

**Holding America Back:  
Crumbling Water and Transportation Infrastructure (and How  
Public and Private Investment Can Turn It All Around)**

Carol Foster, School of Public Affairs BA/MPA candidate  
American University Honors Capstone  
General University Honors  
Faculty Advisor, Daniel Fiorino, School of Public Affairs  
Spring 2012

## Abstract

---

America's crumbling infrastructure threatens the efficiency of its economy, the movement, health and safety of its people, and the quality of its environment. Dams, levees, roads, public transit systems, bridges and water delivery systems need to be expanded and repaired in order to adequately meet the needs of those who depend upon them for efficient transportation and a dependable, clean water supply. However, public budget shortfalls limit American governments at all levels from making the necessary investment in such improvements, resulting in the continual passing off of deficient infrastructure's negative externalities to private actors. Private-Public Partnerships (PPPs), encompassing a wide variety of collaborative contracting arrangements, allow governments to provide quality water and transportation infrastructure at decreased public costs by creating incentives for private contractor efficiency and innovation. Examination of a variety of infrastructure PPP case studies makes clear that the shortest term PPPs are the most successful in practice, but that the longer-term, more comprehensive PPPs that offer the most potential public savings are failing to meet potential in practice because of a serious lack of private domestic American investment. By analyzing the errors of the more recent domestic long-term PPPs, and the successes of the much earlier-established long-term PPPs abroad, necessary improvements on behalf of the public and private actors in the facilitation of these arrangements become apparent so that they may finally reach their full savings and infrastructure provision potential in domestic practice.

## **I. Intro:**

Transportation and water infrastructure, including roads, bridges, rails, public transportation systems, dams, levees and water delivery systems, are structures that are essential for the daily ease of movement of people and commerce, and the provision of an adequate supply of clean water. As these highly depended-upon systems continue to age, the public entities responsible for their upkeep have either been unable, or unwilling, to maintain infrastructure quality and keep pace with the demanded capacity expansions. Failing to address the problem of deteriorating infrastructure comes with a price; deficient transportation and water infrastructure systems are costing private actors in terms of time, economic opportunity and safety. According to the American Society of Civil Engineers (ASCE), the investment needed to correct the existing transportation infrastructure deficiencies is around \$220 billion per year through 2040<sup>1</sup>. Public entities that do not invest in timely infrastructure improvements and expansions pass these costs off to private actors and increase their own costs for repair and replacement at a later time.

In the face of great infrastructure investment need, American state and federal governments are struggling to balance their budgets, and thus are finding it difficult to invest in even the minimal amount of operational infrastructure maintenance. Public budget constraints at all levels threaten the ability for governments to invest in adequate infrastructure system repairs. Continually rising repair costs combined with current public budget limitations provide plenty of foundation for unease over American governments' ability to adequately address infrastructure concerns. Without satisfactory government funding, alternatives to public funding solutions must be explored.

---

<sup>1</sup> American Society of Civil Engineers. "Failure to Act: The Economic Impact of Current Investment Trends in Surface Transportation Infrastructure." 2011. ASCE, 28 Aug. 2011. <<http://www.asce.org/failuretoact/>>.

Private-public partnerships (PPPs) have been used for centuries as an alternative to the traditional total public funding for infrastructure projects. The broad umbrella of PPPs encompasses a wide variety of contracting arrangements, including designing or building an infrastructure project, operating it, financing it, maintaining it, or some combination of any two or more of those tasks. Longer-term, more comprehensive PPPs are much riskier, but the increased risk is accompanied by a greater potential payoff for both the private and public actor. By analyzing the problems and the successes experienced by both domestic and international existing comprehensive PPPs, it becomes clear that further public logistical support is needed before such beneficial long-term PPPs can be implemented to their fullest potential in the United States. If long-term transportation and water infrastructure PPPs are more widely embraced and implemented throughout the United States, the American economy will have the potential to expand and function more efficiently. However, before considering how best to improve the facilitation of long-term PPPs, it's necessary to understand more about the deficient infrastructure problem itself, the burdens that insufficient infrastructure currently puts on the American economy and the exact size of the investment needed to bring the systems up to date.

## **II. Examining the Need for Infrastructure Investment:**

America's highways and bridges are in a state of rapid decline. On average, 31 percent of American national vehicle miles travelled (VMT) are on roads that have been identified by the U.S. Department of Transportation (U.S. DOT) as being in serious disrepair<sup>2</sup>. Such deficient routes include frequent potholes, concrete or asphalt debris obstructions, and ineffective lane or highway dividers. The problem is more acute in urban areas and on freeways rather than on rural and non-freeway arteries because of lower speeds of travel and less vehicle traffic on non-

---

<sup>2</sup> Office of Highway Policy Information. "Highway Finance Data Collection." 2011. US Department of Transportation. 11 Apr. 2012. <<http://www.fhwa.dot.gov/policyinformation/pubs/hf/pl11028/chapter4.cfm>>.

freeway and rural routes<sup>3</sup>. In 2011, the National Transportation Safety Board (NTSB)'s survey of American bridges rated 18,000 bridges as, "structurally-deficient"<sup>4</sup>. This rating meant that immediate replacement was not necessary, but that the public entities responsible for bridge maintenance needed to make substantial, timely repairs in order to ensure that serious deficiencies did not translate to future critical structural failures. Each day, around 75 percent of American traffic passes over one these, "structurally-deficient," bridges<sup>5</sup>. The poor condition of American highways and bridges creates the negative externalities of comprised safety, forgone economic opportunity and degraded common resources that are then passed on to private actors.

While highway infrastructure rarely malfunctions to the point of complete failure, as was the rare case of the 2007 I-35W Bridge collapse in Minneapolis, Minnesota, poorly maintained bridges and highways threaten the safety of all of those travelling on them. Crumbling concrete, asphalt, and metal can create road obstructions and driving distractions that compromise passenger safety. The U.S. DOT found that beyond substandard weather conditions, infrastructure deficiencies, including, "substandard road conditions, obsolete designs or roadside hazards," are the next largest cause of vehicle accidents<sup>6</sup>. According to the ASCE's 2011 Infrastructure Report Card, one-third of all vehicle accidents occur because of deficient road conditions<sup>7</sup>. Of the over 40,000 people killed and 2.1 million injured in vehicle accidents in 2007, poorly maintained highways and bridges were responsible for around 13,000 of those deaths and 693,000 of those injuries<sup>8</sup>. If initial vehicle contact with roadway debris does not cause an immediate accident, often such debris damages vehicles in a way that may compromise

---

<sup>3</sup> Office of Highway Policy Information, 2011.

<sup>4</sup> Transportation for America. "The Fix We're in For: The State of Our Nation's Busiest Bridges." Oct 2011. Transportation for America. 12 Jan. 2012. <<http://t4america.org/docs/bridgereport/bridgereport-metros.pdf>>.

<sup>5</sup> Ibid., Oct. 2011.

<sup>6</sup> Office of Highway Policy Information, 2011.

<sup>7</sup> American Society of Civil Engineers. "Report Card for America's Infrastructure." 2012. ASCE. 23 Jan. 2012. <<http://www.infrastructurereportcard.org/>>.

<sup>8</sup> Ibid., 2012.

driver and passenger safety at a later time. Private and commercial actors pay a combined total of \$1.2 billion annually to repair safety-critical vehicle features that were damaged by crumbling highway and bridge debris<sup>9</sup>. While the increase in vehicle damage from crumbling roadway debris contributes positively to the vehicle parts and repair business, deficient highway and bridges have an overall negative impact on the American economy.

Highways and bridges that lack necessary traffic capacity and are in overall poor repair decrease commerce, waste potentially productively-used time and reduce the number of American jobs. When consumers perceive that a route is overly congested or difficult to navigate because of debris or potholes, they become less likely to venture out for non-essential travel. Local small retail, entertainment and food service businesses with few locations suffer the most when poor road conditions discourage their customers from coming in and spending money. Additionally, congested and crumbling roads increase travel time, and thus diminish surface shipping companies and mobile service businesses' ability to quickly deliver their goods or reach more clients within their workday, respectively. These deficient routes increase individual household and business fuel costs, directing these funds away from more productive investments<sup>10</sup>.

In addition to wasting fuel, congested, shabby roads waste the time of those who use them. Especially for businesses that require their employees to travel during the workday, employee productivity is diminished by slower and more congested traffic. According to the ASCE's Infrastructure Report Card, in recent years, deficient roadways caused Americans to

---

<sup>9</sup> Apogee Research, Inc. "Infrastructure in the 20th Century Economy." Feb. 1994. United State Army Corps of Engineers. 26 Jan. 2012. <[http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=5&ved=0CEQQFjAE&url=http%3A%2F%2Fwww.iwr.usace.army.mil%2Fdocs%2Fwrrereports%2F94-FIS-9.pdf&ei=OAcnT4PRIO230AHhm7TTCA&usg=AFQjCNE3hJGSf7MD2PZSJw6\\_hwiJM1tulA](http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=5&ved=0CEQQFjAE&url=http%3A%2F%2Fwww.iwr.usace.army.mil%2Fdocs%2Fwrrereports%2F94-FIS-9.pdf&ei=OAcnT4PRIO230AHhm7TTCA&usg=AFQjCNE3hJGSf7MD2PZSJw6_hwiJM1tulA)>.

