Fundamentals of Public-Private Partnerships in the Transportation Sector:
International methodologies of highway public-private partnerships and a framework to increase the probability of success and allocate risk

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Ryan Butler and Eunil Lee

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ABSTRACT

In 2009 the American Society of Civil Engineers (ASCE) gave the US infrastructure sector a grade D, based on the current and future needs of the nation's infrastructure and estimates that by year 2020, the US surface transportation deficit will reach $846 billion. Furthermore, in 2013 the US Congressional Budget Office estimates that the main source of highway funding, the *Highway Trust Fund*, will have insufficient capital to meet its shortfalls by 2015. As defined by the ASCE, infrastructure is the physical framework upon which an economy operates. Without immediate improvement and alternative solutions to fund the crumbling roadway network, the US will continue to struggle to find its way to economic prosperity.

This thesis aims to give an overview of how private participation can play an integral role in revamping the US highway network and will outline several of the most important aspects of structuring a successful highway public-private partnership (PPP). Throughout the thesis, PPP is referred to as a long-term contractual agreement between a private entity and a public sponsor to construct and maintain an infrastructure asset. PPP is a complex and potentially dangerous partnership as it can inadvertently put the public at risk; however, it has also proven to be a very successful tool in many countries around the world. By examining the US highway sector and the history of transportation PPP's, this thesis analyzes failed and successful cases, as well as study partnership frameworks implemented in other countries. With this, the thesis attempts to educate stakeholders and spread awareness of how to identify and effectively allocate risks associated with PPP's. If structured and executed appropriately, PPP's will help the stakeholders in highway privatizations reach each of their respective goals and can help rebuild a sustainable highway network throughout the US.

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1.1 The US Infrastructure Sector

After the recent global financial crisis, governments started looking at infrastructure development as a means to stimulate the economy from a spending and labor creation standpoint. As defined by the American Society of Civil Engineers (ASCE), infrastructure is the physical framework upon which an economy operates. Incidentally, in 2009 the ASCE gave the US infrastructure sector a grade D, based on the current and future needs of the nation's infrastructure. Without immediate improvement and restructuring, the US will continue to struggle to find its way to economic prosperity.

Over the course of the 20th century, infrastructure funding relied heavily on government debt. US government debt as a share of GDP grew from seven percent to over forty percent. Today, the total gross US public debt to GDP is over 83% and is projected to increase significantly over the coming decades.[1] The public financing mechanisms in the US used to fund infrastructure are becoming constrained and limited due to the fiscal deterioration that has occurred at the state and national level. Policy makers throughout the country are looking for alternative mechanisms that will help assure the US infrastructure is sustainable for future generations.

Perspectives on how to develop sustainable and successful infrastructure have shifted drastically over the past decade. Governments, consumers and investors are beginning to align interests and consider alternative and innovative delivery, financing and

[1] "World Economic Outlook - Hopes, Realities, and Risks", *International Monetary Fund,* April 2013 http://www.imf.org/external/pubs/ft/weo/2013/01/pdf/text.pdf

management programs for infrastructure and are starting to move away from the traditional and predominant role of government owned and operated infrastructure. Around the world, especially the United States, policy makers are becoming more aware that traditional methods of public sector infrastructure finance and development may not be the most sustainable or advantageous model and may even prove to be a fiscal constraint on the economy in the long run.

While federal spending and debt have increased substantially, local municipalities throughout the country are also finding it difficult to repay debt and further provide capital to aid in economic growth. Even more troubling than the incredibly burdening debt levels throughout the federal and local authorities is that at this exact moment the US infrastructure sector is in dire need of reform.

1.2 Current Situation: The US Infrastructure Sector

The ASCE findings prove that the deteriorating infrastructure is becoming a public safety issue and is negatively affecting business activity, economic growth, employment prospects, income growth levels and international competitiveness.[2] Shown below is a summary of the funding gaps and estimated requirements for each major infrastructure sector in the United States. In total, the ASCE estimated that by year 2020, the United States infrastructure investment shortfall would exceed $1 trillion and cost the average household $28,000 in lost disposable income from 2012 to 2020.

[2] "Failure to Act: The Impact of Infrastructure Investment on America's Economic Growth ", *American Society of Civil Engineers*, 2013: 5.
http://www.asce.org/uploadedFiles/Infrastructure/Failure_to_Act/Failure_to_Act_Report.pdf

[Figure 1] Summary of Funding Gaps

Sector	Req'd Investment	Expected Funding	Shortfall
Airports	$139 Billion	$95 Billion	**$39 Billion**
Seaports/Waterway	$30 Billion	$14 Billion	**$16 Billion**
Surface Transport	$1.7 Trillion	$866 Billion	**$846 Billion**
Electricity	$736 Billion	$629 Billion	**$107 Billion**
Water Treatment	$126 Billion	$42 Billion	**$84 Billion**

Source: "Failure to Act Report Summary", ASCE, 2013.

The adverse effects that come with inadequate infrastructure spending are disastrous. It is estimated that the inability to fund the deficit over the next decade would result in over $3 trillion in lost GDP, a drop of $2.4 trillion in consumer spending and over 3.5 million job losses in the US. Already 40 percent of the urban interstates in the US have capacity deficiencies and cost the US economy over $27 billion per year in lost time and other physical damages. This amount could reach $276 billion per year by 2020.[3]

As the United States enacts fiscal and monetary planning and strategy to emerge from the Global Financial Crisis, the encumbering obstacles within the infrastructure sector can drastically inhibit a full-fledged recovery at this sensitive turning point. The historically high debt levels and lack of consumer confidence within the municipal debt markets post-2008 demonstrate the importance of finding new mechanisms to fund this shortfall in the infrastructure sector. Innovations in deal structuring, partnerships, and funding sources are required to assure that the US can continue to operate at its full economic potential and revitalize the infrastructure that is the backbone of the economy.

[3] Matt Sledge, "Deteriorating Transportation Infrastructure Could Cost America $3.1 Trillion." *Huffington Post*, July 27, 2011. http://www.huffingtonpost.com/2011/07/27/transportation-infrastructure-cost_n_911207.html

While the majority of the US infrastructure sector is in dire need of reform, our analysis will deal solely with highway infrastructure and the advent of alternative support mechanisms, most notably greater private participation in infrastructure development, management and financing. For the purposes of this paper, we present a detailed outline of the current highway problems in the US and illustrate the inherent advantages and disadvantages of public private partnerships (PPP) by analyzing the components of failed and successful international PPP highway projects. We will also effectively depict the perspectives, goals, and risks that each PPP stakeholder will encounter and show how to mitigate the probability of failure.

2 An Overview of the U.S. Transportation System

At the start of the US transportation era in the early 19th century, capitalists investing for profit helped establish an expansive network of railroads, streetcars, subways and plank-roads. Railways became a technological advancement and helped set the foundation for a major transportation network.

As an early example of capitalist investment in transportation, the Boston-Lowell Line, chartered in 1830, was one of the first and most successful railways to be incorporated in the US. Its initial capital of $500,000 came in the form of one thousand shares in $500 increments. It was a purely private undertaking, funded mostly by the manufacturers of the Merrimack River Valley in Lowell.

Railway charters granted by the states gave exclusive rights to the built tracks usually for 20 years from completion, after which the state reserved the rights to purchase them.

While the corporations had the right to levy tolls, the State reserved the right to reduce the charges, at given periods, in case the net income from all sources exceeded 10% per annum of the cost of the road. In such cases, the rates were lowered until the returns were below the 10% per annum level. [4] In the case of railroads in the western states, which often crossed vast expanses of land with sparse population, the operational profits were not enough to justify purely private investments. The Federal Government granted large tracts of land and financed a large portion of the construction cost through the sale of bonds.

Parallel to the railways in the 19th century, was the introduction of plank-roads. Plank-roads are two parallel rows of small sticks of timber embedded in the road with planks laid upon them at right angles and deep ditches at each side for drainage.[5] Plank-roads were favored by the farmers because the tolls were only a fraction of the cost of riding the train, while it enabled them to carry two to three times more load on their horse-drawn carriages than when on unpaved roads. Financing for these roads came mostly from private investors who installed tollgates and charged on the basis of miles traveled, much similar to present-day toll roads. In New York State, for example, over 2,000 miles of plank-roads were constructed with tollgates placed at intervals of no less than 3 miles as stipulated by law.[6]

For over two centuries, the private sector had a significant role in funding and developing America's initial transportation network. However, in the mid-20th century, the

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[4] "Report of the Directors", *Boston and Worcester Railroad Corporation,* 1832: 39-40.

[5] W. M. Gillespie, *A Manual on the Principle and Practice of Road-Making* (New York: A.S. Barnes & Co., 1847), 231.

[6] Daniel B. Klein and John Majewski, "Plank Road Fever in Antebellum America: New York State Origins", *University of California Transportation Center*, 1994: 53.

US government was the predominant entity responsible for the rapid development and expansion of the highway system. Government initiated highway development was in response to the vast technological advances in automobile manufacturing during the early 20th century when cars and trucks quickly gained popularity. The growth in the car manufacturing industry spurred great demand for more automobile roads so that rural communities could be interconnected throughout the country.

During the Great Depression, the Bureau of Public Roads (BPR) rolled out plans to construct road networks that employed as many workers as possible. The following World War II exacerbated this need for a national transportation system. While several roadway-funding bills were signed in previous years – most notably the Federal Aid Road Act of 1916 and 1921 – President Eisenhower's bill was the first large-scale endeavor to create a holistic highway network funded through a US Government Trust Fund[7]. In 1956, Eisenhower supported and signed The Federal Aid Highway Act to fund the construction of 41,000 miles of interstate highways throughout the country. From 1957 to 1969 over $25 billion were apportioned to construct the network, with 90% of the funding originating from highway users.

Government regulation in highway infrastructure is often in response to natural monopolies that evolved and where infrastructure services were deemed essential to public welfare.[8] In today's society, the US government spends approximately $160 billion each year on highway maintenance and construction, of which approximately $40 billion

[7] "Federal-Aid Highway Act of 1956: Creating the Interstate System .", *Federal Highway Administration* 60, 1 (1996), accessed June 18, 2013, http://www.fhwa.dot.gov/publications/publicroads/96summer/p96su10c.cfm#47.

