

# 1. Public–private partnerships for infrastructure delivery

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## INTRODUCTION

Given the current state of infrastructure needs in both developed and developing economies worldwide, does it not make sense for the public sector to draw on all potential project delivery systems, including public–private partnerships? Together, the public and private sectors can provide the best services to meet the growing needs of United States (US) infrastructure, with the private sector often tapped for its potential to deliver value and innovation. This does not suggest that alternative delivery systems or public–private partnerships are the sole solution for resolving the challenges involved. The art for policy-makers is to determine when and where public–private partnerships make sense, to develop procurement and other systems that balance the transfer of risk and reward to the private sector and, most importantly, to deliver maximum value for the public’s money (paid as taxes and/or user fees) in the form of enhanced infrastructure services.

Developing and upgrading core infrastructure assets is a touchstone of a successful global economy. Research has demonstrated convincing links between the level of infrastructure investment, and social and economic development. Indeed, infrastructure assets have been shown to influence economic growth. Income inequalities decline with higher infrastructure quantity and quality. As the world economy struggles to regain its luster after the 2007 global financial crisis, investments in infrastructure can spark a new cycle of growth.

However, infrastructure investment has been waning in recent years and decades. The United States alone, by some estimates, will require at least \$1.5 trillion to \$2 trillion just to bring existing infrastructure assets up to a reasonable state of repair. This raises important questions for

public authorities. How will they garner the resources to finance this infrastructure? Are there viable alternatives to traditional public delivery and operation of infrastructure? Can and should alternative financing and delivery mechanisms be nurtured so as to begin making up the infrastructure funding gap? These questions require serious and credible answers. They are the starting point of this chapter.

### **From Publicly Owned Natural Monopolies to Public–Private Hybrids**

Some kinds of infrastructure constitute “natural monopolies” for which duplication of services imposes exceptionally high costs. Examples of natural monopolies are major roads between urban centers; large dams that provide flood control, irrigation and sometimes power generation; landline telephones, for which the last mile of copper wire to each home is prohibitively expensive to duplicate; and piped water supply and waterborne sewer collection systems, which must provide the last mile of water or sewer pipe to each home.

Natural monopolies have historically – but not always – been financed, owned and operated by governments (or by heavily regulated, monopoly private providers). Other kinds of civil and social infrastructure, even if not natural monopolies, have been widely perceived as public goods that should be financed, owned and operated by governments, although their design and construction have frequently been contracted out to private firms.

Technological and societal trends have changed this calculus in the last several decades. Technologies such as cellular telephones and power generation have unbundled the creation of goods and services from distribution. Telecom and power providers no longer need to build the last mile of wire or pipe, so they are no longer natural monopolies. This has led to a hybrid of publicly and privately financed, owned and operated wireless telecommunications and power generation facilities worldwide. Similar trends are rapidly advancing in the water treatment and waste treatment sectors. The politics and economics of government financing, delivery and operation of infrastructure have often made it increasingly attractive to supplement public involvement with the private sector’s financing capacity, global expertise, and best practices for sustainable design, delivery and operations.

The private sector has played a role in US infrastructure development since the era of explorers and pioneers. However, private entities’ inherent demand for infrastructure comes coupled with a mandate from investors to generate profits, and these cannot come at too great an expense to the public. Moreover, private entities – both domestic and international – tend to develop expertise in partnering with the public sector, but public

policy-makers often lack the institutional and technical capacity to engage as effectively, or have only recently begun to develop it. This perceived imbalance has generated controversy throughout US history.

### **From Design-Bid-Build to Custom-Designed Public-Private Partnerships**

The conventional American approach to infrastructure development is known as design-bid-build (DBB). It employs separate contractors for design and construction and typically uses public budgetary or borrowed funds from general obligation or revenue bonds to pay for design and construction services. It requires the public sector to obtain necessary financing and procure design and construction services via competitive qualifications-based and low-bid processes, respectively.

This approach has evolved dramatically over the last three decades. The newer approaches may place the responsibility for design, construction, operations and maintenance under a single contractor. It may use public budgets, borrowed funds and/or user fees to pay for capital costs (or to repay capital lent or invested). It may require the contractor to raise the necessary financing; typically through structured project finance from both equity and debt sources. And it may be procured through a multi-stage competitive proposals process.