<sup>10</sup> America 2050. "An Infrastructure Vision for 21<sup>st</sup> Century America." 2008. Regional Plan Association. 20 Feb. 2012. <<http://www.america2050.org/AM2050Infra08sm.pdf>>.

spend, in total, 4.2 billion hours stuck in traffic<sup>11</sup>. The lost productivity and extra fuel use that result from traffic jams cost around \$78.2 billion annually<sup>12</sup>. Finally, deficient roadways hurt American job growth. Companies with extensive mobile operations, local businesses accessed by way of deficient routes, and construction companies may not be able to afford to hire more employees or keep paying those that they already have because of the costs of high fuel usage or a decrease in demand for their goods or services, respectively. In 2010, the direct and indirect costs of roadway deficiencies, including clients lost due to a lack of reliability and productive time lost in highway traffic jams, totaled around \$11.6 billion<sup>13</sup>. As roadways continue to deteriorate, this cost is projected to balloon to \$340 billion per year by 2040<sup>14</sup>.

Finally, deficient roadways and bridges negatively impact the quality of common resources. Air is a non-excludable resource, available for and impacted by all without exception. Whether slow traffic is rooted in a deficient quantity or quality of highway lanes, it results in increased emissions of carbon dioxide, carbon monoxide, carcinogen and other harmful compounds<sup>15</sup>. As more of these harmful gases and compounds are emitted, air quality declines, which in turn increases the probability of local individuals developing asthma, shortness of breath or respiratory cancer<sup>16</sup>. When these compounds settle on land and in water, they threaten the quality of those resources as well as the resiliency of the ecosystems air and water support. On a global scale, emissions from congested traffic contribute to climate change and its associated externalities, including the costly problems of extreme weather events and rising seas.

---

<sup>11</sup> American Society of Civil Engineers, 2012.

<sup>12</sup> Slone, Sean. "Civil Engineers Report: Failure to Improve Transportation Infrastructure Will Cost America Dearly." 27 July 2011. The Council of State Governments. 04 Feb. 2012. <<http://knowledgecenter.csg.org/drupal/content/civil-engineers-report-failure-improve-transportation-infrastructure-will-cost-america-dearly>>.

<sup>13</sup> American Society of Civil Engineers, 2011.

<sup>14</sup> America 2050, 2008.

<sup>15</sup> Office of Energy Efficiency and Renewable Energy. "Vehicle Emissions." Aug. 2003. US Department of Energy. 23 Mar. 2012. <[http://www.iowacleancities.org/idle\\_reduction/files/emissionsfactsheetcc.pdf](http://www.iowacleancities.org/idle_reduction/files/emissionsfactsheetcc.pdf)>.

<sup>16</sup> Ibid., Aug. 2003.

Deficient highways and bridges create high safety, economic opportunity and common resource costs that are passed on to nearly every individual household and every corner of the American economy. Rail and transit systems are viable surface transportation alternatives that have the potential to offer greener, safer and more convenient commercial and personal long-distance and local travel. However, much like highway and bridge infrastructure, system deficiencies are holding rails back from their full alternative transportation potential.

Long-distance rails and light-rail transit systems are growing alternatives to long distance, commuter and commercial highway travel. These highway substitutes decrease the pollution of the commons and reduce the rate of roadway deterioration. In the past 15 years, rail transit use has increased by 25 percent<sup>17</sup>. However, long-distance rail and transit infrastructure is still largely lacking, and existing systems are commonly in need of rail and car repairs so that they can be restored to efficient and reliable operation. The Federal Transit Administration (FTA)'s yearly review of all American rail transit systems frequently finds that around a third of the country's transit rail tracks and subway cars are deficient<sup>18</sup>. The focusing event of the June 2009 Washington, D.C. Metro Rail crash that left nine commuters dead highlighted the risk that systems in disrepair pose to passenger safety. Following the accident, the FTA estimated that around \$50 billion in initial investment, and \$6 billion in yearly maintenance would be required to bring, and keep, rail systems in good repair<sup>19</sup>.

For a developed nation, the United States lags far behind Europe and Asia in terms of access to and availability of distance and commuter rail systems. The American Public Transportation Association estimates that around half of Americans do not have access to

---

<sup>17</sup> American Society of Civil Engineers, 2012.

<sup>18</sup> Walsh, Bryan. "The Metro Crash: A Nation's Aging Transit System." 26 June 2009. Time Magazine. 15 Mar. 2012. <<http://www.time.com/time/health/article/0,8599,1907095,00.html>>.

<sup>19</sup> Ibid., 26 June 2009.



adequate rail transportation systems<sup>20</sup>. Without personal transportation options, these individuals may be forced to forego educational, cultural and work opportunities. Additionally, if local and distance rail systems are inaccessible for many communities, these systems fail to alleviate many of the economic, safety and environmental concerns caused by deficient, congested highway systems.

Much like America's transportation infrastructure, the nation's water infrastructure is largely deficient in regards to its quality and/or capacity. Water infrastructure, including dams, levees and water delivery systems, provides communities with safe drinking water, protects development and humans from the danger of flooding, creates areas for recreation and allows for irrigation. Deficient water infrastructure threatens both the health and the safety of those who depend upon it.

According to the United States Army Core of Engineers (USACE), there are around 85,000 dams in the United States that are 50 years old on average<sup>21</sup>. The USACE bases each dam's hazard potential on the severity of the harm to human life and property that a failure would cause rather than the likelihood of such a failure occurring. The number of high hazard dams, structures that would impact human safety and property the most in a failure, has increased by 3,000 since 2007<sup>22</sup>. As dams become increasingly older and in further disrepair, the chances of them fulfilling that hazard classification increases dramatically. According to the ASCE, \$12.5 billion in investment in dam repairs is needed in the next five years for dams to effectively be brought up to date<sup>23</sup>.

---

<sup>20</sup> American Public Transportation Association. "Public Transportation: Moving America Forward." 2010. American Public Transportation Association. 12 Feb. 2012. [http://www.apta.com/resources/reportsandpublications/Documents/APTABrochure\\_v28%20FINAL.pdf](http://www.apta.com/resources/reportsandpublications/Documents/APTABrochure_v28%20FINAL.pdf).

<sup>21</sup> Apogee Research, Inc., Feb. 1994.

<sup>22</sup> Ibid., Feb. 1994.

<sup>23</sup> American Society of Civil Engineers, 2012.

Like dams, levees are important in protecting the lives and property of those who live in low-lying areas near a body of water that is prone to seasonal or extreme weather flooding. Levees involve a wall or embankment, pumps and drains. While a national levee database does not yet exist, initial federal studies by the USACE have shown that around nine percent of levees are deficient, meaning that they are no longer able to adequately protect low-lying areas from the impacts of flooding<sup>24</sup>. The National Committee on Levee Safety's study of levee failure costs shows the potential consequences of poorly maintained levees. Following large rains in the Midwest in 1993 and 2008, health costs and building damage costs totaled \$272.8 million and \$583.6 million, respectively<sup>25</sup>. The failure of the Army Corps levees in New Orleans during the Hurricane Katrina tragedy was the most costly in American history, totaling \$16.5 billion in property and human health and safety damages<sup>26</sup>. As climate change alters extreme weather patterns and raises the sea level, the pressure on levees will continue to increase, and as levees continue to age, they will be increasingly unable to rise to the occasion of meeting the security and safety needs of communities that are increasingly threatened by flooding. As deficient levees threaten human safety and property, inadequate, aging water delivery systems compromise entire communities' ability to access a clean, adequate water supply.

Around 264 million Americans now depend on public water delivery systems for safe and reliable drinking water<sup>27</sup>. Demand for a public water supply rose 94 percent from the mid-1990s through the late part of the first decade of the 2000s<sup>28</sup>. In deficient systems, leaky as well as rusted pipes threaten both the reliability and safety of the water supply. Nationwide, leaks in

---

<sup>24</sup> Apogee Research, Inc., Feb. 1994.

<sup>25</sup> National Committee on Levee Safety. "Recommendations for a National Levee Safety Program." 15 Jan. 2009. National Committee on Levee Safety. 25 Mar. 2012. <[http://www.lafollette.wisc.edu/publicservice/floods/NCLS-Recommendation-Report\\_012009\\_DRAFT.pdf](http://www.lafollette.wisc.edu/publicservice/floods/NCLS-Recommendation-Report_012009_DRAFT.pdf)>.

<sup>26</sup> Ibid., 2009.

<sup>27</sup> American Society of Civil Engineers, 2012.

<sup>28</sup> Ibid., 2012.

old public water delivery pipes waste 7 billion gallons of clean drinking water each day<sup>29</sup>. As population continues to grow, the United States' roughly 53,000 water delivery systems will require system expansion in order to meet growing demand<sup>30</sup>.

