

Financing U.S. Transportation Infrastructure in the 21st Century

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NOTE: This discussion paper is a proposal from the author(s). As emphasized in The Hamilton Project's original strategy paper, the Project was designed in part to provide a forum for leading thinkers across the nation to put forward innovative and potentially important economic policy ideas that share the Project's broad goals of promoting economic growth, broad-based participation in growth, and economic security. The author(s) are invited to express their own ideas in discussion papers, whether or not the Project's staff or advisory council agrees with the specific proposals. This discussion paper is offered in that spirit.

BROOKINGS

Abstract

The nation's transportation infrastructure, it is widely agreed, is eroding and in need of investment. Most policymakers recognize the merits of investing in the system, such as gains in productivity, global competitiveness, and job creation. Low public borrowing rates have also created an attractive climate for increased public investment. However, government leaders have failed to agree on which investments to make and how to pay for them. In order to break this logjam, this paper proposes two tracks of solutions, some of which can be implemented quickly, and others can be executed over the longer term. In the short term, we propose improvement and expansion of the Transportation Infrastructure Finance and Innovation Act lending program, reauthorization of Build America Bonds, better utilization of the Army Corps of Engineers and the Harbor Maintenance Trust Fund, and reform of the federal gas tax. Over the longer term, we recommend investing in research to improve user fee technology and using federal incentives to encourage states to adopt standardized and innovative user fee technology, fostering cooperation in pooled procurement among states and municipalities, and developing and implementing a broad national strategy to guide infrastructure investment in the United States.

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Chapter 1. Introduction

Most Americans feel the burden of a weakening transportation infrastructure. The evidence is right in front of us: in poor road and bridge conditions, aging airports and seaports, weak passenger rail service, and inadequate public transportation. Most economists and government leaders agree on the merits of upgrading these systems to improve productivity, global competitiveness, and job creation. Most also agree that our nation would benefit from federal action on infrastructure. There are disagreements, however, on which investments to make and how to pay for them, and these disagreements have led to counterproductive inaction.

It is crucial to resolve this stalemate and launch a federal initiative to increase investment before the decay of U.S. infrastructure further affects national well-being. For example, the declining condition of the American road system alone already imposes a large toll on the economy in traffic delays and vehicle repairs.

Moreover, economic reasons suggest that now is an opportune time for infrastructure investment. First, public borrowing rates are near historical lows, with the federal government able to borrow funds at an interest rate of 2 percent, and state and local governments enjoying similarly low rates.¹ For any given rate of return on infrastructure investment, a lower cost of funds today results in greater net benefits for society from the investment in the longer run.

Second, although the labor market has rebounded significantly from the economic recession, the job sectors most involved in building infrastructure remain relatively weak. According to the U.S. Department of the Treasury (DoT), 61 percent of the jobs created by investment in infrastructure are in construction, with another 12 percent in manufacturing (DoT with the Council of Economic Advisers 2010). The unemployment rate for construction workers was 8.9 percent in 2014, significantly higher than the 2014 national average of 6.2 percent (Bureau of Labor Statistics n.d.).

Finally, improving infrastructure today provides an opportunity to incorporate new information on the value of increasing resilience. Superstorm Sandy, Hurricane Katrina, and other natural disasters have demonstrated the significant costs of inadequate and decaying roads, bridges, and tunnels, as well as the potential economic returns from investments that make these byways more resilient. By investing now, with the knowledge gained from recent experiences, we can more efficiently and effectively maximize the return on infrastructure investment.

Given the importance and urgency of these investments, we propose a two-track solution: a first track that offers approaches that could be implemented quickly and over the short term, drawing on existing programs and agencies; and a second track of more-strategic approaches that could be rolled out and implemented over the longer term.

In the short-term track, we propose (1) improving and expanding the Transportation Infrastructure Finance and Innovation Act (TIFIA) lending program, (2) bringing back Build America Bonds (BABs), (3) using the Army Corps of Engineers (Army Corps) and Harbor Maintenance Trust Fund (HMTF) in a more efficient way, and (4) indexing the federal gas tax so it varies with retail gasoline prices.