In this changing environment, four key decisions form the basis of most infrastructure programs:

- What life cycle activities should the project's contractor(s) undertake?
- What revenue mechanism (user fees or other revenue sources) will be used to pay for capital costs and operating services, or to repay capital lent or invested?
- Which entity has responsibility for raising any necessary capital financing?
- What procurement or acquisition approach should the public sector adopt for service acquisition?

The answers to these questions determine participants' respective roles throughout the useful life of the infrastructure assets. These roles, taken together, will define a public-private partnership.

## **PUBLIC-PRIVATE PARTNERSHIPS**

A public-private partnership (PPP) is created when a government agency enters into a long-term (typically 25- to 50-year) concession agreement

with a project-based legal entity called a special purpose vehicle (SPV), under which the SPV has the right and obligation to finance, design, build, operate and maintain a facility (or some subset of these roles) in accordance with contractually specified performance standards. The government generally retains ownership of the infrastructure asset and the land on which it is built, conceding only the rights associated with the asset to the SPV for a defined term. General characteristics of PPPs include:

- a long-term contract(s) between the public sponsor and the private sector participant(s);
- a private, or joint private and public, commitment to provide “bundled” development and operational services;
- funding derived from user charges and/or governmental budgetary or borrowed resources over the lifetime of the asset.

Different types of PPPs provide project sponsors with different options for transferring risks and responsibilities to the private sector:

- A design–build (DB) PPP transfers the engineering and construction risks and responsibilities to an external consortium, firm or joint venture assembled for the project. The project sponsor pays a fixed fee and manages the financing, operations and maintenance of the asset.
- A design–build–operate–maintain (DBOM) PPP transfers the engineering, construction, operation and maintenance responsibilities and risks to the consortium, firm or joint venture. The financing and revenue risk of DBOM projects remain with the sponsoring authority.
- A design–build–finance–operate–maintain (DBFOM) PPP transfers to the consortium, firm or joint venture the engineering, construction, financing, operations and maintenance risks and responsibilities. For financing, the future stream of revenues from the infrastructure asset is leveraged to issue debt (which is underpinned by some private equity). This is what provides the funds for capital and project development. Within the DBFOM PPP, there exist two standard forms of project delivery:
  - a “patronage” concession, in which the private developer will collect revenues and bear all or much of the revenue risk; and
  - direct (or “availability”) payments, in which the public owner makes periodic payments to the consortium, firm or joint venture from government revenues, for delivering the infrastructure service based on a set of defined operation and maintenance performance standards.

## MYTHS AND MISCONCEPTIONS ABOUT PUBLIC-PRIVATE PARTNERSHIPS

A variety of misconceptions – indeed, myths – about the costs and benefits of PPPs warrant clarification before we press on to more substantive matters.

### **Myth 1: PPPs Provide New Private Funds to Pay for Public Infrastructure**

Public infrastructure is never a “free lunch.” Whether the investment required to pay for the capital costs of an infrastructure asset is financed by the government or by a private concessionaire, the investment cost and operating costs must ultimately be repaid from taxes assessed on citizens at various levels, from tolls or other user fees paid for by the users of the asset, or from some combination of these two sources. In recent years, governments worldwide have been very reluctant to raise taxes, especially in the wake of the global financial crisis of 2007. PPPs have often been presented as a way to fund infrastructure without imposing new taxes on the public. It is factually accurate to state that a PPP which will be entirely paid for by user fees does not require new taxes to be levied, but this is misleading. Users will now have to pay new or higher tolls or other usage fees for an asset that might otherwise have been fully or partly paid for by taxes, and then provided to users free or with lower, more-subsidized user fees: lower tolls in the case of a highway or bridge, and free or with lower passenger fares in the case of a transit project.

### **Myth 2: Public Financing in the US is Less Costly than Private Financing**

Legislation and tax policy at multiple levels in the US have created a fiscal and taxation regime in which municipalities, counties, special tax entities (for example, school districts), states and the federal government can issue tax-exempt bonds that allow them to raise financing for public works projects at reduced interest rates. Being tax-exempt at one or more levels reduces the coupon rate of these bonds to reflect the fact that the buyers of the bonds do not pay taxes on the interest paid to them by the issuer. Thus, public financing is often argued to provide a lower-cost alternative to private financing.

