegotiating Infrastructure Concessions: Doing it right</i>. Washington, DC: World Bank.</p>	<p>Describes in detail how poor PPP design and weak implementation can lead to renegotiations and increased costs. Based on a review of experience in Latin America and the Caribbean, where a high proportion of PPPs underwent renegotiation within a short time from contract close.</p>
<p>Frauentorfer, Rudolf, and Roland Liemberger. 2010. <i>The Issues and Challenges of Reducing Non-Revenue Water</i>. Manila: Asian Development Bank.</p>	<p>The section on outsourcing of non-revenue water management activities (see pages 34–37) describes how performance-based contracts can be used to help improve maintenance standards.</p>

Key References: Infrastructure Challenges and How PPPs Can Help - Private participation in infrastructure in Fragile and Conflict States

Reference	Description
Nelson, Jane. 2014. <i>How Can Multinationals Engage with Government to Support Economic Development?</i> Washington, DC: Brookings Institution.	Describes three distinct levels (national, sector-specific and project levels) of multinational corporate-FCS government engagement.
OECD. 2007c. <i>Principles for Good International Engagement in Fragile States</i> . Paris: Organisation for Economic Co-operation and Development.	Explains how OECD countries can improve their engagement strategies with FCS.
Bettcher, Kim Eric, Benjamin Herzberg, and Anna Nadgrodkiewicz. 2015. <i>Public-Private Dialogue: The Key to Good Governance and Development</i> . Washington, DC: Center for International Private Enterprise, Economic Reform Feature Service.	Describes how the use of public-private dialogue can enhance governance and development outcomes.
Qiang, Christine. 2017. "Investment Climate Brief." World Bank. Website	Examines the use of private sector investment as a force for global economic growth and development.

Key References: Infrastructure Challenges and How PPPs Can Help - Climate Changes and Natural Disasters

Reference	Description
AfDB. 2011. <i>Climate Screening and Adaptation Review and Evaluation Procedures</i> . Abidjan: African Development Bank Group.	Provides an overview of AfDB's Climate Risk Management and Adaptation Strategy which includes climate screening at the project preparation level.
ADB. 2011. <i>Guidelines for Climate Proofing Investment in the Transport Sector: Road Infrastructure Projects</i> . Manila: Asian Development Bank.	Presents a step-by-step methodological approach to help project teams incorporate climate change adaptation measures into transport sector investment projects.
ADB. 2013. <i>Guidelines for Climate Proofing Investment in the Energy Sector</i> . Manila: Asian Development Bank.	Provides a step-by-step methodological approach to help project teams incorporate climate change adaptation measures into energy sector investment projects.
UK. 2012b. <i>Adapting to Climate Change: Helping Key Sectors to Adapt to Climate Change</i> . London: UK Government, Department for Environment, Food and Rural Affairs.	Provides guidance about assessing current and projected impacts of climate change in relation to authorities' functions and preparing proposals and policies for adaptation.
EBRD. 2015. <i>Building resilience to climate change: Investing in Adaptation</i> . London: European Bank for Reconstruction and Development.	Presents the methodology for climate resilience audits, which provide a basis to identify, propose and discuss technical and investment solutions with the client.
CLIMATE-ADAPT. 2012. "Guidelines for project managers." European Climate Adaptation Platform (CLIMATE-ADAPT). Website.	Assists project developers to incorporate resilience to current climate variability and future climate change within their projects.
OECD. 2009. <i>Integrating Climate Change Adaptation into Development Co-operation: Policy Guidance</i> . Paris: Organisation for Economic Co-operation and Development.	Policy guidance for policy makers and practitioners on approaches for climate integration at the national, sectoral, project and local level.
WB. 2011a. <i>Catastrophe Deferred Drawdown Option</i> . Treasury Product Note. Washington, DC: World Bank.	Product note regarding Development Policy Loan with a Catastrophe Deferred Drawdown Option (Cat DDO), a contingent credit line that provides immediate liquidity to IBRD member countries in the aftermath of a natural disaster

Reference	Description
WB-Risk. Accessed March 15, 2017. "Climate, and Disaster Risk Screening Tools." Washington, DC: World Bank. Website.	Provides a resource for use by development practitioners at an early stage of national level planning processes or project design. There are national/policy level tools and project level tools which provide a user-friendly step-by-step approach to understanding potential risks to programs and investments.
ESMAP. Accessed March 15, 2017. "Hands-on Energy Adaptation: Toolkit (HEAT)." Energy Sector Management Assistance Program Energy and Climate Adaptation Initiative. Website.	Online resource designed to assess climate vulnerabilities and adaptation options in a country's energy sector and raise awareness.
WB. 2016e. "Climate and Disaster Resilience." Pacific Possible. Washington, DC: World Bank.	Highlights the costs of making Pacific coastlines more resilient to climate change, and provides evidence to policy makers on how incorporating climate adaptation activities into infrastructure development will reduce impacts in future years.
WB. 2016d. "Toward Climate-Resilient Hydropower in South Asia." LiveWire. Washington, DC: World Bank.	Describes planning for climate-resiliency in hydropower projects in South Asia.
WB. 2010. "The Costs of Adapting to Climate Change for Infrastructure." Discussion Paper No. 2. Washington, DC: World Bank.	Presents a methodology to estimate the costs of adapting to climate change.
AfDB. 2013. <i>Initiative for Risk Mitigation: Needs Assessment for Risk Mitigation in Africa, Demands and Solutions. Final Report.</i> Abidjan: African Development Bank Group.	Assesses risk mitigation needs and possible solutions for African countries.
Pieris, Luigi de. 2012. "Risk Mitigation Instruments in PPP Projects." Presentation prepared for a PPP Conference, Dakar, June 5.	Presents the IRMA and AfDB's risk mitigation instruments.
Hallegatte, Stéphane, Ankur Shah, Robert Lempert, Casey Brown, and Stuart Gill. 2012. "Investment Decision Making Under Deep Uncertainty: Application to climate change." Policy Research Working Paper 6193. Washington, DC: World Bank.	Explains decision-making methodologies to be applied to the uncertain scenarios of climate change.
Bonzanigo, Laura, and Nidhi Kalra. 2014. "Making Informed Investment Decisions in an Uncertain World: A Short Demonstration." Policy Research Working Paper 6765. Washington, DC: World Bank.	Examines ten different case studies and the decision-making approaches applied to them; describes utilizing a different robust decision-making approach to conduct economic analysis of a different case.
Kalra, Nidhi, David G. Groves, Laura Bonzanigo, Edmundo Molina Perez, Cayo Ramos, Carter Brandon, and Iván Rodríguez Cabanillas. 2015. "Robust Decision-Making in the Water Sector: A Strategy for Implementing Lima's Long-Term Water Resources Master Plan." Policy Research Working Paper 7439. Washington, DC: World Bank.	Describes using robust decision-making in the Master Plan for Lima's water sector.
UK. 2015a. <i>Valuing Infrastructure Spend: Supplementary Guidance to The Green Book.</i> London: UK Government, HM Treasury.	Presents the need for considering resilience in assessing and developing infrastructure projects.

1.3 How PPPs Are Financed

Transferring responsibility to the private sector for mobilizing finance for infrastructure investment is one of the major differences between PPPs and traditional procurement. Where this is the case, the private party to the PPP is responsible for identifying investors and developing the finance structure for the project. However, it is important for public sector practitioners to understand private financing structures for infrastructure and to consider the potential implications for government. This section

- ♦ Introduces ways that private finance of PPP projects can be structured (*Section 1.3.1 - Finance Structures for PPP*);
- ♦ Highlights points that governments need to bear in mind when procuring a privately-financed PPP—that is, ways in which the government might need to enable or control how the private party raises finance to ensure the project is implemented successfully (*Section 1.3.2 - Considerations for Government*);
- ♦ Describes different roles for public finance in PPPs—that is, why and how governments may be directly involved in the financing of PPPs (*Section 1.3.3 - The Role of Public Finance in PPPs*).

The chapter on PPP Financing in **Farquharson et al's book on PPPs in emerging markets** provides an overview of some of the topics covered in this section (Farquharson et al. 2011, Chapter 5). **Yescombe's** (Yescombe 2007) and **Delmon's** (Delmon 2015) **books on PPPs** cover a wide range of topics on PPP financing. The relevant sections of these books, as well as links to additional resources, are provided throughout the section for more information on specific points.