[8] Chris Chan et al., *Public Infrastructure Financing: An International Perspective*, (Melbourne: Australian Government Productivity Commission, 2009), 10.

comes from the Federal Government. Taxes and highway usage fees (which come in the form of tolls) are the main sources of income that fund today's US highway system. These two sources, however, account for only half of the capital that is required to maintain the highways; the remaining funding comes from the Treasury, state and local municipalities. [9]

2.1 Current Practices in the US: The Highway Trust Fund

As noted, the main source of revenue for the US Interstate Highway system originated from the implementation of *The Federal Aid Highway Act of 1956* and the user fuel tax. The current fuel tax of 18.3 cents per gallon of gasoline, or 24.3 cents per gallon of diesel fuel funds two trust accounts: the *Highway Account* and the *Mass Transit Account*. For years, the primary source of funding for the highway system came from the imposed fuel tax as the Federal Government viewed this as an attractive revenue source due to its transparency, stability and ease of forecasting. In addition, it is often argued that the highway fuel tax embodies the idea of fairness in the distribution of costs and benefits of highway usage. However, in today's society, the US model is disproportionally in favor of the user and the government is covering an ever-increasing share of the expense.

The US fuel tax rates have not increased since 1993, even as inflation and construction costs have grown significantly over the past two decades. In addition, this revenue source is inversely correlated with technology and fuel efficiency, boasting a

[9] Joseph Kile, "The Highway Trust Fund and Paying for Highways", *Congressional Budget Office*, (2011). http://heinonlinebackup.com/hol-cgi-bin/get_pdf.cgi?handle=hein.congrec/cbo08019&section=1.

'quasi-Jevons paradox'.[10] For example, fuel tax revenue will diminish as the government continues to set stringent regulations and benchmarks to encourage the use of more fuel-efficient vehicles. While structured similarly to the European model, the US tax is dissimilar when analyzing the fuel tax rates that are charged; for instance, the average gas tax in France over the past thirty years has been approximately eight times higher than in the US.[11]

As approximately 90% of revenue for the Highway Trust Fund comes from the fuel tax, other notable sources of revenue are: tire tax (1%), truck sales tax (5%) and heavy vehicle user tax (4%). While the fuel tax became the standard form of funding for the highway system, the Federal Government is starting to explore alternative funding mechanisms because of the significant shortfalls that are occurring.

2.2 Change Is Required

Illustrated on the U.S. Department of Transportation (DOT) website, the Federal Highway Administration (FHWA) shows a significant positive account balance, albeit declining.[12] What is misleading about this statement is that this account balance does not take into consideration the accumulating deficits and existing obligations that the Trust

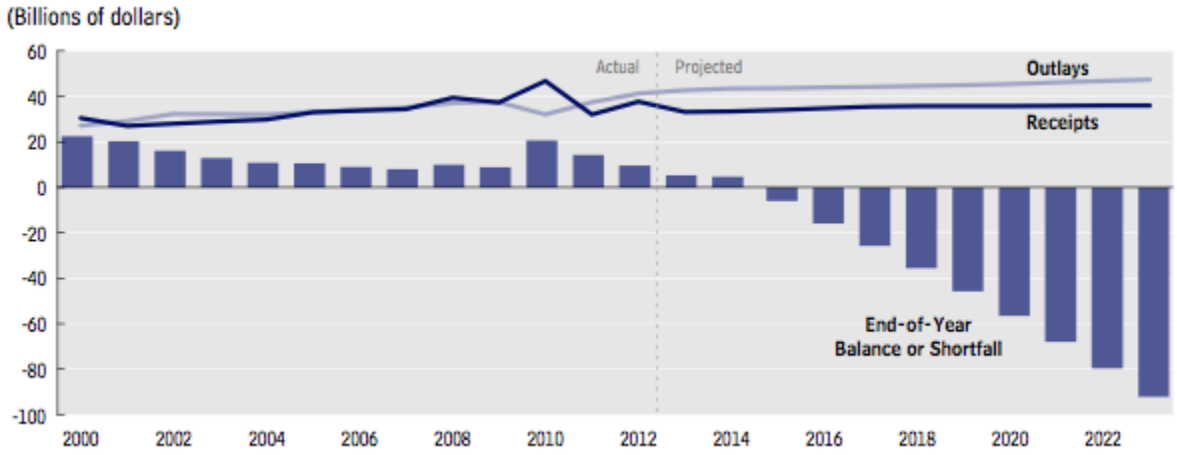
[10] *Jevon's Paradox* is the idea that technological progress increases the efficiency with which a resource is used which then increases the rate of consumption of that resource. In this instance, cheaper driving costs (via more fuel efficient vehicles) encourages more driving and thus more roadway deterioration with less capital to cover maintenance costs.

[11] Edward Glaeser, *Triumph of the City: How Our Greatest Invention Makes Us Richer, Smarter, Greener, Healthier, and Happier* (New York: Penguin Press, 2011), 178.

[12] "Highway Trust Fund", *Federal Highway Administration*, accessed June 18, 2013. http://www.fhwa.dot.gov/highwaytrustfund/.

Fund has incurred over the years. In a recent paper titled "Statement for the Record Status of the Highway Trust Fund" published by the Congressional Budget Office (CBO), Analyst Sarah Puro found that the Highway Trust Fund structure is an unsustainable funding mechanism and estimates that the Trust Fund will have an insufficient amount of capital to meet its shortfalls by 2015. After the Global Financial Crisis in 2008, Congress has avoided these growing shortfalls of existing obligations and maintenance by allocating funds from the General Fund of the Treasury to the Highway Trust Fund. From 2008 to 2014, Congress will have transferred over $57 billion into the Highway Trust Fund and is expected to require an additional $14 billion in 2015 to prevent the projected shortfall.[13]

[Figure 2] Receipts, Outlays, and Balances of the Highway Trust Fund



Source: "Statement for the Record Status of the Highway Trust Fund", *Committee on the Budget U.S. House of Representatives, Congressional Budget Office*, 2013.

In addition to the CBO findings, the National Surface Transportation Infrastructure Financing Commission estimates that from 2008-2035, the current revenue generating

[13] Sarah Puro, "Statement for the Record Status of the Highway Trust Fund" (Committee on the Budget U.S. House of Representatives, Congressional Budget Office, 2013), 4-6. http://www.expresswaysonline.com/pdf/44093-HighwayTrustFund.pdf.

models will only meet 44% of the requirements to maintain the current system and such revenues will fund 36% of the cost necessary to improve the highway network.[14] Remedies such as tax increases and spending reductions are potential short-term solutions to assure that the US highway system does not fall into disrepair. However, better implementation, management and alternative sources of capital are greatly required to assure that US roadways continue operating at full capacity and don't wreak havoc on overall economic stability and productivity.

As illustrated, the existing mechanisms and revenue sources used to develop and maintain the US highways are no longer suitable and the US problems need to be solved. It is imperative that the roadway users cover an equitable share of their use of the roadways. Innovation and restructuring of the highway funding system is required to assure that the highway system continues to aid in economic growth and transportation safety for future generations.

3 New Mechanisms to Fund the Highway Sector

In most societies throughout the world, highways are viewed as a public good that should be provided to aid the general welfare of society. Specifically in the US the fuel tax has become the standard and non-invasive way to fund (insufficiently) the highway system. However, over the past several decades there has been a growing acceptance to pay for use of highway infrastructure and a public acknowledgement that in some instances private

[14] Donald G. York et al., "The Sloan Digital Sky Survey: Technical Summary.", *The Astronomical Journal* 120, no. 3 (2000):6 .

sector involvement bode well for efficiencies, upkeep and speed of delivery at the initial stages of construction. Efficiency improvements have been a key component of the rationale for privatization in an attempt to reduce the budgetary burden caused by state enterprise inefficiencies.[15] With this in mind, many governments are utilizing innovative project financing structures that encourage private sector investment in the highway network.

3.1 Highway Project Finance

Because the United States has a well-functioning capital market sector and a developed roadway network, one of the major concerns of policy makers is not how to finance new highway projects, but rather how to assure that the projects generate ample revenue to cover debt obligations and future maintenance costs.[16] The nature and complexity of a highway infrastructure project should determine the type of fund structuring, not the other way around. Each project is inherently different; design, management, finance and other characteristics need to be scrutinized to determine the optimal organization.

In today's market, we are seeing a shift to more highway project finance deals whereby the long-term financing is based on a stream of cash flows from the project. This type of financing structure is usually a combination of equity from a sponsor, and loans

[15] Rajiv Sharma, "The Potential of Private Institutional Investors for Financing Transport Infrastructure." (International Transport Forum Discussion Papers, 2013), 8. http://www.internationaltransportforum.org/jtrc/DiscussionPapers/DP201314.pdf. P.8

[16] Donald G. York et al., "The Sloan Digital Sky Survey: Technical Summary.", *The Astronomical Journal* 120, no. 3 (2000): 19.

from banks. To use this method, the highway system needs to generate fees through tolling, shadow tolling or availability payments paid directly by the government to the highway sponsor. As we will outline later, risk allocation is a key component of successful project financing, but the foundation of appropriate use of project finance stems from two fundamental objectives: Efficiency (which promotes maximization of overall GDP or aggregate economic welfare), and equity (which embodies the idea of fairness in the distribution of costs and benefits and economic welfare across individuals)[17]. Both public finance objectives are best served the more completely and accurately the infrastructure pricing reflects the complete and total costs of the infrastructure at the time and place of its usage, including capital and operating costs, and ideally also even including "external" costs such as pollution and congestion.[18]

As the current highway funding structure is proving inadequate and highway maintenance costs are becoming a significant burden for local and federal agencies, we stress the importance of equitable cost sharing for highway use. Shifting to a user-based fee system to fund highways is crucial for the viability and sustainability of US transportation system.

3.2 The Importance of Cost Sharing

While there are many forms of funding mechanisms for highways, the importance of transitioning highways into revenue generating assets cannot be stressed enough. With

[17] David Geltner (professor of finance) in discussion with the authors, June 2013.

[18] David Geltner, written comment to authors, July 1, 2013.

this, we've concluded that the only way a highway can be sustainable is if the users of the road pay an equitable portion for the use of that particular road, a policy that scholars have encouraged for centuries. In 1776, the same year as the founding of the United States of America, Adam Smith wrote in his book, '*An Inquiry into the Nature and Causes of the Wealth of Nations',* his understanding of the importance of cost sharing in transportation infrastructure;

> *"When the carriages which pass over a highway or a bridge, and the lighters which sail upon a navigable canal, pay toll in proportion to their weight or their tonnage, they pay for the maintenance of those public works exactly in proportion to the wear and tear which they occasion of them. It seems scare possible to invent a more equitable way of maintaining such works. This tax or toll, too, though it is advanced by the carrier, is finally paid by the consumer, to whom it must always be charged in the price of the goods. As the expense of carriage, however, is very much reduced by means of such public works, the goods, notwithstanding the toll, come cheaper to the consumer than they could otherwise have done, their price not being so much raised by the roll, as it is lowered by the cheapness of the carriage. The person who finally pays this tax, therefore, gains by the application more than he loses by the payment of it" (Smith 303).*[19]

Tolls or user-based fees are an essential mechanism to support highway infrastructure. But the question remains of how to accurately set pricing levels and show the public that this is the only remedy to sustaining well-functioning highways in the US.