On the long-term track, we recommend (1) federal incentives and guidelines for the development and adoption of new technologies to collect user fees, (2) cooperation among states and municipalities to foster pooled procurement, and (3) development and implementation of a national strategy that calls for federal actors to commit themselves to a long-term plan for infrastructure investment in the United States.

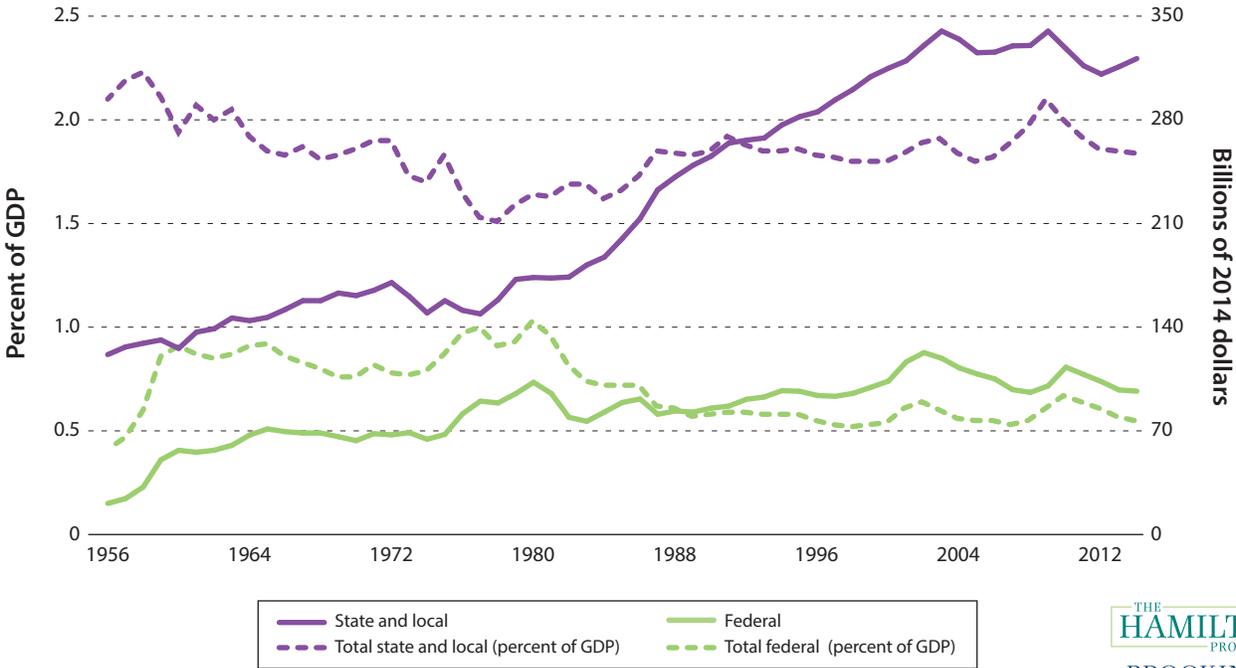
Chapter 2. High-Level Challenges to Federal Infrastructure Investment

The backbone of America’s economy is our transportation infrastructure system. Key parts of this system have been decaying for a variety of reasons, as documented by earlier Hamilton Project reports (Basso and Duvall 2013; Engel, Fischer, and Galetovic 2011; Kahn and Levinson 2011), and chief among them is a lack of investment. The cost of this decay is often invisible at first, with small problems and delays causing minor costs and inconvenience. Over time, these costs magnify. Extreme results, such as the collapse of the Interstate 35 Bridge in Minneapolis in 2007 or the collapse of the Skagit River Bridge on Interstate 5 in Washington State in 2013 are still quite rare. Without increased investment, collapses could become more common: the American Society of Civil

Engineers (2013) deems one in four bridges either functionally obsolete or structurally deficient. Furthermore, the World Economic Forum’s annual *Global Competitiveness Reports* show that in the past six years the United States has fallen from ninth to sixteenth in overall infrastructure quality (Porter and Schwab 2008; World Economic Forum 2014). The American Society of Civil Engineers issues annual, increasingly dire, assessments of the nation’s underpinnings.