1.3.1 Finance Structures for PPP

The private party to most PPP contracts is a specific project company formed for that purpose—often called a **Special Purpose Vehicle (SPV)**. This project company raises finance through a combination of equity—provided by the project company's shareholders—and debt provided by banks, or through bonds or other financial instruments. The finance structure is the combination of equity and debt, and contractual relationships between the equity holders and lenders.

Figure 1.3a - Typical PPP Project Structure shows a typical contract structure for a PPP project. The government's primary contractual relationship is with the project company. This may be complemented by a direct agreement between contracting authority and lenders; although often this relationship is limited to the provisions in favor of the lenders included in the PPP agreement, such as step-in rights or senior debt repayment guarantees.

The initial equity investors, who develop the PPP proposal, are typically called **project shareholders**. Typical **equity investors** may be project developers, engineering or construction companies, infrastructure management companies, and private equity funds. **Lenders** to PPP projects in developing countries may include commercial banks, multilateral and bilateral development banks and finance institutions, and institutional investors such as pension funds and insurance companies.

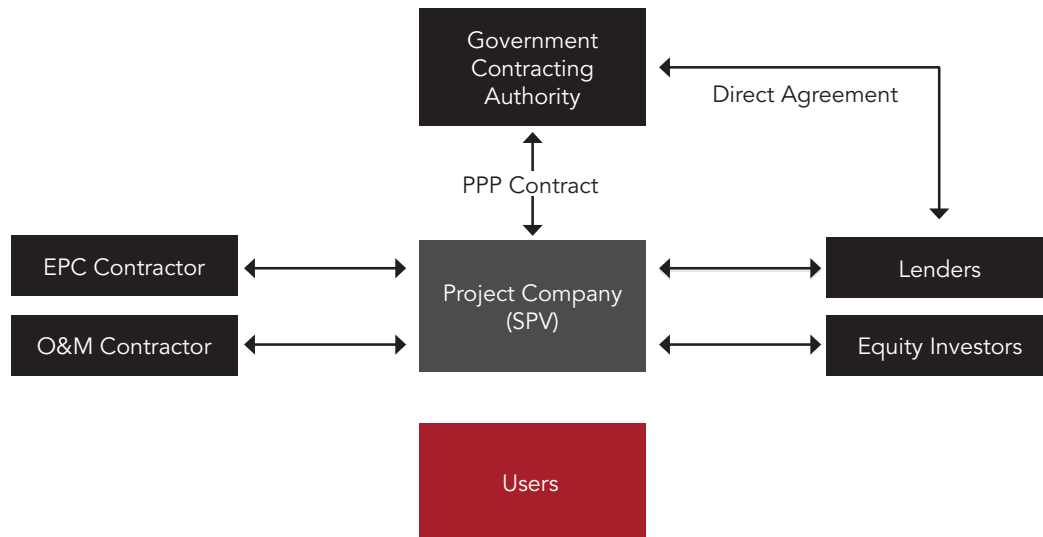
As shown in *Figure 1.3a - Typical PPP Project Structure*, the project company contracts with firms to manage design and construction (usually known as an Engineering, Procurement and Construction, or EPC contract), and operations and maintenance (O&M). These contractors may be affiliated with the equity investors. **Yescombe's book on PPP finance** includes examples of PPP structures for different types of PPP (Yescombe 2007, section 1.4).

As described in **Farquharson et al's chapter on PPP financing** (PPIAF 2001, 53), equity investment is 'first in, last out'—that is, any project losses are borne first by the equity investors, and lenders suffer only if the equity investment is lost. This means that equity investors accept a higher risk than debt providers and therefore require a higher return on their investment.

The aim of the project shareholders and their advisors in developing the finance structure is typically to minimize the cost of finance for the project. Because equity is more expensive than debt project shareholders use a high proportion of debt to finance the project. In each country, this proportion may vary from project to project, depending on the risks assumed by the PPP operator.

The financial modeling for the PPP project will tailor debt service and expected dividends according to the expected flow of funds, including revenue from user fees and government payments, and construction and on-going expenditures, namely for maintenance and operations. See *Figure 1.3b - Flow of Funds* for the typical flow of funds in a PPP.

Figure 1.3a Typical PPP Project Structure



Non-recourse project finance for PPPs

Under non-recourse project finance, lenders can be paid only from the project company's revenues without demanding compensation from the equity investors. That is, the project company's obligations are ring-fenced from those of the equity investors, and debt is secured on the cash flows of the project. As described in **Yescombe's chapter on project finance for PPPs** project finance structures typically involve a large proportion of debt (Yescombe 2007). In many cases, it ranges from 70 to 95 percent of total finance. From the equity investors' perspective, this helps manage risk by limiting exposure to a project, and makes it possible to undertake much larger projects than would otherwise be the case. For lenders, it means undertaking rigorous due diligence, focusing on the project cash flow and contractual structure.

There is a large literature on project finance structures, including several comprehensive textbooks listed in the key references for readers interested in exploring the subject further.

Alternatives to non-recourse project finance

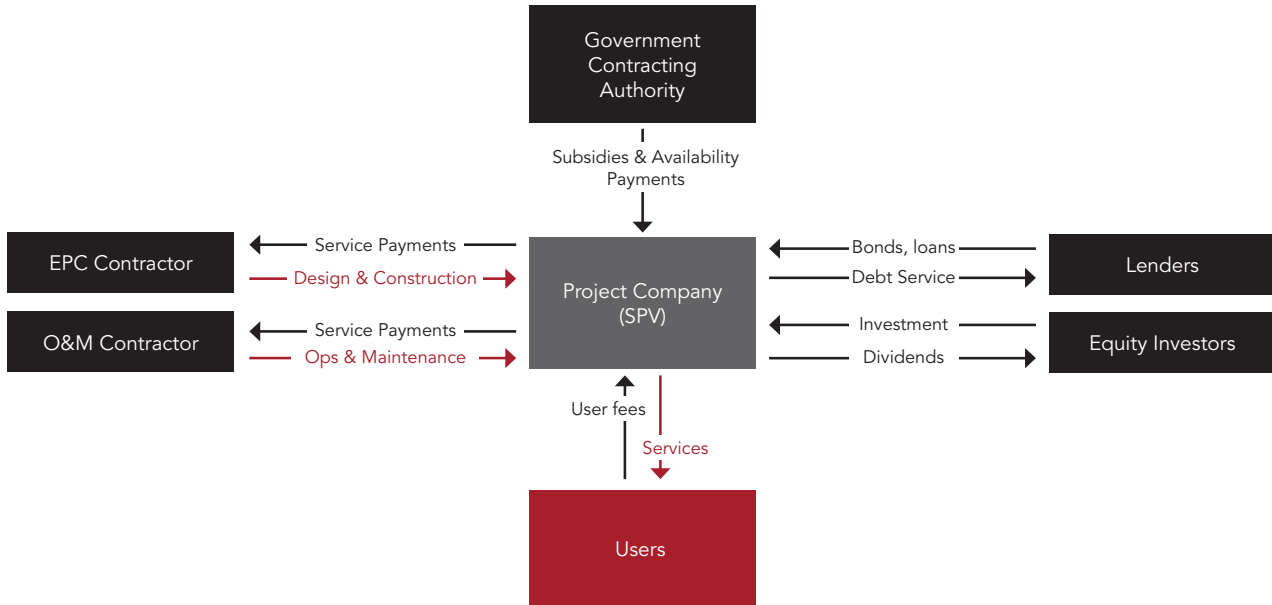
While helpful for raising finance for large, highly leveraged investments, project finance comes at a cost. Interest rates for project-finance debt are more expensive than government borrowing, and

often more expensive than borrowing by established companies. The transaction cost—setting up the contractual structure, and carrying out adequate due diligence—can make it unattractive for smaller deals. For this reason, many smaller PPP projects do not adopt non-recourse project finance structure to achieve greater contractual flexibility, or lower the financing cost.

One option is for project shareholders to back up the project company by providing a corporate guarantee to the lender for repayment for all or part of the project debt. *Box 1.10 - Examples of Project Finance Structure with Corporate Guarantees* provides examples.

Large infrastructure companies can structure the financing of their projects either through traditional **full recourse corporate finance** or through **limited recourse project finance**. If the corporate finance route is followed, the lenders provide loans directly to the parent company, on the strength of its credit rating and balance sheet. In case of default the lenders have full recourse to the balance sheet of the company but their loan is generally unsecured, which means that it is not backed by a specific asset. In project finance, a special purpose company (SPV) is created to hold the assets of the project exclusively. The SPV is owned by the infrastructure company and other equity investors. Lenders provide loans to the SPV. Their recourse in case of default is limited to the cash flows generated by the assets of the SPV but not to the balance sheet of

Figure 1.3b Flow of Funds



the equity investors. On the other hand, lenders will typically have security over the assets of the SPV.