In terms of safety of the water supply, the federal government first set national drinking water standards in 1974 in the Safe Drinking Water Act (SDWA) that followed more general water pollution and quality standards set forth in the 1972 Clean Water Act<sup>31</sup>. Since the passage of these two water quality acts and subsequent amendments, spending on water delivery systems has doubled, but is still not enough to address the increasingly deficient nature of such systems. As water delivery systems continue to age, connections between pipes worsen and the pipes themselves begin to dissolve, allowing for contaminants to easily get into the water supply. These sources of contamination result in over 5,000 cases of illness each year<sup>32</sup>.

Impure water negatively impacts America's already ailing economy. For water-intensive industries, including chemical plants and breweries, lower water quality increases business costs, and thus forces companies in those, and related industries, to reduce their number of employees<sup>33</sup>. To meet all safety, economic and basic water-related needs, ASCE estimates that spending on water delivery systems needs to be increased by about \$11 billion each year<sup>34</sup>.

### **III. Inadequate Public Investment:**

A total investment of \$315.1 billion is required this year in order to bring rail, highway and water infrastructure up to an acceptable level of quality and capacity (see Table 1).

---

<sup>29</sup> Barringer, Felicity. "Oh Danny Boy, the Pipes, the Pipes are Failing." 20 Dec. 2011. The New York Times. 15 Feb. 2012. <<http://green.blogs.nytimes.com/2011/12/20/oh-danny-boy-the-pipes-the-pipes-are-failing/>>.

<sup>30</sup> Ibid., 20 Dec. 2011.

<sup>31</sup> United State Environmental Protection Agency. "Water Infrastructure." 2 Aug. 2011. US EPA. 5 Dec. 2011. <<http://water.epa.gov/infrastructure/>>.

<sup>32</sup> Dudley, Michael. "Aging Wastewater System Threatening Water Supply." 15 May 2008. Planetizen. 02 Feb. 2012. <<http://www.planetizen.com/node/3119>>.

<sup>33</sup> Barringer, 20 Dec. 2011.

<sup>34</sup> Apogee Research, Inc., Feb. 1994.

Traditionally, federal and state funding for infrastructure is appropriated and then passed to the local maintenance and construction authorities that are actually responsible for the final execution of an infrastructure project. However, traditional streams of public infrastructure investment are presently more constrained than in previous years. As fiscal

<b>Table 1:</b> <b>Water and Transportation Infrastructure Funding Needs and Appropriations<sup>35</sup></b>			
<b>Type of Infrastructure</b>	<b>FY 2012 Federal Appropriations</b>	<b>FY 2012 Needs</b>	<b>Funding Differences</b>
<b>TRANSPORTATION</b>	\$102.6B (total)	\$251.6B (total)	-\$149B (total)
<b>Bridges and Roads</b>		\$186B	
<b>Rails</b>		\$12.6B	
<b>Transit</b>		\$53B	
<b>WATER</b>	\$10.9B (total)	\$63.5B (total)	-\$52.6B (total)
<b>Water Delivery Systems</b>		\$51B	
<b>Levees</b>		\$10B	
<b>Dams</b>		\$2.5 B	

<sup>35</sup> American Society of Civil Engineers, 2012.

year (FY) 2012 is expected to push the federal debt level to \$16.4 trillion by way of a \$1.3 trillion projected deficit, additional federal funding for major infrastructure projects is highly unlikely<sup>36</sup>. Entitlements, including healthcare and social welfare programs, and the payment of interest take up nearly a third of the federal budget, leaving only 38 percent of the budget for all discretionary funding, including defense operations, a major recipient of discretionary funds<sup>37</sup>.

For FY 2012, 5 percent of federal discretionary spending, about \$102.6 billion, was appropriated for transportation infrastructure projects<sup>38</sup>. Of that amount, 75 percent was allocated specifically to road and light-rail infrastructure construction and maintenance<sup>39</sup>. With rails requiring \$12.6 billion, bridges and roads requiring \$186 billion, and transit systems requiring \$53 billion each year for the next five years to be brought into good repair and expanded capacity, the FY 2012's appropriated \$102.6 billion barely covers half of transportation funding needs nationwide<sup>40</sup>.

Water infrastructure received even less funding. FY 2012 appropriated \$10.9 billion for improvements and maintenance of water delivery systems, dams and levees<sup>41</sup>. Repairing and expanding the capacity of dams, levees and water delivery systems requires \$2.5 billion, \$10 billion, and \$51 billion, respectively<sup>42</sup>. Federal spending falls about \$50 billion short, annually<sup>43</sup>.

At the state level, weighty amounts of debt on most balance sheets have left officials scrambling to find funding for basic administrative and public safety functions, pushing

---

<sup>36</sup> Chantrill, Christopher. "Government Spending Data." 29 Feb. 2012. [USGovernmentDebt.us](http://www.usgovernmentdebt.us/index.php). 29 Feb. 2012. <http://www.usgovernmentdebt.us/index.php>.

<sup>37</sup> Ibid., 29 Feb. 2012.

<sup>38</sup> Ibid., 29 Feb. 2012.

<sup>39</sup> American Society of Civil Engineers, 2012.

<sup>40</sup> Chantrill, 29 Feb. 2012.

<sup>41</sup> Kosik, Alison. "Experts: U.S. Water Infrastructure In Trouble." 21 Jan. 2011. [CNN](http://www.cnn.com/2011/US/01/20/water.main.infrastructure/index.html). 10 Dec. 2011. <http://www.cnn.com/2011/US/01/20/water.main.infrastructure/index.html>.

<sup>42</sup> Ibid., 2012.

<sup>43</sup> American Society of Civil Engineers, 2012.

infrastructure improvement and expansion funding low on the priority list<sup>44</sup>. On average for FY 2012, states appropriated eight percent of their budgets for transportation projects, and less than seven percent for all water infrastructure improvement and maintenance projects<sup>45</sup>.

In total, \$315.1 billion per year for the next five years is needed for transportation and water infrastructure maintenance and improvement projects, but federal and state-level appropriations are set to fund less than half of those needs<sup>46</sup>. Transportation and water infrastructure expansion and repair needs exceed funding by \$201.6 billion annually<sup>47</sup>. To address infrastructure shortcomings within the context of strained state and federal budgets, creative private funding solutions that incentivize infrastructure project efficiency and encourage comprehensive planning are worth exploring.

#### **IV. Understanding Public-Private Partnerships**

Public-Private Partnerships (PPPs) have become an increasingly popular option for financially-strapped governments as they look to provide necessary maintenance and expansion projects within the constraints of their tight public budgets. PPPs encompass a wide variety of contracting arrangements. Most broadly, transportation and water infrastructure PPPs can be defined as any arrangement where a public actor hands over any combination of financial, design, construction, maintenance and/or operational risks and responsibilities of an infrastructure project to a private actor that is motivated to participate by the possibility of profit. The public actor pays the private actor to complete a project in a short-term agreement whereas the private actor pays the public actor for the right to collect user fees in a more comprehensive,

---

<sup>44</sup> Luhby, Tami. "States go deeper into debt." 30 July 2010. CNN. 24 Feb. 2012.  
<[http://money.cnn.com/2010/07/30/news/economy/state\\_debt\\_levels/index.htm](http://money.cnn.com/2010/07/30/news/economy/state_debt_levels/index.htm)>.

<sup>45</sup> Chantrill, 29 Feb. 2012.

<sup>46</sup> Ibid., 29 Feb. 2012.

<sup>47</sup> American Society of Civil Engineers, 2012.

long-term PPP. The greater the risk and responsibility handed over to the private actor, the greater the potential for a private actor to make large profits<sup>48</sup>.

PPPs are nothing new; they have been used at all levels of American government for over 200 years. Presently, municipal governments use private companies for between one-third and one-half of all local public services, from waste collection to public building maintenance<sup>49</sup>. Because of the high level of public oversight and collaboration, PPPs are very different from full-on privatization of an infrastructure project.