It was not always this way. Historically, infrastructure investment received steady support at all levels of government. The legendary New York City mayor Fiorello H. La Guardia captured this spirit in his reported observation that “there

FIGURE 1. Public Infrastructure Spending by Federal, State, and Local Governments, 1956–2014



Source: CBO (2015b).

Note: State and local spending for infrastructure is net of federal grants and loan subsidies. These loans and subsidies are counted as federal spending. Public infrastructure includes spending on highways, mass transit, rail, aviation, water transportation, water resources, and water utilities. Annual values in dollars are adjusted using an infrastructure-specific index that accounts for changes in the prices of goods and services spent for infrastructure.

is no Democratic or Republican way of cleaning the streets.” Indeed, the federal gasoline tax was first enacted under President Dwight D. Eisenhower to fund construction of the interstate highway system. This federal tax became the key revenue source for the Highway Trust Fund (HTF), the nation’s primary finance mechanism for highway construction and maintenance. Subsequent increases in this tax occurred under President Ronald Reagan, who was the first to expand the HTF to cover mass transit, and under President Bill Clinton.

However, the federal gasoline tax currently stands at 18.4 cents per gallon, the same level as it was in 1993.² If the gas tax had been set to automatically adjust for inflation, it would currently be 30 cents per gallon. Looked at another way, motorists in 1993 were paying about 17 percent of the average price at the pump (\$1.07 per gallon) in federal gas taxes. Over the past five years, federal gas taxes made up only 5 percent of the price paid at the pump (\$3.42 per gallon). Even with the sharp drop in gas prices at the beginning of 2015, the share of the price that went to federal taxes was half of what it was in 1993 (U.S. Energy Information Administration n.d.).

Concomitant with the effective freezing of the gas tax has been a stagnation, followed by a decline, in total national spending on transportation infrastructure. According to the Congressional Budget Office (CBO 2015b), total public spending on U.S. infrastructure in 2014 was \$416 billion—a lower level in real terms than we saw ten years ago. This sum includes funding for highways (48 percent of total spending), aviation (17 percent), rail and mass transit (16 percent), as well as funding for water resources such as ports and harbors, and utilities.

Not all of this money comes from federal sources. Historically, infrastructure spending has largely been the domain of state and local governments. For example, as shown in figure 1, in

2014 state and local governments provided more than three quarters of the funding to build, maintain, and operate the nation’s highways, mass transit, airports, and water infrastructure, compared to the federal government, which supplied just under one quarter of funding (CBO 2015b).

In recent years there have been varied attempts, often bipartisan, to expand federal support for infrastructure. Calls for a National Infrastructure Bank, which would make federal loans to qualified infrastructure projects, began in 2007, with different versions of this idea proposed again in 2013. More recently, President Obama proposed allowing multinational corporations to repatriate their overseas cash in exchange for paying a 14 percent tax on the returned amounts, with the proceeds going entirely to infrastructure investment. A different proposal, which rested on repatriation of deferred foreign corporate income to fund an infrastructure bank, garnered more than seventy-five cosponsors in the House in the 113th Congress. There have also been advocates for a hike in the federal gas tax. Nevertheless, no legislation to fundamentally reform the national infrastructure financing system has advanced through any legislative committee.

The challenge we face is how to improve the quantity and quality of infrastructure investment in the United States. The federal government’s investment in infrastructure is declining, budgetary resources for discretionary programs are becoming even scarcer, and political gridlock is increasing. Exacerbating this, the United States has a highly decentralized system of infrastructure investment, operation, and control, with states and localities playing a major role in selecting, funding, financing, and operating infrastructure. We propose ways to break through this logjam and jump-start new infrastructure investment through legislative and executive action. If done properly, there should be no long-term adverse effect on the federal deficit.