In general, investors prefer limited recourse, because the risk of the project is limited to the equity they put in the SPV company. The cost of debt is generally higher, but the risk is circumscribed.

From the public sector standpoint, if the limited recourse project finance route is followed, it is important to ensure that the SPV

is not too thinly capitalized, that is, the debt/equity ratio should not be too high. Otherwise, the investors’ interests might not be aligned with those of the public sector, and financial close might be difficult to achieve. In addition, project finance induces lenders to focus on the PPP project assets and their ability to generate cash flows implying that lenders will implement better due diligence, and that they may later create an additional layer of protection to the public interest by exercising step-in rights in order to guarantee service delivery according to standards.

Box 1.10 Examples of Project Finance Structure with Corporate Guarantees

In some cases, a project company may be unable to raise finance on a non-recourse basis. One option is for a major project shareholder to provide a partial or full guarantee on the project debt. For example:

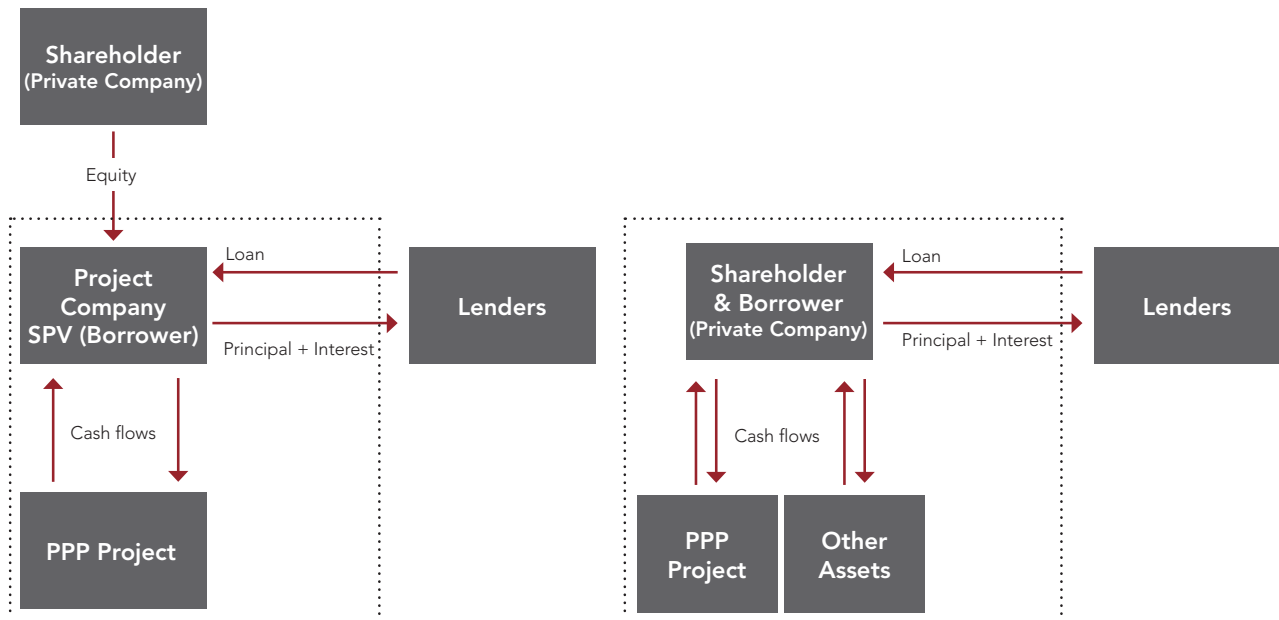
In 1997, a concession for the eastern section of metro Manila was awarded to the Manila Water Company, a consortium led by the Ayala Corporation of the Philippines, with interests from United Utilities, Bechtel, and the Mitsubishi Corporation. In the wake of the Asian Financial Crisis, the Manila Water Company was unable to raise debt to finance investments on a non-recourse project

finance-basis, so Ayala provided a corporate guarantee to back up the project company.

In 1992, an oil pipeline in Colombia was being developed as a joint-venture between the national oil company and international oil companies with the IFC as the main lender. At the time, the IFC was concerned about possible guerilla attacks and the project stalled. To move forward, the shareholders provided a full loan guarantee on the project.

Sources: (Esguerra 2003); (IFC 1999)

Figure 1.4 Non-Recourse and Full-Recourse Corporate Project Finance Structures



From the lenders perspective, limited recourse project financing will often not be sufficient. They will typically require additional credit support from the PPP company shareholders and/or third parties. Monoline insurance companies were widely used for this purpose before the 2008 global financial crisis. Sometimes, lenders will ask for step-in rights in case of default. In full recourse schemes, the only drawback is a potentially long and complex process for redress, especially if the investors' parent company is based overseas.

Figure 1.4 - Non-Recourse and Full-Recourse Corporate Project Finance Structures presents the structures for full-recourse corporate and non-recourse project finance. These two cases are not the only financing structures available. PPP financing is actually quite diversified. In some countries with less developed financial institutions, where project finance is not common, but where contracting authorities wish to design good PPP arrangements, investors are required to create a PPP company (the SPV), which then obtains loans with guarantees from the PPP company shareholders. A **World Bank report on PPP financing in Latin America** (WB 2017b) describes some of these financing arrangements. In countries with more developed financial markets, large investors do finance the PPP projects with their own resources (obtained through full recourse corporate finance) and later, after construction is com-

pleted and construction risk disappears, they issue project bonds to the financial markets.

Another alternative to lower the cost of finance for a PPP is for the government to participate in the finance structure, as described in *The Role of Public Finance in PPPs* under *Section 1.3.2 - Considerations for Government*. The government—or a government-owned financial institution—could provide finance as a lender to the project company, or could provide a guarantee to some, or all, of the project debt.

Islamic Finance

Alongside the conventional system, the Islamic financial market has emerged as an increasingly relevant method for financing PPPs. According to the **Africa Islamic Economic Foundation** (AIEF 2014), Islamic financial institutions have accumulated significant liquidity, and are looking for quality projects to invest in high quality medium to long-term investment opportunities. As such, Islamic finance presents a relatively untapped market for PPP financing. But there is a more fundamental reason for the growth in and appeal of Islamic finance—during the 2008 global financial crisis, financial institutions and structures that were Sharia compli-

ant performed far better than their conventional counterparts. The two key features of Islamic finance that bring better stability are: transactions are asset-backed or asset-based (as trading of debt is prohibited); and they are based on risk-sharing principles.

Sukuk (bond-like structures) allows for co-ownership of productive resources (underlying assets). As a result, the income to *sukuk*-holders is generated by the actual underlying business activity and hence is considered profit rather than interest. The **APMG PPP Certification Guide** (APMG 2016, Annex B) presents a description of Islamic financing principles and products that may be used for PPPs. Islamic project finance requires careful design of *sukuk* that is well-adapted to each specific project and the financing instruments being used, such as *istisna* (construction financing during development phase) and *ijara* (lease financing during operational phase).

Typically, an *istisna* agreement is signed between the Islamic financier and the project's SPV to procure the construction of a PPP asset by entering into a direct agreement with its construction contractor. Once the asset has been constructed, the SPV delivers it to the financier at a pre-agreed price. This is followed by *ijara*, whereby a lease (with usufruct rights) of the same project asset is granted by the financier to the SPV. The *ijara* contract typically includes a promise by the Islamic financier as lessor to transfer ownership of the leased asset to the lessee either at the end of the lease period or in stages during the term of the *ijara*. An example of this type of arraignment is the **Queen Alia International Airport**, a 25-year concession in Jordan (IsDB and WBG 2016). An Islamic structure co-financed the project with a \$100 million *istisna* combined with a forward lease under the *ijara* structure—it should be noted that in the co-financing, Islamic financing ranked *pari passu* (at the same level of seniority) with conventional senior lenders.

If the transfer of ownership of tangible assets is not allowed or possible, the beneficial rights contained in the project agreement can be assigned to the Islamic financier. For instance, in the **Hajj Terminal Expansion Project** (IFC 2013) in Jeddah, Saudi Arabia, the Saudi Arabian Civil Aviation Authority, the Islamic Development Bank, and IFC used a Sharia-compliant Build, Transfer, and Operate (BTO) concession model. The Islamic financiers purchased the beneficial rights under the BTO agreement, and then, as lessors, entered a forward lease agreement (*ijara*) with the project company under which the rights under the BTO agreement were assigned to it in return for rental payments.