However, the cities, counties, states and federal government agencies that issue these bonds are collectively subsidizing this difference in cost by foregoing the taxes they would normally collect on bond interest payments. The allegedly less costly tax exempt bonds result from a massive and costly cross-subsidization by governments of each other's projects through

reduced tax receipts all around. And since this cross-subsidy scheme reduces tax revenues, governments at all levels faced with fiscal crunches have periodically considered removing this tax loophole. For example, in the post-2007 governmental fiscal crisis, certain representatives and senators in the US House and Senate were once again proposing the removal of this tax loophole.

Moreover, many of these bonds are not general obligation bonds of the government entity issuing them that are backed by the full faith, credit and taxing ability of the government entity involved. Rather, they are “revenue bonds,” typically backed only by the revenues derived from the portfolio of revenue-generating assets operated by the public owner of the project for which the funds are being raised, and sometimes limited to the revenues from that specific project. So, the risk of a default borne by the purchaser of the bonds is essentially the same whether the bonds are issued by a government or a private issuer (unless the revenue bonds are guaranteed by revenue from a portfolio of infrastructure assets). Thus, the real risk-adjusted interest rate on a given public owner’s portfolio of projects, net of tax subsidies, should be comparable. If proponents argue that government-issued bonds will be less expensive even after adjusting for these tax subsidies, because the local, state or federal government is likely to bail out government-issued revenue bonds with general taxpayer funds in the event of a default, then the cost savings from this perceived reduced risk of default are simply being transferred to taxpayers in the form of increased bail-out risks (Chapman, 2009).

Since other local or state jurisdictions continue to issue these tax-exempt bonds and impose the associated tax revenue reductions on their peer and higher-level government entities, a given jurisdiction can rightfully conclude that it would be foolish not to take advantage of the interest cost savings. So, as long as this cross-subsidization scheme persists, the reduced cost of public tax-exempt bond financing for a specific infrastructure project must be more than offset by a combination of risk transfer and other public benefits to make PPP delivery with private financing a preferred alternative to traditional public delivery with tax-exempt public financing.

Recent developments in the US such the Transportation Infrastructure Finance and Innovation Act (TIFIA) loan enhancement program and Public Activity Bonds (PABS) have made it possible for private developers to access partial project financing from enhanced and tax-exempt loans, reducing the difference in financing costs between traditional publicly financed delivery versus privately financed PPP infrastructure delivery.

**Myth 3: The Only Benefit of a PPP is Privately Arranged Financing**

It is true that private financing can help to augment or replace government financing, but we argue that it delivers four additional benefits:

1. **Alternative sources of financing.** Sometimes public agencies are able to generate funding from taxes or user fees to pay off the capital and operating costs of a given project but are unable to finance the otherwise viable and beneficial project for various reasons, including their own fiscal plight (as in the post-2007 financial meltdown), legal restrictions such as laws requiring legislative supermajorities or public referenda to authorize bond sales, or current capital market conditions. To the extent that public financing capacity becomes a constraint on the development of infrastructure, PPPs can dramatically increase the available sources of financing to build needed infrastructure.
2. **Risk transfer.** Transferring some or all of the project risks to the PPP concessionaire protects the state from mishaps and cost overruns. This, in turn, creates a level of profit-driven discipline that is often lacking in publicly funded projects (Flyvbjerg et al., 2005a). For resource-starved governments, this efficiency boost and transfer of risk is often welcome.
3. **Sustainability.** When a concessionaire assumes the life cycle costs of building, operating and maintaining an infrastructure asset to specified performance standards, the decisions that are made tend to focus on optimizing life cycle sustainability rather than simply on minimizing first cost or operating cost (Henisz et al., 2012).
4. **Time savings.** Designing and building an asset using innovative construction methods has been demonstrated to reduce design and construction time by up to two years (Chasey et al., 2012) when compared to a traditional design-bid-build public procurement approach. This time saving can often also help offset the higher cost of PPP financing.
5. **Contractually guaranteed maintenance.** When governments face fiscal shortfalls, the first thing to be cut is typically the maintenance of existing infrastructure assets. Deferring needed maintenance incurs the need for increasingly more costly compensating downstream maintenance. Many large infrastructure projects in the US that were funded by 90 percent federal funds with a requirement that local funds be used to maintain the project have rapidly fallen into disrepair for this reason. PPP contracts typically impose stringent performance standards for maintenance which, if not met, impose financial penalties on the concessionaire. Thus, PPP projects tend to be reliably well maintained as long as the concession remains viable.