Chapter 3. Benefits of Investing in High-Quality Infrastructure

There is much evidence and widespread agreement that wise infrastructure investment pays a high return to society in both the short and longer terms. In the short term, infrastructure investment creates jobs and can grow the economy at a higher rate than other types of government investment (Leduc and Wilson 2012). Recent work by the International Monetary Fund concluded, “In countries with infrastructure needs, now is a good time for an infrastructure push. Many advanced economies are stuck in a low growth and high unemployment environment, and borrowing costs are low. Increased public infrastructure investment is one of the few remaining policy levers to support growth” (Abiad, Furceri, and Topalova 2014).

Quality infrastructure investment also increases the economy’s long-run potential for economic growth, reduces negative externalities such as congestion and pollution, and improves mobility and choices for consumers and businesses. The promise of increasing the economy’s long-run growth potential is a strong claim, but highly regarded research demonstrates the link between infrastructure and productivity. Public infrastructure investment has been linked to significant private sector productivity gains, and

in many cases these returns were higher than private capital investment (Aschauer 1989a, 1989b, 1989c). Other research finds that infrastructure investment also improves a region’s economic growth, with one channel being the productivity gains in the private sector (Munnell 1992).

Reaping economic returns from investing in infrastructure does not apply only to new construction. In fact, the late Edward Gramlich, before he joined the Board of the Federal Reserve, argued that the highest return on investment comes from bringing existing infrastructure up to a state of good repair (Gramlich 1994).³ The hidden costs of poorly maintained infrastructure can be substantial. Indeed, one study found that more than 27 percent of the nation’s major urban roads are in substandard condition, which costs the average urban driver \$377 in additional fuel and car maintenance a year. This equates to \$80 billion in costs borne by families and businesses each year due to poor road conditions (TRIP 2013). Investing in basic maintenance can also reduce future need for more-expensive repairs, with evidence that for every \$1 spent on preventive pavement maintenance, between \$4 and \$10 are saved on future rehabilitation (Baladi et al. 2002; CTC & Associates 2003).

Chapter 4. Proposals for the Short Term

Given the scope of the problem, we offer a realistic set of short-term improvements that can be made to existing programs and processes. First, we recommend expanding and revising the TIFIA lending program by increasing its annual funding authorization, expanding its scope of feasible projects beyond surface transportation, and updating the manner in which project credit ratings are assigned. Second, we propose reauthorizing BABs, which offer several advantages over municipal bonds for the purpose of infrastructure financing. Third, we advocate more-efficient use of the existing surplus in the HMTF and the Army Corps to support high-priority projects. Finally, we propose reforming the existing user fee that supports the HTF, primarily the gas tax.

1. REFORM TIFIA

a. Background on TIFIA

The federal initiative that offers perhaps the greatest opportunity for near-term improvement is the TIFIA lending program. Congress realized the potential for TIFIA when it increased the program's funding in 2012 through the Moving Ahead for Progress in the 21st Century (MAP-21) legislation reauthorizing federal surface transportation spending. However, we believe that there is room to further expand and enhance TIFIA so it can provide additional financing to a broader set of eligible projects in a more efficient manner. Specifically, the following steps should be taken:

- Federal funding should be increased from \$1 billion per year to \$10 billion per year. This would allow financing for infrastructure projects to total nearly \$400 billion.
- Project eligibility can be expanded to include a broader definition of transportation infrastructure including ports, aviation, and economic development that maximizes the value of infrastructure assets.
- Internal accounting can be improved to allow the program to fund more infrastructure projects within its existing budget.

TIFIA has a sixteen-year track record; during that time approximately \$3 billion of federal funds have been authorized to cover \$21.8 billion of loans. None of these loans has lost federal dollars.⁴ Of the fifty loans made with TIFIA assistance, only

two have defaulted, and in both those cases the government is expected to recover almost its full investment. In fact, the most recent estimate projects that, among all TIFIA loans, the federal government will receive 99.9 percent of its money back (Office of Management and Budget [OMB] n.d.a).