As equity, by definition, is compliant with Islamic financial principles, it is invested either directly by sponsors or by Islamic infrastructure funds (mutual funds or unit trusts) in PPP projects. Equity could also come from *sukuk* as *mudarabah* (profit sharing trust financing—with no role in management decision-making) or *musharakah* (equity financing similar to a joint venture model). *Takaful* (Islamic insurance based on the concepts of cooperative risk sharing amongst the members) funds can also provide an alternate mode of financing PPP projects.

The following additional references provide a starting point on this subject:

- ♦ *An Introduction to Islamic Project Finance* (2013) Clifford Chance Briefing Note (Latif 2013)
- ♦ *Islamic Finance and Economic Development* (2014) Salman Syed Ali, IRTI (Syed Ali 2014)
- ♦ *An Introduction to Islamic Finance* (1999) Harvard Business School, Paper N9-200-002 (Esty et al. 1999)
- ♦ *Islamic Banking and Finance* (2011) Brian Kettell (Kettell 2011)
- ♦ *Mastering Islamic Finance* (2015) Faizal Karbani, Financial Times Publishing/Pearson (Karbani 2015)
- ♦ *Islamic Capital Markets, Products and Strategies* (2011) Hassan and Mahlkecht (Hassan and Mahlkecht 2011)
- ♦ *Public Private Partnerships: Lesson from Sukuk* (2013), Abdul Gahfar Ismail, IRTI (Ismail 2013)
- ♦ *Financing PF2 Projects: Opportunities for Islamic Project Finance* (2014) Noor Zawawi et al (Zawawi et al. 2013)
- ♦ *The Nitty Gritty of Supporting Islamic Finance* (2011) Hoda Moustafa, MIGA (Moustafa 2011)

1.3.2 Considerations for Government

When a PPP involves private finance, the investor typically has primary responsibility for developing the finance structure of the project. Nonetheless, government may need to influence its design.

At the most basic level, governments need to ensure that the project design is *bankable*—that is, the project company can raise debt. Although the ability to raise debt is a necessary feature, too much debt can undermine risk-transfer, so governments may want to limit the amount of debt finance (leverage) allowed. More arcane but still important details include: how to manage risks in going from contract award to financial close; how to deal with the possibility of refinancing project debt; and how to define step-in rights for lenders and the government. These points are described in turn below.

Governments may also participate in the finance structure. Governments can provide debt, equity, or guarantees—either directly, or through government-owned financial institutions such as development banks and pension funds. *Section 1.3.3 - The Role of Public Finance in PPPs* describes the role of this kind of public finance in PPPs.

Bankability

The ability of a project to raise finance is often called bankability. *Bankable* really means that a project can attract not only equity finance from its shareholders, but also the required amount of debt. **Delmon's chapter on bankability** (Delmon 2015, Chapter 4) and **Farquharson et al's chapter on PPP financing** (Farquharson et al. 2011, 54–57), both describe the factors banks will consider in deciding whether to lend to a project.

For a project to be bankable, lenders need to be confident that the project company can service the debt. Under a project finance structure, as described in *Section 1.3.1 - Finance Structures for PPP*, this means operating cash flows need to be high enough to cover debt service plus an acceptable margin. It also means that the risk of variation to the cash flows must be highly likely to stay within the margin. Lenders therefore carefully assess project risks, and how these risks have been allocated between the parties to the contract.

If too much risk has been allocated to the private party, lenders will reduce the amount they are prepared to lend until the margin of cash flow over debt service is acceptable. When this happens, more equity will be needed. At the same time, the project company needs to be expected to generate high enough returns to compensate its equity holders for their level of risk.

From the government's perspective, the key considerations for ensuring bankability are therefore the technical and financial viability

Box 1.11 Example of a Thinly-Capitalized PPP: Victoria Trams and Trains

The State Government of Victoria awarded five franchises (similar to concessions) for operation of trams and commuter rail in Melbourne, and regional trains in the State of Victoria. The financial equilibrium of the projects relied heavily on the expected growth in patronage and reduction in costs. The government expected total savings in subsidies to the projects of A\$1.8 billion over the life of the contracts. However, the total private capital at stake, including equity and performance bonds, was only A\$135 million, which is approximately three percent of total assets. When the growth and cost reductions were not realized, the franchisees experienced losses. Because the capital at stake was relatively low, the operators could walk away from the franchises, rather than endure the losses trying to improve it. This put the government in a position of having to renegotiate the contracts with the existing operators.

Sources: (Ehrhardt and Irwin 2004); (VIC 2005)

of the project, and appropriate risk allocation. *Section 3.2 - Appraising Potential PPP Projects* provides guidance on assessing financial viability of a potential PPP project. *Section 3.3 - Structuring PPP Projects* provides guidance and tools for practitioners on risk allocation.

Moreover, lenders and shareholders both have incentives to reduce their risks and maximize their return. This means that in structuring the PPP, the government undertakes a difficult balancing act—ensuring the project is bankable, while resisting pressure for the government to accept more risk than necessary.

Limiting the amount of debt allowed

Projects shareholders often have an incentive to finance a PPP with a high ratio of debt to equity—that is, to achieve high leverage. As **Yescombe** describes, higher leverage typically enables equity investors to achieve higher returns, and makes it easier to manage the financial structure, since it can be easier to raise debt than equity (Yescombe 2007). Moreover, as described in **Ehrhardt and Irwin** (Ehrhardt and Irwin 2004), governments often provide more

protection to debt investors than to equity investors, providing a further incentive for high leverage. For example, governments may provide guarantees on demand designed to ensure revenue can cover debt service, or agree to payments in case of early termination that are set equal to the level of debt, such that lenders are repaid even in case of default by the project sponsor on its obligations under the contract.

To ensure a sustainable level of leverage, and large enough equity stake in the project, governments can consider introducing a minimum equity ratio for PPPs. *Box 1.11 - Example of a Thinly-Capitalized PPP—Victoria Trams and Trains* presents an interesting case in Australia where the minimum equity requirements were inadequate to ensure a genuine commitment from operators. As **Ehrhardt and Irwin** (Ehrhardt and Irwin 2004, 49–50) note, equity ratios can be particularly important if the government is also providing guarantees that are designed to protect lenders' investment. However, restricting an investor's ability to choose its capital structure can increase the cost of capital, as described in a **World Bank Gridline note on financing Indian infrastructure** (Harris and Tadimalla 2008). The authors also note the importance of structuring any guarantees or termination payment clauses to avoid creating incentives for high levels of debt and leverage.

Minimum requirements on equity levels and composition are also relevant for having a core of strategic equity investors. Governments should limit the ability of equity owners to sell-down until a certain period after construction completion and commissioning, i.e. until the project is fully operational, ensuring that strategic investors keep capital at risk long enough to ensure service performance according to contractual standards. The length of that post-commissioning period depends on the sector and the technology used.

Risks in going from award to financial close

A PPP contract is sometimes awarded and signed before the project reaches financial close—that is, before the finance for the project is fully secured. In the interim period, lenders complete their due diligence process, including detailed review of the PPP agreements. Loan agreements set *conditions precedent* that must be in place before the project company can access funds from the loan.

This process creates a risk that the project could be delayed or even fall through, if the winning bidders are unable to raise finance on the expected terms. As described by **Farquharson et al** (Farqu-

harson et al. 2011, 125) the government may be under pressure to change the contract terms to meet lenders' requirements, since re-opening the procurement process at this stage would cause delays and additional transaction costs for the government.

Governments have a few options available to mitigate this risk. As **Farquharson et al** also explains, bidders can be required to provide a bond, which may be called if the preferred bidder fails to achieve financial close within a certain period. This may encourage bidders to develop more concrete financing plans before submitting bids. Another option to avoid the risk altogether, as described by **Delmon** (Delmon 2015, 445–446), is for governments to require bids with financing commitments already in place (called an *underwritten bid*). In this case, lenders must complete due diligence before the tender process is complete. However, both these options increase the cost of bidding, which may deter bidders and undermine competition. For projects with a small number of potential lenders, requiring underwritten bids will immediately create an upper limit on the number of bidders able to present a proposal, as discussed in the PPP Certification Guide (APMG 2016, Chapter 1, Section 7.2.2).