3.3 Growing Acceptance of User-Based Fees

Instead of solely charging a fuel tax, which is highly dependent on fuel efficiency, it's argued that user-based revenue tools, such as tolls or mileage-based fees, are very effective

[19] Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations*, (London: T. Nelson and Sons, 1852), 303.

ways to increase revenue and allow for greater flexibility and equitable cost sharing.[20] Sources of capital for infrastructure projects should be strategically merged to minimize the lifetime financing costs of the project and should mirror the benefits and requirement of the users. Outside the US, toll systems and user-based fees, paired with fuel taxes, have become the standard form of revenue generation for highway infrastructure assets and it appears that this structure is poised for greater growth and acceptance in the US market. It is often a misconception that people oppose tolling US highways and some state that it is unjust to charge for use of the roadways. However, as the markets continue to evolve and public awareness of the current problems become common knowledge, the general public is starting to realize that fair user-based fees are the only solution to maintaining a national highway system.

In a study conducted by the Public Policy Center at the University of Iowa, researchers found that drivers are very open to and will accept a user-based fee system. After conducting a test with 2,650 volunteers over a two-year period (with over 21 million aggregate miles driven), the University of Iowa study concluded that public sentiment changed drastically from a 40% acceptance rate to 70% of users actually preferring to pay a user-based fee established on miles driven.[21] The drivers involved in the study appreciated the user-based model once they learned how it was being implemented and how the rate was set.

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[20] For example, fees can be charged based on specific characteristics of the automobile weight, age, and encourage more environmentally friendly vehicles.

[21] Paul F. Hanley and Jon G. Kuhl, "National Evaluation of Mileage-Based Charges for Drivers.", *Transportation Research Record: Journal of the Transportation Research Board* 2221, no. 1 (December 1, 2011): 10–18, doi:10.3141/2221-02.

Use of either a GPS or toll device is an accurate and cost effective way to charge equitable fees for roadway use. With tolling, fee variability mechanisms can also easily be implemented to charge users specific fees at different times of the day (i.e. rush hour) and actually help reduce congestion. Long-term implementation and planning is important for a user-based revenue-generating device to become successful. There are many hardships, such as timing, market sentiment and cost perspectives, when implementing a new user-based fee system, but this method can help assure that direct-user fees will raise ample revenue to help sustain the nation's roadway system.

3.4 Setting Appropriate Toll Rates

It is important to find the equilibrium point of the cost charged to the users and the reduction in costs imposed on taxpayers who may not use the service or asset.[22] Toll rates or user-based fees should be set at a rate that is most acceptable to control congestion and can be structured as a variable pricing mechanism that charges fees based on time of the day or weight of the vehicle. The rate level should help increase the functionality and efficiency of the roadways. It is important to understand that toll rates should work to increase, rather than decrease the *functionality* of the project and should be priced according to market demand and optimal usage.

This understanding is captured in the concept of an efficient toll rate, which is defined by D. Geltner and R. Ramaswamy as;

[22] Chris Chan et al., Public Infrastructure Financing: An International Perspective, (Melbourne: Australian Government Productivity Commission, 2009).

> *"An efficient toll rate is equal to the difference between the marginal social cost of highway usage (including the marginal effect on congestion) and the average private cost of highway usage actually experienced by the user, both taken at the efficient usage level on the highway. The efficient usage level is that at which the marginal social value of usage equals the marginal social cost of usage."*[23]

Implementing funding and cost sharing mechanisms can be time consuming, complex and can present great risks if not properly structured. Through research, we ascertain that while these revenue sources exist and are widely used, the public sector has proven unable to effectively establish a program that charges the users an equitable share of the costs incurred for each mile driven. Private partners who specialize in infrastructure construction, finance and management can help bring out efficiencies and sustainability measures in highway infrastructure and can partner with the public sector in order to appropriately disperse risks and rewards. If the public sector can work with sophisticated and respectable private partners, partnerships will form to help highways become a self-sustainable asset class that boast modest investment returns for the investors while increasing the speed, functionality and safety for the users.

3.5 Justification for Private Participation

There are several arguments in favor of privatization of roadway networks. Research by, D. Geltner and F. Moavenzadeh[24] argue that there are four main reasons for private

[23] David Geltner and Rohit Ramaswamy, "Economic Efficiency Implications of Optimal Highway Maintenance Policies for Private Versus Public Highway Owners", *Transportation Research Record* 1116, (1987): 22-30.

[24] David Geltner and Fred Moavenzadeh, "An Economic Argument for Privatization of Highway Ownership", *Transportation Research Record* 1107, (1987): 14-20.

participation in highways: (a) greater revenues without increased taxes, (b) improved highway use efficiency, (c) production efficiency of maintenance and (d) quality of highway services. While it is sometimes argued that governments are able to generate revenue by tolling, the private entities are better equipped at pushing through this transition because they do not have administrative and political burdens that public entities must bear. Moreover, private entities have profit-maximizing incentives (that can be limited by public regulation to assure user-interest is priority) which will help minimize costs, increase maintenance production efficiencies and provide better "services" to the customer.

The following sections of this thesis will discuss how PPP can play an important role in the US highway sector and help US highways transition to revenue generating and self-sustainable assets. We will first give an overview of PPP's in the transportation sector and illustrate how this mechanism continues to evolve into an efficient and advantageous tool. Furthermore, we will analyze and document successful and failed highway PPP cases from around the world so that we have a guidelines to help identify several of the key components that can help mitigate inherent risks in PPP projects.

4 Public-Private Partnerships

The baseline of a public-private partnership is a contractual agreement between a public agency and a private sector entity that results in a greater participation of the latter in the delivery, financing or management of infrastructure projects.[26] Using PPP's to

[26] "Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance Report to Congress", *U.S. Department of Transportation*, 2009.

finance and operate a highway asset can bring great flexibility, reduce risk, and generate the required revenue to sustain the highway system. In addition to being an advantageous source of financing, PPP's shift inherent risk - such as financing or construction – from the public sector to the private sector. These aspects have proven to help lower the overall construction cost through better risk management and is a faster sources of finance for projects that might otherwise be financially constrained.[27] While it may seem like a new style of partnership that is just starting to evolve, public-private partnerships have been used abroad and in the US for centuries.

4.1 A Historical Overview of Private Investment in Transportation

Over the past century, public replacement of private investments in the U.S. transportation sector appears to have been initiated out of necessity rather than through a calibrated policy; the necessity to continue operations under marginal costs or the necessity for fiscal stimulus and job creation. Another contributing factor to increased public ownership of infrastructure, especially in most European nations, was the presence of ideological diversity. Many countries had left-leaning governments, and consequently public ownership became the conventional wisdom in these governments during the decades following the Second World War.[28] This public dominance, however, was relatively short lived; with ideological diversity soon came increased influence from hard-liner labor unions, which in some countries eventually caused enough inefficiency to be a

[27] Chris Chan et al., Public Infrastructure Financing: An International Perspective, (Melbourne: Australian Government Productivity Commission, 2009), 29.

[28] "Transport's public private history", *BBC News*, last modified February 6, 2002, accessed June 14, 2013, http://news.bbc.co.uk/2/hi/in_depth/business/2001/ppp/1507970.stm

main cause of cost hikes. Coupled with the government's dwindling capability to continue investing in public infrastructures, due to macroeconomic instabilities caused by OPEC cartels during the 1970's, public infrastructure soon fell into disrepair.

Then in 1979, Thatcher came to power in the U.K. and set about to untangle this insolvency problem by privatizing various public sectors. This adaptation in private infrastructure financing and management in the U.K. illustrated the advantages of private participation in transportation infrastructure and helped initiate the transition to private cooperation and a user-based cost sharing system in Europe.

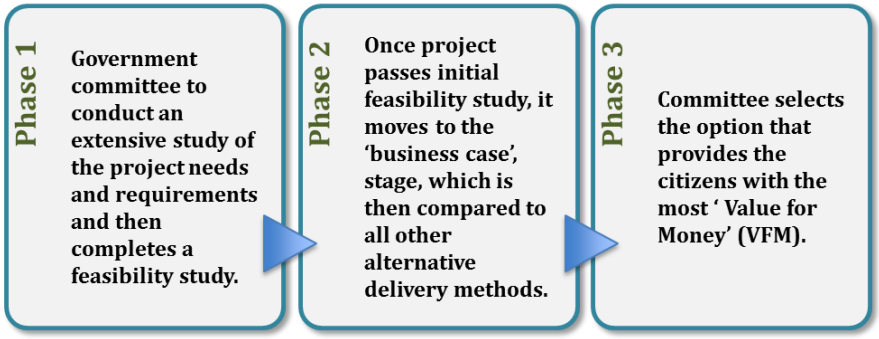
While PPP's are often complex dealings with the potential to incur adverse effects to the public, PPP has equally become a positive advancement as a new procurement option for the government. Going forward, PPP's possess the potential to evolve into much more. Protection, education and awareness are crucial for the next stage of PPP evolution and it is imperative that the appropriate steps are taken to find the best partnership.

4.2 Assessing PPP Feasibility

When contemplating a PPP, it is important to undertake the appropriate steps to find the best procurement method. As outlined in the following section, there are numerous variations of PPP and great care should be used to identify all alternative delivery options so that the stakeholders can use the most appropriate structure to meet the demands of the project. Throughout the world, many countries have adopted a practice called *Value for Money* (VFM) and *Public Sector Comparator* (PSC), to: (a) ascertain if private participation is in fact the most beneficial procurement structure for the public

asset and if so (b) evaluate potential cost saving from private-public cooperation and (c) how to establish framework to selecting the best project delivery method.

[Figure 3] Process of Choosing PPP Procurement Method



Source: "Policy Issues in U.S. Transportation Public-Private Partnerships: Lessons from Australia", *Mineta Transportation Institute*, 2010.

By using quantitative and qualitative criteria, VFM and PSC compare the proposed private procurement project against alternative public procurement options. A project is said to have achieved "value for money" and is in favor of private participation when the private procurement method costs less than the best realistic public sector project alternative. Below is a commonly used format in Australia that helps guarantee that the public chooses the most appropriate structure.