PPPs can reduce the time it takes for infrastructure projects to be completed, help public authorities accurately budget, bring in additional public revenue and save public funds. Because private contractors have the incentive to finish a project more quickly in order to come out with a profit, PPPs make dams, bridges, roads, rails and water systems available for the public's use faster<sup>50</sup>. PPPs allow public officials to more accurately budget for infrastructure projects because the cost of the short-term project is predetermined in the agreement with a private actor. The private actor then has the incentive to complete the project in the most cost-efficient manner possible so that they can make a profit within the constraints of the predetermined project payment. Longer-term PPPs can also help public officials balance their transportation and water infrastructure budgets because they generate revenue. For certain long-term, fee-for-use infrastructure projects, the private actor will pay the public authority upfront to undertake an infrastructure project in exchange for a public forfeit of all profits generated once the project is completed. This frees up more capital for public authorities to use on other less-profitable and

---

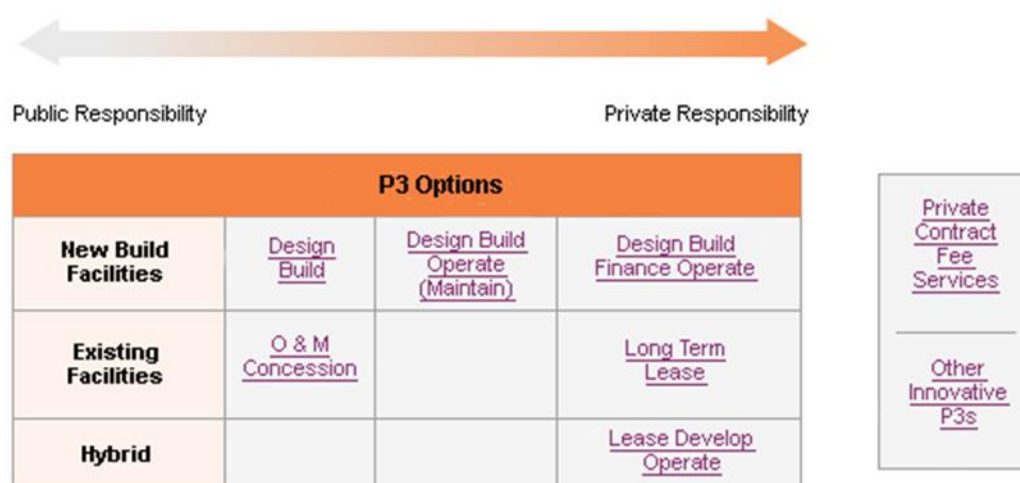
<sup>48</sup> The National Council for Public-Private Partnerships. "Fundamentals for Public-Private Partnerships (PPPs)." The National Council for Public-Private Partnerships. 13 Jan. 2012. <<http://www.ncppp.org/howpart/PPPfundamentals.html>>.

<sup>49</sup> Ibid.

<sup>50</sup> Federal Highway Administration. "Defining PPPs and Their Benefits." 6 Apr. 2011. US Department of Transportation. 25 Mar. 2012. <<http://www.fhwa.dot.gov/reports/pppwave/03.htm>>.

thus less attractive infrastructure projects. Additionally, PPPs save public funding and improve infrastructure quality because they allow more experienced infrastructure experts to take the reins on a project and cost the public entity only when a project arises. When infrastructure work becomes slow within a certain jurisdiction, a private actor can contract out their expertise elsewhere, whereas public experts are left to sit idle while still on the public payroll.

**Table 2: Types of PPP Arrangements<sup>51</sup>**



Public and private actors can tailor a PPP arrangement to the desired and appropriate length of time and balance of responsibility that a particular infrastructure project warrants (see Table 2). Nationally, the least risky types of PPPs are the most common. These include Design and Build (D &B), Fee-for-Service, and Operations and Maintenance (O&M), where respectively, a private actor is paid to design and construct a project, to complete a specific repair, or to operate and upkeep the infrastructure<sup>52</sup>. These short-term PPP options are the least risky option for private actors, but lowered risk comes with the tradeoff of lower maximum potential profits. Short-term PPPs also require the public actor to manage many different

<sup>51</sup> The National Council for Public-Private Partnerships.

<sup>52</sup> Federal Highway Administration, 6 Apr. 2011.



contracts throughout a piece of infrastructure's lifetime. Additionally, the public actor cannot take advantage of the cost savings of comprehensive planning when responsibility for an infrastructure project is divided among many actors. With multiple lower-risk contracts to manage, the public sector saves less than they would with a single, long-term PPP<sup>53</sup>.

More comprehensive PPPs include long-term leases, Design, Build, Operate and Maintain (DBOMs), Lease, Develop, Operate (LDOs), and Design, Build, Finance and Operate (DBFOs). Respectively, these arrangements entail long-term maintenance and operation of an existing facility, public financing of an infrastructure project built and then operated by a private actor, private operation during and after private execution of major improvements on an existing facility, and finally, private financing of an infrastructure project built and then operated by a private actor<sup>54</sup>. The entity responsible for a piece of infrastructure can best plan to save on current and future costs when they can look at the structure's comprehensive lifecycle; long-term PPPs allow private entities to do just that. Additionally, a single private expert is more likely to be able to handle the wide range of financial and technical risks associated with long-term responsibility than their public sector counterpart. According to a Stanford University study, long-term PPPs cost public actors 10 to 20 percent less than if the project had been undertaken fully by the public sector or by multiple short-term PPPs<sup>55</sup>.

Despite these benefits, long-term PPPs for water and transportation infrastructure in the United States are still rare. In order to increase the number of American PPPs, it's important to understand the past and present challenges that face such projects in the United States. Looking at those existing long-term PPP arrangements in the United States and to more successful,

---

<sup>53</sup> Federal Highway Administration, 6 Apr. 2011.

<sup>54</sup> The National Council for Public-Private Partnerships.

<sup>55</sup> Bestani, Robert. "Rebuilding America's Infrastructure: Lessons From Abroad." Nov. 2008. Stanford University. 22 Mar. 2012. <[http://crgp.stanford.edu/publications/working\\_papers/Bestani\\_rebuilding\\_americas\\_infrastructure\\_WP0042.pdf](http://crgp.stanford.edu/publications/working_papers/Bestani_rebuilding_americas_infrastructure_WP0042.pdf)>.

longer-established comprehensive PPPs abroad provides valuable insight for developing recommendations aimed at improving domestic long-term PPP facilitation and execution.

## **V. Domestic Long-Term PPP Progress**

The four different types of long-term PPPs, DBOM, LDO, DBFO and long-term lease, are attractive to public entities because of their ability to save more public dollars and to bring in larger private profits than less comprehensive, short-term PPPs. However, until the turn of the 21<sup>st</sup> century, almost without exception, American public and private actors did not pursue long-term PPP arrangements<sup>56</sup>. The recent long-term lease of the Chicago Skyway and the Indiana Toll Road, the LDO arrangement for the overhaul of the Elizabeth, New Jersey water delivery system and the Dulles Greenway DBFO agreement mark significant progress in the development of American long-term PPPs. These examples provide valuable insight as to the progress made in establishing PPPs, the hurdles that such arrangements faced in the past and the challenges that still prevent more long-term PPPs from being pursued.

In 2006, the City of Chicago signed America's first long-term highway lease, ceding the Chicago Skyway, a 7.8 mile-long toll road that connects I-94 to I-90, to a private operating entity<sup>57</sup>. The Skyway was constructed by the City of Chicago in 1958 and was maintained and operated by the city's Department of Streets and Sanitation from 1958 until 2006. By 2004, rising maintenance costs and a strained municipal budget led the city to search out a private partner to assume the highway's associated costs and responsibilities. In exchange for a payment

---

<sup>56</sup> Becker, Fred, and Valerie Patterson. "Public-Private Partnerships: Balancing Financial Returns, Risks, and Roles of Partners." *Public Performance & Management Review*. 29.2 (Dec. 2005): 125-44. <<http://www.jstor.org.proxyau.wrlc.org/stable/20447583?&Search=yes&searchText=partnerships&searchText=public&searchText=infrastructure&searchText=private&list=hide&searchUri=%2Faction%2FdoBasicSearch%3FQuery%3Dprivate%2Bpublic%2Bpartnerships%2Bin%2Binfrastucture%26acc%3Don%26wc%3Don&prevSearch=&item=1&ttl=5152&returnArticleService=showFullText>>.

<sup>57</sup> Federal Highway Administration. "Case Studies of Transportation Public-Private Partnerships in the United States." July 2007. *US Department of Transportation*. 24 Jan. 2012. <[www.dot.gov](http://www.dot.gov)>.

of \$1.83 billion and an agreement that the private company would be responsible for all maintenance and improvement costs, the City of Chicago gave the Spanish and Australian company Cintra/Macquarie, the right to keep all tolls generated on the roadway for the next 99 years. No American company placed an offer in the bidding process. Cintra/Macquarie combined its financial resources with the toll-backed investments of Chicago-area banks to form the private operating entity, the Skyway Concessions Company, LLC<sup>58</sup>.

The largest obstacle that Cintra/Macquarie and the City of Chicago faced in establishing the Skyway PPP was local toll collection restrictions. Chicago's original city charter banned toll roads. Without the ability to collect tolls, the Skyway could not be developed into a profitable, long-term PPP. In order to make the project attractive to a private partner without going through the difficult process of amending the city's charter, Chicago bypassed the law by classifying the elevated highway as a toll bridge, rather than a toll road<sup>59</sup>.

Chicago used the \$1.83 billion concession fee to invest back into less profitable, yet essential municipal infrastructure services that would otherwise be left unfunded. Over the course of the next five years, Chicago plans to use \$100 million of the concession fee to fund small-scale infrastructure construction and maintenance projects within some of the city's more disadvantaged neighborhoods<sup>60</sup>. Based on the success of this arrangement, other cities and states have since commenced similar long-term lease agreements with private foreign companies.