Another approach is to introduce stapled financing. Stapled financing is a pre-arranged financing package for the project, developed by the government and provided to bidders during the tender process. The winning bidder has the option, but not the obligation, to use the financial package for the project. Stapled financing is common in Mergers and Acquisition deals, and has been used for infrastructure projects—for example, **Russia** used it for Pulkovo airport (IFC 2017) with EBRD and IFC staple finance, and it is commonly used in PPPs in Europe, with part of the SPV debt offered by EIB under conditions pre-announced to all bidders and subject to further due diligence on the winning bidder. Staple financing is further discussed in **EPEC's 2009 report on the financial crisis and the PPP market** (EPEC 2009).

The role of output based aid

PPPs are output-based projects—users and procuring authorities will pay for service delivered and asset availability, not for inputs. When serving poor populations, PPPs can be combined with results based financing (RBF) mechanisms that can effectively give underserved populations access to electricity, water, sanitation, health care, education, and other basic services necessary for growth and opportunity. Output-Based Aid (OBA), an RBF mechanism,

has been successfully used as a component of PPPs specifically to ensure that the poor benefit from the PPP scheme—as presented in a **World Bank report on OBA for water** (GPOBA 2016).

Results-based financing (RBF) encompasses a range of mechanisms designed to enhance access to and delivery of infrastructure and social services using performance-based incentives, rewards, or subsidies—see *Box 1.7 - Performance Based Road Contracts—Improving Maintenance of Infrastructure*. RBF mechanisms typically have a funding entity (typically a government or government agency) that provides a financial incentive, conditional on the recipient undertaking a set of pre-determined actions or achieving a pre-determined performance or outputs. Resources are disbursed not solely against the completion of specific expenditures or contract effectiveness on the input side, but against demonstrated and independently verified results that are largely within the control of the recipient such as the installation of solar home systems, or the connection of households to water supply systems.

Payments that are based on independently verified results are the principal characteristic of RBF approaches. Subsidies are used to incentivize service providers to offer access to services to underserved poor populations. The subsidies can be used to contribute to the capital cost of the project so that it becomes affordable for the private operator, ensuring commercial returns from the operation. OBA is the RBF mechanism most frequently paired with PPPs. The focus is on access to basic infrastructure and social infrastructure (health, education) and on output-based reimbursement.

For example, consider a water network that reaches neighborhoods that can pay for household connections, yet the same mains line runs past poor neighborhoods that need and will pay for clean water, but cannot afford the household connection—OBA funds can help pay for the expansion of connection to poor households. Thus poor households will gain access to water services and the utility will have new paying customers that it would not have had otherwise. For additional information, see the **Global Partnership on Output Based Aid (GPOBA) website**.

Refinancing of project debt

Refinancing means taking on new debt to pay off existing loans. The project company and its shareholders may have two main reasons to refinance debt that was initially used to finance the project.

First, the project may have been unable to obtain a financing package with a long enough maturity to match the project's length. This could occur because long-term debt was not available at the time when the project was awarded, or because lenders viewed the project as too risky to extend credit with a long maturity. In this case, the project could proceed with a shorter-term loan, as described in **Yescombe's chapter on financial structuring** (Yescombe 2007, Chapter 10). This creates a refinancing risk—that is, the risk that the shorter-term loan cannot be refinanced at the expected terms. The PPP contract should specify who bears refinancing risk, as described in *Section 3.3 - Structuring PPP Projects*.

One option to mitigate refinancing risk is *take-out financing*, in which a second lender promises to take over a loan at some future point—thereby encouraging the original lender to provide longer-term debt than might otherwise be the case. For example, the Indian Infrastructure Finance Company Limited has established a take-out financing scheme for infrastructure projects (IIFCL 2015).

Refinancing can also provide an opportunity for the project company and its shareholders if more favorable terms become available. Because infrastructure projects have long durations, capital markets could change during the life of the project and offer better terms on the existing project debt. Lenders also tend to offer better financing terms to projects with demonstrated track records and have already moved past initial risks, such as construction. Shareholders can use refinancing for increasing the debt/equity ratio, re-leveraging the project and freeing equity. **Yescombe's section on debt refinancing** (Yescombe 2007) further describes the potential gains to equity investors from refinancing.

Refinancing is also relevant for lenders, allowing banks to release capital to allocate to new projects. Capital markets (and pension and insurance funds in particular) are well-placed to provide such refinancing, as they can generally provide longer tenor, and—as risk is lower after the construction phase—they can often provide cheaper debt.

Refinancing with more favorable terms can lower overall costs for users or government, improve returns to investors, or both. The government needs to consider upfront how benefits of refinancing will be treated. Options include:

- ♦ **Do nothing**—allow equity holders to gain from refinancing through higher dividend payments;

- ♦ **Share gains between project shareholders and users/clients**, by including in the PPP contract or PPP regulation a clause which states that benefits of refinancing must be reflected in the price paid for the asset or service;
- ♦ Building into the PPP contract the **right for the government to require or request refinancing of the project debt**, if it believes that more favorable terms are available in the market.

Several governments have introduced rules for how PPP refinancing benefits will be treated, as described by **Yescombe** (Yescombe 2007). For example, in 2004 the **United Kingdom's Treasury** introduced into its standard PFI contracts a 50:50 split of any refinancing gain between the investors and the government (UK 2012c); this was subsequently revised in each version of contract standards. South Korea has also introduced a similar provision in its legislation governing PPPs. Since 2008, the United Kingdom's government has also reserved the right to request for refinancing of project debt to take advantage of more favorable capital market conditions. A further discussion of refinancing and potential structural issues arising from it can be found in **EPEC's 2009 report on the financial crisis and the PPP market** (EPEC 2009).

Step-in rights

Step-in rights refer to a power under the contract or in the country's legislation for the government or lender to take control of the project in certain situations. Step-in rights for the government are normally reserved for situations in which the project poses significant health and safety risks, threats to national security, or when legal requirements call for the government to take over the project. The government may also terminate the PPP contract and take over the project if the project company fails to meet service obligations.

Effective step-in rights by lenders require, besides contractual provisions, a direct agreement between government and lenders, regulating the process for requiring and implementing those rights.

Lenders generally require step-in rights that come into effect if the project company fails to meet its debt service obligations, or if the PPP contract is under threat of termination for failure to meet service obligations. In this situation, the lenders would typically appoint new senior management or another firm to take over the project. Step-in rights do not only protect the interests of lenders, but also protect the public interest, by creating a third-party buffer

between the government and the project—so that, in case of project misperformance, the lenders are allowed and incentivized to act, before the government is forced to intervene.

It is important that both the government and lenders have a clear framework and timeline for invoking their step-in rights so they are informed when problems start to occur and can take remedial actions. *Section 3.4 - Designing PPP Contracts* provides more detail on how step-in rights can be built into a PPP contract.

The role of pension funds

Pension funds have long-term liabilities on their balance sheets in the form of future pension payments. To avoid a mismatch of maturities between the two sides of their balance sheets, pension funds need to invest in long-term assets. Thus, the long-term nature of infrastructure investments suits the investment profile of pension funds; and their returns, which tend to keep up with inflation, help hedge pension funds' liabilities that are also inflation-prone. Additionally, pension funds are interested in diversifying their portfolios to lower the volatility of their returns. Infrastructure investments can be attractive when the correlation between their anticipated returns and those of traditional assets is low.

In **Australia** and **Canada**, which benefit from a well-defined investment regulatory framework, funding to infrastructure projects through pension funds has been successfully implemented on a wide scale. In Latin America and the Caribbean—where domestic pension funds in Chile, Colombia, Peru, Mexico, Uruguay, and Brazil hold assets ranging from 12 to 68 percent of GDP—only **Chile's** and **Peru's** domestic pension funds have invested substantially into infrastructure (WB 2017b). Globally, pension funds' investments in infrastructure are estimated to be less than one percent of their assets (OECD 2011).

In general, pension fund financing to infrastructure is hindered by rigid investment regulatory frameworks, slow progress in capital market reforms, and the absence of a sound project financing framework for the banking sector. Pension funds' poor ability to conduct effective due diligence and to understand infrastructure risk may also reduce their appetite for investing in PPPs—they are better placed to refinance projects, once construction risk is out of the way and the project has a track record of good service performance. Also, the lack of suitable PPP projects—i.e. lack of well-structured projects submitted to market competition—tends

to dissuade the involvement of pension funds in infrastructure schemes. Furthermore, in countries such as **China** and **India**, overly restrictive pension fund laws undermine their investment capabilities (Inderst and Stewart 2014).