In short, a variety of factors could make PPP an attractive project delivery option. And yet, a project's specific circumstances largely determine whether or not a PPP makes sense. The decision as to whether a project is best done through traditional public procurement or a PPP relies on a “value for money” analysis that compares the relative financing costs, administrative and legal costs, risk transfers, and the expected value to the public of transferring those risks to the private sector.

#### **Myth 4: PPPs Mean Imposing Tolls, and Voters Dislike Tolls**

Since many of the roads in the US – in particular, the Interstate Highway System – were primarily paid for with federal funds, citizens in the Western US, who developed their intercity road networks later than those in the East, have grown accustomed to driving in and between cities on “freeways” rather than paying by the mile for the use of tolled “turnpikes,” which are much more common among the more densely populated and older intercity and urban roads in the Eastern US. Western drivers' resistance can create significant political challenges to any attempts to fund roads partially or fully through tolls. And in spite of a long history of tolling in the Eastern US, resistance to introducing new tolls can still become significant, as in the cases of the Elizabeth River Tunnels in Virginia and Tappan Zee Bridge Replacement in New York.

In this respect, it is important to keep in mind that all infrastructure projects must ultimately be paid for or funded in one of two ways: (1) government funds raised through taxes; or (2) fees charged to users of the project, such as tolls. Even privately financed PPP projects must be funded by public subsidies, user fees, or a combination. In other words, private financing does not necessarily lead to tolls. In fact, transportation projects utilizing private finance outside the US often do not involve user fees, but rather incur direct payments by the government over time (Garvin, 2009).

#### **Myth 5: PPPs Represent a New and Untested Infrastructure Procurement Policy in the US**

Between the late eighteenth century and early twentieth century, Congress shrewdly supported expansion and economic growth using a two-track strategy: spending federal funds to “push” projects considered crucial for developing commerce and trade, and “pulling” projects from the private sector through indirect means such as land grants or franchises awarded to private parties. Such projects are amenable to granting contiguous property rights to their developers or to charging fees from their users.



Governments at all levels throughout the nation used similar approaches to develop infrastructure deemed to be in the public interest. For instance, the first PPP in California can be traced back to 1851 when the Mission Toll Road was opened to the public. At the time, canals and railroads had drained public coffers, forcing the construction of new roads onto the private sector. As a result, private road building enjoyed quite a boom in the far West from 1850 to 1902 (Klein and Yin, 1996). Records indicate that 414 toll roads were incorporated in California during that period (although only 159 are known to have been built) (Klein and Yin, 1996).

The private sector's dominance began to wane when the automobile came on the scene. But when Ronald Reagan became Governor in 1967, he found a large budget deficit and resumed the search for alternative methods of finance. Once again, as public debt rose further in the 1970s, the popularity of PPPs began to increase. They were used for a number of categories of infrastructure including local water, healthcare and prisons. In the 1980s, discussions about PPPs in the state legislature were focused on transportation projects. However, only two PPP projects from this period resulted in construction: (1) the 91 Express Lane (Caltrans, 2009; Garvey, 1999; OCTA, 2011) between Orange and Riverside Counties; and (2) the South Bay Expressway (AASHTO, 2011; FHWA, 2018b) in the San Diego area (Peter, 2011).

During the Schwarzenegger administration (2003–2011) a flurry of activities resulted in the authorization of \$20 billion to various transportation projects that contained additional PPP provisions. California had only two significant PPP projects underway at the end of Governor Schwarzenegger's term: (1) the Presidio Parkway (ARUP PB Joint Venture, 2010), a new southern approach to the Golden Gate bridge; and (2) the Long Beach Courthouse. These projects represent two of the latest efforts in California to utilize the PPP model not only in transportation but also in financing essential government buildings.

In sum, the private sector has been a partner in various US infrastructure projects for more than 200 years. The ideology behind allowing the public sector to draw on all potential project delivery systems is based on the conviction that, together, the public and private sectors can provide the best services to meet the growing needs of US infrastructure, with the private sector often tapped for its potential to deliver value and innovation.

