

Policy Issues in U.S. Transportation Public-Private Partnerships: Lessons from Australia



MTI Report 09-15



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**POLICY ISSUES IN U.S. TRANSPORTATION
PUBLIC-PRIVATE PARTNERSHIPS:
LESSONS FROM AUSTRALIA**

July 2010

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EXECUTIVE SUMMARY

This report examines Australia's experience with transportation public-private partnerships (PPPs) and the lessons that experience holds for the use of PPPs in the United States. Australia is an important country from which to learn because it has decades of experience in PPP use, it has used the approach to deliver billions of dollars of critical transportation projects, it has a comparable history to the United States, and a legal system based on English common law, which is used in the majority of U.S. states.

Although the authors explore a range of issues in this report, they focus on four key PPP policy issues: (1) how to distribute the risks inherent in PPP contracts across public and private sector partners; (2) when and how to use non-compete (or compensation) clauses in PPP contracts; (3) how to address concerns about monopoly power; and (4) the role and importance of concession length.

The authors addressed those and other questions by surveying the relevant literature on PPP use internationally, and by interviewing numerous Australian PPP experts from the public and private sectors, as well as from academia.

The authors summarize the main findings of this study by listing several "dos" and "don'ts" when approaching transportation PPPs in the United States. Some of these findings relate directly to the four questions above, while others surfaced during the course of interviews as critical issues for consideration. The "dos" include:

- **Plan for a Long-Term Partnership.** Australian experts stress the importance of maintaining a long-term working relationship with private partners. They recognize that contract closing is not the end of the relationship, but the beginning of a partnership that will include both large and small contract renegotiations. Some experts suggested that, because of this, fewer details should be specified through *ex ante* contracting and more should be determined through *ex post* negotiation as conditions evolve.
- **Recognize that PPPs are Important and Complex Commitments Requiring Substantial Public Sector Experience.** Public sponsors should appreciate the complexity and importance of PPP contracts, and realize that they will be negotiating with experienced private partners. Public sponsors should therefore consult with outside experts as needed, and vigorously enhance their own expertise. In some Australian states, relevant public officials are required to take courses in contract creation and administration.
- **Focus on Performance-Based Contracts.** PPPs can be used to enhance performance in project delivery, maintenance and operation. New facilities should be built with customers (that is, motorists) in mind. High-quality maintenance and operation should be assured through the use of multiple key performance indicators (KPIs) that carry financial penalties and rewards.
- **Use Concession Length Strategically.** Australian experts indicate that they are comfortable with concession lengths of between 30 and 45 years but (consistent

with the earlier point), stress that concession length should not be fixed but rather should be viewed as a useful policy tool. It can be a bid variable, and/or can be used in renegotiations. If, for example, there is a material adverse effect on private partners from a competing facility, then contract length can be extended to provide compensation other than cash payouts.

- **Create public “special purpose entities” to deal with initial contractual negotiations.** Consistent with the previous point, Australian states often have successfully used government-created special purpose entities to conduct the complex bidding and contract negotiation process. After contract closing, ongoing administration is then turned over to the relevant government authority. Where that authority should reside within government is itself the subject of debate.
- **Use material adverse effect clauses (or “non-compete clauses” in U.S. terminology) in conjunction with “compensable enhancement” provisions.** A material adverse effect (MAE) clause typically includes a provision granting the concessionaire compensation if an unplanned competing facility reduces its traffic flows, and thus revenues. A compensable enhancement provision is essentially the opposite of an MAE clause in that the public sector shares in revenues generated by new facilities that *increase* traffic on the PPP facility. Since the installation of a new nearby facility can obviously either increase or decrease flows on the PPP facility, both clause types should be included.

Important “don’ts” include:

- **If congestion pricing may be used in the future, don’t become locked into a set of long-term PPP contracts that do not accommodate such pricing, particularly if those PPPs interact in a network setting.** If system-wide variable congestion pricing is envisioned for the future, it is important that long-term PPP contracts allow for its implementation. This is particularly important if there is a set of PPPs in or around one urban area, so that pricing on one PPP may affect traffic on another. This is an emerging concern in Sydney.
- **Don’t fail to “bring the public along” through public relations efforts that explain PPP contracts, its benefits to the public, and its progress.** Failure to conduct effective public relations activities led to widespread public misunderstanding of some Australian PPP projects, while other efforts, particularly at PPP openings, were very successful.
- **Don’t withhold details of PPP contracts from the public unless disclosure would harm the competitive process.** Some details of Australian PPP contracts in New South Wales have been withheld from the public using “commercial in confidence” provisions. This appears to have increased public skepticism about PPPs. Consistent with conducting effective relations with the public, project sponsors should encourage the maximum degree of transparency consistent with a competitive bidding process.

- **Focus on outcomes for customers, not inputs.** Numerous interviewees stressed that an important benefit of private sector participation lies in its ability to innovate, and that this is also true in project design and delivery (as well as in operation and expansion). Public sponsors should thus specify the outcomes they hope the project delivers, and allow private bidders to deliver those outcomes in an innovative way.
- **Don't attempt to maximize up-front concession fee payments on greenfield projects.** In some early Australian transport PPPs, state governments structured bidding to receive large up-front payments on new concessions. Although up-front payments may generate social benefits by allowing other transport projects to proceed, they were viewed skeptically by the public, which believed they came at the expense of higher tolls.

The authors discuss these and other policy considerations further in the body of the report.

INTRODUCTION

“Public-private partnership” has become a catch-all term for a range of contractual agreements between a public sector project sponsor and private sector partners who are able to provide the design and construction of a new transportation facility, or the operation, renovation, and expansion of an existing facility. Formal PPP definitions are notable for their breadth. A report by Australia’s State of Victoria defining PPPs stresses regulation by contract: “This report uses public private partnership (PPP) to designate a relationship between a government party and a private party to deliver public infrastructure or facilities and any related ancillary services. The relationship is regulated by a contract that allocates responsibilities, rights, risks and rewards between the parties.”¹ International definitions are similar. A U.S. Federal Highway Administration (FHWA) study of transportation PPPs in the international context emphasizes the role of the private sector in project financing: “For the purposes of this paper, a public-private partnership is defined as a contract between the public and private sectors for the delivery of a project or service in which the private partner has responsibility for acquiring the majority of the necessary financing.”² Certainly one of the most notable aspects of PPPs is that, by allowing equity participation, they facilitate the flow of capital into transportation infrastructure and thus risk bearing.

PPPs are notable for the wide variety of services they can help provide. They range from such major responsibilities as private partners designing, financing, building, operating, and/or managing a major transportation facility to the concession of a highway rest stop.³ PPPs are also increasingly being used to construct the range of facilities falling under the broad term of “social infrastructure,” which includes schools, hospitals, prisons and desalination plants, among many others.

Because of the vast array of services potentially provided via a PPP, it is important to focus the discussion. In this study, the authors stress private investment in surface transportation infrastructure, such as roads, bridges, and tunnels. The basic approach discussed here, however, can be applied easily to other transportation facilities, such as ports and intermodal connectors.

Fiscal necessity was an important motivation in many countries, including Australia. Public officials sought new funding sources due to tight governmental budget constraints and, in some cases, a desire to move financing off public sector balance sheets.⁴ However, many governments have retained, refined, and expanded their PPP programs over time.⁵ Their analysis of and policies toward PPPs have consequently improved. In addition to raising capital, common reasons for retaining PPP programs include the ability to transfer important risks to the private sector (such as revenue or traffic risk, and construction-related risks), incentives for life-cycle facility management (which simply means applying the best management practices and a concern about costs over the life of the facility, rather than just in the present time period; also called life-cycle costing), enhanced innovation in both design and operation, greater competition in service provision, accelerated project delivery, and specialized expertise in designing and constructing new facilities. Australian states have pursued PPPs for similar reasons under the broad rubric of providing better “value for money” for citizens.⁶ If poorly implemented, however, PPPs can result in large

net social costs. Potential costs stem from greater exploitation of monopoly power, high contracting costs, and lack of transparency.

The purpose of this report is to examine the lessons that Australia's PPP experience holds for the United States. The authors hope that such a study will reduce the social costs potentially created by PPPs. Their goal is to distill the practices that have worked well in Australia, and which may be transferable to the United States, as well as to identify those best avoided. The research design was to first examine lessons offered by the current relevant literature on PPPs. The authors then examined four policy issues that have been prominent in the United States (1) how to distribute the risks inherent in PPP contracts across public and private sector partners; (2) when to use non-compete (or compensation) clauses in PPP contracts; (3) how to address concerns about monopoly power; and (4) the role and importance of concession length.

The authors then interviewed a number of Australian PPP experts, mostly by phone (although several were interviewed in person), about those four issues, as well as other questions that have arisen when transport PPPs were used in Australia.

Interviewees were chosen for their expertise in transport PPPs, as well as for their diversity across regions and backgrounds. The list of interviewees is reported in Appendix B. The interviews were intended to be relatively open and free-ranging to afford maximum learning. However, there was a pre-determined list of questions for interviewees that the authors hoped to touch on in each case. The list of questions is reported in Appendix C. To encourage candid discussions with interviewees, the authors maintain the confidentiality of responses throughout, and thus refer only to "interviewees" and "experts" in the text. The authors believe that this approach was successful in eliciting candid responses. Because a number of points were identified in the interviews that extend beyond the four core issues, the report includes a separate section focusing on topics in addition to those four.

The report proceeds as follows: The authors first describe a number of standard types of PPP contracts to give the reader a better sense of how they work in practice. They then show why Australia provides an appropriate setting for distilling valuable transport PPP lessons. While doing so, the authors offer general background information on the motive and structure of Australia's transport PPPs. They then show why policy lessons surrounding transport PPPs are critical for the United States today, providing an overview of current U.S. transport policy, and offering some examples of U.S. PPPs. They follow with a broad survey of the burgeoning literature on PPPs. This review is by necessity partial because PPP literature—even that specific to transport—is now so large that a complete survey of it is beyond the scope of this report.

The authors then turn to discussion of the four central policy issues. In each case, they define the issue and show why it was chosen, and why it is important. They note how the issue has been treated in the United States, and then discuss its treatment in Australia. The authors then follow with a section cataloging several additional policy issues identified as a result of their interviews with Australian PPP experts.

Notably, the FHWA 2009 scanning study entitled *Public-Private Partnerships for Highway Infrastructure: Capitalizing on International Experience* appeared during the preparation of this report.⁷ To the extent that it identifies lessons for the United States from international experience, that study has much the same objectives as this study. The authors view its publication as independent confirmation of the value of their endeavor. The FHWA study, however, examines four countries: Australia, Spain, Portugal and the United Kingdom. It should thus be viewed as providing more breadth across countries, while this study provides more depth into a single country's experience. The authors report the FHWA's views and use their analysis as a point of departure wherever appropriate. The study concludes by summarizing its key policy insights, as well as highlighting differences in best practices between the United States and Australia.

TYPES OF PPP CONTRACTS

The authors next provide a sense of how transport PPP contracts work by describing several standard types. This list is incomplete, but serves to illustrate the inherent flexibility of the PPP contracting approach. Roughly speaking, moving from the least amount of private responsibility to the greatest, some common contractual categories include the following seven:⁸

1. Design-bid-build (DBB) was the traditional contractual approach used to construct many public works in the United States in the twentieth century. Under a DBB contract the public sector engages engineers and architects to design a facility to meet certain specifications. It then accepts bids from pre-certified construction firms to build the facility. Notably, the design and construction firms in a DBB contract are separately responsible for each of those project stages. The government is responsible for financing the project and assumes all risks associated with its ownership and operation. The facility remains under government management for its entire design life. Private financing and risk assumption are minimal in a DBB contract.
2. A design-build (DB) contract is a straightforward extension of a DBB contract. Under a DB approach, a single private partner designs and constructs a facility, in contrast to the separation of those responsibilities in a DBB contract. A DB contract has the advantage of capturing any economies of information, knowledge, and skill between a facility's design and its construction. Like DBB contracts, DB contracts usually do not involve private financing, but private parties do assume additional risk through the design and construction process.
3. The design-build-operate-maintain (DBOM) approach allows parties to benefit from additional process integration relative to a DB contract. Under a DBOM arrangement, the private partner is responsible for the design, construction, operation, and maintenance of a facility for a specific time period. Operation and maintenance functions are therefore added to the private partner's responsibilities relative to a DB contract. Payment after project completion is conditional on meeting certain performance standards, such as physical condition, traffic congestion, ride quality, and capacity. A DBOM contract allows the private partner to utilize its detailed knowledge of a particular facility's design and construction to develop a maintenance and operating plan specific to that facility. By assigning responsibility to the private partner for project quality and performance throughout its entire lifecycle, this approach also gives the contract team incentive to provide the best possible plan and project. If, for example, heavy vehicles are going to use a highway, then a private firm that builds and then maintains the facility will use more durable pavement.⁹ The government typically retains ownership and is responsible for financing the project under a DBOM contract.
4. Long-term lease (LTL) agreements allow the competitively chosen private partner to lease an existing toll facility for an extended time period through a bidding process. The contract details the responsibilities of the private partner regarding maintenance, operation, improvement, and expansion of the facility in return for the right to the facility's toll revenue. The private partner typically pays an upfront concession fee, although

other approaches, such as revenue sharing or annual lease payments, are possible. Ownership again remains with the government, but private investors usually assume risks—such as revenue risk from changes in traffic flow, as well as risks associated with changes in operation, maintenance, and renovation costs. In the United States, the Indiana Toll Road and the Chicago Skyway concession agreements are examples of long-term leases.

5. A design-build-finance-operate (DBFO) contract is an extension of the DBOM approach in that the private partner assumes at least some added responsibility for financing the project and the risks associated with that financing—that is, the private partner becomes responsible for the design, construction, financing, operation, maintenance, improvement, and expansion of a new facility. The partner is granted the right to actual toll revenue (or shadow toll payments) for a specified time period in exchange for fulfilling those responsibilities. Although DBFO contracts vary according to the degree of private financing involved, part of the financing is usually accomplished through debt that leverages streams of toll revenue. A DBFO contract may be awarded for the upgrading or expansion of an existing facility if the necessary renovations are significant. In many cases, operational responsibility reverts to the government after a period of time. This appears to be a popular approach internationally.
6. Under a build-operate-transfer/build-transfer-operate (BOT/BTO) contracting approach, the private partner designs, constructs, finances, and operates the facility as under a DBFO contract. The private partner owns the facility, however, until the end of the construction period or the contract term. Ownership reverts to the public-sector sponsor at the end of the agreed-upon period. In Australia, for example, facilities have often been built and operated under a build-own-operate-transfer (BOOT) approach.
7. A build-own-operate (BOO) contract engages the competitively chosen private partner in a broad range of responsibilities, including the design, financing, construction, ownership, maintenance, and operation of a transportation facility. Because the private partner actually owns the facility, it assumes all risks associated with the facility's ownership and operation. Although there is typically no provision for transferring facility ownership to the government, the terms of the concession may be renegotiated, or the government may purchase the facility.

An additional noteworthy PPP distinction is between real toll, shadow toll, and availability payments arrangements. Real toll arrangements involve charging drivers directly for road use. The motorist actually pays the toll. Shadow tolls differ in that the motorist does not pay a toll directly. Payments are instead made by the public sector to a private road operator based partly on the number of vehicles using the road. Availability payments are similar to shadow tolls in that the private partner does not receive toll revenue directly. The public partner's payment is here not based on traffic volume, but rather on the basis of other dimensions of service quality, including such factors as safety, congestion, minimum performance criteria, and lane availability (hence the name).¹⁰ Depending on the details of their structure, such non-toll arrangements allow public and private partners to share traffic (or demand) risk. They also allow performance-based PPPs to be used on un-tolled roads. This means that, even if political or other considerations prevent tolling, a PPP

may still be used. Each type of arrangement carries its own set of costs and benefits, and provides public sponsors with additional policy choices.

In the United States, a distinction has also been made between two broad categories of transport PPPs: greenfield and brownfield agreements. In a greenfield PPP, the private partners are responsible for the financing, design, construction, operation, maintenance and expansion of a new facility. Brownfield projects involve leasing of an existing tolled facility by a private partner.¹¹ The partner is typically responsible for maintaining, operating, refurbishing and upgrading the facility in return for the right to collect toll revenue. Although there have only been four, brownfield PPPs in the United States have been more controversial than greenfield projects.

The issues discussed in this report relate most directly to greenfield PPPs, since Australia has only built new facilities using the PPP approach. However, Australia is now confronting similar issues as those raised by brownfields in the United States. Some Australian PPPs have encountered financial difficulties, and a decision must be made regarding whether or not to find new operating partners. Also, when a concession expires, the relevant state government must decide if there will be a new concession, which is effectively a brownfield PPP.¹² The next chapter discusses why Australia provides an appropriate setting for the study of transport PPPs.

WHY AUSTRALIA?

There are several reasons why Australia provides an excellent setting for in-depth study of transportation PPPs. First, Australia has extensive experience, in terms of both time and number, with PPPs relative to the United States.¹³ Australia's experience with PPPs is usually dated from 1985, when discussions began with private partners to build the Sydney Harbour Tunnel. Australia's use of PPPs accelerated in the 1990s. Until the early 1990s, most of Australia's public infrastructure was financed through current tax revenue or government borrowing. Budget pressures in the early 1990s combined with the need to deliver large, increasingly complex infrastructure projects to meet rapid urban growth, motivated Australia to turn to the private sector for the design, financing, construction and management of transportation projects.¹⁴ Over time, the PPP approach became accepted as a legitimate procurement method. By 2005, all territorial and state governments, as well as the Commonwealth Government, had embraced the PPP concept. A 2005 study listed almost 90 Australian PPP projects across a range of economic activities, either under construction, completed or proposed.¹⁵ The Australian PPP program has moved forward rapidly since then.

Second, Australia is the world's largest, and perhaps its most experienced, infrastructure investor. Australian superannuation (or pension) funds have been an important driving force in infrastructure investing, with approximately 5 percent of assets actually invested in infrastructure on average. Some funds have invested significantly more.¹⁶ Many were set up in the mid-1990s, so Australian managers now have substantial experience in infrastructure investing. U.S. pension funds were some of the earliest investors in those infrastructure funds.¹⁷ According to one survey, Macquarie Group is the largest fund manager, with assets of over \$20 billion and a market share of 44 percent.¹⁸

Third, Australian banks and operating companies are large investors in U.S. transportation infrastructure. The Australian company Transurban, for example, is partnering with Fluor in the Washington DC Beltway HOT Lanes construction project. Transurban also has a substantial interest in the Pocahontas 895 PPP project in Virginia and is negotiating a HOT lanes project on I-95 between Washington DC and Richmond with the Virginia Department of Transportation. Moreover, in 2004 the Sydney-based Macquarie Infrastructure Group partnered with the Spanish firm Cintra to complete the Chicago Skyway lease agreement. Australian domestic PPP policy may therefore be of particular interest in the United States.

Fourth, Australia has a legal system similar to the majority of U.S. states.¹⁹ Law in both Australia and the United States evolved out of English common law, so similar traditions with respect to property rights and contract enforcement obtain, both of which are critical for successful PPPs. Moreover, Australia and the United States share the same language and similar cultures, because of their backgrounds as British colonies. Because of their similar language, legal, and cultural background, lessons from Australia's PPP experience may be more readily applicable to the United States than those of some other nations.