A **World Bank report on LAC infrastructure financing** (WB 2017b) analyses what pension fund managers want from infrastructure—high returns, low risk, liquidity of the instrument, fair pricing, and reliable partners. Infrastructure bonds can offer a **return** over government instruments that reflect credit risk plus some liquidity risk—but poorly prepared projects may not attract pension funds; and poorly designed PPP programs may create long-lasting distrust among institutional investors. Preference is given to **liquid** instruments such as standardized infrastructure bonds more easily valued in the market, and used for the whole concession program, instead of for individual projects. To reduce **risk**, pension funds may require government guarantees, particularly during the construction phase, but governments need to carefully manage the added contingent liabilities brought by contractual guarantees. Otherwise they require a two-stage financing mechanism, where the long-term financing comes only after completion of construction—therefore creating some refinancing risk. **Fair pricing** may not exist where governments control or cap investor returns or where the tax regime is not clear and appropriate.

1.3.3 The Role of Public Finance in PPPs

The exclusive use of private finance is not a defining characteristic of a PPP—governments can also partially finance PPP projects. Reducing the amount of capital investment needed from private entities reduces the extent of risk transfer—weakening private sector incentives to create value for money, and making it easier for private entities to abandon the project if things go wrong. Nonetheless, there are several reasons why governments may choose to provide finance for PPP projects. These include:

- ◆ **Avoiding excessive risk premiums**—the government may consider the risk premium charged by the private sector for the project to be excessive in relation to the actual project risks. This can be a difficult call to make, since financial markets are usually better at assessing risk than governments, but can apply particularly for new projects or markets, or during financial market disruptions.
- ◆ **Mitigating government risk**—where project revenues depend on regular payments from government, the risk of default by the government will be assessed by the private party and will be reflected in the project cost. Where reliability of government payments may be in doubt, providing subsidies or payments upfront in the form of loan or grant finance, rather than on-going payments, could improve the bankability and lower the cost of the project.
- ◆ **Improving availability or reducing cost of finance**—particularly when capital markets are under-developed, or disrupted, the availability of long-term finance may be limited. Governments may choose to provide finance at terms that would otherwise be unavailable. Some governments have access to finance on concessional terms, which they may pass on to lower the cost of infrastructure projects. This may also be part of a broader policy of involving state financing institutions to provide long-term lending for developmental purposes.

There are different ways in which governments can contribute to the financing structure of a PPP. Governments may provide loan or grant finance directly to the project company, or provide a government guarantee on a commercial loan. The APMG PPP Certification Guide discusses de-risking approaches and credit enhancement instruments (APMG 2016, Chapter 1, Section 7.4.2). Government-owned development banks or other finance institutions can also be involved—either providing finance to PPPs as part of a broader portfolio, or being established specifically to support the PPP program. Finally, governments may simply not transfer the financing function to the PPP project to the private sector, instead retaining on-going responsibility for capital expenditures. These options are described in more detail further in this section.

The rationale for government financial support to PPPs may be strengthened during periods of capital market disruption, and many governments introduce specific forms of financial support in response.

Loan or grant finance directly from government to project company

Governments may provide finance directly to a PPP in the form of loans or upfront grant subsidies. These can be critical for project viability, where revenue projections show that the project is not likely to be financially viable without government funding. Capital

contributions can also reduce the project's costs to the government by making finance available at better terms than would otherwise be possible. For example:

- ◆ In the **United States**, the Transportation Infrastructure Finance and Innovation Act (TIFIA) established a flexible mechanism for the United States Department of Transport to provide loans (as well as loan guarantees) directly to private and state project shareholders for eligible projects. The credit assistance is offered on flexible terms, and typically takes a subordinated position, which in turn makes it easier to attract more private debt (US 2010, Chapter 4).
- ◆ India's Viability Gap Fund uses funds appropriated from the national budget to provide upfront capital subsidies for PPP projects, as described in *Box 2.9 - The Viability Gap Fund Program in India*. The **Indian government's guidelines on financial support for PPP in infrastructure** (IN 2013a) provide more details on this initiative.

The willingness of the public sector to provide funds can also act as a signal to help build confidence of private investors. For example, after the 2008 financial crisis, the United Kingdom's Treasury recognized several infrastructure projects could have difficulty raising debt and were in danger of being scrapped. The Treasury created the Treasury Infrastructure Finance Unit (TIFU) to lend at commercial rates to PPP projects that were unable to raise enough commercial bank finance. The unit funded one major project in April 2009: The Greater Manchester Water project. According to a **United Kingdom National Audit Office report** (NAO 2011, 8), the Treasury's willingness to lend improved market confidence, and as of July 2010, 35 further projects had been agreed without public lending.

Government provision of SPV equity

Under the **British Government's revised PPP policy introduced in 2012**—termed *Private Finance 2*, or *PF2*—the Treasury may provide a minority share of the equity in PF2 projects (UK 2012a). The rationale was to give government better access to project information, including in relation to the financial performance of the project company; allow government to be more involved in strategic decision making; and improve value for money by sharing in the ongoing investment returns. A similar structure has been used

by a few other governments, such as the Regional Government of Flanders in Belgium.

However, public equity in a PPP can also generate conflicts of interests within the public sector, and may enhance the perception of risk for private investors. In particular, government ownership can trigger conflict of interests with its regulatory function; and the private investors may be concerned that the government might be tempted to interfere in the management of the PPP contract within the SPV, if some decisions need to be taken to maximize shareholders value but are not necessarily in the public sector's best interest. Under the **United Kingdom's PF2 policy** (UK 2012a), this potential conflict of interest is mitigated by separating the ownership function from the contract management function. Hence, equity shareholdings are managed by a unit located in the Treasury separate from the procuring authority. France follows the same approach.

Government guarantee of commercial loan to project

Rather than providing lending directly, governments may instead guarantee repayment of debt provided by commercial sources, in case of default by the private party. **Farquharson et al** (Farquharson et al. 2011, 63) notes that guaranteeing project debt undermines the risk transfer to the private sector. For this reason, governments often provide only partial credit guarantees—that is, a guarantee on repayment of only a part of the total debt.

Partial credit guarantees have been used by both developed and developing country governments to help support their PPP programs. For example:

- ◆ **Korea's** Infrastructure Credit Guarantee Fund guarantees project debt through a counter-guarantee structure. That is, the Fund guarantees an on-demand term loan provided by a financial institution that can be called by the project company to meet its senior debt service payments (Fitch 2006a, 6–7).
- ◆ **Kazakhstan** has provided guarantees on infrastructure bonds issued for its transport PPPs. The guarantees on the bonds by the government gave security for the pension funds to invest in the projects (USAID 2008).

- ♦ **Indonesia** has established IIGF, as described in *Section 2.4.3 - Budgeting for Government Commitments to PPPs*.

The use of guarantees should be carefully considered, and cover the risks which the government is best placed to manage. Inappropriate use of guarantees can increase government's fiscal exposure, and reduce value for money as the transfer of risk to the private sector is mitigated. A more detailed discussion on this topic can be found in *Section 1.3.2 - Considerations for Government* which focuses on the dangers of over-leverage, and in *Section 1.2.1 - Insufficient Funds* which discusses the risks associated with the lack of fiscal clarity from PPPs. For more information on government guarantees and public financial management for PPPs, see *Section 2.4 - Public Financial Management Frameworks for PPPs*.

Forfeiting structures

A finance structure sometimes used to reduce the cost of finance for PPPs is the forfeiting model, which can be used for government-pays PPP projects. Under this model, once construction is completed satisfactorily, the government issues an irrevocable commitment to pay the project company a portion of the contract costs—typically sufficient to cover debt service. This can lower the project's financing costs.

However, it means the government retains more risk under the PPPs. The lender has less interest in ensuring project performance since government payments are no longer conditional on the private operator meeting performance objectives. Since there is certainty in government payments, this is effectively a government debt obligation—and government should account for this liability accordingly. Besides, the fact that payment is not conditional reduces revenue risk. It should therefore be reflected in the pricing of SPV debt. The forfeiting model has been widely used in Germany for small projects—typically municipal projects—where over half of the PPPs implemented between 2002 and 2006 used this structure. For more detail on the forfeiting model, see **Daube's article** (Daube et al. 2008) comparing project finance to the forfeiting model.

A variant of the forfeiting model is the cession de créance (assignment of receivables) used in France. In this case, upon verification of availability, the project company assigns its receivables payable by the government to the commercial bank financing the project. Therefore, once the infrastructure is built and operational the

government payments are unconditional and can be used to cover some or all of the debt service of the PPP project company.