### **Myth 6: PPPs are the Same as Privatizations**

The private sector has always been involved in the building and maintenance of infrastructure projects, whether they come in the form of PPPs or traditional public procurement. Likewise, no matter the delivery

mechanism, the government always remains closely involved, even underwriting the ongoing delivery of the public service. In PPPs, the assets are not sold to the private sector. The private sector is simply responsible and at risk for service provision. The government still defines what is required to meet the needs of the public in a PPP. Moreover, the government also retains the authority to hold the private sector accountable for meeting these requirements via contract. So, if the private sector fails to deliver, there are a variety of safeguards for the government:

- The contractor is under considerable risk of capital loss should the contract not get off the ground, which offers a very powerful incentive to get the project done on time and on budget.
- The equity investors will only benefit from the project after it is complete and in operation. And the initial investment is sometimes recouped over a long time horizon, which promotes a life cycle approach to project delivery.
- The creditors are more risk-averse than the equity providers. These investors put up most of the money for the projects. The creditors play a huge role in due diligence, ensuring that there are no “bridges to nowhere” being built with their money (because their loans would never be paid back).

Thus, the private sector may play an important role in PPPs, but the public sector still has considerable authority. Moreover, the public ultimately retains ownership of the assets. Notwithstanding the clear evidence dispelling the myth of privatization, one additional element bears further attention. It relates to additional public involvement within the concession arrangement through a minority equity investment.

Consider the case of investment arms of private companies that also have infrastructure operating business units that frequently contract with their parent company’s operating business units to provide the engineering, construction, and/or operations and maintenance for PPPs. At commercial close most PPPs have a fixed price, and a date-certain design–build contract that cannot change unless relief events in the commercial agreement or DB agreement occur; typically just *force majeure* events. Hence, the incentive from the equity holders’ (or SPV) side is always to drive costs down and reduce delivery time once a deal is struck, not vice versa. Nevertheless, some critics of PPPs have argued that, if corporate entities related to the delivery contractors are the principal or only shareholders in the PPP concession, as was the case in the (England to France) Channel Tunnel, there is the potential for a real – or at least a perceived – conflict of interest to arise in transactions such as change order negotiations related

to the provision of the engineering, construction or operations services to the project.

The infrastructure investment units in these companies are typically staffed, operated and evaluated independently of their sister service delivery arms, so the investment arm is in tension with the construction or operations and maintenance arm, and the transactions between them tend to be managed at “arm’s length.” And it can be argued that the parent company in this case is more committed to the venture than a passive institutional investor would be, since it is holding both an equity and an operational stake in the project and is likely to seek win-win outcomes in negotiations, as opposed to win-lose or self-dealing outcomes.

However, the construction and investment arms of these firms may have common ownership structures, and so there could be real or perceived conflicts of interest in the SPVs. Involving pure financial equity investors such as pension funds, or funds whose goals are strictly to maximize return on equity, helps to manage these conflicts, when combined with SPV corporate articles and bylaws that require recusal of conflicted parties from board decisions, and the appointment of independent directors and probity auditors, as is now often done in Australia (see Chapter 5 in this volume).

In jurisdictions where there is no strong public infrastructure procurement and finance agency with the capacity and expertise to audit PPP projects independently, governmental or public perception of a possible conflict of interest can be a significant concern to state or local agencies. The various levels of government involved can collectively take significant equity stakes in specific PPP projects to mitigate this concern. For example, governments in Canada and Australia have taken stakes of up to 49 percent in some of their most successful PPP projects to date. Taking equity in a PPP project places representatives of the government “at the partners’ table” so that they can be engaged in negotiating transactions such as change orders between the equity holders and the construction or operations delivery business units of the equity holders’ parent companies.

Having governments take equity stakes in their PPP projects also recognizes the fact that governments always have some residual risk in developing public infrastructure, even when these risks have been contractually allocated to others. The government equity holder gives the PPP projects the perception of being more transparent in evaluating change orders requested by the service providers, or in pricing other transactions between the financing and delivery arms of these enterprises. And, from the private investors’ point of view, a local government or a local public pension fund that is a significant stakeholder in a PPP project gives the project some level of “political air cover” against future expropriation of project returns

by the local government through forced governmental buyouts, unnecessarily stringent regulation of tolls, or other means. This political air cover can be particularly valuable for PPP projects delivered in countries with a weak rule of law and turbulent politics.

### **Myth 7: The Private Sector's Profit in PPPs Comes at the Expense of the Public Sector**

The idea of a PPP is to harness the private sector in the areas where it can provide additional value for money. In this respect, the objective is to find situations where the private sector can manage to create sufficient profit, while still adding net value for the public sector by aligning interests and allocating risks to the people best able to manage them. This can be done in a variety of ways, such as through accelerated project delivery. Project planners can define risks that are optimally shouldered by the private sector, and those that should remain with the public sector. Any government's interest in PPPs should rest on its ability to find value for money (VfM) from the public investment that does not come at the expense of the public sector.