What is TIFIA?

TIFIA was created in 1998 as part of a broader surface transportation reauthorization act, the Transportation Equity Act for the 21st Century. TIFIA was partially a response to a perceived market failure in which states and local governments had difficulty obtaining financing on reasonable terms for infrastructure projects backed with user fees, such as toll roads (USDOT 2015c). TIFIA provides three forms of assistance for infrastructure financing: direct loans, loan guarantees, and standby lines of credit. USDOT awards these forms of credit to eligible applicants on a project-by-project basis.

Who is eligible and what types of projects are funded?

Those eligible for TIFIA financing include state transportation departments, public transit operators, local governments, railroad companies, private entities, and special transportation authorities (USDOT 2015d). Private entities engaged in projects with public sponsors are also eligible if they can demonstrate state support for the project through the project's inclusion in the state's planning documents (the long-range plan and the state transportation improvement plan; USDOT 2015e). Eligible projects include highway, bridge, intercity passenger rail, certain types of freight rail, and public transit projects; and projects involving multiple forms of transportation or access to a port (USDOT 2015f). A list of sample projects, including sponsors, project type, project cost, size of TIFIA assistance, primary revenue pledge, and fiscal year closed are included in table 1. Additionally, projects that are focused on intelligent transportation systems, such as real-time traffic and accident monitors and red light cameras, are now eligible as well. Because TIFIA receives its federal funding from the HTF, only projects involving surface transportation can receive money.

Furthermore, TIFIA projects must be of a certain size, typically at least \$50 million in capital construction costs, although the threshold is lower for rural or intelligent transportation

TABLE 1.

Sample Projects Financed by TIFIA

Project	Sponsor	Project Type	Project Cost (millions)	TIFIA Assistance (millions)	Primary Revenue Pledge	Fiscal Year Closed
Dulles Corridor Metrorail Project	Metropolitan Washington Airports Authority; Fairfax County, VA; Loudon County, VA	Public transit	\$5,683	\$1,876	State or local appropriations; toll revenues	2014
Triangle Expressway	North Carolina Turnpike Authority	Roadways and bridges	\$1,135	\$387	User charges	2009
Reno Transportation Rail Access Corridor	City of Reno, NV; Union Pacific Railroad	Railroads	\$280	\$51	Room tax revenues	2001
Miami Intermodal Center	Florida Department of Transportation; Miami-Dade Aviation Department	Other surface transportation	\$2,043	\$270	User charges	1999

Source: USDOT (2015b).

systems projects. The projects also must have a dedicated revenue source in order to repay the federal government (USDOT 2015f). There has been increasing latitude in what can be considered a dedicated revenue source in order to move beyond tolls and direct user fees to include broader tax increment financing or general obligation pledges. However, no federal funds may be used as part of this dedicated revenue stream. In addition, the federal government cannot take an explicit equity position in the project.

How large is TIFIA and how much effect has it had on infrastructure built?

The answer to this question is not as straightforward as it might appear. As discussed above, TIFIA is a federal credit program, and the way the government budgets and accounts for the program is very different from the actual amount of infrastructure that the program supports. TIFIA leverages the federal money allocated in two ways. First, the appropriated funds are generally in the form of loans or loan guarantees, and these monies are gradually repaid and can be used to fund additional projects. Some money may be lost if the project defaults on its obligation, but, similar to other loans, this does not mean the creditor gets nothing back. To be concrete, suppose TIFIA contributes \$100 million to a project that has a 10 percent chance of defaulting. (TIFIA projects are credit scored, again like other loans, and we return to this point below in section IV.2.c.) Even if the project defaults, the government can expect to get 60 percent of its money back. In that case, the expected loss to the federal government—or funds permanently expended—is only \$4 million ($\$100 \text{ million} \times 10 \text{ percent} \times 40 \text{ percent} = \4 million). Thus, the \$100 million loan actually costs only \$4 million and can be appropriated as such.