Finally, transportation plays a particularly important role in Australia's economy. Australia's extensive transport systems include railroad networks, roadways, shipping and airlines. Those systems support the movement of people and goods around an extraordinarily large land mass. In 2006–2007, the national total freight load was 507 billion ton-kilometers, and total passenger travel amounted to about 367 billion passenger kilometers. Transportation also accounts for a considerable fraction of Australia's overall economic activity. Transportation-related industries represented 4.7 percent of its gross domestic product (GDP) and 4.7 percent of its total employment in 2007–2008.²⁰ Australia's road and highway system is also extensive relative to its population. In 2004 there were 341,448 kilometers of paved roads in Australia, or about 17 kilometers per person. This is almost 20 percent more than the 14.2 kilometers per person in the United States in that year.²¹

The following chapter provides more detail on the use of transport PPPs in Australia.

PUBLIC-PRIVATE PARTNERSHIPS IN AUSTRALIA

Australian transport PPPs are typically undertaken at the state level. The states with the greatest use of PPPs are New South Wales, Victoria, and Queensland. Each state has a different history of PPP use and a different approach, which allows comparisons across states. Australia imported many ideas and concepts about implementing PPPs from the U.K.'s private finance initiative (PFI) in the early 1990s.²² States have refined their approach and adapted it to their needs over time.

Although they still account for a relatively modest amount of overall infrastructure investment in Australia, PPPs are now used in some of the most complex and dense urban transportation settings. Indeed, Australia today has not only contractually closed but has under construction some of the largest highway PPP agreements in the world.²³ The Australian Government's Productivity Commission pegs the overall fraction of public infrastructure provided by PPPs at about 5 percent, and notes the growth in PPP use over time.²⁴

Commentators in Australia often make a distinction between economic and social infrastructure. Economic infrastructure is sometimes defined by heavy reliance on user fees to fund the project, with the private sector assuming demand or revenue risk.²⁵ The government of New South Wales, for example, states that the:

Typical characteristics of economic infrastructure are:

- Private revenues are derived from third party users
- The private provider faces market/demand risk
- Traditionally delivered through a government business enterprise (including a state-owned corporation)
- Revenue risks are a key driver of financial outcomes²⁶

Social infrastructure involves facilities that are typically not funded on a user-pay basis, but where the basic required infrastructure is nevertheless procured through a public-private partnership. Such infrastructure includes facilities like hospitals, schools, prisons, courthouses, and public housing. The Australian state of New South Wales (which includes Sydney) has in recent years procured the following diverse array of social and economic infrastructure projects using the PPP approach:

- Motorways
- Heavy and light rail
- Housing
- Health care
- Prisons
- Energy projects
- Olympic infrastructure
- Landfill waste facilities
- Water treatment plants
- Waste water recycling facilities

Overall, between 2000 and 2006, Australia contracted for 39 PPP projects totaling almost \$17 billion.²⁷ Tollways have been one of the most dynamic components of those projects, with 11 toll roads delivered since the 1980s, equivalent to investment of about \$12 billion. Table 1 below displays the number and total value of PPP infrastructure projects by state.²⁸ Although social infrastructure projects are typically more numerous, economic infrastructure accounts for the greatest overall value of PPP projects. Table 1 shows how projects have been concentrated in a few states.

Table 1 PPP Infrastructure Investment in Australia, 2000 to 2006

Government	No. of PPP Projects	Value of PPP Projects (Aus\$m)
Commonwealth Government	2	706
New South Wales	15	8,000
Victoria	16	4,500
Queensland	2	2,500
Western Australia	1	200
South Australia	1	40
Tasmania	1	0
ACT	0	0
Northern Territory	1	600
Total	39	16,636

Source: Australian Government, Productivity Commission, *Public Infrastructure Financing: An International Perspective* (March 2009), Table 8.2, p. 156.

There are several reasons why Australian states are expanding the use of the PPP approach. Commentators stress the benefit of bringing projects forward that would otherwise languish for years or decades waiting for public funding. They also note the advantage of being able to transfer some of the risks inherent in facility design, construction and operation to private partners. Third, experts stress how PPP use has assisted in the development of robust domestic design, construction, financing and operating industries. Summarizing these points, the Australian Government's Productivity Commission states:

Public-private partnerships constitute around 5 percent of investment in public infrastructure, more in New South Wales and Victoria which have been the main users of this financing vehicle. This growth is due in large part to the scope to bring in private sector management skills, the opportunity that bundling design, construction and operation, or parts thereof, provide to improve efficiency and the ability to bring forward the provision of infrastructure service....

The potential to lower total costs through alignment of incentives to manage project risk with capacity to do so is considerable. Contract design and management are important to ensure that only risks that can be better managed by the private sector partner are allocated to them. PPP use in Australia has also fostered the development of a large domestic infrastructure investment, construction, and facility operation industry.²⁹

Similarly, the FHWA study emphasized the use of PPPs to bring projects forward and help develop the domestic industry to support them:

Australian states have used highway PPPs selectively in their urban centers to implement large-scale surface mobility improvements in a relatively short timeframe. These highways have improved both commuter and freight travel in the most densely populated cities in Australia—Sydney, Melbourne, and Brisbane. Similar to Spain, the activity in Australia has spawned an industry of highway developers, operators, and financiers. These private firms are also positioned to provide their services across the globe.³⁰

This study discusses the use of PPPs in Australia at the state level in more detail in Appendix D, where the authors describe programs and projects in New South Wales, Victoria, and Queensland. In the next chapter, they explain why transport PPPs are of particular importance in the United States.

TRANSPORTATION PUBLIC-PRIVATE PARTNERSHIPS IN THE UNITED STATES

A confluence of powerful forces in the United States is encouraging states and localities to consider a greater private sector role in the financing, construction, operation, and maintenance of transportation facilities such as highways, bridges, tunnels, ports, and inter-modal connectors. Mirroring Australia in an earlier period, severe state and local budgetary constraints driven by weak tax revenues are also a factor. Those budgetary problems are combined with reluctance to raise fuel taxes at either the state or federal level. The purchasing power of fuel tax revenue has also been declining due to inflation. Fuel tax revenue declines are exacerbated by increasing vehicle efficiency and the use of alternative fuels, both of which are encouraged by federal transportation policy.

Meanwhile, large sections of state roads, arterials, and the U.S. interstate highway system itself, have reached the end of their original design lives and are in need of major renovation and expansion. In many places, too few lane-miles have been added to keep pace with the demand for transportation services, which manifests itself through congestion and overloaded transportation systems.³¹

Together those forces have created a massive “infrastructure-financing gap in the United States.” The gap is defined as the difference between financing needs and the capital available to fund those needs. In a 2009 report, the National Surface Transportation Infrastructure Financing Commission pegged the nation’s average annual transportation financing gap at \$172 billion per year (U.S.) to maintain the existing system and \$214 billion to improve it, while the National Surface Transportation Policy and Revenue Study Commission pegged the gap at \$194 billion (U.S.) annually to maintain and \$262 billion to improve.³² Current sources of financing are insufficient to address the gap, and there is a consensus that innovative sources of financing, including private capital, must be accessed to help close it.

The wide availability of private capital is also a factor. The interest of global investors, including pension funds and insurance companies, in infrastructure investment continues to grow, making large pools of investment capital and expertise available for U.S. transport projects.³³ This is especially true after the global financial crisis as investors search for stable returns in investments they can actually touch. The history of successful private investment in other network industries in the United States, such as railroads, electricity, and natural gas, is also likely to make U.S. governmental entities more sympathetic to private participation.

Several U.S. transport PPP projects are described in this chapter. They help to illustrate the variety of contractual arrangements used in the United States. As noted, an important distinction is between brownfield concessions and greenfield projects. In a greenfield, a PPP is used to design, build, finance, and then operate a new facility. The authors provide examples of both below.

California 91 Express Lanes. The 91 Express Lanes combine a 10-mile, high-occupancy toll road with a full tollway lying completely within the median of State Route 91 (the

Riverside Freeway) in California. Opened in 1995, the express lanes are separated from the regular SR 91 lanes by a three-foot wide pavement section where the boundary is marked by yellow plastic pylons. There are no tollbooths on the lanes, and all tolls are collected electronically using FasTrak transponders. To help manage congestion, the toll lanes use time-of-day pricing (as opposed to real-time, variable tolling).

The project was developed through a partnership between the California Department of Transportation (Caltrans) and the California Private Transportation Company (CPTC). In April 2002, the Orange County Transportation Authority (OCTA) agreed to purchase the lanes for \$207.5 million, and it took possession in January 2003. The lanes are managed and operated by Cofiroute USA, which is one of the primary investors in the project.³⁴

The 91 Express Lanes are notable for several “firsts.” In explaining their decision to assign the 1996 Excellence in Highway Design award to the 91 Express Lanes, the U.S. Department of Transportation’s Federal Highway Administration stated that “Ninety-One Express Lanes is the world’s first automated toll road; the first implementation of congestion pricing on a U.S. toll facility; and the first toll road to be privately financed in the U.S. in more than 50 years.”³⁵

The 91 Express Lanes were controversial because of a non-compete clause in the PPP agreement. Non-compete clauses are designed to prevent loss of revenue due to competing unplanned free roads, and are common to both publicly and privately financed roads. The clause precluded construction by the state of competing facilities along thirty miles of the Riverside Freeway. CPTC filed a lawsuit against Caltrans when the state widened parts of the freeway.³⁶ Although the lawsuit was dismissed after OCTA purchased the facility, the controversy caused changes in the nature of many non-compete agreements.

Chicago Skyway. The Chicago Skyway concession is an example of a long-term leasing, or brownfield, PPP contract. The skyway is a 7.8-mile toll road that is part of the I-90 interstate highway. It connects the Dan Ryan Expressway (which carries both I-90 and I-94 route numbers) in Chicago to the Indiana Toll Road (I-90). A 3.5-mile section of the skyway is elevated, allowing it to cross the Calumet River. The skyway carried about 50,000 vehicles per day in 2005.³⁷

The City of Chicago issued a request for qualifications in March of 2004 from bidders interested in leasing the skyway for a 99-year term. The city received ten responses, and five bidders were asked to submit detailed proposals. The high bid of \$1.83 billion came from a partnership of Cintra Concesiones de Infraestructuras de Transporte S.A. (Cintra) of Madrid, Spain, and Macquarie Infrastructure Group of Sydney, Australia, which cooperated to create the Skyway Concession Company LLC (SCC). The city awarded the contract to SCC in the first modern long-term lease of an existing U.S. toll road.³⁸

The Skyway Concession Company has the right to all concession and toll revenues. Toll increases are capped at 2 percent per annum, the rise in the Consumer Price Index, or the increase in U.S. gross domestic product per capita, whichever is greatest. The \$1.83 billion upfront payment was equivalent to an impressive 70 percent of the city’s annual budget.³⁹ Although the advantages of PPPs do not stem from the way in which public

sponsors decide to use concession proceeds, it is nevertheless instructive to examine how they were used here. Of the \$1.83 billion, \$825 million was used to pay off both outstanding skyway and city debt, \$500 million went to creating a reserve fund that will produce about \$25 million annually for the city, \$325 million was invested in an annuity, and \$100 million went to a variety of projects, such as homeless shelters, facilities for senior citizens, and libraries.⁴⁰ Moody's Investor Service upgraded Chicago's bond rating as a result of its improved fiscal position to the highest level in twenty-five years.⁴¹

Importantly, by revealing the true market value of the facility, this brownfield PPP allowed the citizens of Chicago to know and consider the rate of return they were earning as owners of the skyway under city management. Given the income and expenses of the skyway and the \$1.83 billion market value of the concession as revealed through the bidding process, citizen-owners were receiving an abysmal 0.4 percent return on their investment.⁴² Taxpayers were therefore much better off paying down debt, which carried an interest rate of about 5 percent—over twelve times what they were earning prior to the lease.⁴³ The private partner improved the operation of the road—by quickly adopting electronic tolling, for example—and the lease was widely viewed as a success.

Denver Northwest Parkway. The Northwest Parkway is a 9-mile toll road outside of Denver, Colorado, forming a portion of the (incomplete) Denver beltway. Construction on the parkway began in June 2001, and it opened to traffic on November 24, 2003. The parkway struggled financially its first few years. In November 2007, the Northwest Parkway Public Highway Authority entered into a concession and lease agreement for its operation and maintenance with the Northwest Parkway LLC, a joint venture between the Portuguese firm Brisa Auto-Estradas S.A. (known simply as Brisa) and the Brazilian firm Companhia de Concessões Rodoviárias (CCR). This arrangement was unusual, and laudable, in that a toll authority itself leased responsibility for its operations.

Brisa and CCR paid €603 million for the concession rights. The Parkway Authority will use the proceeds to pay off remaining construction financing debts, provide funding for a 2.3-mile extension of the toll road connecting to state Highway 28 in Broomfield, and put funds into an escrow account to provide incentive payments for local jurisdictions.⁴⁴ These payments will be used to mitigate local opposition to the completion of the missing portion of the overall Denver beltway.

Dulles Greenway. The Dulles Greenway is a 14-mile, limited-access highway outside of Washington DC. It extends from the state-owned Dulles Toll Road, which connects the Washington DC beltway to Dulles Airport, to Leesburg, Virginia, and it opened to traffic in September 1995.

The Dulles Greenway offers an interesting case study of the versatility of private investment arrangements. Its structure does not fit into standard modern PPP categories and may instead be best described as a modern example of a facility built under a nineteenth-century toll road charter. Indeed, its website notes that “the Dulles Greenway is one of the first highways of its kind in the United States, and is the first private road in Virginia since 1816.”⁴⁵

The greenway was built under the Virginia Highway Act of 1988. Interestingly, the 1988 act did not grant the investors—the Toll Road Investors Partnership II (TRIP II)—the power of eminent domain. Rather, the assemblage of private lands required to build the greenway was purchased at market price.⁴⁶ Dulles Greenway regulation is also unusual. The greenway is regulated by the Virginia State Corporation Commission, which limits its rate of return to 18 percent, which is consistent with utility-style regulation. Unlike with standard utility regulation, however, the greenway receives no legally enforced monopoly through an exclusive territory. It continues to pay real estate taxes on property purchased to build the road, thus generating more tax revenue than a traditional project delivery approach.⁴⁷

The greenway was financed at a cost of \$350 million by TRIP II, with \$40 million in equity and \$310 million in privately placed taxable debt. Ten institutional investors held most of the debt. In the original agreement, operational responsibilities were to revert to Virginia after 42.5 years. The greenway faced financial challenges in its early years, however. TRIP II restructured its debt in 1999, and the Virginia State Corporation Commission extended the concession length by 20 years to 2056.⁴⁸ Tolls were increased in September 2004, and different peak and discounted off-peak rates were allowed. TRIP II sought regulatory approval for more variably priced tolls in July 2006, consistent with a congestion-pricing approach. The change in contract length suggests how this variable can be adjusted to account for differing financial conditions.

TRIP II was purchased by the Macquarie Infrastructure Group in August 2005 for \$617.5 million, and is now a fully owned subsidiary of Macquarie. The road is, however, operated by Autostrade International, which is a subsidiary of the largest toll road operator in the world, Italian-based Autostrade S.p.A.⁴⁹

Indiana Toll Road. The Indiana Toll Road is another example of a brownfield long-term leasing arrangement. In operation since 1956, the 157-mile Indiana Toll Road runs along the northernmost border of Indiana. The toll road is an important transportation facility in a broader sense, linking large cities on the eastern seaboard with those on the Great Lakes.⁵⁰

The Indiana Department of Transportation operated the toll road for many years. In 2005, the State of Indiana issued a request for proposals for a 75-year lease and received four. The winning offer was for \$3.8 billion from the Indiana Toll Road Concession Company (ITRCC), which again is a joint venture between Cintra and Macquarie.⁵¹ The concession agreement placed limits on toll increases and on the concessionaire's return on investment. The state used the proceeds to fund a ten-year transportation plan known as "Major Moves," which will support about two hundred transportation projects around the state. As a result, Indiana is the only U.S. state with a fully funded transportation plan for the years 2006 to 2015.⁵² Major Moves will result in a quadrupling of highway spending in Indiana, from \$213 million in 2006 to \$874 million in 2015. As in Chicago, the brownfield concession resulted in an upgrade of Indiana's debt rating by Standard & Poor's to AAA, its best rating ever. The improved debt rating will save the state millions of dollars in interest payments over time.

I-495/Washington DC, Beltway HOT Lanes. The Washington DC, region generally and the Northern Virginia area in particular are among the fastest growing areas in the country. The amount of traffic using the Capital Beltway overall has tripled since it was last expanded in 1997, and congestion costs the local economy almost \$5.5 billion per year.⁵³ Unsurprisingly, the Northern Virginia portion of the Washington DC–Capital Beltway is one of the most congested traffic routes in the eastern United States.

Assistance is coming in the form of 14 miles of high-occupancy toll (HOT) lanes to be added to the Northern Virginia portion of the beltway, the first major expansion in over 30 years. HOT lanes are tolled lanes that operate alongside existing untolled highway lanes. The goal is to provide motorists with faster, more reliable alternative lanes. In this case, there will be two new HOT lanes in each direction. Carpool vehicles (defined here as carrying three or more occupants), buses, motorcycles, and, of course, emergency vehicles will all have free HOT lane access. Vehicles with fewer than three occupants can choose to have access to the lanes by paying a toll. Importantly, dynamic tolling (that is, congestion pricing) will be used on the HOT lanes to ensure traffic remains free flowing at all times. Tolling will be fully electronic, using transponder technology.⁵⁴ According to the Virginia Department of Transportation:

The I-495 Virginia HOT Lanes Project will deliver the most significant enhancement to the beltway since its opening in 1964. The project includes two new lanes in each direction from the Springfield Interchange to just north of the Dulles Toll Road and the replacement of more than \$260 million in aging infrastructure. This includes replacing more than 50 bridges, overpasses, and major interchanges.⁵⁵

The Capital Beltway HOT lanes will be financed, built, and operated through a fixed-price, design-build PPP. In June 2002, the Virginia Department of Transportation (VDOT) received an unsolicited proposal from Fluor Daniel to design, build, and finance Capital Beltway HOT lanes. The proposal was received through Virginia's Public–Private Transportation Act of 1995, which allows private parties to enter into transportation PPP agreements with the state, and for unsolicited proposals. VDOT invited competing proposals, but none were received.⁵⁶

A comprehensive development agreement was concluded in December 2007, under which a partnership of Fluor and Transurban will construct and operate the lanes, while VDOT will own and oversee them.⁵⁷ Total concession life is 85 years, with five years of construction and 80 years of operation. Total project cost, estimated at \$1.9 billion, will be financed using a mixture of sources, including private equity, private activity bonds, TIFIA loan financing, and a \$409 million grant from the state. This is the largest financing of HOT lanes in the United States, and the first time private activity bonds will be used to help fund HOT lanes. Importantly, the project's large cost and state fiscal constraints would likely have prevented it from moving forward without private investment.⁵⁸

Texas State Highway 130. Texas State Highway 130 is also known as Pickle Parkway (after former congressman J. J. “Jake” Pickle), or SH 130. It is a tollway that will, when completed, be 89 miles long and run in a corridor south and east of Austin.⁵⁹ SH 130 was

constructed to help address the large increase in truck traffic between the United States and Mexico associated with the passage of the North American Free Trade Agreement (NAFTA), which came into force on January 1, 1994. It serves as an alternate route to I-35, which it parallels.⁶⁰

Lone Star Infrastructure, a partnership of civil engineering firms and large highway construction firms, was awarded a contract to build one major section of SH 130 in 2002. The first segment was opened to the public in November 2006. In June 2008, Cintra-Zachry reached an agreement with the State of Texas to build segments five and six of SH 130. Cintra-Zachry will receive the right to collect tolls on those segments for 50 years in return for their investment of \$1.3 billion. The agreement stipulates that toll rates will rise at the rate of inflation. Cintra-Zachry and the state will share toll revenue. Title to the road remains with the state. The concessionaire is responsible for designing, constructing, operating, maintaining and, importantly, financing the facility. As an indication of the capital-raising advantage of PPPs, a tax-exempt, debt-only approach using toll revenue bonds would have raised about \$600 million, while a PPP was able to raise the entire \$1.3 billion using a combination of debt and equity.⁶¹ Like the Capital Beltway HOT Lanes, it is unlikely that the SH 130 project would have been built without private financing.⁶²

CURRENT LITERATURE ON PUBLIC-PRIVATE PARTNERSHIPS

This chapter briefly surveys the current literature on PPPs before discussing the four key policy areas that are the focus of this study. As PPPs have risen in importance, the academic community has broadened and deepened understanding of many aspects of PPPs. Included are discussions extant research on the public decision-making process, public relations in PPPs, the use of PPPs in rail and aviation projects, the choice of concession length, and the perspective of investors in PPPs.