Following the City of Chicago's lead, in 2004, newly-elected Indiana Governor Mitch Daniels challenged the Indiana Finance Authority to explore the possibility of a long-term lease for the Indiana Toll Road. The highway runs 157 miles across the northern corridor of the state, connecting I-90 in Ohio to the Chicago Skyway in Illinois. The State of Indiana hired Wilbur

---

<sup>58</sup> Federal Highway Administration, July 2007.

<sup>59</sup> The National Council for Public-Private Partnerships.

<sup>60</sup> Ibid.

Smith and Goldman Sachs to investigate the feasibility of turning the route into a long-term PPP. The two firms analyzed the route's traffic volume and determined that the highway would generate enough tolls for a private partner to recover their initial investment over an extended period of private operation. Confident that the route could be turned into a public cost-saving, yet privately lucrative long-term PPP, Indiana opened up the project for bids in September 2005. Indiana received five bids for the project; all bidders were based in Africa, Spain and Australia by companies specializing in infrastructure financing and maintenance<sup>61</sup>.

In 2006, just after Cintra/Macquarie successfully purchased the rights to operate and toll the Chicago Skyway, they were awarded the rights to operate and toll the connecting Indiana Toll Road. The company, which created a subsidiary, Toll Road Concession Company, LLC, for the project, was the highest bidder, offering \$3.8 billion in exchange for a 75-year lease of the road<sup>62</sup>. The State of Indiana used the lump sum for improvements and expansion of a route vital to lower income communities in the southern part of the state that would have otherwise fallen into further disrepair.

Despite having won the lease, legal obstacles still prevented the company from immediately taking over. Pressure from Gov. Daniels finally pushed the Indiana State House to pass the authorizing legislation for the project, House Enrolled Act 1008, in March 2006. The act terminated the Indiana Department of Transportation's authority over the route and authorized the Toll Road Concession Company, LLC to take control of the route and collect all tolls generated. Because of these legal delays, the long-term lease officially began on June 29, 2006.<sup>63</sup>

---

<sup>61</sup> Federal Highway Administration, July 2007.

<sup>62</sup> Ibid., July 2007.

<sup>63</sup> Ibid., July 2007.

Years before the debut of long-term highway PPPs in America, American Water's subsidiary, Liberty Water Company, used a LDO PPP to save money in revitalizing their municipal water delivery system. The company paid the City of Elizabeth, New Jersey \$19 million for the first year, \$12 million for the second year, \$19 million for the third year of operation and a portion of utility revenues each year for the right to operate and collect utility fees<sup>64</sup>. The City of Elizabeth agreed in the LDO arrangement to invest in some system enhancement and expansion. Liberty was assigned the responsibility of collecting utility fee and investing in system upgrades for increased water quality and quantity. Utility fees not invested in system improvements or surrendered to the City of Elizabeth were American Water's profits.

Elizabeth first transferred water system operation and improvement responsibilities in 1998. At the time, the water delivery system was around 100 years old and in need of dramatic repairs. Several of the iron cast water mains broke in the mid-1990s, resulting in damage to surface infrastructure and private property<sup>65</sup>. Despite the existence of real needs, Elizabeth alone couldn't provide the investment needed to improve system safety, reliability and capacity. While Liberty is responsible for all system repairs and customer service inquiries throughout the duration of the 40-year LDO contract, operations are still subject to quarterly review by a committee comprised of members from both the City of Elizabeth and American Water.

Liberty was able to generate profits by revolutionizing the quality of the Elizabeth water delivery system. They installed computerized water pressure and rate of flow monitors so that potential system cracks in the 192 miles of piping could be detected long before they resulted in major, costly water main breaks. The arrangement represents a true collaborative and cost-

---

<sup>64</sup> American Water. "Operations." 2012. American Water. 24 Mar. 2012.  
<[http://www.amwatersolutions.com/uploads/projects/casestudies/CaseStudy\\_1\\_Project%20Sheet%20021\\_Liberty9cdfd195-1277-4ae4-9508-e7f8905e741b.pdf](http://www.amwatersolutions.com/uploads/projects/casestudies/CaseStudy_1_Project%20Sheet%20021_Liberty9cdfd195-1277-4ae4-9508-e7f8905e741b.pdf)>.

<sup>65</sup> Ibid., 2012.

saving partnership for the benefit of the municipal government, a private company and the general public<sup>66</sup>.

Far less successful than the Skyway and the Elizabeth, New Jersey water delivery system PPPs, the Dulles Greenway is a DBFO arrangement that illustrates the challenges that long-term PPPs still face in the United States. The Virginia State Assembly made private toll road PPP arrangements legally viable through a piece of legislation in 1988. The Greenway is a 14-mile long toll road that connects the Virginia-owned and operated Dulles Toll Road with Leesburg and splits its tolls with those collected on the Dulles Toll Road by the state of Virginia. At a cost of \$350 million, the state of Virginia contracted for the road to be built from 1993 to 1995, with the facilities coming under Virginia control in 2036<sup>67</sup>. CIGNA, John Hancock Mutual and Prudential Power Funding Associates, along with three other banks, invested in the project; these loans were backed by projected toll collection.

When private investors back their infrastructure investments with toll projections, they depend upon that predicted traffic volume to remain profitable. In 1995, when the highway opened, low traffic volume threatened the profitability of the DBFO project. In response to minimal traffic, the group of private investors reduced tolls, which raised volume, but still did not increase revenue to the levels needed to recover their initial investment. By 1996, the Greenway was facing financial default. In another effort to increase revenue, tolls were increased in July 1997 and the State of Virginia allowed the route to increase its speed limit to 65 miles per hour to attract more traffic<sup>68</sup>.

Despite all of these attempts to make the highway more profitable, in 1999, the investors were still struggling to make a profit. Without a plan for public operation, the state agreed to

---

<sup>66</sup> American Water, 2012.

<sup>67</sup> Federal Highway Administration, July 2007.

<sup>68</sup> Ibid., July 2007.

extend the PPP's timeframe by 20 years to 2056 to give the investors a longer period to recover their investment. By 2005, the Macquarie Infrastructure Group (MIG) purchased the project from the struggling investors for \$617.5 million<sup>69</sup>. The outlook for project profitability under MIG is promising; beginning in 2013, MIG can raise the toll annually at their discretion to compensate for changing traffic volumes. The Greenway case illustrates the very real level of risk involved for the private actor in a long-term PPP and the problems that can arise when the public actor has no back-up operating plan in the event of a private partner's default.

The slow embracement of such beneficial arrangements, the mixed success of such pursuits and the deficit of willing American private-partners illustrates that additional public support for PPPs is still needed in the United States. Looking to the examples of longer-established international long-term PPPs provides insight as to how obstacles facing the establishment of long-term PPPs and their operational success may be overcome.

## **VI. Lessons from the International Long-Term PPP Experience**

International long-term PPPs were pioneered in developed nations decades before their American counterparts. Most developed countries' governments have learned from their experiences and have now minimized many of the initial obstacles facing the most cost-effective long-term PPP arrangements. Rather than learn from their own mistakes, American governments and investors can learn from the international experience and apply such findings to American PPPs so that they can become more effective without experiencing the financial losses of a trial and error period. Australia's EastLink DBFO project, Spain's national PPP risk management, Europe's European Investment Bank, and Israel's Trans-Israel Toll Highway 6 DBFO arrangement, illustrate, respectively, the benefits of third party oversight, PPP appropriateness

---

<sup>69</sup> Federal Highway Administration, July 2007.

analysis, dispersed private risk, and advanced planning for an emergency public take-over, in creating the most robust long-term PPPs.

By hiring a third party to oversee the feasibility prior to and the quality during the creation of the DBFO East Link highway project, Victoria, Australia ensured that the long-term PPP would become a financial, social and environmental success. Planning for Victoria, Australia's EastLink highway began in the 1960s<sup>70</sup>. Victoria partnered with a third party to determine whether traffic in the proposed highway's area would be enough to generate a profit, and whether having a tolled route there would disproportionately impact poorer area populations. The third party deemed that both long-term PPP conditions had been met and gave Victoria their approval to proceed. However, before Victoria continued with the PPP, they hired yet another third party in the 1990s to assess the environmental impacts of the project. Having satisfied economic, social and environmental concerns, Victoria opened the project for bids.

While planning began in the 1960s, ConnectEast, a private Australian infrastructure financier and operator, won the bid in 2004. ConnectEast paid Victoria \$2.4 billion to build, operate and collect tolls on the 39 kilometers-long highway<sup>71</sup>. Victoria and ConnectEast sacrificed some of their savings and profits to pay for a third party to oversee construction and the first two years of operation. The third party was hired so that the public and Victoria's government could be assured that the project was constructed and run in a safe, environmentally-sound manner, and protected ConnectEast from any extraneous, costly infrastructure demands imposed by the government of Victoria. As a result of third party oversight before and after the development of the long-term PPP, the EastLink opened 5 months ahead of schedule and has

---

<sup>70</sup> Federal Highway Administration. "International Programs." 1 Feb. 2012. US Department of Transportation. 10 Mar. 2012. <<http://international.fhwa.dot.gov/pubs/pl09010/03.cfm>>.