The second way that TIFIA funds are leveraged is through the nonfederal share of the project itself. For most of TIFIA's history, TIFIA's commitment to any project was capped at no more than 33 percent. Returning to our earlier example, the \$100 million TIFIA loan would be part of a \$300 million project. Thus, in this hypothetical case the \$4 million of appropriated federal funds was leveraged to support \$300 million worth of infrastructure. This can be thought of as leveraging real federal dollars at a rate of 75:1, assuming that the \$300 million would not have been invested in infrastructure absent the TIFIA funds.

For most of its history, TIFIA's federal appropriations were approximately \$100 million per year. As a result of the MAP-21 legislation in 2012, TIFIA's federal funding was increased from \$125 million per year in FY 2012 to \$750 million in FY 2013 and \$1 billion in FY 2014.

The recent changes in the TIFIA program both expand and reduce the leverage of TIFIA funds into actual infrastructure activity. The increase in appropriated TIFIA dollars allows for greater activity. Specifically, this new level could support federal lending capacity of approximately \$9.2 billion in FY 2014 (USDOT 2015f). This includes only the first level of leverage discussed above and excludes the matching from other, nonfederal, sources. However, the matching rate between TIFIA investment and nonfederal sources was recently increased as part of MAP-21. The maximum TIFIA match is now 49 percent instead of 33 percent. This effectively lowers the second level of leverage, from a peak of 3:1 to about 2:1, and reduces the scope of projects that TIFIA can help fund.⁵ If each new TIFIA loan were made at a matching rate of 51:49, that would translate into total infrastructure activity of roughly \$18.4 billion. For comparison's sake, at the prior 3:1 match ratio, the current TIFIA appropriation of \$1 billion could generate \$27.6 billion of infrastructure activity.

How much demand is there to participate in the TIFIA program?

In FY 2013 total demand for TIFIA funding was \$46.5 billion (USDOT 2015g). Thus, TIFIA was oversubscribed by more than two to one. While demand fell in 2014 as USDOT worked through this backlog of applicants—it can take several years after submission of an application to reach an executed TIFIA deal—there have been seven new projects requesting more than \$9 billion in TIFIA funding in just the first half of FY 2015 (USDOT 2015g). TIFIA’s appeal rose substantially during the financial crisis as it became more difficult and expensive to obtain other sources of funding.

TIFIA also enjoyed popularity during its founding years. From the first loan in 1999 through 2001, TIFIA made seven deals financing over \$8 billion of project activity (USDOT 2015b). However, from 2002 through 2004 only two TIFIA deals were completed, and in two of those three years there were no transactions. It is also worth noting that one deal, the South Bay Expressway (formerly SR 125 Toll Road) in California experienced significant financial problems, with the private operator filing for bankruptcy in 2010. However, given TIFIA’s preferred status as a creditor, the program is expected to recover all of the original loan balance (USDOT n.d.).

b. Components of Proposal

Our proposal for TIFIA has three key components:

Increase TIFIA’s funding.

Despite Congress increasing appropriations—more than 800 percent in a two-year period—demand for TIFIA funding continues to exceed supply. There are multiple potential explanations for this increased demand: A first reason could simply be the size of the infrastructure deficit. A second reason could be the continued movement away from funding infrastructure through upfront revenue and reliance on financing. TIFIA remains the largest federal financing program for surface transportation infrastructure. A third reason could involve the recent financial crisis. During and after the financial crisis, many states and localities faced problems accessing credit markets, particularly for newer and more-innovative financing systems. A final possible reason for the increased demand is that TIFIA has grown large enough to attract the interest of very large infrastructure projects, which may not have previously considered TIFIA, given its smaller size.