Several groups of researchers have examined the decision making processes and analytic tools that public agencies use when embarking on PPPs. Morillos and Amekudzi⁶³ survey current practices for conducting value for money (VfM) analyses. They identify six key VfM drivers: risk transfer, output specifications, contract length, performance measurement and incentives, competition, and private sector management skills. Strength and weaknesses of different calculation methods are discussed. Buxbaum and Ortiz⁶⁴ provide a thorough study of the decision making process involved in significant PPPs in the U.S., along with a useful history of PPPs. They discuss the advantages of PPPs for financing transportation infrastructure, with the caveat that the long-term implications are not widely understood and superior, as yet unexplored alternatives may exist. Important changes due to PPPs cited are the replacement of taxes with tolls, private equity versus private lending, and the private sector's ability to bring about cost savings. Bonnafous and Jensen⁶⁵ provide guidance for public agencies deciding which of several possible PPP projects to undertake. They show that correctly ranking projects to obtain the most efficient outcome may require sophisticated mathematical modeling. Such models take into account both the financial and socioeconomic aspects of the projects. In a similar vein, Tsamboulas et al.⁶⁶ demonstrate how a hierarchical risk analysis can be used as a tool to help a public agency better understand the importance of different risks to potential private investors. They also show how it could be used to structure discussions during the negotiation of a PPP contract.

Public perception of PPPs has also been a concern, and several researchers have addressed this issue. Ward and Sussman⁶⁷ studied toll road PPPs in Malaysia, where a lack of transparency and public participation in the PPP process has led to protests. They propose policies to address these problems and ensure the long-term viability of PPPs there. Lawther (2004) argues that attention must be paid to public outreach and marketing of new PPPs to encourage their use. Lawther⁶⁸ uses three urban Advanced Traveler Information Systems (ATIS) as a case study, but the lessons can also be applied to physical infrastructure projects as well. Buxbaum and Ortiz⁶⁹ also provide strategies for addressing public concerns about PPPs.

PPPs have been used in contexts other than roadways, in particular in rail and aviation, and lessons can be learned from these projects as well. Risk allocation in urban rail PPPs was studied by Phang.⁷⁰ Across urban rail PPPs in Latin America, Asia, and Europe, common tradeoffs that had to be addressed when formulating PPP contracts included technical knowledge versus PPP management knowledge in the government agency, the extent to which complementary services should be bundled into a single contract, and concession

length. In particular, longer concession lengths might enhance the ability of the government agency to develop a long term relationship with a vendor whereas shorter concession lengths allow more opportunities for competitive bidding. However, frequent bidding also may entail higher transaction costs simply because renegotiation occurs more often. Else and James⁷¹ perform a mathematical analysis of PPPs involving railways and show that in certain market structures, quality of service is likely to fall. This highlights the importance of explicitly incorporating service standards in the PPP contract. Majumdar and Ochieng⁷² investigate the effects of PPPs on funding, new technology, project management, pricing, and customer service in the context of aviation navigation infrastructure. The discussion of these facets of PPPs is also relevant to surface transportation PPPs.

The optimal length of PPP concessions has been an active area of research. Albalade and Bel⁷³ use a simulation study to compare flexible concession lengths with fixed-length concessions. Using data from two tollways in Spain, they show that a flexible concession length would have resulted in a shorter contract length (because of unexpected growth in demand), hence benefiting the users of the tollway. Vassallo⁷⁴ discusses an approach to variable-length concessions taken in Chile, in which contractors bid on the least present value of the revenues (LPVR). The evolution of the LPVR approach in Chile is traced and it is compared with other common tactics to mitigate demand risk. Bel and Foote⁷⁵ compare recent PPP tollway projects in France and the U.S. They found that investors in the U.S. paid on the order of five times as much as did investors in France (relative to current cash flow). They identify aspects of the contracts and the bidding processes that may explain this difference. First, the concession lengths in the U.S. were longer and the maximum allowable toll was higher. Secondly, in the U.S. bid price was the sole factor used in determining the winning bid, whereas in France multiple criteria determine the winning bid. These factors impact the relative burden placed on users of the toll facility and taxpayers.

Understanding the perspective of potential investors is also important to a successful PPP. Brown,⁷⁶ in a summary of recent growth trends of PPPs in the U.S., highlights the importance of tax benefits to the private partner due to depreciation of the infrastructure assets. An interplay exists between the contract length and the ability of the private partner to maximize their tax benefits. Debande⁷⁷ reports on the UK's experience with transportation infrastructure PPPs since the inception of the country's Private Finance Initiative (PFI) in 1992. A useful typology of relevant risks by project phase is provided, as is a discussion of several case studies. Vassallo and Sanchez-Solino⁷⁸ describe the recent use in Spain of subordinated public participation loans (SPPL) as an instrument to facilitate the financing of toll facility PPPs. SPPLs are essentially loans originated by the public sector whose interest rate depends on the traffic level on the facility. Such loans can be used to encourage private participation through a more equitable sharing of risk. Although the authors find that SPPLs have been used successfully in Spain, they also propose possible improvements.

FOUR KEY PPP POLICY ISSUES

This chapter discusses the four policy issues that are the main focus of our study, and consider their importance for U.S. PPPs. To recap, those issues are: (1) how to distribute the risks inherent in PPP contracts across public and private sector partners; (2) when to use non-compete (or compensation) clauses in PPP contracts; (3) how to address concerns about monopoly power; and (4) the role and importance of concession length.⁷⁹ In each case, the authors first considered the importance of the issue, and how it has been treated in the United States. They then discussed how it has been addressed in Australia.

RISK ALLOCATION IN PPP CONTRACTS

The authors first consider an issue that many experts consider to be a critical aspect of PPPs: the allocation of risk between public and private partners. Scholars studying the interaction of economics and the law have long recognized that contracts play a key role in allocating the risk of any economic activity among the contracting parties. PPP contracts are no exception. One role of a PPP agreement is to determine how the risks inherent in a given transportation project will be distributed between the government—that is the citizens of the relevant jurisdiction—and the private partner.⁸⁰

Importantly, without some form of private participation, citizens will by default bear almost all the risks associated with financing, designing, constructing, operating and maintaining a transportation asset. The only substantial portion of project risk not borne by citizens is that assumed by municipal bondholders.

First consider some of the main risks associated with a transportation project.⁸¹ There is agreement among analysts that some basic PPP risks include, but are not limited to:⁸²

- **Traffic or Revenue Risk.** Traffic, revenue, or demand risk may be the most important economic risk associated with the design and construction of a new transportation facility, that is, with a greenfield PPP. This is the risk that actual or realized traffic volume, and thus revenues, will be less than projected at the time the facility was planned and constructed. This risk is important because it could impact the private partner's financial viability, and thus its ability to repay its debt. In many PPP agreements, the private partner receives its compensation through collection of facility toll revenue. The private partner thus assumes demand risk. This is consistent with basic principals of efficient risk allocation, since private investors are usually highly diversified, assume demand risk voluntarily, and are compensated for this type of risk assumption. Although it is rarely viewed as such, the risk of competing facility construction (normally addressed in the United States through non-compete clauses, as discussed below), is a subset of traffic or revenue risk, since a competing free facility may reduce traffic and thus revenues on the facility in question.
- **Cost Overrun Risk.** This is the risk that the actual cost of a transportation project will exceed its expected cost. There are a variety of risks associated with completing a transport facility that may cause costs to rise, such as unexpected geological conditions, problems in design, and increases in the cost of materials. Cost overrun risk is more

relevant for greenfields than for brownfields, although major existing facility expansion and refurbishment may also suffer from cost overruns. As in many countries, cost overruns have been a significant risk in Australian transportation projects, particularly under traditional procurement methods.⁸³

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- **Time Overrun Risk.** This is the risk that a project will take longer to design and construct than expected. This risk is sometimes conflated with cost overrun risk. Although it is obviously related to cost overruns, it is a distinct risk, since it is possible for a project to be completed on budget, but later than expected, which carries a unique set of hazards. If a project is delayed, motorists will be denied the use of the facility during the time delay. Those are not necessarily hazards associated with cost overruns.
- **Maintenance and Operation Risk.** These include maintenance costs that are higher than anticipated as well as operational failures. Operational risk is generally associated with the risk that road capacity might be unavailable. It includes roadway unavailability during winter due to snow and ice, as well as lack of availability due to staff management issues.
- **Financial Risk.** This risk arises because the anticipated financing for the project might not materialize at the expected cost of finance. It includes not only risks associated with raising the necessary capital, but also exchange rate risks, interest rate risks, and insurance costs, among other sources.
- **Environmental Risk.** This is the risk that the necessary environmental permits to construct the facility will not be forthcoming, and that costs associated with environmental mitigation will be higher than expected. This risk type is likely to be more important for a greenfield than for a brownfield PPP, although it is relevant for a major expansion of an existing facility.
- **Regulatory and Sovereign Risk.** This risk includes the possibility that regulations will adversely affect facility profitability and thus value. If, for example, a facility is rate-of-return regulated, this includes the possibility that tolls will not be increased adequately to allow the operator to realize a market rate of return on their investment. It can also include changes in planning and environmental requirements. An example of sovereign risk is the possibility that the public sponsor will decide to cancel the project after bidding has been completed or after construction has begun. Sovereign risk includes the possibility that the government might expropriate infrastructure assets. An example of sovereign risk in Australia is the February 2010 cancellation by the New South Wales government of the planned AUS\$5.3 billion central business district metro rail line in Sydney after costly bids for the project had already been placed.⁸⁴
- **Land Assembly Risk.** This is the risk that the large tracts of land required to complete a greenfield PPP will not be forthcoming. This is due to the problem of property owners “holding up” projects, or because of environmental issues. This risk is mitigated by the power of eminent domain in the United States, although not all PPP projects have relied on that power to assemble the necessary land.

- **Force Majeure Risk.** This type of risk includes “acts of God” that are not under the direct control of either party. It includes such adverse events as earthquakes, wars, floods and tidal waves, among others.

The key question that must be addressed by the contracting parties is: which of these risks are best borne by investors and which by citizens in their capacity as transportation facility owners? There are two basic elements to risk management: who is best able to actually control the risks and who is best able to bear the remaining systematic risk via hedging and diversification. Investors may be better able to manage some risks while others are best borne by the public sector. The public partner may, for example, be better able to manage risks associated with sovereign, regulatory and environmental risks, whereas private partners may be better positioned to manage financial risks.

Although patterns are emerging, the contracting parties often determine the best allocation for the particular project at hand and given the prevailing capital market conditions. That is, the optimal risk allocation across parties may vary across projects, jurisdiction, and time. The public sponsor might assume greater risk (such as assuming demand risk through shadow tolls or availability payments) in some cases in order to attract private investment and to realize the numerous other benefits associated with private participation. Risk sharing does in fact appear to vary widely across projects.⁸⁵ As noted, under exclusive government operation citizens assume almost the entire range of risks associated with facility design, construction, maintenance, expansion and operation.

Risks transferred to the private sector are priced into the cost of the bid. The gains from risk sharing accrue from the fact that the private sector may be better at managing certain risks, so that the overall cost of risk management is reduced.⁸⁶ The pricing of risk also helps to make the actual costs of risk more transparent. As one PPP expert states:

Society benefits if the market for risk bearing works effectively. Some parties exposed to particular risks will be willing to pay a large sum to have those risks transferred to others. Other parties may be able to bear, or take actions to mitigate, those risks at a low cost and are thus willing to take them in return for some lower sum. Insurance contracts are the classic case of such risk transfer (with benefits arising from pooling of risks by the insurer).⁸⁷

The type and degree of risk transfer remains one of the most important issues in PPPs. Next is a discussion of the allocation of risk in Australian PPPs. The authors combined the findings of two existing studies of risk allocation in Australian PPPs in Table 2. These studies identified several risks in addition to those noted above.

Table 2 suggests that there is a broad range of risks that must be allocated via a PPP contract. The table might lead one to believe that risk transfer is static across time and projects. Australia has, however, been utilizing PPPs long enough that its basic approach to risk allocation has changed significantly over time.

Several experts interviewed for this study pointed out that Australia has gone through at least three stages of risk allocation over the past 25 years. The first could be loosely called the Sydney Harbor Tunnel (SHT) stage, where the public sector essentially guaranteed

revenues and thus assumed the project's demand/traffic/revenue risk. The SHT PPP has sometimes been criticized as a "giveaway" to private sector partners, mainly due to the public sector's assumption of demand risk. It is notable that this PPP resulted from a 1985 unsolicited proposal from a partnership of two transportation facility construction and operating companies, Transfield and Kumagai. That is, there was no large equity investor participation, so there were no residual claimants to act as risk bearers and actively seek risks for which they could be compensated.⁸⁸

After the SHT project, and perhaps in reaction to it, the pendulum appears to have swung in the opposite direction. The second phase could be called a "maximum risk transfer" approach, where public sponsors sought to transfer as much risk as possible to the private sector.⁸⁹

Table 2 Risk Allocation in Australian PPPs

Risk Type	Public Sector	Private Partner
Market/Demand/Revenue		X
Design		X
Financing		X
Environmental Compliance		X
Construction		X
Approvals Process	X ^a	
Geotechnical		X
Land Assembly	X	
Utility Relocation		X
Operations and Maintenance		X
Latent Defects		X
Legislative Changes/Sovereign	X	
Native Title	X	
Force Majeure	X	
Competing Facilities		X ^b

^a Often shared between the two parties.

^b Limited restrictions on public sector.

Sources are Federal Highway Administration, *Public-Private Partnerships for Highway Infrastructure*, Table 6, p. 25; and Table 1 in Mick Lilley and Catherine DeGiorgio, "A Private-Sector Perspective," *Australian Accounting Review*, July 2004: Vol. 14, no. 2, p. 35.

Public sponsors came to understand that there is no "free lunch" with regard to risk transfer in the sense that private partners will take the proposed risk transfer as given and will price risk assumption into competitive bids. If the private sector is, in fact, worse at assuming certain risks, then maximum risk transfer will increase the overall social cost of the project. There was also an understanding that a significant number of private sector financial failures stemming from excessive risk assumption under the PPP model was not in the long-run interest of present or future public sector partners. It is good for both if PPPs are viewed as successful overall.

The result was a move toward what some interviewees called "optimal risk transfer." Here public and private participants seek to allocate risks to the party that is able to manage

them at least cost. This lowers the overall social risk assumption cost of the project.⁹⁰

Although risk assumption in this period differed across projects, patterns appeared to emerge, with private partners assuming traffic and cost change risk, while public sponsors assumed the risk of land assembly. This allocation appears largely consistent with Table 2. A study of PPPs in NSW, for example, noted the learning and the risk allocation on the M4 and M5 projects in Sydney: “Positive attributes coming out of the M4 and M5 were that the operators accepted all patronage and cost escalation risk without recourse to Government, while the RTA (Roads and Traffic Authority) retained the risk of property acquisition and took interest rate risk up to a point.”⁹¹

Although it may be too early to be termed a “stage,” there appears to be an emerging trend with regard to risk allocation since the global financial crisis (GFC) that began in 2007. The GFC had the effect of reducing significantly the amount of risk capital (both debt and equity) available globally for many investments, including transportation infrastructure. Overall, capital markets were less willing to assume risk. Interviewees noted that, in order to attract capital to PPP projects it became necessary for risk allocation to shift again, with public sponsors absorbing more demand risk through shadow toll/availability payments type approaches.⁹² Experts also noted the effects of increased competition for infrastructure-oriented capital from other regions, particularly in Asia (China and Korea were emphasized), where public sponsors are willing to assume demand risk. Although the study’s interviews reveal no definite consensus regarding whether or not demand risk is likely to be re-allocated to private partners in the future, once credit markets ease, some experts did state that they expect future Australian transportation PPPs to be availability-payments based. Several also believe that the urban projects that could be easily funded via toll revenue were largely already exploited; there is little “low hanging fruit” left. Some also noted that the other social benefits of PPPs, such as moving projects forward in time, innovation in design and other aspects, and life-cycle costing justify continued use of the PPP model, and that its use was not threatened by shifting demand risk to the public sponsor. This is substantiated by the increasing reliance on the PPP model for social infrastructure, where the public sector always absorbs demand risk. Regarding credit markets, several experts stressed that the degree of financial leverage or “gearing” of projects via debt was likely to remain lower than during pre-GFC days for some time.

This discussion suggests that the public sector can “dial in” the amount of risk it assumes in order to get projects completed. Such adjustability demonstrates one of the main benefits of the contracting approach—its inherent flexibility.

Several interviewees stressed that for the risk-transfer social benefits of PPPs to be realized, demand risk must be truly transferred to the private partner. Suppose, for example, that a transport project is undertaken as a PPP where the private partner assumes demand risk, perhaps through a real toll project. If the private partner subsequently encounters financial difficulties due to inadequate demand, the public partner may then begin to subsidize the private partner to ensure its ongoing financial viability. In that case, the public sector is effectively assuming demand risk, thus defeating one of the key justifications for the PPP approach. These experts stressed that the public sector must be willing to allow the project to stand or fall on its own for risk to in fact be transferred.

There are two Australian transport PPPs in Sydney where assumption of traffic risk proved to be pivotal: the Cross City Tunnel and the Lane Cove Tunnel. In both cases traffic forecasts for the first two years of operation proved to be optimistic. When the predicted traffic volumes did not materialize, the concessionaires faced financial difficulties. Consistent with the risk-transfer aspect of PPPs, equity holders largely absorbed those losses. Cross City Tunnel equity investors lost about 90 percent of their investment value, while the lending banks received their loans back in full.⁹³ Lane Cove Tunnel equity investors were completely wiped out; the lenders' situation is unclear as of this writing.⁹⁴ These financial failures became fodder for the media and eventually political footballs. Although equity holders were impacted, losses did not accrue to the respective governments however. Indeed, in the case of the Cross City Tunnel, the government of NSW received an upfront payment of \$96 million.⁹⁵

Those failures have both costs and benefits for the PPP approach. While some members of the public and the media view these projects as repudiating the PPP approach, at least one interviewee noted that such financial losses serve to reinforce the point that the private sector in fact does assume substantial risk in a greenfield PPP, saying that, "After these high-profile financial failures, it is difficult to argue that toll-road PPPs are a 'giveaway' to the private sector."