While it is commonly assumed that private participation is a more efficient procurement method, advantageous in cost reduction, and better operational and management stability, PPP's may incur higher transaction costs, due to the necessity of additional bidding, contracting and monitoring. In addition, financing costs are usually higher for the private sector than for the public. Therefore, the main purpose of the VFM analysis is to assure that the efficiency gained through private participation would outweigh additional cost

incurred.[29] This technique has been instrumental in helping public entities take appropriate steps in finding a suitable procurement method, and in some countries it has even become a legal requirement.[30] The US will also greatly benefit from the establishment of national guidelines and the streamlining of the decision process for PPP procurement, assuring that the optimal delivery method is chosen for every project.

4.3 PPP Delivery Methods

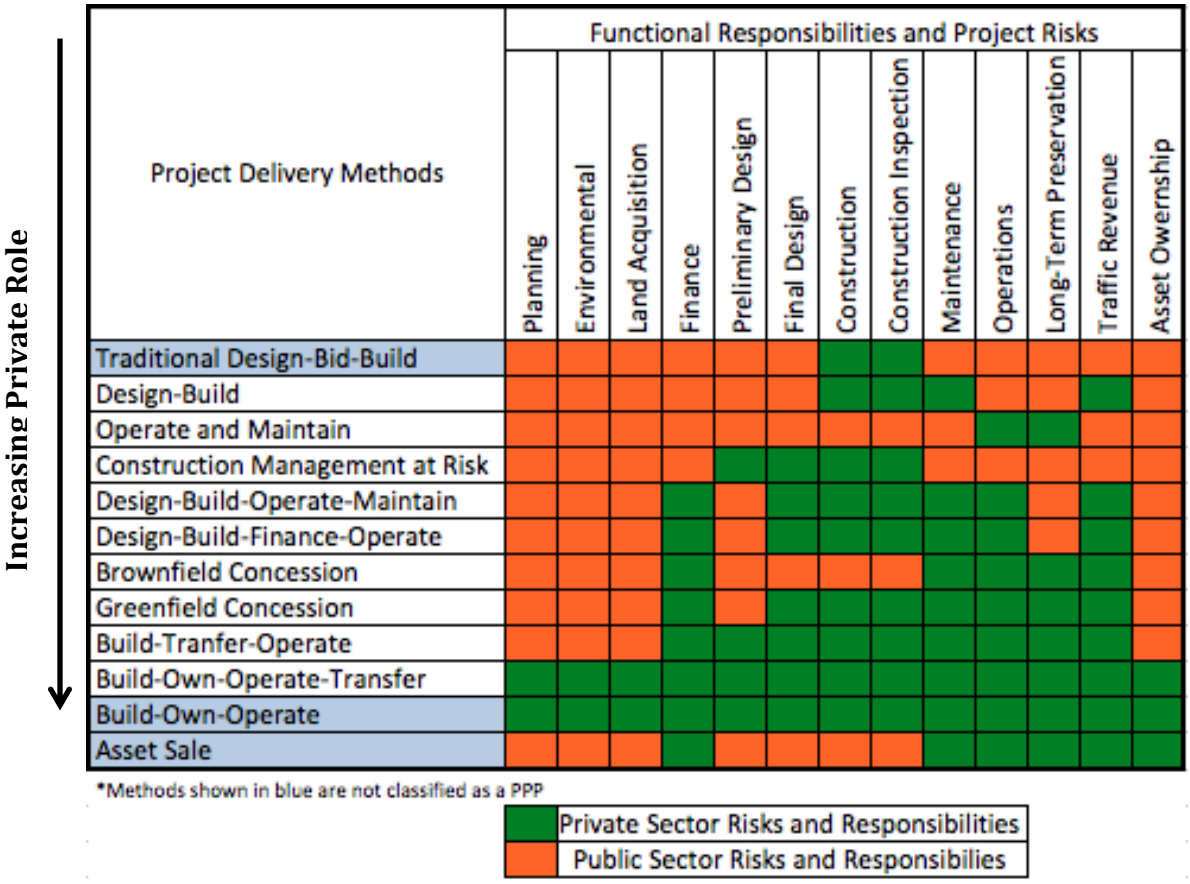
In addition to the aforementioned PPP feasibility analysis, another essential component to finding the best partnership structure stems from selecting an appropriate delivery method. As outlined below, each method varies in terms of responsibility and risk allocation; it is imperative that all models be examined so that the risk and responsibility are allocated to the most appropriate stakeholder. Shown in the first delivery line item in [Figure 4], traditional design-bid-build is when the public retains complete control and ownership but outsources specific tasks to the private sector. The subsequent delivery methods in the matrix depict an increasing role of private participation until it reaches complete privatization of a public asset ("build-own-operate" and "asset sale"). For detailed descriptions refer to *Appendix B*.

Below matrix illustrates the array of PPP delivery and procurement methods available. Identifying, vetting and selecting the best partnership structure is the first framework to assure the stakeholders transfer responsibilities to the appropriate party.

[29] The EPEC PPP Guide (http://www.eib.org/epec/g2g/i-project-identification/12/124/index.htm)

[30] "Guidelines for Successful Public-Private Partnerships", *European Commission Directorate General*, 2003.

[Figure 4] Risk and Responsibility Allocation Matrix



Source: Jaime Rall et al., "Public-Private Partnerships for Transportation: A Toolkit for Legislators", *National Conference of State Legislatures*, 2010.

5 The Foundation to Successful PPP's

It is a misconception that PPP's are a type of agreement whereby the government sells, or privatizes, a state asset purely for investment return and generating capital (i.e. not to protect public interest). Rather, a successful PPP is when interests are aligned so that appropriate cooperation is established between the private and public entities. When viewed as an innovative form of financing and partnership, PPP's can help transform

existing assets into revenue generating and sustainable assets that bode well for both the users and investors while allocating risks to the appropriate stakeholder.

5.1 The Stakeholders

The attraction of PPP lies in the fact that it can be a win-win proposition, whereby the pursuit of one's objectives may result in an increased aggregate utility level. When properly thought through and strategically planned, PPP's can become a powerful device that helps each stakeholder obtain its objective and desired result.

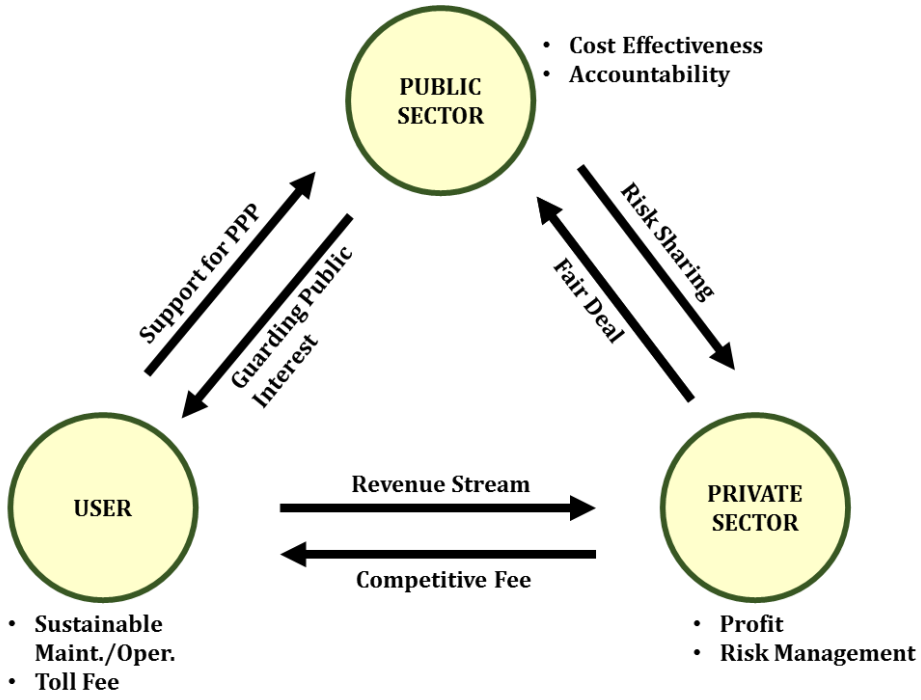
In our analysis, we established a framework to illustrate each stakeholder involved in a highway PPP: the user (i.e. driver), the private (i.e. investor/manager) and the public (i.e. government sponsor). A successful PPP is one that accomplishes multi-dimensional goals from the public, private and user perspective and will bring the greatest utility (both economic and social) to each stakeholder. Implementation of a successful PPP starts with laying a solid foundation so that the partnership will be financially and physically sustainable while meeting the main objective of the users.

The first step to establishing this foundation is to ensure that the objectives and the inherent risk of each stakeholder is successfully identified, and that they understand how their appropriate interaction will result in an equitable sharing of project costs, benefits and risks.

5.2 The Interactive Model of Cooperation and Mutual Gain

The three stakeholders, as outlined above and shown in [Figure 5], are interdependent and interlinked. Any action may ripple through and affect the efficiency of the entire model.

[Figure 5] Interaction Between Stakeholders in a PPP



Source: Authors

To illustrate this relationship, we first show the public sector. By sharing project risk with the private sector through appropriate risk allocation, the public sector is able to lower the private entities risk premium. A lower risk premium will thus then calculate into the model to solicit a lower fee for the users (as the private entity's hurdle rate of return is lowered due to the decreased risk). The user, in turn, pays a justifiable share for use of the asset and satisfies the objective of sustainable maintenance and operation. This successful

PPP experience is then fed back into the model in the form of public support for PPP whereby the public agent gains more credibility and political authority to employ PPP's. Accumulation of best practices will allow the public sector to progressively assess and assist better in risk allocation and thereby enable a more efficient PPP model.

This model also works inversely from a user acceptance standpoint. By soliciting and trying to establish a fair deal with the public agent, as opposed to "hitting a homerun", the private sector gives the public agent the comfort and legitimacy to pursue and advance its PPP endeavors. This formula gives the users confidence since the efficiencies in risk and cost sharing are dispersed and the users feel that they are being charged an equitable fee for the use of the asset. The level of comfort that the users feel, then feeds back into the system, by streamlining the user's willingness to embrace the PPP model, enabling a seamless revenue stream to the private sector without the possible repercussions that bad publicity and uprising might bring.

Accurately identifying each stakeholder objective is crucial, but the step of charting risk tolerance and allocation is just as significant. Now that we have documented the process of cooperation and the importance of stakeholder awareness, we will move onto the discussion of risk allocation and sharing. Once the parties involved in a PPP understand each objective from the others' perspective, it is then crucial to identify risks and ascertain how to allocate each risk effectively. This process will aid in increased project efficiencies and further the probability of success.

6 The Importance of Risk Allocation

Risk allocation is the process of dividing different risks between the private and the public sector. The recent advent of appropriate risk allocation to structure an optimal partnership has enhanced the overall efficacy of the PPP sector and has helped encourage private sector participation and investment.