## **RECOMMENDATIONS FOR SELECTING AND IMPLEMENTING PPPs**

Governments considering the delivery of infrastructure via PPPs should conduct VfM analyses for all proposed PPP projects using consistent, rigorous and transparent processes such as those of Infrastructure Ontario (2012a), the Florida Department of Transportation (FDOT) and the consultants on the Presidio Parkway. Impartial third parties should be retained to assess the most significant risks, and the VfM analysis should be repeated when project scope or other key assumptions underlying the initial VfM analysis change materially.

Very few US state or local governments currently possess their own mature and sophisticated PPP or public infrastructure delivery and finance agencies with the capacity to perform rigorous VfM analyses, and to negotiate PPP concession agreements. Until they can develop this kind of capacity, we recommend that US state and local agencies contemplating PPP projects contract with consultants in project evaluation, engineering due diligence, financial due diligence, PPP contract law, and other areas of expertise needed to develop PPP delivery processes and to negotiate PPP concession agreements that are tough but fair. The transaction advisory units in large global infrastructure engineering, legal and financial services

companies can provide many of these services, including conducting rigorous VfM analyses to judge whether a PPP offers the public positive value for money compared to traditional public sector delivery methods.

Government agencies involved in PPP projects should consider taking an equity stake in the concession arrangement when legally, financially and fiscally possible, particularly when there is a concern for a perceived conflict of interest on the part of private parties (due to single organizations or related party organizations in concession agreements). This direct investment into a project gives the public entity access and involvement in the PPP process, and an additional level of oversight to the activities of the concessionaire. Such practices can also help to mitigate residual project risk.

The use of PPP delivery for social infrastructure – schools, hospitals, courthouses, jails, and so on – has been widely and successfully adopted in the United Kingdom, Canada, Australia and other countries, but has been relatively little used in the US to date, aside from its large-scale use to develop military housing (GAO, 2006, 2009) and university residence halls. Public building agencies such as the General Services Administration, which develops and manages federal office buildings, have often leased office space from private developers, similarly to the way that large private firms such as Google or Intel do, but have seldom used PPP delivery approaches to develop new facilities on public land. A few hospitals have been built this way (for example, Seattle Bellevue Children's Hospital). The most visible social infrastructure PPP project recently built in the US is the courthouse in Long Beach, California. There is significant opportunity for other kinds of social infrastructure to be built by PPPs, assuming sufficient scale or complexity to counter the attendant transaction costs, at a time when the US economy could greatly benefit from the large number of resulting construction jobs created, with their high economic multiplier.

The most recent round of California transportation PPPs was initiated by an all-volunteer Public Infrastructure Advisory Commission appointed by the Governor, consisting of a combination of interest group representatives and infrastructure delivery experts, but without any significant funding or staff resources. The one PPP project that was recommended by this commission to date – the Presidio Parkway project described above – achieved financial close in May of 2012. The California Department of Transportation and the local agencies involved in this project were competently advised by a group of consultants with experience on PPP projects in other states and countries. California, along with other states that lack a significant public infrastructure financing capability that are contemplating the use of PPP delivery for civil or social infrastructure, will need to use such consultants to advise them in the near term. In the

longer term, they should avail themselves of the expertise, experience, process guidelines and document templates available from mature global public infrastructure delivery and finance management organizations (e.g., Infrastructure Ontario, Partnerships UK and Partnerships BC), and allocate the required resources to begin developing these kinds of analytic and decision-making capabilities for themselves. Interestingly, as of July 7, 2018, Governor Brown, the succeeding California Governor who was elected in 2011, had not yet appointed a chair of the Public Infrastructure Advisory Commission (PIAC), so it was still dormant.<sup>1</sup>

If California would like to develop governmental capacity to harness the many advantages that PPPs can provide its citizens in renovating its existing infrastructure and developing new, sorely needed, world-class infrastructure for the most populous state in the union, the state could begin by augmenting an existing organization such as the California Infrastructure Bank. The California I-Bank already has significant infrastructure project financing and contractual expertise, which could easily be augmented to provide broad-based public infrastructure financing capability by hiring additional staff familiar with PPP processes and methods. The expanded I-Bank should ideally be set up in the executive branch as part of the Governor's office, where it would be relatively isolated from the inherently shorter-term and local political pressures impinging on members of the state legislature. The legislature is the appropriate body to decide what fraction of the state budget should go to infrastructure overall, and through state agencies and commissions such as Caltrans and the California Transportation Commission, to prioritize projects relative to one another for funding. Similarly to Partnerships UK or Infrastructure Ontario (2012b), California's public sector procurement and financing agency can then determine the most appropriate way to deliver the state's projects – via either one of the traditional public sector delivery options, or PPP delivery – and to put in place appropriate procedures for financing and managing these projects through the cognizant state or local agencies for transportation, justice, education, hospitals, and so on.