The next section addresses the second key policy issue, which is the use of non-compete and compensation clauses.

NON-COMPETE CLAUSES AND COMPENSATION CLAUSES

A non-compete clause is a provision in a PPP contract that prohibits the public partner from constructing an unplanned government-supported transportation facility that would compete directly with the privately operated facility in question. The clause is intended to protect the private partner's investment from competition from an unplanned competing facility. The issue of non-compete clauses was brought to the forefront of the U.S. PPP debate by the SR 91 Express Lanes in California, as discussed above, which is one reason this topic was chosen for study.

A less restrictive version of a non-compete clause has emerged both in the United States and abroad, called a compensation clause. In Australia such clauses are typically part of a broader "material adverse effect" clause, which allocates the risk of a range of potential adverse effects. In a compensation clause, the public partner may construct an unplanned competing facility but is required to compensate the private partner for revenues lost from the added competition. The Indiana Toll Road concession agreement for example requires the state to compensate the concessionaire for lost revenues if the state constructs, within 10 miles of the Indiana Toll Road, a new interstate-quality highway of 20 or more continuous miles.⁹⁶

The economic rationale for such clauses is straightforward: both debt and equity investors will be loath to invest if they fear competition, and thus a loss of revenue, from a nearby government-supported facility. To borrow a term from another industry, if a large, unplanned, competing facility were installed, the facility in question might become a "stranded" asset.

Stranded assets are sunk investments on which it becomes impossible for a firm to earn an economic rate of return. Although that may happen in the normal course of economic activity, asset stranding is a concern when caused by an unanticipated regulatory change or other government action.⁹⁷

An example suggests that, historically, competition from nearby un-tolled government-supported facilities has stranded toll facilities. On February 18, 1928, the U.S. Highway 11 bridge across Lake Pontchartrain in Louisiana was opened to traffic.⁹⁸ The toll bridge was built with private funds as a tolled facility by a group of contractors called the Watson-Williams Syndicate. Governor Huey P. Long, who campaigned on the promise of “free” (meaning non-tolled) bridges, entered office soon after and built competing bridges at the Rigolets and Chef Menteur Pass. As a result, the Watson-Williams Bridge suffered a severe drop in revenue, became stranded, and its owners were eventually forced to sell the bridge to the State of Louisiana for pennies on the dollar. The effect on both equity and debt holders was ruinous.

Non-compete clauses originally evolved to assure buyers of toll revenue bonds (both private and government issued) that traffic would not be diverted from the toll road, thus reducing its ability to repay that debt.⁹⁹ The holders of any type of bond who anticipate being paid back via a facility’s toll revenue are likely to demand guarantees against unplanned competing non-tolled roads.¹⁰⁰

One interviewee stressed the interaction of non-compete clauses and revenue sharing, noting that one major concern with non-compete clauses is governmental time inconsistency. The problem is that government may contractually commit in the contract to not construct a competing facility, and later renege on that agreement. If there is revenue sharing, however, then the public sector has an incentive to avoid the construction of competing facilities.

Although they are not always viewed as such in the United States, compensation clauses are another example of risk allocation through contracts. They attempt to address one type of event among many (the construction of a competing facility) that can affect the revenues accruing to a particular facility.

Economic literature suggests that a particular risk should be borne by the party in the best position to manage it, as this lowers the overall cost of risk bearing. Because the decision to construct a competing facility lies with the public partner, efficient risk allocation appears to argue in favor of compensation clauses.¹⁰¹ However, in the United States concern has been expressed about compensation clauses because they may constrain future public sector decisions regarding capacity additions. A balance therefore must be struck between the need for a compensation clause to attract capital and the public sector’s need for flexibility in adding future capacity.

Compensation clauses in the United States have been adjusted depending on the contractual setting. The Chicago Skyway agreement, for example, offers the concessionaire no protection against the construction of unplanned competing facilities. However, this may not reflect imprudent risk assumption by the concessionaire since dense urbanization near the Skyway makes competing facility construction costly.

Similarly, many new contracts to construct and operate managed lanes contain only limited protection against the development of competing facilities. For example, on the I-635 managed HOV Lanes Project in North Texas, which was approved by the U.S. Federal Highway Administration under the Express Lanes Demonstration Project (ELDP) in March of 2009, the scope of protection is limited to new main lanes within the project right of way. The concessionaire is thus offered no protection from the construction of new, reconfigured, or expanded, frontage roads. Similar limited protection arrangements obtain for the North Tarrant Express project in Texas and the I-495 Capital Beltway managed lanes projects in northern Virginia. Other U.S. PPP agreements, however, contain greater assurances of compensation for the effects of competing facilities.

Compensation clauses in U.S. PPP contracts remain an important policy issue. The draft version of the Surface Transportation Authorization Act of 2009 released by the House of Representatives Transportation and Infrastructure Committee in July 2009 contains provisions that would restrict the use of non-compete agreements. In particular, Section 1301 (a)(3)(E) states: “The public authority shall not enter into an agreement with a private person under which the State is prevented from improving or expanding the capacity of public roads in the same travel corridor.”¹⁰² Because of their importance in attracting both public and private investment while constraining public sector decisions, policies regarding compensation clauses should be considered carefully.

Experts informed us that the trend in Australia is away from material adverse effect clauses that restrict the public sector, and toward greater assumption of competing-facility risk by the private sector. Increasing private sector risk assumption is consistent with the observation of some interviewees that a very high standard of proof must be met before a private operator will be compensated for a material adverse effect. The clauses are usually heavily qualified, and the standard for proving “materiality” is quite high, particularly in Sydney. Interviewees suggested that private sector partners thus place very little value on such clauses.

Interviewees also noted that MAE clauses are becoming more standardized overall. Private bidders are expected to take the allocation of risks enumerated there as given, and price those factors into their bid. This is consistent with the view of several experts that public sponsors are more cognizant of the risks they are willing and unwilling to assume, such that risk allocation in PPP contracts is becoming more standardized overall.

Several experts stressed the interaction of compensation clauses and “compensable enhancement clauses.” Conceptually, a new, nearby facility may either increase or decrease traffic flows on a PPP facility. A compensable enhancement clause is effectively the reverse of an MAE clause in that the public sponsor will be compensated for the effect of facilities that increase the private partner’s revenues. If, for example, the government builds an unplanned new road that feeds traffic to the PPP facility, that may be a compensable enhancement. The amount owed to a private partner via a compensation clause can thus be offset by a compensable enhancement. In this way, there is effectively a ledger of payments kept between compensations and compensable enhancements. For example, on the EastLink facility in Melbourne, if the operator, ConnectEast, can prove that there was a material adverse effect, they can only be compensated if there is an off-setting compensable enhancement to draw from.

ADDRESSING POTENTIAL MARKET POWER

Another critical public policy concern addressed through a PPP contract is the control of market power potentially possessed by a private participant. This is a concern to economists because the high prices that may result from monopoly result in a misallocation of resources, with too little of the good or service in question being produced or consumed. In some industries, elaborate, costly regulatory structures have evolved to address market power. Economists have criticized some regulatory approaches as being themselves misguided and inefficient, so it is important to consider approaches to controlling monopoly power carefully within the transportation context.

In any market, pricing power stems from the lack of available substitutes for the good or service in question. In the vast majority of markets, such as bread, gasoline, cars or houses, there are several viable alternatives for the product offered by any one company, so prices are constrained by competition within the market itself.

From an economic perspective, it is important to keep prices in check not because doing so constrains companies' profits or because it prevents "price gouging," however defined. Rather, it is important because consumers will then purchase the correct (that is, the economically efficient) amount of bread, gasoline, cars and houses. If suppliers face limited competition, they would be able to raise prices to a level that would cause consumers to purchase an inefficiently small amount of the good or service, and society would lose as a result. Public policy should thus focus on the *quantity* of the good or service produced and consumed.

In the transportation context, market power results in a toll road operator charging such a high toll that too few customers—in this case motorists—choose to use the facility. This is a concern regardless of whether the operator is public or private. An inefficiently small number of motorists end up using the road, bridge or tunnel. Again, the focus is not on price (here, the toll), or on the operator's profits, but rather on what quantity (here, traffic volume) is most socially desirable.¹⁰³

Traffic flows possess some unusual economic attributes, however. For most goods, a higher price will reduce the quantity consumed, all else equal. For a congested transport facility, such as a highway, a toll that increases with traffic flows will help reduce congestion, smooth traffic flow, and increase facility throughput. Therefore, high tolls themselves are not necessarily a sign of market power abuse. Rather, they may simply reflect effective use of congestion pricing. Market power only becomes a concern when higher tolls work to decrease, rather than increase, facility throughput.

There are two main ways in which public sponsors using PPPs can constrain market power. The first is at the bidding stage, where the public sector can inject competition through a wisely structured tendering process. The second is through contract clauses that limit the rate at which tolls can be increased over time. We first discuss constraining market power by limiting tolls.

Toll Regulation Via Price Caps

One insight from the policy literature is that toll regulation should be viewed as a substitute for within-market competition. If a facility faces sufficient competition from other roads and modes, then toll regulation is unnecessary. If a facility operator attempted to raise tolls in such a case, then motorists would switch to other alternatives, and traffic volume (and thus facility revenue) would quickly fall. The available alternative routes affect how sensitive traffic volume is to toll changes—that is, the elasticity of demand for the facility in question. More alternative routes and modes increases demand elasticity. If demand elasticity is very high (and much traffic is lost when tolls increase), then even an unconstrained facility operator will not find it in their interest to raise tolls.

The intensity of competition from other roads and modes is likely to vary greatly across transportation facilities. This has important implications for the stringency of toll regulation, which should, if properly administered, vary inversely with the degree of competition. Given that the purpose of regulation is to mimic within-market competition (and thus to generate the benefits of competition, such as reduced costs and enhanced innovation), toll regulation should be relaxed as competition rises. Since optimal toll regulation is likely to vary across facilities, a one-size-fits-all approach may be undesirable. Rather, regulation of market power in transportation through contracts is best determined on a case-by-case basis after careful consideration by public sponsors. An individualized outcome is likely to be achieved through facility-based negotiations and bidding. Of course, for many transportation facilities competition from other roads and modes may be weak and thus insufficient to keep tolls in check.¹⁰⁴ In such cases, toll regulation is very important.

Consistent with practice in some other industries, caps on the tolls private participants are allowed to charge have become the dominant form of PPP regulation internationally. In general, price cap regulation simply limits the prices charged by the regulated firm, but there are several possible permutations. The price could be fixed at one level, which means that the toll in real terms falls over time. More commonly, however, the price cap is allowed to rise with some broad inflation index, such as the consumer price index. The important aspect of price cap regulation is that the firm's incentives to innovate and contain costs are retained while monopoly power is controlled.¹⁰⁵

A second insight is that toll regulation in the PPP contract should focus on how the price or toll charged impacts traffic volume, since that is what affects economic efficiency.¹⁰⁶ Although most PPP contracts include some form of toll regulation, approaches focusing on traffic volume itself have been used in PPP regulation. For example, the concession contract for the 407 Express Toll Route in Canada allows the private operator (the Spanish firm Cintra) to set tolls as it wishes, but assesses penalties on the firm if it fails to attract adequate traffic from un-tolled roads that parallel 407.¹⁰⁷ This obviously constrains Cintra's ability to raise tolls to a level that would restrict traffic flows, but still allows it to use congestion pricing and also creates an incentive to expand the facility as necessary. A key question is the degree to which toll caps interfere with a firm's ability to implement congestion prices. Tolls that are high enough to effectively regulate traffic flow may violate the cap. One solution is to impose a cap on the average toll over some time period (for example, over a week or a month), which allows tolls to exceed the cap within that time

frame if there are compensating low tolls during off-peak times. Notably, congestion tolls that must be very high to effectively regulate traffic are a reflection of the fact that facility supply has failed to adequately respond to increased demand over time.

This relates to another important issue mentioned by several interviewees: having several PPPs in an urban setting that rely on price caps may interfere with the public sector's ability to implement network pricing in the future. This is a concern in Sydney where several long-term PPPs relying on price caps are in use, and renegotiating the contracts to allow congestion pricing is likely to be costly. Several interviewees suggested that public sponsors try to anticipate the need for future congestion and network pricing when negotiating PPP contracts for urban areas. In addition to price caps written into the contract, market power can also be addressed through franchise bidding, which is discussed below.

Franchise Bidding to Address Market Power

One important advantage of the PPP approach over traditional procurement is that PPPs create competition for the right to design, build, and operate a transportation facility. Competition here occurs at the stage of bidding for a concession or design and construction contract, rather than continuously over time, as when competition occurs within a market.

When properly structured, bidding for the right to serve a market can convey many of the advantages of competition within a market. Franchise bidding can be structured to take place along different dimensions. It could, for example, take place on the basis of the lowest toll acceptable to the concessionaire with a pre-set lease term and specified service quality standards.¹⁰⁸ If a sufficient number of firms bid for the right to serve a particular market, then bidding will cause the toll to be bid down to the per-unit cost of providing the good or service, as in a competitive market.¹⁰⁹

A second advantage of franchise bidding is that it can achieve productive efficiency. That is, the winning bidder will be able to produce the output (facility design, construction and operation, for example) at the least possible cost. If another firm were more cost-efficient, it would be able to under-bid its competitors and still receive a market rate of return on its capital.

Public sponsors can structure the bidding depending on what they wish to achieve. If the goal is to deliver a facility of a specified quality while charging the least possible toll, then bidding should take place on the basis of the lowest proposed toll schedule over time. Alternatively, in either a greenfield or brownfield context, if the goal is to maximize an up-front payment then bidding could be on the basis of the largest concession fee given a pre-specified toll schedule and service quality level. Conversely, if a subsidy is required to operate the road, then bidding can take place on the basis of the lowest subsidy acceptable to the concessionaire. Some bids in Spain have been conducted on this basis.

Another innovative option is for bidding to take place on the basis of the smallest net present value of revenue given the toll schedule, with the concession re-bid when that present value is received by the concessionaire. This type of bidding has been recommended by several scholars, and has been used in Chile.¹¹⁰

Addressing Monopoly Power in Australia

The authors next examine how monopoly power concerns have been addressed in Australia. Regarding the type of regulatory regime, perhaps the most striking insight from the interviews with Australian experts is the contrast between the importance economists place on it and the lack of concern coming from policy makers. All three Australian states rely on a simple price cap approach where the public sponsor sets the rate at which the toll can increase over time, although the rate of toll increase has been a bid variable in several cases. Experts simply noted that toll caps are applied in most cases and moved on. Several noted that CPI caps have the advantage of being politically appealing and are easily understood by the public. In no case did an expert suggest that toll caps were inadequate to the task of controlling monopoly power or that some other approach was better. Indeed, two interviewees noted the problems created by a rate-of-return regulatory approach in PPPs and highlighted how they blunt salutary incentives. This gave them confidence that toll caps are an appropriate way of addressing market power concerns in transport PPPs.

The use of bidding to inject competition proved to be a more interesting interview topic. The states differ as to which and how many elements are subject to bid. In New South Wales, for example, the government specifies the initial toll rate and then uses indexing to determine toll escalation. In Victoria and Queensland, the initial toll rate has also been a bid variable, but the government sets the tolling structure over time.¹¹¹

Interviewees representing different aspects of the transport sector stressed the importance of encouraging competition in the bidding process at all times. They suggested that it is best to define the full agreement carefully in advance and to then keep the bidding process going. In the words of one, it is wise to “keep the competitive pressure up as long as possible,” as this extracts the maximum benefit from competitive forces.

Certain aspects of the bidding process in Australia are noteworthy. Both Victoria and Queensland opted to form temporary public agencies for the sole purpose of procuring and commissioning highway PPP projects. The goal is to staff those agencies with people who are experienced in the PPP process. This focused expertise is itself likely to help ensure the efficiency and competitiveness of the procurement process. This also reflects recognition of the fact that the PPP contracting process is complex, and benefits from knowledge and experience. The creation of special agencies is also consistent with the comments of several interviewees, who stressed that public sector expertise is critical in structuring projects that are in the public’s interest.

The bidding process is similar across states. Prior to any actual bidding, governments conduct intensive study of the need for particular projects. Once a project passes an initial feasibility study, it moves to the “business case” stage. The business case is developed in accordance with the relevant government’s procurement guidelines. The business case for the project considers alternative delivery options (for example, PPP versus a traditional procurement approach) for the project, and identifies the option that is likely to provide citizens with the most “value for money.”¹¹²

Since PPPs create competition both between the traditional and the PPP approach, as well as competition among private providers (all of which helps to control monopoly power), it is useful to consider the meaning of value for money since this has become an integral part of the process. The FHWA study of PPPs reported that:

...the basic drivers of VfM in New South Wales and Victoria are virtually identical:

- **Improved Risk Management:** This involves more rigorous risk evaluation and transfer to the private sector of those risks it is best able to manage, including those associated with providing specified services, asset ownership, and whole-of-life asset management.
- **Ownership and Whole-of-Life Costing:** Efficiency is improved as design and construction become fully integrated upfront with operations and asset management.
- **Single Point of Contact:** Ongoing service delivery, operational, maintenance, and refurbishment costs become a single party's responsibility for the length of the contract period.
- **Innovation:** This involves wider opportunities and incentives for innovative solutions to deliver service requirements. Opportunities may include: (1) bundled services through a package deal for all non-core services, (2) upgrades of associated and complementary infrastructure, and (3) packaged information systems.
- **Asset Utilization:** This includes reducing costs to the government, as a sole user, through more efficient design to meet performance specifications (that is, service delivery) and creation of complementary opportunities to generate revenue from others' use of the asset.
- **Whole-of-Government Outcomes:** These include non-asset and non-price related, value-added outcomes of wider interest to the government, for example, socioeconomic and environmental outcomes.

In practice, Queensland has followed similar logic.¹¹³

Once analysts have determined that the project will in fact create value for money if delivered as a PPP, the next step is to begin the procurement process. The three Australian states all utilize a multistage competitive procurement process. The first stage is an invitation for expressions of interest (EOI). Once expressions of interest have been received, then a "short list" of acceptable participants is developed. The government then issues the request for proposals (RFP). The RFP typically includes: (1) comprehensive information about the issuing public agency, project objectives, and key stakeholders; (2) a description of the proposed payments mechanism and service delivery requirements; (3) a proposed construction completion date and design requirements; (4) proposed contractual arrangements and risk allocation; and (5) a description of the evaluation and selection processes to follow.

The government then receives proposals from the short-listed groups. It meets with those groups and conducts negotiations.¹¹⁴ A preferred bidder is then selected after final proposals are evaluated against predetermined criteria. The financial close occurs once contracts are finalized. Although states request a conforming proposal, there is latitude for the private sector to introduce new ideas and concepts. This process ensures that citizens benefit from PPP-induced competition. Depending on how bidding is structured, competition at the bidding stage will either drive up the amount of the concession payment, or drive down the concession term and/or the toll rate.