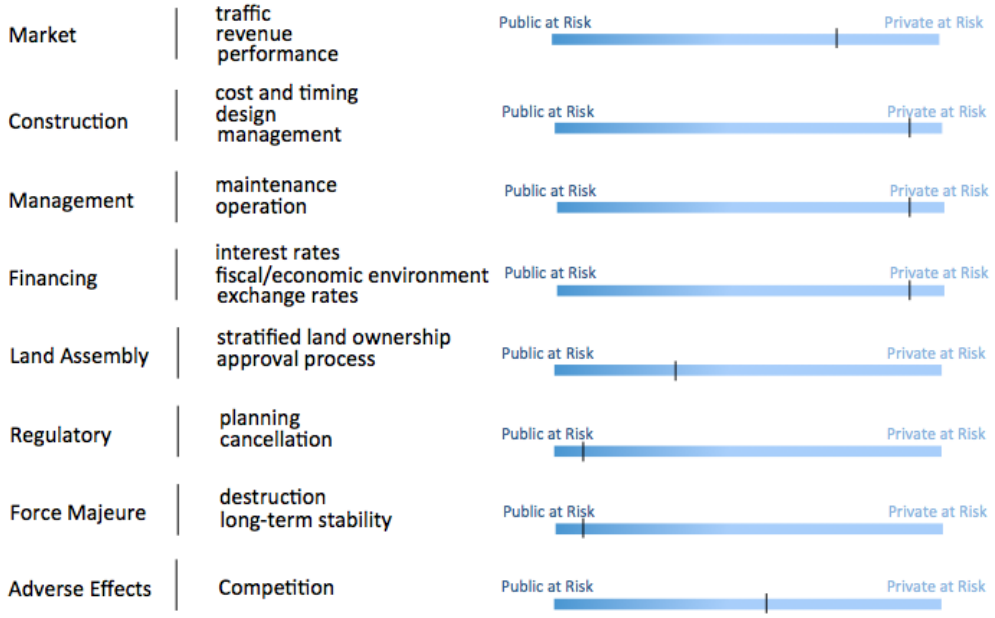
6.1 Risk Allocation

The first step to forming a sustainable partnership is to accurately and effectively outline the inherent risks associated with each project. Next step is to ascertain which party is better at managing each individual risk and then find a way to effectively allocate these risks accordingly. According to the Australian Commonwealth Government, one of the main advantages of PPP's comes from the ability to lower the total project costs through improving project risk management.[31] In Victoria, Australia, a region with an incredibly sophisticated understanding of PPP's, the governmental PPP guidebook states, "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 the public interest considerations. This does not mean that all risk is transferred. If risk is transferred inappropriately, the government will pay a premium." That said, the objective is not to maximize risk transfer to a specific party, but rather to find an equitable risk sharing structure that aids in the mutual gain of all the stakeholders.

[31] Chris Chan et al., Public Infrastructure Financing: An International Perspective, (Melbourne: Australian Government Productivity Commission, 2009), 29.

[Figure 6] illustrates an optimal risk spectrum that is based on the most used methodologies of highway PPP's in Australia. Shown at the end of the each spectrum is the maximum risk allocation to either one party or the other. Each project and entity has a variety of changing variables, so it is the obligation of each member to find the optimal structure (i.e. at any point between the two ends of the spectrum) for each specific project. The below allocation has been developed from decades of evolving PPP's in Australia and is an example to illustrate some fundamentals that are often overlooked.

[Figure 6] Risk Factor and Optimal Risk Allocation Spectrum



Source: Authors' Adaptation from "Policy Issues in U.S. Transportation Public-Private Partnerships: Lessons from Australia", *Mineta Transportation Institute*, 2010.

Market Risk: Market risk deals with the revenue generating potential of the asset. This is one of the most contemplated risk sharing items discussed to date. The current Australian PPP model stresses the importance of the private sector absorbing the market risk and

notes that the private entities will be compensated accordingly (via the upfront charges and risk premium used in underwriting). The public sector may inherit some risk through the adverse action or competition clause, but the public should be aware that utilizing these "guarantee" provisions can involuntarily require the public sector to take on unwanted risk that should have already been priced into the private sector bid.

Construction Risk: The private sector should be an expert in many facets of design, construction and project delivery. This risk category deals with the potential that a project will incur cost and delivery overruns, thus adversely affecting the public and users. Most of the private entities specializing in PPP and transportation infrastructure are more efficient than their public counterparts and can help reduce cost and expedite delivery. It is important for the public sector to include very restrictive clauses that outline the penalties for failing to deliver a quality product in a timely (as agreed) fashion.

Management: The operation and maintenance risk is best absorbed by the private sector for large-scale toll ways. This facet of risk involves operational costs, labor management and roadway upkeep. The efficiencies gained in this realm of highway ownership are best handled by the competitive marketplace and most appropriately handled by specialists.

Financing Risk: This component deals with risks inherent in capital raising efforts, unanticipated changes in cost of financing, exchange rate fluctuations and costs to insure the project. As one of the major arguments for private participation in highway infrastructure is shifting funding, construction and operational cost away from the public sector, this risk is best handled by the private sector.

Land Assembly: In the US this risk component can be mitigated by the public sector (i.e. eminent domain) but should also be shared in part with the private entity. Stratified land ownership can burden potential green-field development sites and citizen sentiment is very important in the permitting and land assembly stages. If the private sector is willing and able to provide a "fair deal" and works well with the (educated and non-conflicted) public entity, then the project leaders will have an easier time gathering a positive consensus to help this phase proceed.

Regulatory: Sometimes unforeseen regulatory changes will have unfavorable effects on a highway project. Changes in planning, environmental policy and potential project cancelations or delays can inhibit the project from moving forward. This risk is borne by the public sector, as the private party has little ability to dictate or control regulatory and political issues.

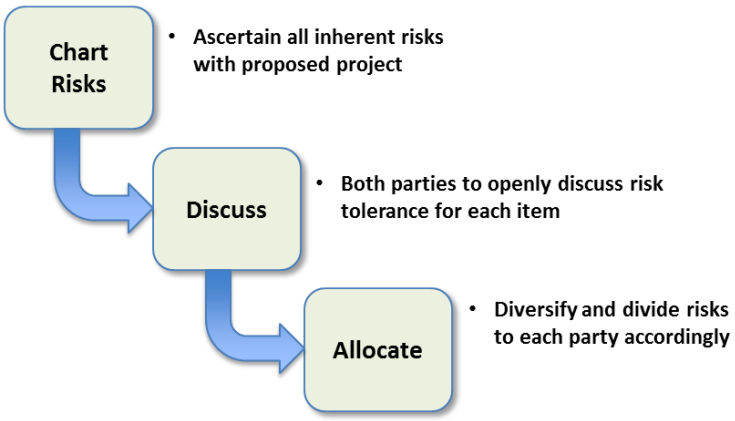
Force Majeure: This component is assumed by the public sector. Force majeure, or "acts of God" such as natural disasters, will no doubt financially impact the highway project.

Adverse Effects: Sophisticated private entities often use this component to shift the revenue and market risk back to the public sector. Adverse effects can be the result of an action that affects the private toll road operator's revenue or operational stability. This factor can be detrimental to the objective of equity and economic sharing between the stakeholders as it often limits the public sector from renovating or constructing new roadways that may compete with the public-private asset (even if this work is required for public wellbeing or safety). In long-term concessions (i.e. +30 years) this can be a significant problem for the public as traffic demand and urban growth are not easily

forecasted. While investors require some assurance that competition or actions will not erode potential earnings, new provisions, such as competition clauses, should be employed as we discuss later.

Without fully understanding all project risks, the costs and probability for failure will rise considerably. Each infrastructure project differs in time, complexity, and jurisdiction which make it impossible to conjure a universal 'optimal risk sharing' structure. However, by using the below three-step process, combined with the awareness of risk allocation, the stakeholders of a PPP project will achieve higher probability of success, transparency and equitable sharing of risk and reward.

[Figure 7] The Process of Risk Analysis and Allocation



Source: "Policy Issues in U.S. Transportation Public-Private Partnerships: Lessons from Australia", Mineta Transportation Institute, 2010.

Risk allocation is a normal procedure to find an optimal and sustainable partnership. With this in mind, it is important to realize that sophisticated private partners will appropriately price certain risks and evaluate risk premiums into the bidding and underwriting process at the initial stages. And as we outline in the following section, some

countries have established government programs to aid in reducing the risk premiums that is inherent in highway infrastructure projects.

7 Establishing a Successful PPP Framework: Lessons Learned

As just depicted, the importance of understanding perspectives of each stakeholder and risk allocation is the building block for a successful PPP. Over the past century, the US transportation sector grew through public intervention that helped create one of the world's most comprehensive infrastructure networks. But because of a lack of foresight and planning, the public oversight that helped develop America's holistic network is now threatening its very existence.

As the US highways system is complete, it is our assessment that it's most effective to transfer certain risks and responsibilities to the private sector so that it may help restructure and renovate the highway system so that it becomes a sustainable asset. When structured properly, highway PPP's do not result in a zero-sum game - where one participant's gain results from the other participant's loss - but will rather help each participant achieve respective goals to the benefit of each member.

After analyzing and researching numerous cases of highway privatizations from around the world, we have identified several of the most important aspects that need to be addressed when working with PPP's. By scrutinizing the failures and successes of highway projects in the leading regions focused on highway privatization – predominately South America, Northeast Asia and Australia – we were able to characterize and find related components that increased the probability of failure. With this, we outline below the

aspects that policy makers, users and investors should consider when entering into highway PPP's.

7.1 The Importance of Accurate Forecasting and Underwriting

One of the major components to failed highway privatizations comes from a lack of accurate forecasting. It is inherently difficult to forecast traffic flow patterns, but it is imperative that underwriters and investors utilize more sophisticated underwriting tools – such as Monte Carlo simulation and sensitivity analysis – to avoid overly optimistic revenue projections and thus inappropriate financing that increase the risk and probability of future default. Over the past 25 years, Australia and Mexico have encountered significant hardships and learned the importance of building sensitivity analysis into underwriting.

From 1987 to 1994, Mexico implemented 43 private toll-based highways that cost investors approximately $12 billion to construct. Even more astonishing than the scale of this project is that the undertaking passed unconceivable hardships, costs and difficulties to the government and users. During the initial stages of bidding and construction, the private companies forecasted overly optimistic traffic estimations during the initial bidding and construction phase. Charging abhorrently high tolls to compensate for the lack of demand, the government was forced to re-nationalize 23 of the privatized roads and assume $7.5 billion in debts owned by the highway builder and $2.5 million owed to the

Government in taxes and social security payments.[32] The Secretary of Communications and Transport stated, "The Government had learned painful lessons about the need to accurately predict traffic flow and to avoid grandiose design."