<sup>71</sup> ConnectEast. "The Benefits." ConnectEast Pty. Limited, 24 Apr. 2012. <<http://www.eastlink.com.au/page.aspx?cid=117>>.



come to be held in high-esteem by the Australian public. Reviewing a potential PPP before its execution can help decrease a project's negative social and environmental impacts and can also minimize unintended economic consequences because it makes long-term PPP investors better aware of project risks before assuming them.

There are fewer instances of international long-term PPP default arguably because of international firms' greater experience than American firms with the logistics of infrastructure investment. However, the common foreign public practice of notifying investors of long-term PPP risks before taking on an infrastructure project may also contribute to a reduced number of international infrastructure investor defaults. Spain has a national law that mandates that before any infrastructure PPP can be agreed upon and executed, the government must assess the projected social, environmental and economic impacts of a long-term PPP and fully disclose all project risks<sup>72</sup>. The national government analyzes profit projections of a particular highway, bridge, rail system or water delivery system and shares them with all potential investors before they place their bids. Full disclosure of risks discourages companies, especially inexperienced companies, from taking on the potentially unmanageable risks posed by the most complex PPPs.

Beyond Spain's risk disclosure approach to reducing long-term project defaults, finance pooling has been a popular method internationally for reducing risk. In Europe, the European Investment Bank has allowed governments, particularly those in Eastern Europe, to benefit from the cost-savings of long-term infrastructure PPPs without the threat of the entire project failing because of a single private partner's default. The European Investment Bank serves as a continent-wide infrastructure bank; it coordinates the collection of many small, private

---

<sup>72</sup> Federal Highway Administration, 1 Feb. 2012.

investments for each long-term PPP infrastructure project<sup>73</sup>. Since each individual company makes a small investment in the project, the financial burden early-on before user-fees can be collected to recover the initial investment is distributed and thus does not greatly threaten the overall solvency project. Because of the European Investment Bank's infrastructure investment coordination, less economically-robust regions, including Poland's depressed Wisla River Valley, have been able to attract stable private investment to make highway and bridge projects feasible at a lower public cost.

When public entities do not disclose project risk or coordinate the pooling of investment to limit long-term PPP risk, international public entities typically create emergency plans in advance for public takeover in the event of the private partner's failure. Israel initiated a long-term highway DBFO PPP for its Trans-Israel Highway 6 near Tel Aviv in order to better connect its growing population and open up more routes for military mobilization at a lower public cost. The 53-mile highway was contracted for 40 years beginning in 1999 to a private company, Derech Eretz, in exchange for \$1.3 billion<sup>74</sup>.

In order to ensure that the project would not fail in the event that Derech Eretz went bankrupt, Israel developed an emergency plan for public construction and operation. Israel originally set aside funding equal to 80 percent of the route's construction costs so that completing the highway project would still be financially feasible even without the backing of the private partner<sup>75</sup>. After construction was completed, Israel freed those funds for other infrastructure projects, but arranged with the private actor that any profits above the top

---

<sup>73</sup> The European Investment Bank. "Projects." 2012. The European Investment Bank. 25 Apr. 2012. <<http://www.eib.org/infocentre/search.htm?keywords=infrastructure>>.

<sup>74</sup> Federal Highway Administration. "Case Studies of Transportation Public-Private Partnerships around the World." 7 July 2007. US Department of Transportation. 16 Mar. 2012. <[http://www.fhwa.dot.gov/ipd/pdfs/int\\_ppp\\_case\\_studies\\_final\\_report\\_7-7-07.pdf](http://www.fhwa.dot.gov/ipd/pdfs/int_ppp_case_studies_final_report_7-7-07.pdf)>.

<sup>75</sup> Ibid., 7 July 2007.

projections would be saved by Israel for operation in the event of a Derech Eretz default. Having a thorough back-up public operation plan ensured that the highway project would not be a wasted investment even if the private actor would no longer be financially-able to hold up their end of the PPP agreement.

Internationally, the keys to successful long-term PPPs have been a pooling of project risk, critical third party assessment before and during PPP execution, and prepared comprehensive public emergency takeover plans. These successful international strategies can be readily adopted domestically to increase the success of future American long-term PPPs.

## **VII. Recommendations For Fostering the Most Beneficial Long-Term PPPs:**

Analyzing the problems facing American long-term PPPs and the innovations that contributed to the success of international PPPs creates an understanding as to the steps that American governments need to take in order to increase domestic PPP success. The following recommendations are aimed at increasing the number of interested private partners, especially American private investors, and at decreasing the risk of project failure once a long-term PPP infrastructure project is underway. Beyond the recommendations below, American governments should continue to keep an eye on international long-term PPP innovations. International PPPs are on the cutting edge and American governments should learn from their successes and mistakes in order to avoid the cost of trials and errors domestically.

**Recommendation #1: Before opening up an infrastructure project to private bids, governments should consider whether a long-term PPP arrangement is appropriate in the context of that particular type of infrastructure and the community it will serve.**

All long-term PPP arrangements require that the private actor is able to recover their initial investment. In order to earn a profit on their initial investment, the private actor must be

able to collect private fees for the use of their infrastructure project. Reliably collecting user fees is not possible for all types of infrastructure. Public transit, bridges, highways, water delivery systems and rails are excludable. However, since levees may protect wide areas of mixed-use land and dams may create a variety of services, from flood protection to recreation to power, it becomes difficult to determine who will pay and how such fees should be collected. Should fees from all private and public owners of property being protected from flooding be collected or should fees be collected from all of those using the water and the land being protected from flooding for recreation? For a long-term PPP to be attractive to a private partner, there must be a clear method of fee collection. Otherwise, they cannot guarantee that free-riders will benefit from the infrastructure projects at their loss.

Public actors should also avoid using long-term PPPs for projects that would cause extreme negative distributional impacts. Pay-per-use infrastructure that serves lower income populations either would be less profitable for a private partner, or would impose significant burdens on that population. User fees are essential in making long-term PPPs profitable, but these user fees, depending on the exact price, could negatively impact disadvantaged populations if they have no other alternative infrastructure option. Highways and bridges can often be bypassed, but the natural monopoly quality of water delivery systems and public transit make payment nearly unavoidable. American public entities should consider alternative short-term PPP options for infrastructure projects that lack clear user-fee collection points and those for which user-fee collection would create burdensome distributional impacts.

**Recommendation #2: Governments should foster the creation of Infrastructure banks (I-banks) that disperse long-term infrastructure project risk.**

The enormous risk that comes with individually undertaking a long-term water or transportation PPP is the reason that so few American companies have competed in the long-term PPP bidding process to date. I-banks, for example the European Investment Bank, are commonly used abroad as a tool for attracting long-term PPP investors who do not have the resources or the experience to coordinate an entire project on their own. American governments at all levels should facilitate the creation of I-banks so that the public sector can quickly see the cost-savings of more long-term PPPs and so that young, American infrastructure investors can begin to get the experience that they will need in order to eventually take on the entire risk of a long-term PPP by themselves someday.

To date, American municipal governments have been much more successful in establishing I-banks than state or federal governments. New York City was the first government in the United States to boast an I-bank and has since successfully used the bank as a tool for improving its tunnels and public transit system<sup>76</sup>. Chicago has followed New York's lead and announced the establishment of its own municipal I-bank in March 2012; the bank has since attracted over \$1 million in private investments<sup>77</sup>. Nationally, a federal I-bank proposal has repeatedly come through the Senate Committee on Commerce, Science and Transportation (SCCST), but still has not been passed in any original or reauthorizing transportation or water infrastructure legislation<sup>78</sup>. Most recently, a bipartisan proposal, backed by Senators John Kerry and Kay Bailey Hutchison, for a national I-bank facilitated by the U.S. DOT passed through the

---

<sup>76</sup> Reuters. "Banker Rohatyn to Guide NY Infrastructure Bank: Governor." 28 Feb. 2012. Reuters. 03 March 2012. <<http://www.reuters.com/article/2012/02/29/us-newyork-rohatyn-idUSTRE81S0B220120229>>.

<sup>77</sup> Hinz, Greg. "How to Make Rahm's Infrastructure Bank Really Work." 2 Mar. 2012. Crain's Chicago Business. 14 Apr. 2012. <<http://www.chicagobusiness.com/article/20120302/BLOGS02/120309949/how-to-make-rahms-infrastructure-bank-really-work>>.

<sup>78</sup> American Water Works Association. "National Water Infrastructure Bank." American Water Works Association. 03 March 2012. <<http://www.awwa.org/files/GovtPublicAffairs/PDF/InfraBankLegPrinciples.pdf>>.

SCCST in July 2011, but failed to be passed by the full Senate<sup>79</sup>. Broad international and narrower American I-banks success warrant further American national and state government attention to establishing I-banks at those higher levels. If more American governments facilitate the creation of I-banks, more long-term PPPs can be developed in the near future, and more American investors will soon have the resources and experience necessary to confidently individually assume all of the risks associated with long-term PPP infrastructure projects.