The Australian procurement process raises interesting questions regarding the theory and practice of PPPs. Different variables are subject to bidding in different PPPs. It is not well understood if increasing the number of bid variables tends to increase or decrease the competitiveness of the PPP process. One can imagine a large number of bid variables might make comparison across proposals more difficult.

Interviews with Australian experts, however, suggest that the toll level and the concession term are now the primary bid variables, with lower tolls and shorter concession terms being preferred. While concession length is a simple, straightforward variable to compare across concessionaires, comparing toll structures across bids can be a complex task, particularly for large projects (such as CityLink) that have multiple sections. The toll structure may involve different per-mile rates on various sections, various peak rates, as well as a cap on the total trip cost, among other complications. Given these considerations, it appears best to keep the number of variables subject to bidding to a relatively small set. This allows for an “apples to apples” comparison across bidders.

In sum, the consensus across experts is that price (toll) caps combined with competitive bidding are an effective way of addressing market power in PPP contracts. Experts suggest that toll caps are easy to understand, and are preferable to rate-of-return regulation. The actual bidding process is in more of a state of flux, but appears to be evolving toward a model where there are standard clauses, and private participants price those provisions into their bids in a competitive process.

CONCESSION LENGTH IN PPP CONTRACTS

PPP concession length has become a prominent policy issue in the U.S. PPP debate. That appears to be a reaction to two brownfield PPPs featuring long concession lengths. Those include a 99-year concession on the Chicago Skyway and the Pocahontas Parkway, and a 75-year lease on the Indiana Toll Road. As with other policy variables, longer concession length has both costs and benefits. On the benefit side, longer concessions allow more capital to be raised on a given project since they provide more assurance that a market return on capital will be achieved. This is likely to be particularly important for greenfield projects incurring losses during many early years that must be made up through profits in later years.

Longer concession lengths can also be beneficial in attracting private investment because of favorable tax treatment. For example, if the concession length exceeds the facility’s remaining design life, then the concessionaire can be treated as the facility owner for

tax purposes. That allows the concessionaire to benefit from accelerated depreciation. In particular, a highway can depreciate the share of its upfront payment allocated to tangible physical assets over 15 years rather than for the full lease term. Such favorable tax treatment will also help attract private participants. Longer concession length is also beneficial in that the often-substantial transaction costs of completing a PPP agreement are spread out over a longer term. Re-bidding costs are reduced.

There are also important costs associated with longer concession lengths. A longer concession reduces public sector flexibility since it locks both parties into a contractual arrangement for a longer period of time. This is a concern not only because of the effects of compensation clauses but also if contracts restrict the use of congestion pricing. Also, a longer concession implies that the concession will be less frequently re-bid, so the salutary effects of competitive bidding will be less frequently realized.

Concession length also relates to the need to modify (or “rebalance”) contracts over the life of the concession. Rebalancing can take many forms, and contracts can be modified in either party’s favor. Some countries have found it useful to make small contractual modifications as the need arises rather than infrequent but large contractual renegotiations. This regularizes the interactions between the contracting parties and is likely to reduce the cost of contract modification. The term “rebalancing” is appropriate since it suggests the gradual modification that was observed in many Australian contractual relationships. The concession deed that governs CityLink in Melbourne, for example, has been amended 29 times. One expert informed us that about half of those changes represent serious renegotiations.

Australian PPP concession lengths are notable for their variability. The concession length on the Sydney Harbor Tunnel was 35 years, with 5 years of construction. The M2 was 45 years, and 35 years for CityLink. EastLink is 39 years. Peninsula Link will be 25 years. The concession term for the AirportLink/Northern Busway project is 45 years.

Australian PPP concession lengths are also notable for the creative ways in which they are used. On the EastLink PPP, for example, concession length was a bid variable. The concession lengths of major Australian toll roads are listed in Table 3 below.

Table 3 Concession Lengths of Major Australian Toll Roads

Project	Cost	Concession Length
M2 Motorway	\$650 mill.	45 years
Melbourne CityLink	\$2 bill.	35 years
Eastern Distributor	\$525 mill.	48 years
Cross City Tunnel	\$680 mill.	30 years
Westlink M7	\$1.5 bill.	34 years
Lane Cove Tunnel	\$1 bill.	33 years
Eastlink (Mitcham-Frankston Freeway)	\$2.5 bill.	39 years
AirportLink/Northern Busway		45 years

Source: Christine Brown, “Financing Transport Infrastructure: For Whom the Road Tolls,” *Australian Economic Review* (2005) vol. 38, no. 4, Table 1, p. 432.

Concession length in Australia is used as a policy tool in several ways. In written work, one expert notes that PPP concession length is set so as to cover costs, including those of debt and equity, stating, “The length of the concession period is determined on the basis that the sales of the asset-based services are sufficient to discharge construction, financing, operation and maintenance costs plus a reasonable profit for private investors.”¹¹⁶ Others note that the concession term often includes the construction period, which gives the concessionaire an incentive to complete the project more quickly.¹¹⁷ Concession length is also sometimes used as compensation for the concessionaire in the case of revenue loss from a competing facility. That is, the concession can be lengthened in response to revenue loss.

The use of concession length in creative ways is consistent with practice in other countries. The FHWA scanning study of Australia, Portugal, Spain, and the United Kingdom also emphasized that concession length is used to incentivize concessionaires to achieve their key performance indicators.¹¹⁸ Longer concession length is used to reward the concessionaire for superior performance, similar to its use to compensate for a material adverse effect: “In some cases if the PPP contractor maintains or exceeds the level of performance specified for the majority of the contract term, the contract period is extended by a predetermined number of years. In this case, the incentive is back-loaded.”¹¹⁹

Concession length could presumably also be shortened to impose a penalty, but the authors did not find examples of that approach.

Australian states rebalance contracts as necessary, and have established processes for implementing both major and minor contractual changes to the contract.¹²⁰ Numerous interviewees noted the importance of managing the relationships over the life of the contract (often simply called “managing the contract”), and confronting and rebalancing issues as they arise rather than waiting until very large contractual changes become necessary. Overall, the need for rebalancing has not resulted in wholesale contract breakdown.

This speaks to the importance of planning for a long-term relationship via a PPP. Indeed, given the ability to rebalance, some interviewees suggested that contracting parties should specify fewer detailed terms *ex ante* in the contract, while allowing more to be taken up through *ex post* rebalancing as they arise. Many stressed that such ongoing interaction helps to build trust and makes future negotiations proceed more smoothly.

In this regard, interviewees, particularly from the private sector, also noted the value of having a tasked public agency to manage the contract throughout its life. This offers the private partner a clear point of contact with which it can discuss contractual changes. Private partners benefit from such clarity because many facility changes, such as refurbishments and expansions, are value-improving. Private partners thus want to undertake them. Experts noted that those improvements were difficult to negotiate, even if value enhancing, if the government was not actively managing the contract.

Several interviewees also stressed that the specialized government agency should have a mandate to maximize the facility’s social value, which is (assuming that monopoly power is properly controlled) consistent with the private partner’s for-profit incentive, and

consistent with motorists' interests. That is, both entities should strive to maximize the facility's use by motorists (that is, throughput), and to improve its quality and safety.

Information provided by interviewees on the four policy issues discussed above was invaluable. However, the authors encouraged experts to explore what additional PPP issues they thought were important. The following chapter discusses these issues.

Table 4 Upfront Payments and Revenue Sharing in Four Australian PPPs

Project	Upfront payment	Realized revenue (% of base case)	Government's share (% above base case)
Westlink M7	\$194 mill.	< 105	0
		105–110	10
		110–120	15
		120–130	20
		> 130	25
Cross City Tunnel	\$97 mill.	< 110	0
		110–120	10
		120–130	20
		130–140	30
		140–150	40
Lane Cove Tunnel	\$79 mill.	< 110	0
		110–120	10
		120–130	20
		130–140	30
		140–150	40
Melbourne EastLink	\$0	> 150	50
		< 105	0
		105–110	20
		110–115	25
		115–125	30
		125–135	35
		135–145	40
		145–155	45
		155–180	50
		180–205	60
		> 205	70

Source: Christine Brown, "Financing Transport Infrastructure: For Whom the Road Tolls," *Australian Economic Review* (2005) Vol. 38, No. 4, Table 3, p. 435.

PPP PERFORMANCE AND PUBLIC ACCEPTANCE OF PPPS IN AUSTRALIA

One key issue is the perceived economic performance of transport PPPs, or the value they create for citizens and motorists. Interviewees were mostly positive on this score. Several noted that the refinement of PPP processes over time has increased the social value generated by PPPs, and the public has responded positively. Many emphasized that PPPs have allowed large, complex transport projects to be delivered sooner, and have facilitated innovation. Several noted that motorists would have waited years or decades for projects to be delivered under traditional procurement.

Others emphasized that PPP use has also improved the *certainty* of project delivery, so that estimates of project cost and time were more reliable.¹²¹ Available data are consistent with that conclusion. Table 5 below reports the on-time delivery performance of Australian transport PPPs, displaying the actual delivery date relative to the scheduled opening. As indicated, the total project delivery time saved on these projects is almost 4.5 years in New South Wales alone.

Table 5 On-Time Performance of Highway PPPs in New South Wales, Australia

Project	Opened	Scheduled Opening	Time Saved
M4	May 1992	February 1993	9 months
M5	August 1992	February 1994	18 months
Sydney Harbour Tunnel	August 1992	August 1992	On Time
M2	May 1997	November 1997	6 months
Eastern Distributor	December 1999	August 2000	8 months
Cross-City Tunnel	August 2005	October 2005	2 months
Westlink M7	December 2005	August 2006	8 months
Lane Cove Tunnel	March 2007	May 2007	2 months
Total Time Saved			53 months

Source: Federal Highway Administration, Table 10, p. 47. "Schedule Performance of Highway PPPs in New South Wales." Sydney is the major metropolitan area in New South Wales.

Interviewees indicated that the public is accepting of the PPP approach generally, which includes transport as well as social infrastructure projects. Several noted that, while there was significant media coverage of the use of a PPP in the past, that attention appears to have diminished over time. Their interpretation is that PPPs have become so commonplace in Australia that the media no longer considers them news unless the PPP is a financial failure. Experts also suggested that the evolution of policies and procedures to analyze and implement PPPs has reduced public skepticism about them over time.¹²²

Interviewees noted that the financial difficulties of some Australian transport PPPs (including the Cross City Tunnel and the Lane Cove Tunnel) generated concern about them, but that once those examples played out without significant effects on either motorists or on the government, concern dissipated. Traffic on the Lane Cove Tunnel, for example, was low enough that two key equity investors were forced to write the value of their investment

down to zero. Cheung Kong Infrastructure (CKI), which is controlled by Li Ka Shing, Hong Kong's richest businessmen, wrote down the value of its 19 percent stake (\$113 million), to zero.¹²³ The public appears to understand that equity holders absorbed that risk (as was appropriate) and that despite those problems motorists nevertheless now have access to new infrastructure.

Although many interviewees stressed that overall the Australian experience with transport PPPs has been positive, several cautionary lessons were also stressed. The authors summarized these issues in the "don'ts" section of the Executive Summary, and elaborate on them in the following chapter.

CAUTIONARY LESSONS FROM THE AUSTRALIAN PPP EXPERIENCE

In this chapter, the authors discuss issues that policy makers should approach with caution when using PPPs.

Flexibility to Use Congestion Pricing. Several interviewees noted that PPPs not contemplating congestion pricing in the original contract can make its subsequent implementation difficult. This is becoming an issue in New South Wales, where a number of PPPs have been used to complete roads ringing Sydney. With the minor exception of an additional dollar charge to use the Sydney Harbor Bridge during peak hours, these facilities are not congestion priced, and the original contracts did not include provisions allowing it. This may not have been a concern when the contracts were signed, but more analysts now recognize congestion pricing as a valuable tool for managing Sydney's increasing traffic congestion.

Implementing congestion pricing would require the government to negotiate its use with a number of concessionaires, and to coordinate its use across facilities that interact. Interviewees viewed such renegotiations as "difficult but not impossible." The cautionary lesson is not that PPPs should not be used, but rather that contracts, particularly when facilities are likely to interact as a network, should contemplate congestion pricing as a policy option.

The Importance of Public Relations. Several experts stressed the importance of ongoing public relations in ensuring PPP success. They noted that, although the public should be involved and informed at every stage, public relations is particularly important immediately prior to and during the opening of a new PPP facility. The public and private sponsors should inform customers of the PPP opening, and of the benefits of the facility in terms of time savings. Many facilities have utilized a "toll free period" directly after opening and then applied tolls over time. Indeed, one expert referred to potential negative public relations surrounding a PPP as "media risk," which must be carefully managed like other risks.

A vignette illustrates the importance of public relations efforts. The Cross City Tunnel (CCT) in Sydney is a 2.1-kilometer east-west tunnel that runs under Sydney's central business district. One important goal of the tunnel was to reduce traffic on surface streets in the central business district. The PPP contract thus envisioned closure of certain streets once the CCT was complete. When the CCT opened and those streets began to close, however, the public viewed street closures as "funneling" traffic into the tolled tunnel and off of free streets, which caused a backlash against government authorities. Some experts suggested that a more intensive public relations campaign that focused on informing the public of the original reasons for planning street closure prior to tunnel opening, and generally "bringing the public along" during the process, would have enhanced understanding and mitigated backlash. Indeed, the authors were struck by how frequently the Cross City Tunnel surface street closures were mentioned by experts as negatively affecting the public perception of PPPs.

Maximization of Up-Front Payments in Greenfield Concessions. Several experts stated that the bidding structure in some NSW greenfield concessions also generated public concern. The consortium in the Cross City Tunnel, the CrossCity Motorway, for example, paid the government of NSW AUS\$100 million as a concession fee. The negotiations were concluded in 2002. Motorists came to view large concession fees as coming at the expense of higher tolls. Public concern was heightened when this was combined with surface street closures. Experts were uniformly opposed further use of this bidding approach, and did not believe that bidding that included a large up-front payment would occur again.

Optimal Degree of Transparency. A salient issue in some Australian PPPs has been disclosure or, conversely, how much information is withheld from the public due to commercial confidentiality. This has become a concern in the construction of the Southern Cross Station in Melbourne, which is a PPP. In that case, some documents related to the station's construction are to be withheld from the public until 2058.¹²⁴

There is an economic case for holding some information in confidence during the bidding process. That is when the release of commercial information would result in too little effort or investment on the part of potential bidders, or when release would reveal trade secrets. Bidding on PPP contracts in Australia is costly, and if one bidder can "free ride" off of the efforts of another bidder by copying their efforts before the winner is chosen, it may do so. The end result is that fewer bidders will incur the high cost of submitting bids if there is free riding, and the overall PPP process will be less competitive. Careful attention to confidentiality should be paid in cases where free riding is possible.

However, keeping the details of contracts confidential beyond such situations is likely to fan public distrust of the PPP process, and may facilitate contracts that are not in the public interest. It is wise to disclose the terms of the PPP contracts wherever possible, and to inform the public of what decisions were made and why.

BIDDING PROCESS AND TRANSACTION COSTS

To recap, all three Australian states follow a similar approach with regard to bidding. They begin with an invitation for expressions of interest. A short list is generated from those expressions. The government follows with a detailed request for proposals. The process allows for both conforming and non-conforming proposals. Nonconforming proposals are viewed as facilitating the injection of fresh concepts and approaches into the provision of transportation services.

Several interviewees suggested that it might be useful to rethink the PPP bidding process. Their main concern is that bidding costs under this approach can be very high, with private consortia incurring costs of between \$10 and \$20 million to simply assemble a bid. That is much higher than in other PPP-active countries, such as Spain. Experts believe that this high cost discourages potential bidders, and places pressure on private partners to be overly aggressive in bidding in order to recoup those costs. One interviewee suggested an alternative that would lower bidding costs is to conduct a first stage where relatively simple bids are entered, and the government would then put the best team together by choosing amongst those preliminary bids. Here the government effectively chooses the winning consortia. Others suggested subsidizing the cost of bidding, and increased standardization, as ways to lower bidding costs.

SUMMARY OF LESSONS AND CONCLUDING REMARKS

This chapter briefly summarizes the study's findings pertaining to the four policy issues that have been prominent in the United States: (1) how to distribute the risks inherent in PPP contracts across public and private sector partners; (2) when to use non-compete (or compensation) clauses in PPP contracts; (3) how to address concerns about monopoly power; and (4) the role and importance of concession length.

This chapter concludes with a list of additional lessons learned from Australia beyond the scope of these four policy issues.

The Australian experience suggests that the public sector can “dial in” the amount of risk it assumes in order to get projects completed and adapt to changing financial conditions. Australia has gone through at least three stages of risk allocation. Most recently, after the global financial crisis, capital markets have been less willing to assume risk and so public sponsors have been absorbing more demand risk through shadow toll/availability payments type approaches. Even once credit markets ease, some experts expect future Australian transportation PPPs to be availability-payments based.

In terms of compensation clauses, the trend in Australia is away from material adverse effect clauses that restrict the public sector, and toward greater assumption of competing facility risk by the private sector. Interviewees noted that MAE clauses themselves are becoming more standardized overall. Private bidders are expected to take the allocation of risk enumerated there as a given, and price those factors into their bid. “Compensable enhancement clauses” have also been used and interact with MAE clauses.

Regarding the type of regulatory regime, perhaps the most striking insight from our interviews with Australian experts is the contrast between the importance economists place on it and the lack of concern coming from policy makers. All three Australian states rely on a simple price cap approach where the public sponsor sets the rate at which the toll can increase over time, usually tied to the CPI. The use of bidding to inject competition was more diverse. Different variables are subject to bidding in different PPPs, though as the use of PPPs has evolved in Australia the toll level and concession term are now the primary bid variables.

Australian PPP concession lengths are notable for their variability and the creative ways in which they are used. Concession lengths ranged from 25 to 45 years. Several interviewees noted that when the construction period is included in the concession term, the concessionaire is motivated to complete the project more quickly. Numerous interviewees noted the importance of managing the relationships over the life of the contract (often simply called “managing the contract”), and confronting and rebalancing issues as they arise rather than waiting until very large contractual changes become necessary.

Australia now has over 25 years of experience with the basic PPP approach to providing transport services. Its methods have been refined over time, a process that is in only its earliest stages in the United States. It is thus useful to highlight several areas where the authors believe Australia's best practice diverges from that in the United States. These

insights and lessons are distilled from the study's in-depth interviews. Some U.S. states may have adopted these practices to a greater or lesser degree, but the authors believe that these are key points on which policy might wish to focus.

The Importance of Public Sector Expertise. One key lesson is the importance of developing expertise in the PPP process. PPP contracts are complex, long-term commitments that should be entered into carefully. It is important that a state have a tasked group of public officials who can quickly develop and retain PPP expertise. Public sponsors should also seek all necessary outside advice to ensure that PPP contracts are in customers' and taxpayers' best interest. Throughout the interviews, the authors encountered dedicated public officials who have developed considerable expertise in this area.