The Government of Peru has also introduced a financing structure for PPPs that is a variant on the forfeiting model. In the Peruvian model, irrevocable payment commitments are issued *during* construction on completion of defined milestones. The CRPAO structure is described in *Box 1.12 - CRPAOs in Peru*. These forfeiting-type models allow for the private partner to gradually finance its investment by securitizing the guaranteed future flow of payments related to each phase of construction. However, it also means the government is committed to paying a proportion of the contracted amount irrespective of whether the asset is completed. The relevance of this approach may depend on the nature of the asset—in particular, whether it is readily divisible.

Box 1.12 CRPAOs in Peru

In Peru, an innovative financing structure has been developed to finance construction of its road concessions. The Government of Peru issues PAOs (Pago Annual de Obras or *annual payments for work*) to the private contractor for completing construction milestones. PAOs are obligation of the Government of Peru to make dollar-denominated payments on an annual basis (similar to bonds). After they are issued, the payments are not linked to the performance or operation of the roads and are irrevocable and unconditional. Debt for the project is raised through bonds that are backed by the securitization of the PAOs, known as CRPAOs (Certificado de Reconocimiento de Pago Annual de Obras).

Peru first used this financing structure in 2006 to finance the first 960km piece of the IIRSA Interoceania Sur. The project raised \$226 million in debt for the project with a \$60 million partial credit guarantee from the Inter-American Development Bank. Two subsequent pieces of the Interoceania Sur have also used the CRPAO financing structure.

Sources: (Fitch 2006b); (USAID 2009)

Development bank or other state finance institution involvement in PPPs

Many governments have established publicly-owned development banks or other finance institutions, which may provide a range of financial products to PPP projects. These financial institutions may be capitalized by the government, and can often also access concessional financing. Where these entities operate as commercial finance institutions, they may be better placed to assess the viability of a proposed PPP project than the government itself—although they are sometimes also exposed to political pressure that may undermine the quality of due diligence or project structuring.

In some cases, established development banks may expand their activities into the PPP sector. For example, the **Banco Nacional de Desenvolvimento Econômico e Social** (BNDES, Annual Report)

has been a major lender to private infrastructure projects in Brazil—appraising risk and providing finance.

Alternatively, governments may establish finance institutions specifically to serve PPPs, and sometimes other infrastructure investments. For example, the India Infrastructure Finance Company Limited (IIFCL) was established in 2006 to provide long-term debt to viable infrastructure projects undertaken by public or private companies. The Indonesia Infrastructure Guarantee Fund (IIGF) was established in 2009 as a state-owned company to provide guarantees for infrastructure projects under PPP schemes. However, as described by **Klingebiel and Ruster in their paper on infrastructure facilities** (Klingebiel and Ruster 1999), unless policy and institutional frameworks are developed to provide a pipeline of bankable projects, government-backed financing facilities are unlikely to provide the desired results.

Table 1.4 Example of Third-Party Risk Mitigation or Credit Enhancement Instruments

Instrument	Description	Example Provider(s)
Full or comprehensive credit guarantees	Cover the full value of a project's senior debt for all risks. Such cover is typically available for projects that are already relatively low-risk, with the objective of raising the rating of those projects to investment grade, enabling more risk-averse investors such as pension funds to participate in the project financing.	Historically such guarantees were provided by “monoline” insurers. Providers of such guarantees are relatively few, and include some Development Finance Institutions (e.g. EIB), Export Credit Agencies, and MIGA's guarantees regarding ‘non honoring of financial obligation’.
Partial credit guarantees (PCGs)	Tailored to the project, they cover loss in case of default up to a certain proportion of a project's senior debt. This cover may be on a first loss or <i>pari passu</i> basis. First loss guarantees absorb the first percentage of loss given default: that is, they reduce the risk of loss from a lender's perspective in a similar way to subordinated debt. <i>Pari passu</i> guarantees absorb a defined percentage of any loss—that is, reduce the size of loss, but not the risk.	Most development finance institutions can provide partial credit guarantees, for example the World Bank, or the EIB's Project Bond Initiative, which can offer both subordinated debt or partial credit guarantees. GuarantCo specializes in providing partial credit guarantees in local currency, to enable local financial institutions to participate in project financing (also reducing currency-related risks).
Political risk insurance	Protect the project sponsor and/or lender from loss due to political risks. These may include the risk of expropriation, political violence such as war or civil disturbance, or transfer or convertibility risk, and breach-of-contract risks.	Offered by several development finance institutions, including MIGA. A report by the Initiative for Risk Mitigation in Africa (IRMA) (Pierris 2012), which is a program in partnership with the AfDB, it illustrates that the range of IRMA's PRI instruments that can be used for PPP projects.
Currency swaps or forward contracts	Swaps or forward contracts to hedge against fluctuations in currency or commodity prices. Currency swaps in particular are often available only for a limited range of widely-traded currencies.	Commercial banks and the Currency Exchange (TCX), a donor-funded initiative that provides currency swaps for a wide range of currencies.
Insurance or contingent credit lines against natural disasters	Protect from loss due to natural disaster, or alternatively, provide a contingent credit line to finance needed investments.	Provided by several development finance institutions or in some cases, private providers. Examples include index-based weather derivatives (see <i>Box 1.9 The Uruguay Weather Derivative</i>), or the World Bank's Catastrophic Risk Deferred Drawdown Option (WB 2011a).

Government-owned finance institutions can also be used to provide PPP policy coordination and enforcement, by establishing clear rules and requirements for when financing will be available. This can particularly apply when a financial institution is set up specifically to serve the needs of a PPP program. For example, in Mexico most PPPs have been implemented with the support of FONADIN, an infrastructure investment fund under the national development bank BANOBRAS. The operating rules for FONADIN *de facto* established the rules and procedures by which PPP projects will be implemented, as described in *Box 1.13 - Mexico's FONADIN*.

1.3.4 Third Party Risk Mitigation and Credit Enhancement

The PPP Agreement is at the center of a PPP, as shown in *Figure 1.3 - Typical PPP Project Structure*. This agreement allocates projects risks, responsibilities, and rewards between the two signato-

ries—the contracting agency and private parties—following the principles discussed in *Section 3.3 - Structuring PPP Projects*. The overarching goal is to align the profit incentives of the private parties with the government's objectives for the project.

However, a well-structured PPP agreement, based on sound risk allocation, may not necessarily result in a bankable project. As described in *Section 1.3.2 - Considerations for Government*, if the level of risk allocated to the private party is too high, lenders may increase their lending rates or reduce their willingness to lend to the project to the point where the project becomes unviable or not bankable. For example, projects with particularly high exposure to geotechnical or natural disaster risks—particularly in the context of climate change, as described in *Section 1.2.6 - Climate Change and Natural Disasters*—could be difficult to finance. Projects in countries with a high perceived risk of doing business with the government in general, such as in fragile or conflict-affected states, as described in *Section 1.2.5 - Infrastructure in Fragile and Conflict-Affected States*, often face similar challenges.

In these circumstances, governments can secure the bankability of the project by accepting more risk (through adjusting the agreement or providing additional guarantees), or providing government grants or loans to reduce the extent to which the private party needs to raise finance, as described in *Section 1.3.1 - Finance Structures for PPP*. However, these levers have limitations: they may reduce the risk transfer to the point where the alignment of incentives is simply too weak to be effective; they may present fiscal costs or risks that the government is not willing to bear; or they may simply not be effective, particularly in the case of significant political risk or risk of adverse government behavior, which is borne by the private party by definition.

An alternative option is to assign some part of the project risk to a third party through a credit enhancement or risk transfer instrument. These instruments include guarantees, insurance policies, or hedging mechanisms under which, for a fee, the provider will agree to compensate the concessionaire (or its lenders) in case of default and/or loss due to some specified circumstance. Some of these instruments are offered by commercial providers, such as insurance companies or swap providers, which specialize in pricing and managing risks. Others are offered by development finance institutions, such as MIGA, that have access to concessional capital, explicit mandates, different risk appetites, and/or are better placed than private sector lenders to assess and manage the specific risks

Box 1.13 Mexico's FONADIN

Prior to 2012, Mexico had no PPP Law. However, most government agencies that implement projects through PPP schemes did so with the support of the *Fondo Nacional de Infraestructura* (FONADIN). Exceptions are typically projects that are self-financing—that is, projects that generate revenues that are sufficient to cover the costs; the two government entities that generally follow this path are CFE (the national electric company) and PEMEX (the national oil company).