**Recommendation #3: Public PPP partners should have back-up plans prepared for infrastructure completion and operation in the event of private partner default.**

The long-term PPP highway project in Israel arguably was more successful than the Dulles Greenway project because of its public actor's thorough advanced planning for an emergency public project takeover. American public entities partnering in long-term PPPs should not forego the important step of planning both logistically and financially for an emergency public takeover of a long-term PPP. Because the State of Virginia lacked such a plan, they were forced to extend the Greenway project for another 20 years, left hoping that the private partner would stick it out and recover their initial investment over the extended period<sup>80</sup>. However, if the private partner still defaults, with no public plan for financing and operating the project, Virginia might have to close the Greenway until they can find another private partner or come up with the funding themselves. Even if an American public partner expects that their private partner is readily able to assume the financial and logistical risks of a long-term PPP, they should prepare an emergency takeover plan so that an infrastructure project will not go to waste under any circumstances.

---

<sup>79</sup> AASHTO Center for Excellence in Project Finance. "State Infrastructure Banks." 2011. AASHTO. 02 March 2012. <[http://www.transportation-finance.org/funding\\_financing/financing/credit\\_assistance/state\\_infrastructure\\_banks.aspx](http://www.transportation-finance.org/funding_financing/financing/credit_assistance/state_infrastructure_banks.aspx)>.

<sup>80</sup> Federal Highway Administration, July 2007.

**Recommendation #4: Public and private partners should jointly hire third parties to assess the quality of the project and maintain PPP transparency at all project stages.**

Minimizing the environmental and social impacts of highways, bridges, rails, public transit and water delivery systems depends upon honest oversight that holds both the private and the public PPP actors accountable. American governments should borrow their international counterparts' practice of using third parties to assess the economic, environmental, and social impacts of a PPP project before opening it up for public bids and to serve as a referee between the private and public parties during the PPP arrangement. Such an arrangement ensures that only those infrastructure projects that are reasonably believed to be profitable, neutral in regards to ecosystem impacts, and benign in regards to disadvantaged populations will be pursued for long-term PPP development. Once a PPP arrangement has begun, third party oversight during the construction and operation phases builds trust between the two partners by ensuring that both are upholding their contractual obligations. As evidenced by the EastLink case study, the third party ensured that all safety and environmental considerations were honored by the private partner, ConnectEast, and that the public partner, the Victorian government, kept its demands within the bounds of the contract<sup>81</sup>.

Finally, such transparency in the long-term PPP process instills public confidence in the concept of PPPs. Many members of the public who are unfamiliar with PPPs may be skeptical of the arrangement, assuming that it is the privatization of a public good that submits them, as users of a public good, to greedy private fee collections. To instill public and private confidence in the long-term PPP process, American governments and their private partners should forgo some of their savings and profits to hire neutral third parties either from the non-profit, trade association or academic realm. Third party oversight will put to rest the concerns of PPP

---

<sup>81</sup> ConnectEast.

skeptics and help build American salience around the acceptability of long-term PPPs as a viable infrastructure improvement strategy.

### **VIII. Conclusion:**

Budget shortfalls and rising public debts do present an obstacle in funding water and transportation infrastructure projects, but is one that can be creatively overcome. PPPs allow governments to effectively address the problems of water and transportation infrastructure system deficiencies and insufficient capacities. Such arrangements fulfill public need without compromising public solvency and stimulate private sector growth.

Water delivery systems and transportation infrastructure projects can be easily adapted to a for-profit PPP long-term arrangement because of their excludable nature that allows for clear user-fee collection. Government support for long-term PPPs is important for their continued domestic growth, especially in these troubled economic times during which nervous private investors dropped their infrastructure investments by 80 percent<sup>82</sup>. International water and transportation long-term PPP case studies show that such long-term collaboration has been successful in reducing negative environmental, health and safety externalities while simultaneously creating public opportunities for savings and private opportunities for profits. American governments and investors have historically not pursued the most beneficial, long-term PPPs, but if American governments can adopt the tested international approaches of limiting project risk by pooling private investments in I-banks, hiring third parties to assess project risk and feasibility both before and during project execution, and preparing a comprehensive emergency public takeover plan before the start of a long-term PPP arrangement,

---

<sup>82</sup> Jacobius, Arleen. "Infrastructure No Longer an Investing Wallflower." 12 Dec. 2011. Pensions & Investments. 04 March 2012. <<http://www.pionline.com/article/20111212/PRINTSUB/312129976/infrastructure-no-longer-an-investing-wallflower>>.



they may be able to quickly enjoy the cost-savings of long-term PPPs and develop a strong domestic infrastructure investment industry.

The budget shortfalls and public debt of recent years force American governments to think creatively about how to provide quality, reliable water and transportation at an affordable price. Instead of adopting an infrastructure approach rooted in inaction or additional contribution to public debt, American governments should embrace long-term PPPs as a strategy that can fill the public funding void and bring much needed improvements and expansions to American water and transportation infrastructure systems. By thinking imaginatively about water and transportation infrastructure provision, American governments can deliver safe, reliable infrastructure to the public, stimulate the American economy and avoid further ballooning of public debt, and do it all in a socially and environmentally-responsible manner.

## Works Cited and Consulted:

- AASHTO Center for Excellence in Project Finance. "State Infrastructure Banks." 2011. AASHTO. 02 March 2012. <[http://www.transportation-finance.org/funding\\_financing/financing/credit\\_assistance/state\\_infrastructure\\_banks.aspx](http://www.transportation-finance.org/funding_financing/financing/credit_assistance/state_infrastructure_banks.aspx)>.
- America 2050. "An Infrastructure Vision for 21<sup>st</sup> Century America." 2008. Regional Plan Association. 20 Feb. 2012. <<http://www.america2050.org/AM2050Infra08sm.pdf>>.
- American Public Transportation Association. "Public Transportation: Moving America Forward." 2010. American Public Transportation Association. 12 Feb. 2012. <[http://www.apta.com/resources/reportsandpublications/Documents/APTABrochure\\_v28%20FINAL.pdf](http://www.apta.com/resources/reportsandpublications/Documents/APTABrochure_v28%20FINAL.pdf)>.
- American Society of Civil Engineers. "Failure to Act: The Economic Impact of Current Investment Trends in Surface Transportation Infrastructure." 2011. ASCE. 28 Aug. 2011. <<http://www.asce.org/failuretoact/>>.
- American Society of Civil Engineers. "Report Card for America's Infrastructure." 2012. ASCE. 23 Jan. 2012. <<http://www.infrastructurereportcard.org/>>.
- American Water. "Operations." 2012. American Water. 24 Mar. 2012. <[http://www.amwatersolutions.com/uploads/projects/casestudies/CaseStudy\\_1\\_Project%20Sheet%202021\\_Liberty9cdfd195-1277-4ae4-9508-e7f8905e741b.pdf](http://www.amwatersolutions.com/uploads/projects/casestudies/CaseStudy_1_Project%20Sheet%202021_Liberty9cdfd195-1277-4ae4-9508-e7f8905e741b.pdf)>.
- American Water Works Association. "National Water Infrastructure Bank." American Water Works Association. 03 March 2012. <<http://www.awwa.org/files/GovtPublicAffairs/PDF/InfraBankLegPrinciples.pdf>>.
- Apogee Research, Inc. "Infrastructure in the 20<sup>th</sup> Century Economy." Feb. 1994. United State Army Corps of Engineers. 26 Jan. 2012. <[http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=5&ved=0CEQQFjAE&url=http%3A%2F%2Fwww.iwr.usace.army.mil%2Fdocs%2Fiwrreports%2F94-FIS-9.pdf&ei=OAcnT4PRIO230AHhm7TTCA&usg=AFQjCNE3hJGSf7MD2PZSJw6\\_hwiJM1tulA](http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=5&ved=0CEQQFjAE&url=http%3A%2F%2Fwww.iwr.usace.army.mil%2Fdocs%2Fiwrreports%2F94-FIS-9.pdf&ei=OAcnT4PRIO230AHhm7TTCA&usg=AFQjCNE3hJGSf7MD2PZSJw6_hwiJM1tulA)>.
- Barrigner, Felicity. "Oh Danny Boy, the Pipes, the Pipes are Failing." 20 Dec. 2011. The New York Times. 15 Feb. 2012. <<http://green.blogs.nytimes.com/2011/12/20/oh-danny-boy-the-pipes-the-pipes-are-failing/>>.
- Becker, Fred, and Valerie Patterson. "Public-Private Partnerships: Balancing Financial Returns, Risks, and Roles of Partners." Public Performance & Management Review. 29.2 (Dec. 2005): 125-44. <<http://www.jstor.org.proxyau.wrlc.org/stable/20447583?&Search=yes&searchText=partnerships&searchText=public&searchText=infrastructure&searchText=private&list=hide&searchUri=%2Faction%2FdoBasicSearch%3FQuery%3Dprivate>>.