The Creation of Special Purpose Government Entities. Consistent with heavy reliance on public sector expertise, Australian states regularly create special purpose entities to negotiate complex transport PPP contracts. This helps ensure that the contract preserves the public interest. There are also several public bodies which promote and provide information about private investment in infrastructure. For example, the state of Victoria created Partnerships Victoria in 2000 which "provides the framework for a whole-of-government approach to the provision of public infrastructure and related ancillary services through public-private partnerships." In 2008 the Commonwealth government created Infrastructure Australia for this role. This is consistent with Australia's emphasis on both promoting PPPs and on developing expertise in this area.

The Importance of Managing the Contract Over its Life. An insight repeated by both public and private sector interviewees was the need to manage the contract over time. That is, the public sector should not view a PPP contractual close as being the end of its responsibilities. Instead, social welfare from a PPP is enhanced by having an ongoing, clear point of contact for private partners to consult with. A simple example is the addition of a lane to an existing facility, which both increases the social value of the facility as well as revenue to the operator.

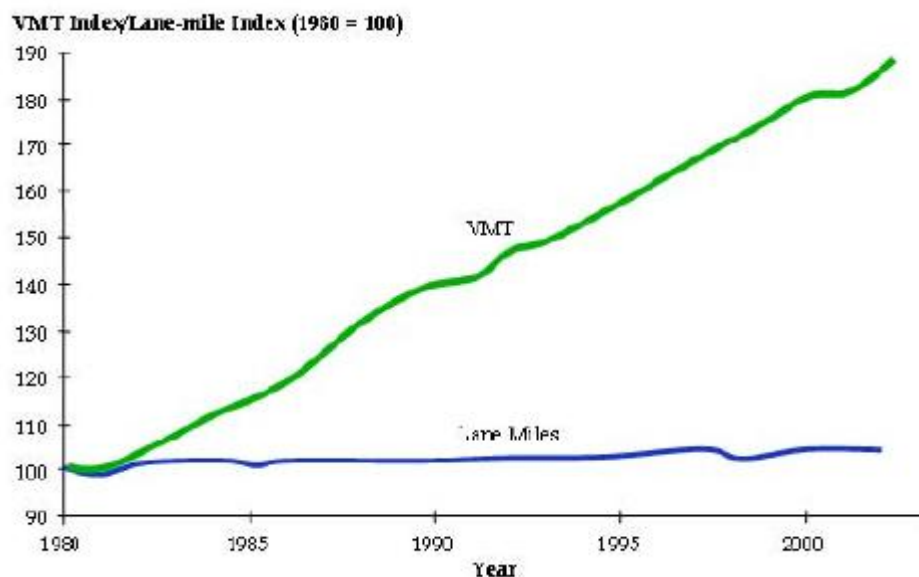
Using Concession Length as a Strategic Policy Tool. Concession length was used in several innovative ways in Australian PPPs. For example, concession length can be a bid variable, where shorter concession lengths are preferable. Concessions can also be lengthened as compensation for reduced revenues from an unplanned competing facility.

Emphasizing Public Relations. Australian states have recognized the importance of keeping the public informed. This includes information on the reasons for the PPP and for transport changes surrounding it, such as the surface street closures associated with the Cross City Tunnel PPP. Moreover, transparency of contractual details enhances public trust. Unless there is a compelling economic reason, the details of PPP contracts should be transparent.

Ensuring that PPP Contracts Accommodate Congestion Pricing, Particularly in Urban Settings. Numerous experts mentioned the challenges ahead for NSW in

implementing congestion pricing around Sydney, since the contracts for the several PPPs forming the Sydney ring road did not contemplate congestion pricing. Renegotiating contracts to allow coordinated use of congestion pricing is likely to be difficult. Interviewees thus recommended that new PPP contracts include congestion pricing provisions.

APPENDIX A: VEHICLE-MILES TRAVELED AND LANE MILES IN THE U.S.



Source: Virginie Raphael, Public-Private Partnerships: Can the United States Learn from the French Experience to Address its Highway Funding Needs? Tufts University Master of Arts Thesis (April 2007, p. 13). Available at: <http://fletcher.tufts.edu/research/2007/Raphael.pdf>, accessed August 5, 2009.

Figure 1 Vehicle-Miles Traveled and Lane Miles in the United States: 1980 to 2005

APPENDIX B: LIST OF INTERVIEWEES

Academia and Non-profit

- Colin Duffield, associate professor, Engineering Project Management, Department of Civil and Environmental Engineering, University of Melbourne
- Henry Ergas, Australian economist and columnist for *The Australian*
- David Henscher, professor of management and founding director of the Institute of Transport and Logistics Studies, University of Sydney
- Michael Porter, director of research and policy, Committee for Economic Development of Australia

Private Sector

- Wendy Adam, National Traffic and Transport Planning executive, Parsons Brickerhoff
- Linda Bardo-Nicholls, former chair, *Australia Post*
- Robert Bartlett, commercial affairs manager, CityLink, Transurban
- Megan Fletcher, group general manager, public affairs, Transurban
- Tomas Nohel, senior consultant, project development & procurement, GHD
- David Rolland, manager, Melbourne, GHD Meyrick
- Richard Warwick, manager, transportation, GHD

Public Sector

- Stephen Alchin, executive director, infrastructure planning, Infrastructure Australia
- Rory Brennan, Infrastructure Australia
- George Brown, Department of Planning, Government of Western Australia
- Laure Darcy, senior private sector development expert, Asian Development Bank
- Matthew Dunn, Treasury Department, New South Wales
- Jennifer Gordon, principal adviser research, Productivity Commission Government of

Australia

- Paul Hubbard, Australian Treasury Department
- Peter Kain, Australian government, Bureau of Infrastructure, Transport and Regional Economics
- Glenn Maguire, executive director, Partnerships Victoria, Department of Treasury and Finance, Victoria
- Lyn Martin, Australian government, Bureau of Infrastructure, Transport and Regional Economics (retired)
- Phil Potterton, Australian government, executive director, Bureau of Infrastructure, Transport and Regional Economics

APPENDIX C: INTERVIEW QUESTIONS ON AUSTRALIAN PPPS

Name: _____

Affiliation: _____

Questions about the bidding process:

- Is competitive bidding or negotiation used more frequently to complete a P3 in your State?
- If competitive bidding is used, what variables are set by contract and which are determined by bidding?
- Are unsolicited P3 proposals allowed?

Questions about the structure of PPP contracts:

- Can you give me the essence of the material adverse effect clause?
- Have the MAE clauses been more or less restrictive of the public sector over time? Who is assuming the most risk?
- How is monopoly power controlled? If through CPI caps, then how is the initial toll level set? Via Bidding?
- How is contractual compliance monitored in you State? Is there a government body that constantly oversees compliance?
- Has there been renegotiation of P3 contracts? If so, how does the renegotiation process take place?
- Do P3 contracts contain termination for convenience clauses? Is the buy-back price market price?
- Do any PPPs in your State include revenue-sharing provisions? Are there any upfront concession fee payments?
- How is the contract length, or duration, determined in P3s in your State? Is it ever a bid variable?
- How does your State deal with low-income groups/those with few travel options on P3 toll facilities?
- Are there any hand-back provisions at the end of the BOOT contract?

Questions about tolling:

- Are there any shadow toll or availability projects in Australia? If not, are shadow tolls or availability payments likely to be used in the future in Australia or will all projects be real toll?
- Do toll caps interfere with a private operator's ability to congestion price? How is this conflict resolved?
- Is the use of congestion pricing likely to increase in the future?

General Questions: What is the role of the Commonwealth Government regarding PPPs in your State, if any?

- Would you say the PPP approach is generally accepted by the public? Is acceptance of PPPs by the public improving or not?
- What do you think has been the most important benefit of including private investment? Risk transfer? Faster project delivery? Innovation? Other?
- In your view, what is the most significant difficulty associated with the use of PPPs?

Please add any additional information you would like to convey regarding the lessons the United States can learn from the Australian experience with transportation PPPs.

APPENDIX D: STATE-LEVEL SUMMARY OF PPPS IN AUSTRALIA

In this appendix, the authors provide additional detail on the use of PPPs in three key Australian states: New South Wales, Victoria, and Queensland. These three were chosen because they have the most experience with PPP use, as shown in Table 1 on page 16.

NEW SOUTH WALES (NSW)

NSW has a population of about 7 million, which makes it the largest state by population. About 4.3 million reside in Sydney, NSW's main urban center. NSW has over 12,427 miles of regional and local roads, and state highways.

NSW began its PPP activity in the early 1990s out of a desire to implement road pricing and in response to governmental budgetary constraints. Reflecting the severity of its budgetary problems, the NSW government enacted the 1995 General Government Debt Elimination Act, which constrained the State's use of debt. Additional motives for exploring PPPs included faster project delivery and the ability to transfer risk to private investors.¹²⁷

Regarding PPP administration, there are two relevant government entities in NSW. The Roads and Traffic Authority (RTA) has oversight of both the highway and the PPP program.¹²⁸ The Office of Infrastructure Management in NSW is responsible for implementing the State Infrastructure Strategy, which is a rolling 10-year plan not limited to transportation infrastructure.

Highway PPPs in NSW (mainly in and around Sydney) are real-toll projects (as opposed to shadow tolls or availability payments).¹²⁹ The NSW government typically determines the initial level of toll—or puts the initial level out for bids—and then uses CPI indexing for increases over time. NSW uses the PPP approach intensively. Eight of the 11 toll road projects in Australia have taken place in New South Wales, which are:

- The Sydney Harbour Tunnel (SHT)
- The Eastern Distributor
- The Hills M2 Motorway
- The M4 Motorway
- The M5 South-West Motorway
- The Westlink M7
- The Cross City Tunnel
- The Lane Cove Tunnel

The authors discuss several of those projects in detail to provide a flavor for transport PPPs in NSW.

The Sydney Harbor Tunnel. The bulk of PPPs in NSW have been used in and around Sydney. NSW's first PPP, and the one that is generally credited with initiating PPP use in Australia, is the Sydney Harbor Tunnel. This PPP resulted from a 1985 unsolicited proposal from a partnership of two transportation facility construction and operating companies, Transfield and Kumagai. Since the proposal was unsolicited, it was not subject to either competitive tendering or a market test (both of which are now required in Australia). The project is also unusual in that it was governed by its own legislation, which is the Sydney Harbor Tunnel (Private Joint Venture) Act 1987. Such an act was necessary because the NSW government did not have a PPP policy apparatus in place at that time, and appears to have been caught somewhat off guard by this proposal.

The State agreed that a tunnel was the best approach to addressing the heavy congestion that had developed on the Sydney Harbor Bridge in the mid-1980s. That congestion constrained the amount of traffic that could flow between North Sydney and the Central Business District.¹³⁰ The NSW government, however, did not have sufficient resources to finance such a large and complex project.

Construction on the Tunnel began in 1987. It went into service in 1992 and cost \$749 million to complete. It is 1.4 miles long, and features two lanes in each direction. It was built under a build-own-operate-transfer (BOOT) agreement with the NSW government. The contract length is 35 years, five of which were spent in construction. At the end of the operating period, in 2022, the Tunnel will become an asset of the NSW government. It is noteworthy that the BOOT arrangement implies that title to the facility rests with the private partner. Actual asset ownership was important for the private partner since it was then able to claim depreciation for tax purposes as well as more secure collateral for financing.

Revenue risk allocation is another unusual aspect of the Tunnel project. Unlike subsequent Australian transportation PPPs, the public sponsor assumed substantial revenue risk. The government of NSW assumed traffic risk by guaranteeing a specified minimum revenue. The NSW Roads and Traffic Authority thus made periodic, predefined payments to the private partner. It also assumed certain financing and default risks. The main risk assumed by the private partner was construction risk, which was important since geotechnical problems arose during tunnel construction. Some analysts believe that this allocation of risk was driven by the financial market's inexperience with and thus apprehension about PPPs in these early stages.¹³¹

Similarly, the private parties in this case were contractors who did not have the balance sheet capacity of large banks or access to other types of equity. The Sydney Harbor Tunnel was consequently entirely debt funded, so investors were naturally more risk averse than equity investors who might have been willing to absorb revenue risk in return for higher potential returns. There simply were no equity holders to assume such important economic risks. Without the participation of equity holders to serve in their critical role of providing risk-bearing services, traffic risk had to be assumed entirely by government.

Experts have noted the change in risk allocation over time. As the NSW Treasury states:

The nature of financing PPPs in NSW has changed dramatically since the construction of the SHT. Early economic infrastructure PPPs were primarily driven by contractors and tended to lack the type of consortium structures seen today—that is, there was not necessarily an investment bank directly involved, or other third parties contributing equity.¹³²

The SHT project is a useful example of how financing structures and risk assumption interact: if developed financing structures exist, then more project risk can be placed on private partners. It also speaks to the underdeveloped nature of infrastructure capital markets at that time. The SHT example is also informative as it illustrates how risk sharing is a variable that can be adjusted depending on capital market constraints. When risk capital is relatively scarce, the public sponsor can assume more economic risk in order to attract private investment.

The Sydney Harbor Tunnel PPP is also important because it inspired NSW to develop new policies and procedures governing the use of private participation in transportation infrastructure. Many experts believe that the development of those policies and procedures were themselves very helpful in facilitating Australia's PPP activity. Some commentators date the inception of the Australian infrastructure market from 1988, when NSW established such policies.¹³³

The Hills M2 Motorway. Another important PPP in NSW is the Hills M2 Motorway. The Hills M2 is a 21km motorway linking the lower north shore of Sydney with Sydney's northwest regions. It opened to traffic in May 1997, and is now a critical part of Sydney's beltway road network. It provides a link between the Lane Cove Tunnel and Westlink M7. The Hills M2 is now owned and managed by Transurban, which acquired it in 2005. The M2 includes electronic express lanes to improve traffic flows. Transurban has a concession to operate the M2 under a 45-year contract until 2042. After that time ownership of the M2 transfers to the government at no cost.

The M2 is of interest from a policy perspective. It is a real-toll build-own-operate-transfer (BOOT) PPP where the private partner bears traffic risk. Unlike the SHT, the public partner makes no direct payments or guarantees to the private partner. After an examination of project risk, the Auditor-General of New South Wales concluded that, "the M2 contractual arrangements had soundly transferred and valued the project's risk. The M2 contract and financial structure was used as a model for the CityLink project in Melbourne, Australia's first fully electronic toll road."¹³⁴ Instead of receiving payments, the private operator is required to pay "land rents" to the public sector for the right to levy a toll. This is not a payment for leasing the land, but is instead actually a charge for the right to levy tolls. The payment is, however, contingent on the concessionaire earning a pre-defined minimum rate of return.¹³⁵ Notably, this approach is similar to the revenue-sharing approach used on the SH130 in Texas.

The Cross City Tunnel. The Cross City Tunnel (CCT) is probably Sydney's most contentious

PPP. The CCT is a 2.1 km tunnel running east to west in Sydney. It links Darling Harbor to the Central Business District. It bypasses 16 sets of traffic lights westbound and 18 eastbound, carving 20 minutes off travel time.

The concept behind the tunnel was to encourage traffic to bypass Sydney's central business district, which would reduce surface traffic. This would hopefully make that area more conducive to public transport, cyclists, and pedestrians. In 2002 Cross City Motorway (CCM) Pty Ltd was awarded a DBFO contract to build, own and operate a tunnel under Sydney's central business district. The contract offered CCM no recourse to the NSW government if traffic volume failed to materialize. The concessionaire also bears both design and construction risks.

One innovation in the CCT contract award process was how the winning contractor was chosen. A competitive bidding process was held. Bidders were asked to bid on the basis of the size of a "business consideration fee" (BCF) payable to the NSW government. As on the M2 Motorway, the business consideration fee is a fee paid to government for the right to levy tolls. CCM was chosen because it offered the highest up-front payment. That payment was \$96.8 million, of which \$54 million went to reimburse the NSW Roads and Traffic Authority for its costs related to the project, and \$46.1 million was a BCF component.¹³⁶ This is consistent with one key goal of the project, which was to build the tunnel at no net cost to the government.

The CCT is actually two distinct tunnels, depending on whether traffic is eastbound or westbound. Each tunnel accommodates two lanes of traffic. The CCT is Sydney's first completely electronic tollway, and requires the motorist to have an electronic tolling tag. The tunnel required \$680 million in both debt and equity financing. The CCT is privately owned and operated, and will revert to public ownership in 2030.

The tunnel was officially opened on August 28, 2005. Early tunnel usage was however less than expected, and in November of 2006 it was reported that the CCT was in financial difficulties. In December 2006, Cross City Motorways was placed in receivership. On June 20, 2007, Leighton Contractors and investment bank ABN AMRO were designated as preferred purchasers of the Cross City Tunnel Group. The tunnel was purchased for \$700 million in what was effectively a greenfield PPP.

Although there are many more PPP projects in NSW, these three hopefully provide a sense of their structure.

VICTORIA

Victoria is situated in the southeastern section of Australia. Over 70 percent of its population of 5.34 million people lives in its largest urban area (and Australia's second-largest city), Melbourne. Victoria has more than 13,670 miles of rural and metropolitan arterial roads. The PPP process in Victoria appears to be the result of detailed long-term planning. There are two main transport PPPs in Victoria: CityLink and EastLink. Victoria had studied the need for those projects for over 40 years.¹³⁷ Although these PPP's account for less than 1 percent of Victoria's overall road network, they are complex, critical facilities in dense

urban settings. Victoria created temporary public agencies for the purpose of administering each of its PPPs. The creation of such agencies is viewed by experts as having contributed to the success of those projects.

CityLink. CityLink is a north-south set of roads that helps provide a connection between Melbourne's airport, its ports, and its central business district. It offers connections between three existing freeways in Melbourne (Monash, Tullamarine, and West gate). It is 14 miles (22KM) long, and is notable for being Australia's first fully automated tollway. It has no toll plazas, toll booths, or coin chutes. Construction began in 1996, and the road was opened to traffic in August 1999. CityLink has two distinct sections: the southern and the western links. The Western Link connects the Tullamarine Freeway to the West Gate Freeway, while the Southern Link connects the West Gate Freeway to the Monash freeway.

CityLink was designed and constructed at a cost of \$2.2 billion. It was financed with \$510 million in equity and \$1.3 billion of debt. As with many other Australian PPPs, it was built under a build-own-operate-transfer (BOOT) contract, where design and construction was undertaken by a joint venture between Transfield and the Japanese company Obayashi Corporation, under contract to Transurban. It is 100 percent owned and operated by Transurban. The concessionaire was responsible for arranging financing and construction, and is responsible for operating and maintaining CityLink. At the end of the 35-year concession period, in January 2034, CityLink is to be transferred to the government. However, some experts suggest that the government is likely to re-bid the concession in a brownfield PPP rather than absorb the ongoing costs of maintenance and expansion. This view applies not only to CityLink but to other concessions that are to expire in the near future, such as the M4 Motorway in Sydney.

Major difficulties were encountered during the construction of CityLink, which required major tunneling and significant elevated construction. Despite these difficulties, the project has been an overall financial and political success. It provides improved mobility to the area, and was completed at almost no cost to the taxpayer.¹³⁸

Early in the process, the State of Victoria decided that an independent authority would handle project development. It therefore established the Melbourne City Link Authority in December 1994. The Authority evaluated submissions for completion of the project, negotiated with interested parties, and recommended the entity that should complete the work. The Authority was also responsible for ensuring that the project was completed in accordance with the Melbourne City Link Act of 1995, and acquired the land necessary for the project. It was disbanded in February 2002. Ongoing responsibility for managing contractual relationships is now vested in VicRoads, Victoria's roads authority. Interestingly, there is a cap of \$6.30 on the overall trip cost on CityLink. That is, no matter how much of CityLink a motorist uses, they know that the total cost will never exceed \$6.30.