In addition to providing subsidized lending and, in some cases grants, FONADIN can help agencies in providing grants for the preliminary studies for the project, preparing the project documentation and implementing the tender process. In practice, this has meant that the Presidential Decree that established FONADIN in 2008 has effectively governed most PPP projects. Under that decree, the Rules of Operation of FONADIN set out the scope, and the processes and procedures to identify, assess, and approve PPP projects.

Source: (FONADIN 2011)

involved in investing in emerging markets—see (WB 2016h) as an example.

Risk mitigation or credit enhancement instruments fall into three broad types: full, or comprehensive credit guarantees, which cover the totality of a project’s senior debt against all risks; partial credit guarantees, which cover a certain proportion of a project’s debt for all risks; and a range of partial risk instruments which provide full or partial cover of loss due to specific risks.

The APMG PPP Certification Guide discusses credit enhancement instruments. (APMG 2016, Chapter 1, Section 7.4.2).

For a general discussion of risk mitigation instruments, the **OECD’s report mapping instruments and incentives for infrastructure financing** (OECD 2015c) provides a comprehensive description of different instrument types, and the **African Development Bank**

(AfDB) on the Initiative for Risk Mitigation (Pierris 2012, 68–72) present several examples. The **World Economic Forum** (WEF 2016) has undertaken a recent assessment of the availability and use of risk mitigation instruments for infrastructure in developing countries.

Accessing these risk mitigation or credit enhancement instruments is mostly the responsibility of the concessionaire during arranging financing for the project. Governments may also consider the option of credit enhancement when structuring a project, and engage with potential providers prior to bringing it to market—particularly for credit enhancements designed to back up the government’s own commitment to the project. This can help attract bidders who may otherwise not participate, and ensure bids are based on comparable assumptions, resulting in a more competitive procurement for the project.

Key References: How PPPs Are Financed

Reference	Description
Farquharson, Edward, Clemencia Torres de Mästle, E. R. Yescombe, and Javier Encinas. 2011. <i>How to Engage with the Private Sector in Public-Private Partnerships in Emerging Markets</i> . Washington, DC: World Bank.	Chapter 5 provides an overview of private finance for PPPs, focusing on challenges faced in developing countries.
Yescombe, E.R. 2007. <i>Public-Private Partnerships: Principles of Policy and Finance</i> . Oxford: Butterworth-Heinemann.	Provides comprehensive coverage of PPP financing; putting PPPs in context; describing financial analysis of PPPs and how this informs investment decisions by both public and private parties; debt financing structures and sources; how PPP financing plans are constructed; and how financing requirements are reflected in contractual terms.
Delmon, Jeffrey. 2015. <i>Private Sector Investment in Infrastructure: Project Finance, PPP Projects and PPP Frameworks</i> . 3rd edition. Alphen aan den Rijn, Netherlands: Wolters Kluwer.	Also covers a wide range of topics on PPP financing. These include an introduction to project finance structures and typical terms (Chapter 2); typical contractual arrangements for a PPP (Chapter 3); and bankability (Chapter 4).
Daube, Dirk, Susann Vollrath, and Hans Wilhelm Alfen. 2008. “A Comparison of Project Finance and the Forfeiting Model as Financing Forms for PPP Projects in Germany.” <i>International Journal of Project Management</i> 26 (4) 376-387.	Describes the forfaiting model used in Germany as an alternative to project finance, to lower financing costs for PPP projects.
Ehrhardt, David, and Timothy C. Irwin. 2004. “Avoiding Customer and Taxpayer Bailouts in Private Infrastructure Projects: Policy toward Leverage, Risk allocation, and Bankruptcy.” World Bank Policy Research Working Paper 3274. Washington, DC: World Bank.	Describes how high leverage combined with high-risk projects and a reluctance to allow a PPP company to go bankrupt can create problems for PPPs, and suggests options to address the problem. Includes PPP case studies in Australia, the United Kingdom, Brazil, and Mexico.
Harris, Clive, and Sri Kumar Tadimalla. 2008. “Financing the Boom in Public-Private Partnerships in Indian Infrastructure: Trends and policy implications.” Gridlines Note No. 45. Washington, DC: World Bank.	Describes how financing structures for PPPs in India have evolved as the use of PPPs has increased since the mid-1990s—in particular, noting an increasing proportion of debt financing—and provides some policy lessons.

Reference	Description
US. 2010. <i>Project Finance Primer</i> . Washington, DC: United States Government, Department of Transportation, Federal Highway Administration.	Outlines the United States financing mechanisms for highway infrastructure. Chapter 4 describes three mechanisms by which the United States government provides credit assistance to private investors in roads.
IN. 2013b. <i>Guidelines for Formulation, Appraisal and Approval of Central Sector Public Private Partnership Projects</i> . New Delhi: Government of India, Ministry of Finance.	Describes India's Viability Gap Financing scheme for providing capital subsidies to private infrastructure projects.
UK. 2010b. <i>Financing PFI Projects in the Credit Crisis and the Treasury's Response, Ninth Report of Session 2010-11</i> . London: House of Commons.	The Treasury of the United Kingdom outlines its response to the financial crisis, which included establishing an Infrastructure Finance Unit to provide lending at commercial terms to projects unable to raise debt from commercial banks.
Farquharson, Edward, and Javier Encinas. 2010. "The U.K. Treasury Infrastructure Finance Unit: Supporting PPP financing during the global liquidity crisis." Public-Private Partnerships Solutions. Washington, DC: World Bank.	Summarizes the United Kingdom's experience with PFI during the financial crisis, and describes the Treasury Infrastructure Finance Unit.
Burger, Philippe, Justin Tyson, Izabela Karpowicz, and Maria Delgado Coelho. 2009. "The Effects of the Financial Crisis on Public-Private Partnerships." IMF Working Paper WP/09/144. Washington, DC: International Monetary Fund.	Investigates the impact of the global financial crisis on PPPs, and the circumstances under which providing support to new and existing projects is justified.
Foster, Richard. 2010. "Preserving the Integrity of the PPP Model in Victoria, Australia, during the Global Financial Crisis." Public-Private Partnerships Solutions. Washington, DC: World Bank.	Describes how the Government of the State of Victoria, Australia, adapted its PPP program to the global financial crisis, by making changes on a project-by-project basis to allocating certain financial risks.
EPEC. 2009. <i>The Financial Crisis and the PPP Market: Potential Remedial Actions</i> . Luxembourg: European Investment Bank, European PPP Expertise Centre.	Provides ideas for governments on ways to support PPPs during the Global Financial Crisis. These include changes to procurement approaches, providing state guarantees or co-lending, particularly as a short-term measure, and adapting PPP structures to attract different types of investor.
Latif, Qudeer. 2013. "An Introduction to Islamic Project Finance." Client Briefing. April 29. Dubai: Clifford Chance.	This reference provides an overview of the Sharia compliant project finance market, summary of a few recent deals and how these deals were structured and procured.
Esty, Benjamin C., Fuaad A. Qureshi, and Mathew Mateo Millett. 1999. "Introduction to Islamic Finance." Harvard Business Review Case Study. August 6. Watertown, Massachusetts.	Provides a basic introduction to the principles of Islamic finance, including the religious background and its legal foundations. Also discusses the development of Islamic financial institutions and the financial instruments they use. Concludes with a discussion of recent developments and future challenges for this growing segment of the global financial system.
Karbani, Faizal. 2015. <i>Mastering Islamic Finance: A Practical Guide to Sharia-Compliant Banking, Investment and Insurance</i> . Upper Saddle River, New Jersey: FT Press.	Guides readers from the basic principles underpinning Islamic finance, including its market applications and prevalent practices.
Esty, Benjamin C. 2014. <i>Modern Project Finance: A Casebook</i> . Hoboken, New Jersey: John Wiley and Sons.	Provides a detailed description and analysis of project-financed transactions.
Hoffman, Scott. 2007. <i>The Law and Business of International Project Finance: A Resource for Governments, Sponsors, Lawyers, and Project Participants</i> . 3rd ed. Cambridge, England: Cambridge University Press.	Covers the complete project finance structure, from conception to negotiation to debt closing, and from project difficulties to successful restructuring.
Finnery, John D. 2013. <i>Project Financing: Asset-Based Financial Engineering</i> . 3rd ed. Hoboken, New Jersey: John Wiley and Sons.	Reviews the project finance process step by step to assist readers in familiarizing themselves with the topic.