The environmental review and permitting process should be approached differently for projects that are known PPP candidates. Public agencies should avoid unnecessary prescription, particularly when it is not required to identify environmental impacts, and wherever possible show potential limits of deviation in elevation and alignment in defining the alternatives. Exceptions to this concept would include, for example, cases where it is necessary to define a precise elevation for assessment of noise impacts. If given some flexibility in choosing alignments or designs, the PPP concessionaire can often develop more innovative alternatives. This maximizes the opportunity for technical innovation in subsequent project phases.

PPP concessions should be awarded once most or all significant environmental review processes have been completed. A concessionaire has little or no control over the rate of progress and ultimate outcome of an environmental impact review process, so it should not be expected to bear these risks. The multi-year delays on California SR125 (Outlaw, 2003; SANDAG, 2012), due to the long and drawn-out environmental impact review undertaken after the award of the initial PPP concession, contributed significantly to the subsequent bankruptcy of the concessionaire on that project. As intended in the concession agreement, the bulk of these risks were indeed transferred to the private equity and debt participants in the concessionaire, resulting in its bankruptcy and a significant write-down of the debt. However, this misallocation of risk cast a pall over private investment for future PPP projects in the state for a decade or more.

PPP project concessions should be financially and contractually engineered from the outset to allow and encourage engineering and construction contractors that are PPP sponsors to exit the SPV after construction completion and the project's ramp-up phase. These competitively selected contractors provide their expertise to manage the design and construction risks. Following the completion of construction, they have already profited more or less, based on how skillfully they have managed the engineering and construction risks. It is thus appropriate for them to exit the project equity once revenue operations have been established so that they can free up their capital to deploy their skills and resources for developing new projects. At this point, sovereign wealth funds, pension funds or other institutional investors can replace the delivery partners' equity with longer-term, lower-risk financing, at lower rates of return that better match the institutional investors' intergenerational tenor and more conservative risk-return goals. The sponsoring government agency can, and sometimes does, share contractually in any additional profit that a lower-cost refinancing generates for the equity partners. This optimizes the cost of capital for the project, allowing each party to bring its expertise in managing risks and its financial risk-return goals to bear on the different kinds and levels of risk in the development versus operational phases of public sector projects. And it has the added benefit that it can help the sovereign wealth and pension funds raise the weighted average returns of their investment portfolios closer to their historical target return rates of about 8 percent, far better than the very low returns currently being achieved by most sovereign debt and other traditional pension fund investments.

Even if they plan to exit the project following construction completion, the sponsoring engineers and contractors will still be incentivized to take a life cycle perspective in their design and construction decision-making to maximize the price and expedite the time at which they can exit the project

by selling it off to the institutional investors. Aggressive non-compete agreements should be avoided on tolled highways in situations where future demand for the infrastructure facility is likely to far outstrip supply. The SR91 in California engendered significant public resentment when traffic demand on these roads increased rapidly, the commute rush-hour tolls became unaffordable to many lower-income commuters, and the freeways became ever more congested. Governments may have to accept a higher private financing cost in the absence of stringent non-compete agreements, or when they disclose those routes where government improvements are permitted or limited prior to procurement. Otherwise, such projects will not be politically viable as privately operated PPP toll road concessions in the long term. A potential alternative would be to make use of availability payments to fund such projects, as in the I-595 (FDOT, 2009a, 2009b, 2009c) and Presidio Parkway PPP projects (see above), so that they can be operated as freeways instead of toll roads. The governments involved would be far more likely to retain public support for a project if the project were not tolled, even if demand were subsequently to balloon, thus rendering even the new or expanded freeway congested.

## NOTE

1. One of the book's editors and co-authors of this chapter served as a Commissioner of this currently moribund California PIAC advisory commission, but resigned after several years of inaction by PIAC, following the election of California Governor Jerry Brown.