%2Bpublic%2Bpartnerships%2Bin%2Binfrastucture%26acc%3Don%26wc%3Don&pre  
vSearch=&item=1&ttl=5152&returnArticleService=showFullText>.

Bestani, Robert. "Rebuilding America's Infrastructure: Lessons From Abroad." Nov. 2008. Stanford University. 22 Mar. 2012. <[http://crgp.stanford.edu/publications/working\\_papers/Bestani\\_rebuilding\\_americas\\_infrastructure\\_WP0042.pdf](http://crgp.stanford.edu/publications/working_papers/Bestani_rebuilding_americas_infrastructure_WP0042.pdf)>.

Chantrill, Christopher. "Government Spending Data." 29 Feb. 2012. USGovernmentDebt.us. 29 Feb. 2012. <http://www.usgovernmentdebt.us/index.php>.

ConnectEast. "The Benefits." ConnectEast Pty. Limited. 24 Apr. 2012.  
<<http://www.eastlink.com.au/page.aspx?cid=117>>.

Dudley, Michael. "Aging Wastewater System Threatening Water Supply." 15 May 2008. Planetizen. 02 Feb. 2012. <<http://www.planetizen.com/node/3119>>.

The European Investment Bank. "Projects." 2012. The European Investment Bank. 25 Apr. 2012. <<http://www.eib.org/infocentre/search.htm?keywords=infrastructure>>.

Federal Highway Administration. "Case Studies of Transportation Public-Private Partnerships in the United States." July 2007. US Department of Transportation. 24 Jan. 2012. <[www.dot.gov](http://www.dot.gov)>.

Federal Highway Administration. “Case Studies of Transportation Public-Private Partnerships around the World.” 7 July 2007. US Department of Transportation. 16 Mar. 2012. <[http://www.fhwa.dot.gov/ipd/pdfs/int\\_ppp\\_case\\_studies\\_final\\_report\\_7-7-07.pdf](http://www.fhwa.dot.gov/ipd/pdfs/int_ppp_case_studies_final_report_7-7-07.pdf)>.

Federal Highway Administration. "Defining PPPs and Their Benefits." 6 Apr. 2011. US Department of Transportation. 25 Mar. 2012.  
<<http://www.fhwa.dot.gov/reports/pppwave/03.htm>>.

Federal Highway Administration. "International Programs." 1 Feb. 2012. US Department of Transportation. 10 Mar. 2012. <<http://international.fhwa.dot.gov/pubs/pl09010/03.cfm>>.

Hanke, Steve H. "In Praise of Private Infrastructure." Apr. 2008. Cato Institute. 12 Jan. 2011.  
<[http://www.cato.org/pub\\_display.php?pub\\_id=9307](http://www.cato.org/pub_display.php?pub_id=9307)>.

Helm, Dieter, and David Thompson. "Privatized Transport Infrastructure and Incentives to Invest." *Journal of Transport Economics and Policy*. 25.2 (Sept. 1991): 231-46.  
<<http://www.jstor.org.proxyau.wrlc.org/stable/20034963?&Search=yes&searchText=crumbling&searchText=infrastructure&list=hide&searchUri=%2Faction%2FdoBasicSearch%3FQuery%3Dcrumbling%2Binfrastructure%26gw%3Djtx%26acc%3Don%26prq%3Dsate%2Bof%2Bamerican%2Btransportation%2Binfrastructure%26Search%3DSearch%26hp%3D25%26wc%3Don&prevSearch=&item=5&ttl=1278&returnArticleService=showFullText>>.

- Hinz, Greg. "How to Make Rahm's Infrastructure Bank Really Work." 2 Mar. 2012. Crain's Chicago Business. 14 Apr. 2012.  
<<http://www.chicagobusiness.com/article/20120302/BLOGS02/120309949/how-to-make-rahms-infrastructure-bank-really-work>>.
- Jacobius, Arleen. "Infrastructure No Longer an Investing Wallflower." 12 Dec. 2011. Pensions & Investments. 04 March 2012. <<http://www.pionline.com/article/20111212/PRINTSUB/312129976/infrastructure-no-longer-an-investing-wallflower>>.
- Katz, Bruce, Charles Puentes, and Christopher Geiss. "America's Infrastructure: Ramping Up or Crashing Down?" Brookings Institution. 23 Jan. 2012. <[http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&sqi=2&ved=0CDEQFjAC&url=http%3A%2F%2Fwww.brookings.edu%2F~%2Fmedia%2Ffiles%2Frc%2Fpapers%2F2008%2F01\\_infrastructure\\_katz\\_puentes%2F01\\_infrastructure\\_katz\\_puentes.pdf&ei=bRAnT-xQ5eHSAbib1fUI&usg=AFQjCNff2sEnrDbIovqSomGfQ7aHTUmY1Q](http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&sqi=2&ved=0CDEQFjAC&url=http%3A%2F%2Fwww.brookings.edu%2F~%2Fmedia%2Ffiles%2Frc%2Fpapers%2F2008%2F01_infrastructure_katz_puentes%2F01_infrastructure_katz_puentes.pdf&ei=bRAnT-xQ5eHSAbib1fUI&usg=AFQjCNff2sEnrDbIovqSomGfQ7aHTUmY1Q)>.
- Kosik, Alison. "Experts: U.S. Water Infrastructure In Trouble." 21 Jan. 2011. CNN. 10 Dec. 2011. <<http://www.cnn.com/2011/US/01/20/water.main.infrastructure/index.html>>.
- Lane, Charles. "The U.S. Infrastructure Argument That Crumbles Upon Examination." 31 Oct. 2011. The Washington Post. 23 Jan. 2012.  
<[http://www.washingtonpost.com/opinions/the-us-infrastructure-argument-that-crumbles-upon-examination/2011/10/31/gIQAnILRaM\\_story.html](http://www.washingtonpost.com/opinions/the-us-infrastructure-argument-that-crumbles-upon-examination/2011/10/31/gIQAnILRaM_story.html)>.
- Luhby, Tami. "States go deeper into debt." 30 July 2010. CNN. 24 Feb. 2012.  
<[http://money.cnn.com/2010/07/30/news/economy/state\\_debt\\_levels/index.htm](http://money.cnn.com/2010/07/30/news/economy/state_debt_levels/index.htm)>.
- National Committee on Levee Safety. "Recommendations for a National Levee Safety Program." 15 Jan. 2009. National Committee on Levee Safety. 25 Mar. 2012.  
<[http://www.lafollette.wisc.edu/publicservice/floods/NCLS-Recommendation-Report\\_012009\\_DRAFT.pdf](http://www.lafollette.wisc.edu/publicservice/floods/NCLS-Recommendation-Report_012009_DRAFT.pdf)>.
- The National Council for Public-Private Partnerships. "Fundamentals for Public-Private Partnerships (PPPs)." The National Council for Public-Private Partnerships. 13 Jan. 2012.  
<<http://www.ncppp.org/howpart/PPPfundamentals.html>>.
- Next American City. "The State of Transportation Infrastructure: An Interview with Robert Puentes." 21 Sept. 2010. Americancity.org. 25 Jan. 2012.  
<http://americancity.org/podcast/episode/the-state-of-transportation-infrastructure-an-interview-with-robert-puentes/>>.
- Office of Energy Efficiency and Renewable Energy. "Vehicle Emissions." Aug. 2003. US Department of Energy. 23 Mar. 2012.  
<[http://www.iowacleancities.org/idle\\_reduction/files/emissionsfactsheetcc.pdf](http://www.iowacleancities.org/idle_reduction/files/emissionsfactsheetcc.pdf)>.

- Office of Highway Policy Information. "Highway Finance Data Collection." 2011. US Department of Transportation. 11 Apr. 2012.  
<<http://www.fhwa.dot.gov/policyinformation/pubs/hf/pl11028/chapter4.cfm>>.
- Reuters. "Banker Rohatyn to Guide NY Infrastructure Bank: Governor." 28 Feb. 2012. Reuters. 03 March 2012. <<http://www.reuters.com/article/2012/02/29/us-newyork-rohatyn-idUSTRE81S0B220120229>>.
- Slone, Sean. "Civil Engineers Report: Failure to Improve Transportation Infrastructure Will Cost America Dearly." 27 July 2011. The Council of State Governments. 04 Feb. 2012.  
<<http://knowledgecenter.csg.org/drupal/content/civil-engineers-report-failure-improve-transportation-infrastructure-will-cost-america-dearl>>.
- Transportation for America. "The Fix We're in For: The State of Our Nation's Busiest Bridges." Oct. 2011. Transportation for America. 12 Jan. 2012.  
<<http://t4america.org/docs/bridgereport/bridgereport-metros.pdf>>.
- United State Environmental Protection Agency. "Water Infrastructure." 2 Aug. 2011. US EPA. 5 Dec. 2011. <<http://water.epa.gov/infrastructure/>>.
- Walsh, Bryan. "The Metro Crash: A Nation's Aging Transit System." 26 June 2009. Time Magazine. 15 Mar. 2012.  
<<http://www.time.com/time/health/article/0,8599,1907095,00.html>>.