On the other side of the world, Australia, a leading nation and supporter of highway privatization, had similar detrimental results in 2010 due to poor underwriting. The Clem 7 toll tunnel in Brisbane was a failed attempt at a public-private partnership due to the overly optimistic forecasts from the engineering consultant and traffic modeler. Currently tied-up in a lawsuit, the participating investors are holding the consultant liable due to the fact that current traffic flow is a third of the anticipated usage.[33] It is yet to be determined if the consultant, who was paid a $1.5 million fee, will be held liable for the $700 million claim, but it is certain that the investment was a failure from the private investment perspective.

The aforementioned examples further the negative sentiment that often accompanies highway privatization from the investor perspective. A lack of sound underwriting can impact investment return and increase default risk, but as shown below, contract drafting is the foundation that ensures project vitality.

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[32] Sam Dillon, "Mexico's Privately Run Highways Prove a Costly Failure ", *New York Times*, last modified August 23, 1997, accessed June 18, 2013. http://www.nytimes.com/1997/08/23/world/mexico-s-privately-run-highways-prove-a-costly-failure.html.

[33] Scott Wilson, "Road Pricing: AECOM Faces Lawsuit over Clem7 Traffic Modeling Forecasts.", *Road Pricing* (blog), accessed June 18, 2013. http://roadpricing.blogspot.com/2011/07/aecom-faces-lawsuit-over-clem7-traffic.html.

7.2 The Importance of Sound Contract Drafting

Professional and sound contract drafting is the most essential component of a successful PPP, as it is the only document or item that will protect both the public and private sector. Often times it is argued that renegotiations increase as demand risk is passed onto the franchise holder, which stresses the importance of fully understanding the goals and stance of each stakeholder involved and taking appropriate steps to allocate all risks. [34]

A lack of sound and protective contract drafting is one of the major reasons PPP's fail to achieve anticipated results. To assure that highway projects are advantageous for all three stakeholders, it is important that both the public and private utilize professional legal and third party opinion during drafting and negotiation. Clear and concise contracts reduce the probability of renegotiations, which usually result in favoring the investors.

Poor contract drafting increases renegotiations as exemplified in Argentina in the mid-1990's when the government realized that its deteriorated roadways were straining economic growth. As a result the public authority encouraged wide-ranging highway privatization, of which most unfortunately failed. It appears that one of the main culprits of these failed roadways was due from the continuous process of renegotiations of the PPP contracts.[35] These renegotiations were the result of poor contract drafting and usually occurred behind the scenes without public scrutiny. The lack of clear contracts and

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[34] Eduardo Engel, Ronald Fischer, and Alexander Galetovic, "Privatizing Highways in Latin America: Is it possible to fix what went wrong?",(Center Discussion Paper no. 866, Economic Growth Center, Yale University, 2003), 4. http://www.econ.yale.edu/growth_pdf/cdp866.pdf.

[35] Ibid. 8.

partnership structures led to many renegotiations that negatively impacted construction costs and public sentiment towards privatization in South America during the 1990's.

As outlined, renegotiations can be detrimental to a sound PPP and can occur for multiple reasons; poor traffic forecasting and modeling paired with inflexible design, utilizing fixed-term contracts, ambiguity within the contract provisions, and a lack of forward thinking from the public sector perspective.[36] It is generally found that franchise contracts are often incomplete, thus encouraging renegotiation and therefore attract private sector firms who specialize in negotiations rather than infrastructure operations.[37] Additionally some advocates are starting to encourage the use of variable term contracts as opposed to restrictive fixed term contracts.

Chile's Ministry of public works has experienced incredible success with implementing a new and innovative PPP structure called the Lease Present Value of Revenue, or LVPR, which helps reduce the need for renegotiations. The basic structure of the LPVR allocates demand risk appropriately to the private entity and uses more flexible agreements called variable-term contracts.[38]

Variable-term contracts terminate when the concessionaire receives a full reimbursement to repay its costs and profit. As forecasting demand is very difficult, using a

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[36] The public sector often uses in-house counsel and consultants who may lack the sophistication of third party experts.

[37] Eduardo Engel, Ronald Fischer, and Alexander Galetovic, "Privatizing Highways in Latin America: Is it possible to fix what went wrong?", (Center Discussion Paper no. 866, Economic Growth Center, Yale University, 2003), 14. http://www.econ.yale.edu/growth_pdf/cdp866.pdf.

[38] Bernardo Weaver, "Latin America: From Disappointment with Privatization to Innovation in PPP's | Private Sector Development.", *World Bank,* accessed June 18, 2013. http://blogs.worldbank.org/psd/latin-america-from-disappointment-with-privatization-to-innovation-in-ppp-s.

variable-term contract allows the franchise holder to adapt to user demand (i.e. holding period can be altered to assure that return of capital and profit occurs) and thus can decrease the need for public guarantee payments. When used correctly, appropriate flexibility and sound drafting can help each stakeholder achieve its desired result while mitigating potential unfavorable renegotiations.

Variable-term contracts are new and still being developed, but so far have helped revamp and improve Chile's PPP sector. As this model continues to evolve, other countries should keep analyzing and weighing the positive and negative effects of this tool. While this advancement in Chile's infrastructure sector has improved the transportation network, Chile's public sector is still learning the importance of reducing conflicts of interest during the PPP structuring phase.

7.3 The Importance of Mitigating Conflicts of Interest

Protecting public interest is a daunting task but can start by being aware of the conflicts of interest that are intrinsically present in large-scale public-private infrastructure projects. In our analysis, we found that corruption and inability to avoid conflicts of interest are detrimental to the PPP. Engel et al. outlined how the several privatized highways in Chile ultimately burdened the public:

> *"[The] government agency interested in the success of the franchise program was usually the same as the agency that supervised the franchise contracts. Since the success of these agencies is often measured by the percentage of the program, which they succeed in building, they tend to be lax in enforcing*

compliance with franchise contracts and are inclined to ease the conditions for franchise holders." [39]

To mitigate the risk of conflicts of interest in agency oversight, Australia has implemented a special purpose entity to deal with the contractual negotiations and management. In Australian states, a separate government-created PPP entity is used to conduct the complex bidding and negotiation process. Once contracts are negotiated and closed, the ongoing administration is then turned over to a separate government entity. [40] It is encouraged to use separate public entities when completing highway privatization; one department should establish the project then hand over the oversight and management to a separate department once completed.

In addition to public participation and allocating interests to non-conflicting parties, it is always important to have third party traffic consultants and advisors completing the traffic forecast studies. Sometimes there are government guarantees that are triggered by low traffic flow, and in some Latin American cases the public sector allocated traffic reporting duties to the prospective franchise holder, which obviously had incentive to underreport potential traffic flow.[41]

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[39] Eduardo Engel, Ronald Fischer, and Alexander Galetovic, "Privatizing Highways in Latin America: Is it possible to fix what went wrong?", (Center Discussion Paper no. 866, Economic Growth Center, Yale University, 2003), 2.
http://www.econ.yale.edu/growth_pdf/cdp866.pdf.

[40] David Czerwinski and R. Richard Geddes, "Policy Issues in U.S. Transportation Public-Private Partnerships: Lessons from Australia", *Mineta Transportation Institute, San Jose State University,* July, 2010, 2.
http://transweb.sjsu.edu/MTIportal/research/publications/documents/2807_09-15.pdf

[41] Eduardo Engel, Ronald Fischer, and Alexander Galetovic, "Privatizing Highways in Latin America: Is it possible to fix what went wrong?", (Center Discussion Paper no. 866, Economic Growth Center, Yale University, 2003), 12.
http://www.econ.yale.edu/growth_pdf/cdp866.pdf.

7.4 The Importance of Limiting the Use of Public Reimbursement Provisions

Another type of conflict is often built into the contract in the form of guarantee provisions. Since 2007, the capital markets' appetite for demand risk has diminished substantially and it appears that infrastructure investors and financiers of privatized highway projects are now determined to benefit from government subsidies that shift the demand risk back to the public entity. That being said, it is sometimes market practice to implement public reimbursement provisions within the PPP agreements. These clauses are often shielded from wide-ranging public scrutiny with complex legal jargon but generally come in a form or combination of:

(a) compensation events; (b) non-compete or; (c) adverse action.[42]

These provisions can burden the public as they give the private entity ability to object to new transportation projects that directly or indirectly affect their own project. In addition, these provisions can even penalize the public for taking action that protects the public wellbeing, as the citizens of Denver, Colorado recently experienced.

In 2008, the private company operating the Northwest Parkway Toll road outside Denver objected to the anticipated road improvements on West 160th Avenue. Their reasoning: it might financially impact their toll road. The concession agreement had harsh 'adverse action' provisions and stated that the private entity had the right to receive compensation for any loss revenue if additional competing roads or transit systems were

[42] Ellen Dannin, "Crumbling Infrastructure, Crumbling Democracy: Infrastructure Privatization Contracts and Their Effects on State and Local Governance", *Northwestern Journal of Law and Social Policy* 6, (2011): 54. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1776350

built during the 99-year lease.[43] This is obviously not in the best interest of the city or public.

A less restrictive form of a non-competition clause, called a "compensation clause," is starting to emerge in several countries. Rather than forbidding any new construction or upkeep that will benefit the public, this provision only requires the public entity to compensate the private entity for lost revenue. Using a competition structure assures that the PPP will also protect the users of the surrounding highway system. Policy makers in the US are now starting to realize that public entities should not enter into PPP agreements that prevent improvement or expansion of the public road capacity. In Australia, the government has limited the use of "adverse action" and is shifting competition risk back to the private sector but also allowing for more risk sharing in the form of competition clauses.[44]

One can quickly gather that public reimbursement provisions defeat one of the justifications for PPP spreading specific risks to the party best able to bear that risk. Widespread use of this provision essentially turns the public entity into the project insurer and defeats the purpose of limiting public exposure to demand risk. Implementing public reimbursement provisions helps many public entities attract more private investment but it is essential that great thought and care go into the drafting stages when establishing this framework.

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[43] *Ibid.,* 48.

[44] David Czerwinski and R. Richard Geddes, "Policy Issues in U.S. Transportation Public-Private Partnerships: Lessons from Australia", *Mineta Transportation Institute, San Jose State University,* July, 2010, 34. http://transweb.sjsu.edu/MTIportal/research/publications/documents/2807_09-15.pdf

7.5 The Value of Competition and Structured Bidding

Benefits of PPP's are wide-ranging. Private companies are able to bring innovation, specialized skills and often faster more efficient delivery methods to projects, thus helping to reduce costs. Additionally private investors can offer capital to fiscally constrained governments and help shift future financial risk from the public to the private sector.