EastLink. Eastlink is Victoria's largest PPP to date. It is a north-south highway on the eastern side of Melbourne. It cost \$2.4 billion and is 25 miles long. It opened to traffic five months ahead of schedule, in June 2008, and is fully electronic. It is very complex, featuring two three-lane mile-long tunnels, 17 interchanges, and 88 bridges. There are 25 miles of shared-use recreational pathways. The project also features attractive, innovative sound

walls, public art, and pedestrian walkways. Interestingly, it has also achieved a net gain in native vegetation.

The structure of bidding for the EastLink concession is of policy interest, since several variables were bid variables. Both the toll rate and the initial toll structure (across the various component parts) were bid variables. The rate of toll increase is capped at the CPI. The concession contract included revenue sharing, with revenues in excess of those forecast shared with the government. The contract also mandates that any financial benefits of refinancing be shared with the public partner. Concession length was also a bid variable. There were clearly defined performance criteria for design, quality, safety, engineering, and other project aspects. In particular, both the Request for Proposals (RFP) and the concession contract specified key performance indicators (KPIs) in four target areas:

- customer service
- maintenance
- landscape and environment
- tolling accuracy

Notably, any penalties arising from failure to meet KPIs are payable directly into the accounts of motorists who hold Eastlink's electronic tags.¹³⁹

In October 2004, ConnectEast, a publicly traded company, was awarded the PPP contract to finance, design, construct, own and operate Eastlink. The agreed-upon concession length was 39 years.¹⁴⁰ Regarding non-compete clauses, there were no restrictions on road improvements, but any work deemed proximate (such as that connecting to or within the vicinity of the project) could entitle the concessionaire to compensation.¹⁴¹ So the relevant clause is effectively a compensation clause.

QUEENSLAND

Queensland is situated in the northeast section of Australia. Its population is about 4,380,000. Two transport PPPs have been used thus far in Brisbane, which is Queensland's main urban center. Because Queensland was relatively late in using PPPs in Australia, it was able to benefit from knowledge and experience developed in other Australian states, particularly Victoria and NSW. Indeed, Queensland employed knowledgeable personnel from other states in its PPP procurement process. Both of Queensland's PPPs are currently under construction. In both cases, the initial toll rate was a bid variable, but the government sets the tolling structure over time by limiting increases to the consumer price index.

The first PPP in Queensland was the North-South Bypass Tunnel, which is now called the M7 Clem Jones Tunnel (CLEM7) in honor of a former Brisbane lord mayor. The Brisbane Municipal Council sought this contract, since it wanted to provide an additional crossing over the Brisbane River. It is a 7km, \$3.2 billion toll road to be built underground between and

Woolloongabba and Bowen Hills in Brisbane. The CLEM7 will be Brisbane's first privately financed toll road, and one of Queensland's largest infrastructure projects. Tolling will be electronic. Up to 100,000 vehicles are expected to use the tunnel each day. Construction began in September 2006, and the official projected opening date is October 2010.

The second PPP in Queensland is the combined Airport Link/Northern Busway project, which is a complex \$4.6 billion project that runs between the airport and downtown Brisbane. AirportLink will be a mostly underground toll road connecting Brisbane's northern suburbs with the airports and the inner city. It will actually be composed of two tunnels (one northbound and one southbound). The Northern Busway will be a two-lane, two-way, bus-only roadway connecting Windsor to Kedron and other suburbs. The Windsor to Kedron section of the Busway will be delivered by AirportLink, which will separate buses from general traffic.

As with several other PPP procurements in Australia, Queensland established a wholly state-government owned company to manage the procurement of the Airport Link/Northern Busway project, called the City North Infrastructure Pty Ltd (CNI). CNI is responsible for all land acquisitions required for the Airport Link/Northern Busway projects. CNI essentially handles the project from start to finish, including the business case, environmental assessment, procurement, contract management, and eventually handover. It considers itself to be a "Special Purpose Vehicle" that acts autonomously.¹⁴²

On May 19, 2008, the Queensland government announced that BrisConnections was the preferred bidder for both projects. BrisConnections is a partnership of Macquarie Capital Group, Theiss and John Holland. The concession length is 45 years. BrisConnections is required to finance, design, construct, commission, operate and maintain the projects. Financial close was achieved on July 30, 2008. Construction commenced in 2009, and the project is due for completion in mid-2012. The combined project cost is over \$4 billion, with AirportLink costing about \$ 3.4 billion and the busway about \$444 million.

ENDNOTES

1. Peter Fitzgerald, *Review of Partnerships Victoria Provided Infrastructure: Final Report to the Treasurer, Melbourne: GSG Strategy and Marketing (January 2004)*. http://www.treasury.nsw.gov.au/_data/assets/pdf_file/0009/3141/wwggui_1.pdf, accessed September 14, 2009, 4. For additional definitions of PPPs in the Australian context, see *Australian Government, Productivity Commission, Public Infrastructure Financing: An International Perspective* (March 2009), page 144, Box 8.1.
2. U.S. Department of Transportation, Federal Highway Administration, *Public-Private Partnerships for Highway Infrastructure: Capitalizing on International Experience*, International Technology Scanning Program (March 2009) 1, <http://international.fhwa.dot.gov/pubs/pl09010/pl09010.pdf>.
3. Similarly, the Federal Highway Administration states that “public-private partnerships (PPP) refer to contractual agreements formed between a public agency and private sector entity that allow for greater private sector participation in the delivery of transportation projects.” U.S. Department of Transportation, Federal Highway Administration, Office of Innovative Program Delivery, “P3 Defined,” <http://www.fhwa.dot.gov/ipd/p3/defined/index.htm> (accessed 5/19/10).
4. See John Quiggin, “Public-Private Partnerships: Options for Improved Risk Allocation,” *Australian Economic Review* 38, no. 4 (2005): 445.
5. As the U.S. DOT FHWA, states in *Public-Private Partnerships for Highway Infrastructure*, page 33: “Most PPP programs in the countries visited began in response to fiscal crises, and the early PPP arrangements in these countries, while well intentioned, did not necessarily provide the best value for the public. Since that time, the planning, procurement, and management of PPP projects have improved substantially.”
6. “The aim is to deliver improved services and better value for money, primarily through appropriate risk transfer, encouraging innovation, greater asset utilization and integrated whole-of-life management.” Government of New South Wales, *Working with Government: Guidelines for Privately Financed Projects* (December 2006), http://www.treasury.nsw.gov.au/_data/assets/pdf_file/0009/3141/wwggui_1.pdf, accessed September 14, 2009, 1.
7. U.S. DOT FHWA, *Public-Private Partnerships for Highway Infrastructure...*
8. These categories are approximations. As the Federal Highway Administration puts it, “One man’s BOOT (build-own-operate-transfer) is another’s DBFO (design-build-finance-operate). The definitions, acronyms, and nomenclature used worldwide for PPPs are far from standard.” U.S. DOT FHWA, *Public-Private Partnerships for Highway Infrastructure*, 3, accessed September 1, 2009.
9. Congressional Budget Office, *Innovative Financing of Highways: An Analysis of Proposals*, 1998, 47, <http://www.cbo.gov/ftpdocs/3xx/doc320/finhways.pdf>, accessed September 1, 2009.

10. Silviu Dochia and Michael Parker, Introduction to Public-Private Partnerships with Availability Payments, Jeffrey A. Parker & Associates, Inc. (2009), http://www.transportation-finance.org/pdf/funding_financing/financing/jpa_introduction_to_availability_payments_0709.pdf, accessed February 9, 2010.
11. This approach has also been used across Latin America under the term “maintenance concessions,” where concessionaires can collect tolls in return for operating existing roads and implementing improvements.
12. Notably, the concession on Sydney’s first toll road in the modern era, the M4, expired on February 15, 2010, after 20 years. The concession was turned over to the New South Wales government, and tolling ended. New South Wales’ Labour government has committed to keeping the M4 de-tolled, despite facing criticism for the lost revenues and increased congestion. See “Sydney’s M4 toll road no more—detolled when concession ended Feb 15 24:00,” TOLLROADSnews, February 17, 2010, <http://www.tollroadsnews.com/node/4610>, accessed March 5, 2010.
13. Other countries have many more years of experience, however. France, for example, has over a hundred years of PPP experience. See, for example, R. Richard Geddes, *The Road to Renewal: Private Investment in U.S. Transportation Infrastructure* (AEI Press), in press.
14. Budget pressures impelled many countries to adopt PPP programs. As the FHWA, *Public-Private Partnerships for Highway Infrastructure*, states on page 3: “Most PPP programs in the countries visited began in response to fiscal crises, and the early PPP arrangements in these countries, while well intentioned, did not necessarily provide the best value for the public. Since that time, the planning, procurement, and management of PPP projects have improved substantially.”
15. Nonie Malone, “The Evolution of Private Financing of Government Infrastructure in Australia—2005 and Beyond,” *Australian Economic Review* 38, no. 4, 423, Table 1.
16. Georg Inderst, “Pension Fund Investment in Infrastructure,” *OECD Working Papers on Insurance and Private Pensions*, no. 32, OECD publishing (2009), 13, <http://www.oecd.org/dataoecd/41/9/42052208.pdf>, accessed March 1, 2010.
17. Ibid., 4.
18. Ibid., 13.
19. Some states, particularly in the West, have a legal approach based on Spanish civil code, while Louisiana’s is based on French civil code.
20. BITRE, Australian Transport Services Yearbook (June 2009).
21. Kilometers of paved roadways were obtained from the Transportation Statistics section of the Nationmaster website, http://www.nationmaster.com/graph/tra_roa_pav-transportation-roadways-paved, accessed February 25, 2010.

22. There is a direct link between the PFI initiative in the UK and the use of PPPs in Australia. New South Wales Treasury, Office of Financial Management, Research and Information, “NSW Public-Private Partnerships Policy—An Evolution” (March 2009), page 1. Also see page 2, which states that, “The United Kingdom was the modern instigator of the new wave of private sector involvement, through the development of the Private Finance Initiative (PFI) in the 1990s.”

23. FHWA, *Public-Private Partnerships for Highway Infrastructure*, 36.

24. Chris Chan et al., “Public Infrastructure Financing: An International Perspective,” Productivity Commission Staff Working Paper (March 2009), xxvii.

25. Some interviewees noted that when availability payments or shadow tolls are used on roadway projects instead of real tolls, the “user pays” distinction disappears, so there is actually little distinction between social and economic PPP projects. Others suggest that a more useful distinction is made based on the type of infrastructure provided.

26. NSW Treasury, *Working With Government: Guidelines for Privately Financed Projects* (2006), 54, <http://www.treasury.nsw.gov.au/wwg>.

27. All dollars in are in Australian dollars unless otherwise noted.

28. Demi Chung, *Private Provision of Transport Infrastructure—Unveiling the Inconvenient Truth in New South Wales*, 31st Australasia Transport Research Forum, page 386, states that, “In Australia, tollways have been one of the most active Public Private Partnership (PPP) markets. Since the 1980s, PPPs have delivered 11 toll roads equivalent to \$12 billion investment in the country.”

29. Chris Chan et al., “Public Infrastructure Financing: An International Perspective,” Productivity Commission Staff Working Paper, March 2009, xxvii.

30. FHWA, *Public-Private Partnerships for Highway Infrastructure*, 49.

31. See Figure 1 in Appendix D, which illustrates the failure of lane miles to keep up with the demand for surface transportation.

32. This refers to annual amounts needed over the 2008–2035 period, in 2008 dollars. See *Paying Our Way: Report of the National Surface Transportation Infrastructure Financing Commission*, page 3, <http://financecommission.dot.gov/>, accessed December 14, 2009. Dollars in this study refer to Australian dollars unless otherwise indicated.

33. It has been estimated that there are \$400 billion available globally for private infrastructure investment. See Mary E. Peters, “Remarks of the Honorable Mary Peters, Secretary of Transportation, National Governor’s Association White House Meeting,” (February 25, 2008), <http://financecommission.dot.gov/Documents/02-25-08NGAPlenary.doc>, accessed September 3, 2009. That estimate may omit the full effects of financial leverage, however. After noting the amount of equity available globally, Mark Florian, Jeff Holt, and Jenn

Frates, "Public-Private Partnerships: Examining the Key Drivers of Value," Horizon: The Future of Transportation, Austin: Texas Department of Transportation, 2007, page 5, state that, "Fully leveraged, this represents over \$800 billion in proceeds potentially invested globally in infrastructure." The financial market turbulence of 2008 has heightened the interest of equity investors in alternative investments. See for example, E.S. Browning, "Investors Lose Faith in Stocks as Record Amounts are Pulled," *Wall Street Journal* (Dec. 22, 2008): A1.

34. California Department of Transportation, "Toll Road Fact Sheet: State Route 91 (Orange County) 91 Express Lanes," <http://www.dot.ca.gov/hq/paffairs/about/toll/status.htm>, accessed February 9, 2010.

35. See U.S. Department of Transportation, Federal Highway Administration, "Excellence in Highway Design: Category 8—Public/Private Participation," <http://www.fhwa.dot.gov/eihd/91exp/htm>, accessed August 13, 2009.

36. See Hearing of the California Senate Transportation and Housing Committee, Tolls, User Fees, and Public-Private Partnerships: The Future of Transportation Finance in California? (January 17, 2007), 7, <http://republicans.transportation.house.gov/Media/File/Testimony/Highways/5-24-07-Lowenthal2.pdf>, accessed February 9, 2010.

37. Nicholas Hann, *PPPs in North America—A Private Sector Partner's Perspective*, Maquarie North America, Ltd. (December 2006), <http://csgb.ubc.ca/files/workshop06/Region4-Hann.pdf>, accessed February 10, 2010.

38. U.S. Department of Transportation, Federal Highway Administration, Office of Innovative Program Delivery, *Case Studies: Chicago Skyway*, http://www.fhwa.dot.gov/ipd/case_studies/il_chicago_skyway.htm, accessed February 10, 2010.

39. Peter Samuel, *Should States Sell Their Toll Roads?* Reason Foundation Policy Study 334 (2005), 11, <http://reason.org/news/show/12767.htm>, accessed September 1, 2009.

40. Ibid.

41. Leonard C. Gilroy, "Public-Private Partnerships in Transportation: Opportunities for Massachusetts, Testimony of Leonard C. Gilroy before the Massachusetts Joint Committee on Transportation" (2008), <http://reason.org/news/show/public-private-partnerships-in-2>, accessed September 1, 2009.

42. Samuel, *Should States Sell*, 10.

43. Ibid.

44. NewEurope, "Portuguese, Brazilian Toll Operators Ink Road Lease," (September 8, 2007), <http://www.neurope.eu/articles/Portuguese-Brazilian-toll-operators-ink-road-lease/77383.php>, accessed February 10, 2010.

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45. See “Dulles Greenway: Facts and Myths,” <http://dullesgreenway.com/facts-myths.html>, accessed September 5, 2009.
46. Ibid.
47. Ibid.
48. U.S. Department of Transportation, Federal Highway Administration, “PPP Case Studies: Dulles Greenway,” http://www.fhwa.dot.gov/PPP/case_studies_dulles.htm, accessed September 5, 2009.
49. See Autostrade S.p.A., “Dulles Greenway Toll Road—Washington Area, Virginia,” http://www.autostrade.it/en/gruppo/attinternaz_pres_dulles.html?initPos=1, accessed February 10, 2010)
50. U.S. Department of Transportation, Federal Highway Administration, “Case Studies: Indiana Toll Road,” http://www.fhwa.dot.gov/ipd/case_studies/in_indianatoll.htm, accessed February 10, 2010.
51. Gilroy, “Public–Private Partnerships in Transportation.”
52. Ibid.
53. Matthew T. Brown et al., *The Capital Beltway and Public-Private Partnerships*, Washington DC: The Trachtenberg School of Public Policy and Public Administration (December 2007), 22, <http://ncppp.org/councilinstitutes/capstonereport2.pdf>.
54. U.S. Department of Transportation, Federal Highway Administration, “Case Studies: I-495 Capital Beltway HOT Lanes,” http://www.fhwa.dot.gov/ipd/case_studies/va_capital_beltway.htm, accessed February 10, 2010.
55. Virginia Department of Transportation, “Hot Lanes Construction,” <http://virginiahotlanes.com/>, accessed August 13, 2009.
56. U.S. Department of Transportation, Federal Highway Administration, “Construction: Capital Beltway HOT Lanes Project,” <http://www.fhwa.dot.gov/programadmin/contracts/sep14va2008.cfm>, accessed May 19, 2010.
57. See U.S. Department of Transportation, Federal Highway Administration, “PPP Case Studies: I-495 Capital Beltway HOT Lanes,” http://www.fhwa.dot.gov/PPP/case_studies/i495_capital.htm, accessed August 13, 2009.
58. See, for example, Leonard C. Gilroy, “Modernizing and Expanding Pennsylvania’s Transportation Infrastructure through Public-Private Partnerships: Testimony of Leonard C Gilroy before the Pennsylvania House Republican Policy Committee,” December 14, 2009, 7, http://reason.org/files/testimony_pennsylvania_transportation_public_private_partnerships.pdf, accessed February 11, 2010, which states, “For example, in return for a
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75-year concession, a private consortium is now adding the first new lanes to the I-495 Capital Beltway in Northern Virginia, which again is something government had been unable to implement through traditional funding approaches.”

59. See Texas Department of Transportation, State Highway 130 information, http://www.dot.state.tx.us/business/partnerships/sh_130.htm, accessed June 21, 2010.

60. Round Rock, Texas, Chamber of Commerce, “Transportation,” <http://www.roundrockchamber.org/Transportation.67.0.html>, accessed February 10, 2010.

61. Robert Poole, “A Tale of Two Texas Toll Roads: What’s Really at Stake in the Battle Over SH-121,” Reason Foundation (May 11, 2007), <http://reason.org/news/show/a-tale-of-two-texas-toll-roads>, accessed August 12, 2009.

62. See Gilroy, “Modernizing and Expanding,” 6–7.

63. Dorothy Morillos and Adjo Amekudzi, “The State of the Practice of Value for Money Analysis in Comparing Public Private Partnerships to Traditional Procurements,” *Public Works Management & Policy* 13 (2008): 114–125.

64. Jeffrey N. Buxbaum and Iris Ortiz, “Public Sector Decision Making for Public-Private Partnerships: A Synthesis of Highway Practice,” National Cooperative Highway Research Program, Washington DC, 2009.

65. Alain Bonnafeous, A. and Pablo Jensen, “Ranking Transport Projects by their Socioeconomic Value or Financial Interest Rate of Return?”, *Transportation Policy* 12 (2005): 131–136.

66. Dimitrios Tsamboulas, Konstaninos Panou, and Constantinos Abacoumkin, “Attractiveness of Transportation Infrastructure Projects to Private-Sector Financing: Assessing the Hierarchical Analysis Risk Scenario Method.” *Transportation Research Record* 1732 (2000): 12–21.