However, one of the most significant advantages to PPP's is that they encourage and create competition. Competition helps reduce price, encourages innovation and avoids potential corruption and influential pricing power that an individual may obtain if no alternative source existed. In a freely functioning market, pricing power stems from a lack of alternative substitutes and gives supreme power to the entity that controls the good or service that the population demands. If no competition or alternative substitute exists, then that entity can dictate the price and have complete control of the product (i.e. the highway). In highway PPP's, it is important to have mechanisms in place that limit pricing power and encourage competition; both of which are crucial to keeping prices at appropriate levels.

In addition to limiting market power opportunities, it is essential to encourage competition in the bidding process. Encouraging and promoting the project to an array of bidders will help the public find the best partner, gain additional capital (by driving up offering prices in concession deals) and can reduce the concession terms and toll rates.[45] After a tendering process is completed, the public is then able to shortlist the most suitable

[45] This statement assumes that the competition will motivate the private bidders with the most favorable terms for the public users to win the bidding.

contractors or operators for the job. The bidding process can also aid in many efficiencies such as better procurement options, increasing innovation, and reducing project costs.

Promoting highway projects to international firms (i.e. 'road shows') is also an important component that will help encourage more talent, innovation and competition. In the mid-1990's, seven out of 13 of the largest highway PPP's in Colombia failed to attract bidders and were subsequently assigned to local firms.[46] It is not surprising that cost overruns and overly optimistic traffic forecasts encumbered the majority of these projects and adversely affected the government and users.

One of the most fundamental components of a bidding process should be aimed at assuring the citizens gain benefit from the produced competition. It is imperative that a plethora of contractors and investors are bidding on the proposed project so that efficiencies are attained.

7.6 The Value of a Macro (Federal) Level PPP Institution

So far the US has been slow to adopt the PPP model compared to other developed nations. This slow adaptation may be attributed to a lack of consensus and understanding among the public and users about the benefits of PPP. However, as the federal and local governments in the US continue to operate sub-optimally and under financial constraints, the need to tap into private resources to meet the infrastructure needs is growing.

[46] Eduardo Engel, Ronald Fischer, and Alexander Galetovic, "Privatizing Highways in Latin America: Is it possible to fix what went wrong?", (Center Discussion Paper no. 866, Economic Growth Center, Yale University, 2003), 8. http://www.econ.yale.edu/growth_pdf/cdp866.pdf.

Throughout the world, there are countless failed attempts at transportation PPP's, of which many are the results of local governments taking it upon themselves to structure a PPP. As the PPP model evolves, we are seeing many governments establishing centralized institutions to help educate stakeholders and implement risk sharing mechanisms to help increase the probability of success and alignment of interest. By establishing a federal unit or a governing body to oversee and administer the PPP sector, the government is then at a better position to administer the PPP sector and give the public agents the same degree of expertise and resource as their private counterparts. The creation of guidelines and spreading awareness of how to properly employ PPP's, benefits all stakeholders by lowering transaction costs, increase the probability of equitable risk and reward sharing, and provide for a generally more transparent investment environment.

As mentioned, models of central government oversight and PPP promotion can be examined throughout the world. For example, the UK government employs under the national government, '*Infrastructure UK (IUK)'* and *'Local Partnerships'* to implement long-term partnership strategies and help facilitate PPP's across various government sectors. In Asia-Pacific, the Australian federal government runs the *'Infrastructure Australia'* which publishes the 'National PPP Guidelines', a guidebook of standardized deal structuring adopted by various state and federal governments. The Canadian equivalent, PPP Canada, gives policy advice, assistance and also educates the public sector in PPP negotiations. Another country deploying a successful PPP program, Korea, takes a more hands-on approach and places all PPP related matters under the responsibility of the Ministry of

Strategy and Finance (MOSF). MOSF in turn, develops guidelines for PPP procurement, conducts evaluations and directs RFPs, tendering and negotiations of PPP.[47]

It is our belief that the establishment of a federal entity specializing in PPP's will benefit the cause of PPP's in the US as well. There is a greater need to create an integrated national agenda for highway PPP and establish a more uniform process across state lines. Many states, cities and municipalities in need of highway investment and upkeep are not well equipped to deal with sophisticated experts in the private sector and often times lack the resources and knowledge to evaluate PPP deals, let alone understand how to allocate risk among parties. While it is important to structure a deal so that the private entities can attain stable *risk-adjusted* returns, it is important that the U.S. establish central oversight so that local governments are educated and protected against the problems, risks and negative long-term impacts that can arise from poor PPP implementation.

8 Concluding Remarks

The advancement and sophistication of highway PPP's throughout the world have aided in efficiently increasing social value and user welfare. When properly structured, PPP's can increase innovation, encourage competition, decreasing costs and providing for a faster procurement and more sustainable highway assets for the long-term .

If deductive reasoning validates that PPP's are advantageous, it is important to spread risk effectively to the party best able to take on that risk and assure that all the stakeholders are acting in a transparent manner that will aid in mutual gains. In addition,

[47] For more details of the institutional frameworks models, see APPENDIX C.

it's imperative that the citizens, or the end users of the asset and most possibly the first source of revenue for the private investor, be kept informed throughout the entire process. This assures that public dissent does not erupt and cause harm to the negotiations. As various studies introduced in this thesis show, users are willing to share the cost for utilizing a functioning and sustainable highway asset, provided that the fee levied is at an competitive and equitable level to the utility it provides.

As the U.S. infrastructure continues to deteriorate and political deadlock continues to threaten the nation's long-term viability and sustainability, new mechanisms are required to help reform and repair the foundation of the country. It is time that the U.S. highway system transition to a performance-based asset that encourages competition, reduces congestion and increases safety and speed. With progressive and rational implementation, it is possible that private involvement will help the US highway system once again become the framework that connects the U.S. and aids in increasing economic productivity and vitality.

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http://ppp.worldbank.org/public-private-partnership/

APPENDICES

APPENDIX A: An Overview of Alternative Sources for Highway Funding

Municipal Bonds: For over a century, the local governments (i.e. states and local agencies) have issued debt on the public market to fund infrastructure. Two widely used categories of long-term municipal bonds include general obligation bonds (GO bonds) and revenue bonds. GO bonds are secured by a pledge of the government's taxing power and revenue bonds are secured by the pledge of the projected revenues. GO bonds are backed by the credit and "taxing power" of the issuer, and not the revenue, and are thus more widely used for non-income producing projects. GO bonds usually have the lowest effective interest rate and require little reserves for debt service repayment. Revenue bonds are repaid via the cash flow stream of the project and not from a pledge to charge additional taxes and are usually sold in $5,000 units with a maturity of 20-30 years (Fahim). While these two forms are widely used, there are many variations of each and they are usually structured to accommodate each specific project.

Tax Increment Financing*:* Funding from tax increment financing, or TIF bonds, is derived from the incremental increase in tax revenue that due from a developmental improvement in a specific area. This "value capture" mechanism uses the perceived gains in taxes to fund

or subsidize a local infrastructure project and is generally used to attract development or redevelopment to areas that are currently not benefiting from private-sector investment[48].

Developer Charges: Another source of revenue for local infrastructure and roadway systems comes from real estate developers. Some authorities around the world charge a high developer fee or require developers to fund a portion of the cost of providing local roads that serve the development sites. In Sao Paulo, Brazil, for instance, developers are required to purchase "certificates of additional construction potential bonds", or CEPACS, that are sold in electronic exchanges and issued by the city of Sao Paulo. When a developer purchases CEPACS, he or she basically pays a fee to buys air rights (FAR). This fee then funds a portion of the cost for local infrastructure improvements and is not returned to the developer.

EB-5*:* Recently over the past half-decade a new financing mechanism has gained popularity. This government-led and initiated program, called EB-5, grants green cards to foreign citizens who invest money in the US. The two investment options of $500,000 or $1,000,000 placed within a targeted employment area (TEA) and in a USCIS approved project, must either directly or indirectly create 10 additional jobs. This funding mechanism has grown rapidly since the 2008 financial crisis as real estate developers, private businesses and infrastructure owners have found the foreign investors' very low required rate of return, in some cases as low as 1% p.a., are a very attractive financing

[48] Mayraj Fahim, "Municipal bonds have been issued by US local government since 1812", *City Mayors*, last edited 20 March, 2012, accessed June 18, 2013. http://www.citymayors.com/finance/bonds.html.

solution. Although not currently being used on a large-scale basis, this capital source can potentially play an integral role in highway financing.

Tax Credit Bonds: Tax-exempt bonds differ from tax credit bonds in that tax credit bonds allow the investor to receive a tax credit on federal tax returns at a rate that is set by the Treasury Department. Historically, the infrastructure segment, as previously noted, was funded through tax exempt bonds which doesn't appeal to two of the largest potential investors: pension funds and international investors. Being that pension funds are tax-exempt entities and international investors are not subject to state tax liability, the tax credit bonds are an advantageous way to tap into a larger investment pool.[49] Alternatively, investors of tax-exempt bonds are able to eliminate tax-exempt interest from their gross income.[50] This form of financing can be implemented by the government for highway infrastructure capital requirements and still allows the Federal government to allocate funds to other projects.

Infrastructure Banks and Trusts: Infrastructure banks have become a key component of infrastructure financing in the European Union. In 1958, the European Investment Bank was established as a publicly owned international financial institution with an aim to finance infrastructure project by borrowing funds from the international capital markets

[49] Keith Miller, Kristina Costa, and Donna Cooper, "Creating a National Infrastructure Bank and Infrastructure Planning Council: How Better Planning and Financing Options Can Fix Our Infrastructure and Improve Economic Competitiveness", *Center for American Progress*, September, 2012. http://www.americanprogress.org/wp-content/uploads/2012/09/InfrastructureBankReport.pdf

[50] "Issue Brief: Taxable Tax-Credit Bond Programs", *Government Financial Officers Association,* April, 2010. http://www.gfoa.org/downloads/taxcreditbonds.pdf

via bond issuance, rather than allocating funds from the European Union. Generally limited to a 50% loan-to-value of total investment costs, the EIB scrutinizes each project, uses the private sector to cover the residual amount required for the investment, and issues a long-term loan with a variable rate that is in accordance with the risk profile of the project. While several variations of this type of financing mechanism exist, the basic structure of Infrastructure Banks is to help facilitate joint public and private investment in infrastructure projects across a vast array of segments. These centralized lending authorities help spur public investment in infrastructure and tap into and leverage capital from the private sector. With proper oversight, governance and clear goals, Infrastructure Banks help coordinate public infrastructure investments and bring in valuable private capital partners with an appetite for diversifying into the infrastructure sector.