67. John L. Ward and Joseph Sussman, “Malaysian Toll Road Public-Private Partnership Program: Analysis and Recommendations for Policy Improvements,” *Transportation Research Record* 1960 (2006): 119–127.

68. Wendell Lawther, “Public Outreach for Public-Private Partnerships. The Case of Advanced Traveler Information Systems,” *Public Works Management & Policy* 9 (2004): 120–131.

69. Jeffrey N. Buxbaum and Iris Ortiz, “Protecting the Public Interest in Long-Term Concession Agreements for Transportation Infrastructure.” *Public Works Management & Policy* 13 (2008): 126–137.

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72. A. Majumdar and W. Ochieng, "From 'Our Air Is Not for Sale' to 'Airtrack': The Part Privatization of the UK's Airspace." *Transport Reviews* 24 (2004) 135–176.
73. Daniel Albalade and Germà Bel. "Regulating Concessions of Toll Motorways: An Empirical Study on Fixed vs. Variable Term Contracts." *Transportation Research Part A* 43, no. 2 (2009) 219–229.
74. Jose Vassallo, "Traffic Risk mitigation in Highway Concession Projects. The Experience of Chile," *Journal of Transport Economics and Policy* 40 (2006): 359–381.
75. Germà Bel and John Foote, "Tolls, Terms and Public Interest in Road Concessions: A Comparative Analysis of Recent Transactions in the USA and France," *Transport Reviews* 29 (2009): 397–413.
76. Kathleen Brown, "Are Public-Private Transactions the Future of Infrastructure Finance?" *Public Works Management & Policy* 12 (2007): 320–324.
77. Olivier Debande, "Private Financing of Transport Infrastructure. An Assessment of the UK Experience," *Journal of Transport Economics and Policy* 36 (2002): 355–387.
78. Jose Vassallo and Antonio Sanchez-Solino, "Subordinated Public Participation Loans for Financing Toll Highway Concessions in Spain." *Transportation Research Record* 1996 (2007): 1–8.
79. In its recent international scanning study, *Public-Private Partnerships for Highway Infrastructure*, the FHWA identified both risk transfer and the determinants of concession length as key issues for further study. See page 4.
80. Darrin Grimsey and Mervyn K. Lewis, "Evaluating the Risks of Public Private Partnerships for Infrastructure Projects," *International J. of Project Management* 20 (2002) 107–118, page 109.
81. This discussion borrows from Darrin Grimsey and Mervyn K. Lewis, "Evaluating the Risks of Public Private Partnerships for Infrastructure Projects," *International J. of Project Management* 20 (2002) 107–118, page 111. A detailed analysis of the main PPP risks is also provided in *Working with Government: Guidelines for Privately Financed Projects*, Appendix 3, Government of New South Wales, Australia, December 2006.
82. See, for example, Mick Lilley and Catherine DeGiorgio, "A Private-Sector Perspective," *Australian Accounting Review* 14, no. 2 (July 2004): 36–7.
83. A 2009 Australian study of over 100 traditionally procured public sector projects found that the vast majority experienced design and construction cost overruns. See Patrick O'Donnell, "Establishing Measurable and Reportable KPIs," Leighton Contractors (February

2009), http://www.investmentfacilitymanagement.com.au/downloads/Presentation_Contract_Selection_Risk_KPIs_POD_Feb_09.pdf.

84. AllBusiness, "Government cancels A\$5bn Sydney Metro contract" (February 24, 2010), <http://www.allbusiness.com/transportation/public-transportation-urban-transit/13986603-1.html>, accessed March 10, 2010).

85. Ronald J. Daniels and Michael J. Trebilcock, "Private Provision of Public Infrastructure: An Organizational Analysis of the Next Privatization Frontier," *The University of Toronto* 46, no. 3 (Summer 1996) page 382, footnote 20, points out that, on the Prince Edward Island Fixed Link project in Canada, the government assumed numerous exogenous risks such as delays related to government regulation, war, earthquakes, nuclear events and environmental injunctions, among others.

86. Other analysts have recognized this. See for example, Australian Commonwealth Government, Productivity Commission, *Public Infrastructure Financing: An International Perspective*, March 2009, page XXIX, which states: "And while risks may be transferred to private partners, the cost of risk will be factored into the cost of finance. The main advantage of PPPs comes from the scope for lowering the total cost of the project through improving project risk management."

87. Kevin Davis, "PPPs and Infrastructure Investment," *Australian Economic Review* 38, no. 4 (2005): 441.

88. Residual claims are property rights to the net cash flows of the firm. Those holding such rights are referred to as "residual claimants." See, for example, Eugene F. Fama and Michael C. Jensen, "Agency Problems and Residual Claims," *Journal of Law and Economics* 26, no. 2 (June 1983).

89. Mick Lilley and Catherine DeGiorgio, "A Private-Sector Perspective," *Australian Accounting Review* 14, no. 2 (July 2004), page 36, discuss the evolution of risk allocation since the Sydney Harbor Tunnel PPP. They state that:

Tollroad financing in Australia has developed through successive projects such as the Sydney Harbour Tunnel, M4, M5 and M2 motorways, Melbourne City Link, Sydney's Eastern Distributor and, also in Sydney, the current Cross City Tunnel, Westlink Motorway and Lane Cove Tunnel projects. Over time, risk has increasingly been transferred to the private sector.

They also display a table of typical risk allocation in Australian PPP contracts. That table is reproduced in the appendix.

90. The Victorian government's PPP guidelines state, "The principal governing risk transfer is that the risk will be allocated to whoever is best able to manage it at least cost, taking into account public interest considerations. This does not mean that all risk is transferred. If risk is transferred inappropriately, the Government will pay a premium." Department of Treasury and Finance, *Partnerships Victoria* (2000).

91. New South Wales Treasury, *An Evolution*, page 5. Similarly, Mick Lilley and Catherine DeGiorgio, “A Private-Sector Perspective,” *Australian Accounting Review* vol. 14, no. 2, (July 2004) page 35 state, “In any infrastructure project, risks should ideally be borne by those best able to manage and mitigate them. The potential benefits of appropriate risk transfer to the private sector are significant and in recent international and Australian experience developers have shown an increasing willingness to assume a greater level of development, construction and operations risk.”
92. Indeed, the planned Peninsula Link project in Melbourne, which would interconnect with Eastlink, will be an availability payments project.
93. “Super Funds Plan to Back Key Projects,” *The Australian Financial Review*, March 4, 2010.
94. Ibid. The government of NSW however had to pay CCT for contractual changes associated with surface street traffic management. Several interviewees note that NSW was criticized for PPPs that maximized an upfront payment through bidding, rather than minimizing toll rates, as has been done in Victoria. The era of maximizing upfront payments in brownfield PPPs appears to be over.
95. However, the CCT did receive compensation back from the government for elimination of traffic-shaping measures on surface streets that were part of the original contract.
96. GAO-08-44, p. 46–7.
97. See, for example, Eric Ralph, “Assets Stranded by Unanticipatable Regulatory Change,” note based on Duke University Ph.D. thesis, <http://www.ekonomicsllc.com/Ralph1996StrandedAssets.pdf>, accessed March 10, 2010.
98. This discussion borrows from Erik Sanzenbach, “U.S. 11 Bridge Celebrates 80th Birthday,” *St. Tammany News*, Feb. 18, 2008, <http://www.newsbanner.com/articles/2008/02/18/news/news02.txt>, accessed December 1, 2008.
99. Peter Samuel, *The Role of Tolls in Financing 21st Century Highways: Reason Foundation Policy Study 359* (May 2007), 36, <http://www.reason.org/ps359.pdf>, accessed December 2, 2008. Non-compete clauses arise in other contexts. For an example of non-complete clauses in airport construction, see Daniels and Trebilcock, “Private Provision of Public Infrastructure,” page 385. Private firms in regulated industries, such as electricity, are effectively granted non-compete protections through exclusive territories.
100. See for example, *Report of the Legislative Study Committee on Private Participation in Toll Projects* (December 2008), 56, ftp://ftp.dot.state.tx.us/pub/txdot-info/library/pubs/bus/tta/sb_792_report.pdf, accessed August 12, 2009.
101. Notably, compensation clauses in PPP contracts raise similar issues to compensation for a “regulatory taking,” in which a regulation has the effect of diminishing or eliminating property value without compensation to the property owner.

102. Surface Transportation Authorization Act of 2009, http://transportation.house.gov/Media/file/Highways/HPP/OBERST_044_xml.pdf.

103. Although this may seem like an academic point, it is a critical but under-appreciated insight in PPP discussions. One effect of a higher toll is to shift welfare from consumers (through lower consumer surplus) to producers (through higher profits). It is impossible to tell a priori what the distributional effect is, however, since investors may include retired teachers, police and firemen. The policy focus therefore should be on the overall “size of the pie” (that is, on economic efficiency) rather than on its division.

104. This is particularly a concern in urban areas where facility demand greatly exceeds supply.

105. Other commentators have recognized the superiority of price caps relative to rate of return regulation. For example, Darrin Grimsey and Mervyn K. Lewis, “Evaluating the Risks of Public Private Partnerships for Infrastructure Projects,” *International J. of Project Management* 20 (2002): 107–118, page 108, state:

In those activities which have natural monopoly characteristics, substitution of price-cap regulation for rate-of-return regulation (that is, fixing of maximum prices rather than the mark up over costs) has created strong incentives to reduce costs, while third party access to certain facilities that are not economic to duplicate has widened competition in the upstream and downstream markets served by the facilities.

106. This is consistent with the view expressed by many private sector interviewees, which is that a main goal of the operator is to enhance facility value by maximizing traffic throughput on it. That goal is consistent with social welfare.

107. Samuel, *Should States Sell*, 6–7.

108. This is in contrast to the bidding that took place for leases on the Chicago Skyway or Indiana Toll Road, for example, which were on the basis of the largest concession fee, but similar to some PPP bidding in Victoria, Australia.

109. Here the per-unit cost is the cost to the bidder per vehicle using the facility. This statement is subject to several complications based on the number of bidders. See for example, Viscusi, Harrington, and Vernon, *Economics of Regulation*, page 466.

110. See for example, Eduardo Engel, Ronald Fischer and Alexander Galetovic, “Privatizing Roads: A New Method for Auctioning Highways,” *Public Policy for the Private Sector: Note No. 112* (Washington DC: The World Bank Group, 1997), <http://rru.worldbank.org/Documents/Toolkits/Highways/pdf/20a.pdf>, accessed September 2, 2009, which describes this approach.

111. FHWA, *Public-Private Partnerships for Highway Infrastructure*, 23.

112. Several interviewees noted that the value-for-money approach evolved in response to the perception that Australian transport PPPs were simply pursued for budgetary reasons, rather than for their own unique merit. They stressed however that the analysis of PPPs has been refined over time, particularly with regard to their impact on budgets, and that concerns about PPP use for purely budgetary reasons are no longer as salient.

113. FHWA, *Public-Private Partnerships for Highway Infrastructure*, 24.

114. Interviews with experts in Victoria suggest that the state is moving toward a model under which the government presents a standard contract and potential bidders offer their best bid. Some private sector interviewees were skeptical that this approach would create as much value.

115. Statements of Linda Carlisle and Edward Kleinbard at hearing of U.S. Senate Committee on Finance, Subcommittee on Energy, Natural Resources and Infrastructure, "Tax and Financing Aspects of Highway Public-Private Partnerships, July 24, 2008, <http://transportation.house.gov/Media/File/Highways/20070213/ssm.pdf>.

116. Demi Chung, *Unveiling the Inconvenient Truth*, 31st Australasian Transport Research Forum, 385.

117. Mick Lilley and Catherine DeGiorgio, "A Private-Sector Perspective," *Australian Accounting Review* 14, no. 2 (July 2004), page 36, state:

Increasingly, governments are including the construction period in the term of the concession; that is, a concession period of 22 years will include two years of construction and 20 years of operation and maintenance. As a result, the private sector bears the risk of construction delays, as any increase in the construction period will result in a reduced period of operation and a diminished revenue stream.

118. One interesting example of innovative concession term use is the Vasco da Gama Bridge in Lisbon, where the length of the concession is tied to a predetermined time period, or receipts from toll revenue, whichever comes first.

119. FHWA, *Public-Private Partnerships for Highway Infrastructure*, 41.

120. *Ibid.*, 37.

121. This is consistent with recent research reports on Australian PPPs. As stated in Michael Regan, "A Survey of Alternative Financing Mechanisms for Public Private Partnerships," Infrastructure Association of Queensland, Research Report 110 (July 31, 2009), states:

The result (of Australian PPPs) has been a significant improvement in project delivery (cost and time), reduced procurement cost, greater certainty with full life cycle costing, higher levels of innovation and technology and better quality service outcomes. These benefits contribute to better value for money results for

government than traditional procurement methods.

Additionally, page 6 states that, “A growing body of evidence supports the view that PPPs are delivering better quantitative and qualitative outcomes than alternative procurement models.”

122. A similar conclusion was reached by the Federal Highway Administration in its international study. Federal Highway Administration, *Public-Private Partnerships for Highway Infrastructure*, page 16, states, “As PPP programs have evolved in the host countries, so too has public acceptance of PPPs, although some issues remain. In many respects, public perspectives of PPPs have improved over time as the nations have tightened policies and improved practices.”

Similarly, page 39 states:

While all nations emphasized the importance of public involvement and information dissemination during the project delivery process, Australia in particular stressed the importance of public involvement as a project nears its opening. This is likely because all of its PPP arrangements employ real tolls and are basically greenfield projects, so the public needs to understand tolling products, rates, and enforcement; points of access, etc.

123. See Scott Rochfort, “Low Traffic Forces Lane Cove Tunnel’s Backers to Write Off Millions,” *Sydney Morning Herald* (March 19, 2008).

124. Henry Ergas, “Cronyism on the Sly,” *The Australian*, October 30, 2009, <http://www.theaustralian.com.au/news/opinion/cronyism-on-the-sly/story-e6frg6zo-1225792583411>, accessed December 15, 2009.

125. A 2010 OECD publication entitled *Dedicated Public-Private Partnership Units: A Survey of Institutional and Governance Structures* provides a detailed overview of such organizations internationally (DOI 10.1787/9789264064843-en).

126. See “About Partnerships Victoria,” State Government of Victoria: Partnerships Victoria, <http://www.partnerships.vic.gov.au/CA25708500035EB6/0/B2FD4F20E80A14B4CA2570AE00050F22?OpenDocument>, accessed March 22, 2010.

127. FHWA, *Public-Private Partnerships for Highway Infrastructure*, 10.

128. *Ibid.*, 10.

129. Shadow tolls are payments made to concessionaires by the government based on the number of vehicles using the facility, but where no direct tolls are charged. This approach might be appealing if it is politically infeasible to toll an existing non-tolled facility, but if the PPP approach is desirable. Similarly, availability payments are payments made by the government to a concessionaire based on various dimensions of service quality, such as traffic flow.

130. U.S. Department of Transportation, Federal Highway Administration, *Case Studies of Transportation Public-Private Partnerships around the World*, July 7, 2007, http://www.fhwa.dot.gov/PPP/pdf/int_ppp_case_studies_final_report_7-7-07.pdf, accessed August 10, 2009), 4–5.

131. *Ibid.*, 4–5.

132. New South Wales Treasury, *An Evolution*, 10.

133. See for example, Christine Brown, “Financing Transport Infrastructure: For Whom the Road Tolls,” *Australian Economic Review* 38, no. 4 (2005): 431, who states that, “The private infrastructure market in Australia dates from 1988 when New South Wales first documented formal procedures and controls governing private sector participation.”

134. New South Wales Treasury, *An Evolution*, 4.

135. See Demi Chung, *Unveiling the Inconvenient Truth*, 392.

136. *Ibid.*, 394.

137. FHWA, *Public-Private Partnerships for Highway Infrastructure*, 23.

138. Deloitte Consulting, *Closing the Infrastructure Gap: The Role of Public-Private Partnerships* (2006) on page 9, states:

Innovation in customer service delivery helps account for such high customer satisfaction levels. Motorists using the Citylink private tollway in Melbourne, Australia, for example, receive alerts when their account is low and can top up their accounts from their mobile phones. A mobile customer service unit traverses the city around the clock, visiting customers at work and at home, helping to install tags and answer account questions. Dissatisfied customers can file complaints with the CityLink Ombudsman, an independent dispute resolution service that investigates complaints and proposes ways to resolve the issues. The private operator has also introduced a customer charter and customer performance scorecard; by measuring CityLink’s performance against charter targets and making the results public, the process has increased transparency and accountability.

139. FHWA, *Public-Private Partnerships for Highway Infrastructure*, 36. Interviewees indicated that KPIs are a critical tool, and have become very complex. One expert noted that “there are hundreds of them” and that they now include “all elements that you can imagine.” They are certainly laid out in fine detail. In some cases a system is used, where the operator pays a fine if they accumulate too many points. In addition, they may include such factors as pavement quality, traffic flow, lighting, road markings, many dimensions of safety, drainage, and signage, among many others. One expert noted that a facility operator in Melbourne was fined \$15 million for failure to meet KPIs.

140. State of Victoria, *Linking Melbourne Authority, Delivering Eastlink, Glen Waverly, Victoria* (July 2009), 1, <http://www.seita.com.au/pages/eastlink-publications-asp>, accessed October 21, 2009.

141. FHWA, *Public-Private Partnerships for Highway Infrastructure*, 36.

142. See the “Home” section of the City North Infrastructure website, <http://www.citynorthinfrastructure.com.au/>, accessed October 21, 2009.

ABBREVIATIONS AND ACRONYMS

ATIS	Advanced Traveler Information Systems
BOO	Build-Own-Operate
BOOT	Build-Own-Operate-Transfer
BOT	Build-Operate-Transfer
BTO	Build-Transfer-Operate
Caltrans	California Department of Transportation
CCR	Companhia de Concessões Rodoviárias
CCT	Cross City Tunnel
CKI	Cheung Kong Infrastructure
CLEM7	M7 Clem Jones Tunnel
CNI	City North Infrastructure Pty Ltd
CPI	Consumer Pricing Index
CPTC	California Private Transportation Company
DB	Design-Build
DBB	Design-Bid-Build
DBFO	Design-Build-Finance-Operate
DBOM	Design-Build-Operate-Maintain
ELDP	Express Lanes Demonstration Project
EOI	Expressions of Interest
FHWA	Federal Highway Administration
GDP	Gross Domestic Product
GFC	Global Financial Crisis
HOT	High-Occupancy Toll (lanes)
ITRCC	Indiana Toll Road Concession Company
KPIs	Key Performance Indicators
LPVR	Least Present Value of the Revenues
LTL	Long-Term Lease
MAE	Material Adverse Effect
NAFTA	North American Free Trade Agreement
NSW	New South Wales
OCTA	Orange County Transportation Authority
PFI	Private Finance Initiative
PPP	Public-Private Partnerships
RFP	Request for Proposals
RTA	Roads and Traffic Authority
SCC	Skyway Concession Company LLC
SHT	Sydney Harbor Tunnel
SPPL	Subordinated Public Participation Loans

TIFIA	Transportation Infrastructure Finance and Innovation Act of 1998
TRIP II	Toll Road Investors Partnership II
VDOT	Virginia Department of Transportation
VfM	Value for Money

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