Private Activity Bonds: Private Activity Bonds, or PAB's, are utilized to leverage private investment in projects that bring positive benefit to the public and issued on or behalf of state or local governments. PAB's are a form of municipal security that must comply with one of two tests: the "private business test" or the "private loan test." The private business test passes if at least 10% of the proceeds of the issue should be used for private trade or business use. The private loan requirement is met if the amount of the process that are to be used to make or finance loans to person other than governmental units exceeds the lesser of 5 percent or $5 million.[51] After receiving approval from the U.S. Department of Transportation, the State or local agencies issue tax-exempt debt on behalf of the private

[51] "*Tax Policy & Administration: Improvements for More Effective Tax-Exempt Bond Oversight",* Committee *on Government Operations*, 1993. 66.

entity that is completing the project. Then, the private entity is responsible for financing and delivering the project and required to cover the debt service on the PAB's.[52] PAB's are structured so that they encourage private investment in infrastructure as they allow for the private sector to enjoy tax-exemption due to the heavily involved in the public infrastructure sector. As of September 2012, over half of the authorized $15 billion in PAB allocations had been approved by the DOT (ref. see footnote 21).

TIFIA: The Transportation Infrastructure Finance and Innovation Act, or TIFIA, provides low-interest or tax-exempt debt to private firms dealing with highway and transportation infrastructure. According to the U.S. Department of Transportation Federal Highway Administration, this Federal credit assistance program comes in the form of direct loans, loan guarantees, and lines of credit to finance surface transportation projects on a national and regional level and helps private firms access capital markets and obtain favorable interest rates. By 2010, TIFIA had become a growing source of financing public private partnerships in surface infrastructure projects and amounted to almost $30 billion in total project investment throughout the country.[53]

[52] "Private Activity Bonds (PABs), Transportation Finance Innovations", *Federal Highway Administration,* accessed June 25, 2013. http://www.fhwa.dot.gov/ipd/fact_sheets/pabs.htm

[53] Jaime Rall, Jim B. Reed, Nicholas J. Farber, and National Conference of State Legislatures, "Public-Private Partnerships for Transportation: A Toolkit for Legislators", *National Conference of State Legislatures*, 2010. http://www.ncsl.org/documents/transportation/PPPTOOLKIT.pdf.

APPENDIX B: Description of Widely Used Project Delivery Methods

Design-Bid-Build (DBB): Design is completed in-house or subcontracted to a designer to complete before the general contractor starts building the project. The public sector is responsible for funding the project.

Design-Build (DB): A single party designs and builds the projects based on specific conditions stipulated from the owner. Both phases are combined into one contract and allows for private sector involvement without transferring operation, finance or maintenance risk to the private sector.

Operate and Maintain (O&M): Public usually retains ownership of the project but the private entity is hired and responsible for maintaining the asset so that it remains financially sustainable. It is generally important that the contracted private party improve operation and maintenance standards of the asset.

Construction Management at Risk (CM at Risk): The hired construction manager also acts as the general contractor and works with a separate design team hired by the public party.

Design-Build-Operate-Maintain (DBOM): All components (design, build, operate and maintenance) are combined into one contract with often little input from the public entity. Financing is secured by the public sector and the private sector may be asked to operate the project for a period of time.

Design-Build-Finance-Operate (DBFO): This method involves the private sector in many long-term project phases such as finance, design, construction, and operations. These methods are often used on long-term concessions whereby a revenue stream covers the financing and debt obligations.

Brownfield and Greenfield Concession: A concession is the act of giving controlling authority to another party, in this case the public giving the rights to own and operate an asset, often for a fixed period of time. Brownfield development is a development that takes place on a previously developed plot of land. Greenfield development refers to a new development on land that has never been developed.

Build-Transfer-Operate (BTO): The private entity is contracted to construct the project then transfer the ownership back to the public authority. However, after this is completed, the private entity continues to oversee the operations of the asset.

Build-Own-Operate-Transfer (BOOT): A method whereby the private sector builds, owns, operates and later transfers the asset back to the public authority. The private receives a full concession of the project and is able to generate revenue or received availability payments from the government to cover costs, debt obligations, and investment returns.

Build-Own-Operate (BOO): Public authority grants (or sells) the private sector the right to develop, finance, design, construct, own, operate and maintain a project. The private sector is responsible for the project operations and sustainability in perpetuity.

APPENDIX C: Institutional Framework for PPP - International Cases

Korean Case - MOSF and PIMAC: Following the tradition of elite bureaucracy in its economic development, Korea established a model distinguished by institutionalism of PPP under its Ministry of Strategy and Finance, supplemented by Korea Development Institute, a government-sponsored think tank, that are responsible for the planning and coordination of the private participation in its PPP projects.

PPP was introduced to Korea in 1994. Prior to this, PPPs were handled by individual supplemental laws, and governed by the relative branch of the administration. The process was long, controversial, and ad hoc. In 1998, the government made an across-the-board revision and placed an umbrella organization for PPP under the Ministry of Strategy and Finance (MOSF).

MOSF is responsible for managing budget decisions for PPPs through bilateral negotiations with the ministry requiring the services of a proposed PPP. MOSF also chairs the PPP Review Committee (PRC), consisted of vice ministers of line ministries and private sector experts in PPP. Its main responsibility is establishment of PPP policies, designation and cancellation of large PPP projects and its concessionaires.

The Korean government further reinforced the one-stop solution for PPP by establishing the 'Public and Private Infrastructure Investment Management Center (PIMAC). PIMAC is housed in a government-sponsored think tank, the Korea Development Institute. Its mandated mission includes evaluation, administration and support of PPP

projects in Korea. It develops guidelines for PPP procurement, conducts value-for-money tests and assists in RFP formulation, tendering and negotiation.[54]

The MOSF and PIMAC is also mandated to issue the 'PPP Basic Plan', which provides PPP policy directions, details in project implementation procedures, financing and re-financing directions, government subsidy schemes where applicable and general documentation directions. PIMAC also publishes 'PPP Implementation Guidelines', which supplies guidelines to Value For Money (VFM) test, guidelines for RFP preparation, guidelines for tender evaluation, guidelines for standard concession agreement and guideline for refinancing. These two publications are updated every year.

British Case - Infrastructure UK: In 2010, the U.K. government created Infrastructure U.K. (IUK) under the Treasury. The IUK was responsible for implementing the nation's long-term infrastructure strategy and facilitating PPP across different government sectors. Two existing PPP units were consolidated, the Partnerships U.K. and U.K. Treasury's PPP Policy Team, and a new unit added, Infrastructure Finance Unit, to form Infrastructure U.K.

IUK's responsibilities include coordinating and simplifying the planning and prioritization of investment in UK infrastructure, and improving the state of UK's infrastructure by achieving a greater Value for Money on infrastructure projects and transitions. It takes over the role of Partnership UK, in assisting the procurement and management process of PPPs. It engages different government entities, such as central government ministries and local governments to give them its technical assistance at the

[54] PIMAC, (http://pimac.kdi.re.kr)

individual project level. Their advisory is a comprehensive package that includes Value for Money analysis, bid structuring, support in negotiating with the private sector. [55]

The Treasury has another body that assists PPP at the municipal level, the Local Partnerships. It is a joint venture with the Local Government Association and the Treasury, Local Partnerships provides support in all stages of municipal PPPs, from structuring, procurement, to delivery. Local Partnerships is a major reason the UK has seen a larger number of successful smaller-scale PPPs than other countries.

Australian Case - A Federalist Approach: Infrastructure Australia was established in 2008, through federal legislation. This institution is not primarily focused on PPP, but on the larger infrastructure system. Infrastructure Australia created the National PPP Guidelines which guides policy frameworks and national standard for PPPs. The guidelines range from procurement options, commercial principles for social infrastructure, specifics for comparative studies between procurement methods and discount methodologies. While Infrastructure Australia has no decision-making authority, its National PPP Guidelines were endorsed by the Council of Australian Governments, and therefore replaces all PPP policy and standards previously implemented by the state and federal governments. Besides PPP policy guidance and standardization, Infrastructure Australia promotes the Australian PPP case through the publication of relevant information.

Partnership Victoria is a sub-government unit responsible for PPP in the State of Victoria. The agency creates a policy framework for all state agencies and provides guidance on all aspects of the procurement and management process. The Standard

[55] Infrastructure UK, (https://www.gov.uk/government/organisations/infrastructure-uk)

Commercial Principles first published in 2005 and revised in 2008 is a 170-plus page document stipulating the state's risk allocation in all stages of a PPP, including the contractual stage, construction stage, maintenance, service payments during operation, and end-of-term arrangements.[56] The contracting public agencies have an obligation to follow these standards, unless they have a strong justification to do otherwise. Partnership Victoria also provides technical assistance during contract management. Partnership Victoria became the model for other states wishing to explore PPP.

Canadian Case - PPP Canada*:* The first feature that stands out with the Canadian case is that the Canadians have chosen to create a corporation structure for their federal PPP unit. PPP Canada was created in 2008 as a crown corporation, a corporation owned by the federal government of Canada and established by an Act from the Parliament. Though owned by the government, this corporation operates like an independent company with its own executive team, and six board members from the private sector. This structure allows the private to have an oversight into the PPP through its board seats, and also behave more like a private business unit.

PPP Canada is responsible for creating policy advices and issuing Best Practices in PPP management, and give technical assistance at the federal and state level. Although PPP Canada has no authority to impose a standard on PPP management, it plays a crucial role in assisting the state and federal government to locate areas where standardization might

[56] "Partnerships Victoria Detailed Guidance Material: Updated Standard Commercial Principles", *Department of Treasury and Finance, State of Victoria*, 2008, accessed June 17, 2013.

help, and get them to legislate. Through this process, PPP Canada educates and levels the playing field across the nation for PPP.

Another important aspect of PPP Canada is the 'P3 Canada Fund'. It is a $1.2 billion fund from the federal government that will invest, along with the private sector, in PPP projects at the State level. It is the federal government's incentive to promote PPPs in states, and also a mechanism in which the federal government gets a first opportunity to involve itself in the States' PPP ventures. The Fund may invest up to 25% of the direct construction cost in a single project. [57] Canada's response to the requirement of a central PPP designation is the closest model that the US Federal government is currently pursuing, namely the National Infrastructure Bank.[58]

[57] PPP Canada, (http://www.p3canada.ca)

[58] Emilia Istrate and Robert Puentes, "Moving Forward on Public-Private Partnerships: U.S. and International Experience with PPP Units", *Brookings-Rockefeller Project on State and Metropolitan Innovation*, 2011.