We propose increasing annual congressional funding of TIFIA from \$1 billion to \$10 billion in order to finance projects totaling up to \$200 billion. The goal of TIFIA, even at this enhanced level, is not to fund the entire infrastructure backlog. By its very nature, TIFIA is meant to deal with projects that generate dedicated revenue, primarily through users and beneficiaries. These projects tend to be newer construction. However, by providing additional financing incentives and opportunities for these projects, we can help address the demand to use existing federal grants for new construction as opposed to using them for maintenance of existing infrastructure.

An increase of that magnitude would require significant new demand beyond the existing set of TIFIA applicants. We believe that in addition to attracting more applicants from existing mega-projects, this increased demand can be met by expanding the eligibility of TIFIA projects.

We propose increasing annual congressional funding of TIFIA from \$1 billion to \$10 billion in order to finance projects totaling up to \$200 billion.

Expand TIFIA eligibility.

Second, TIFIA should be expanded to fund a broader definition of infrastructure beyond surface transportation. This broader set of assets would include ports, aviation, and economic development projects that maximize infrastructure assets’ value. Supporting economic development that directly maximizes the value of infrastructure is good public policy. In addition, it can create more revenue streams to help pay for projects. A natural next step is expansion to ports that need dredging and other investment and that have strong revenue streams. Assisting aviation, including air traffic control upgrades for qualified private entities, could open up significant economic returns and solve a problem that has lingered for decades.

TIFIA’s existing eligibility is restricted to surface transportation. Historically, TIFIA funding has come from the HTF, which has been funded by user fees—mostly by

the gas tax. In recent years, however, as expenditures have outpaced revenues from the gas tax, the HTF has relied on a mix of user fees and transfers of general revenue. Indeed, since 2008 Congress has periodically authorized transfers of general revenue into the HTF to continue funding surface transportation (Kile 2014).

Our proposal for enlarging TIFIA is somewhat agnostic as to whether that funding comes via the HTF, from other transportation trust funds (like the aviation fund), or from the general fund. *Whatever the funding source, the reality is that TIFIA is not funded solely by the gas tax. Thus, TIFIA project eligibility should not be tied to only surface transportation.*

Develop more-accurate credit scoring.

As discussed above, TIFIA is a credit subsidy program that takes appropriated federal dollars and assigns them to individual reserve funds dedicated to specific projects. Each project is assigned a credit score that represents the expected cost to the government. That expected cost is simply the size of the loan, the probability of default, and the assumed loss to the government given default. Subsidy ratings are often given, however, in terms of the anticipated percentage loss relative to the size of the loan. Over the history of TIFIA, the average subsidy rating has been around 9.3 percent of the government's exposure (OMB n.d.a). Although individual project subsidy ratings vary greatly, in the past few years the average subsidy rating has been 7.0 percent, which was substantially less than the 10.3 percent that earlier estimates had expected (OMB n.d.b).

The federal government has not yet lost any funds in the program's sixteen-year history. TIFIA's low-to-nonexistent loss given default is particularly noteworthy, but not surprising, given that TIFIA is taking a minority stake in projects that generate cash flows. Even if those cash flows significantly underperform expectations, they continue to exist. Infrastructure investing is inherently different from venture capital. Complete failure with no revenue recovery is an extremely unlikely outcome. This is particularly true given the other TIFIA requirements, including the requirement that the project is part of a state's existing transportation improvement plan.

We propose that the administration—specifically, USDOT and OMB—use executive action to align TIFIA's future credit scores with its past track record. Simply put, almost fifteen years of experience provide evidence to illustrate that the government has been engaged in safe lending. In the beginning of the program, it was appropriate to be conservative, particularly given other credit subsidy programs that have been problematic. However, at this stage we should learn from our experience and adjust our procedures accordingly.

Aligning TIFIA's credit scoring with its true risk could greatly expand the program's ability to fund projects. While still being prudent and conservative relative to historical experience, cutting TIFIA's average credit subsidy score by half would increase overall infrastructure financing by a factor of at least four. That is, the projected average TIFIA credit subsidy rate would be closer to 5 percent than 10 percent. This subsidy rating would still be far greater than what historical experience has shown to be necessary, as actual losses have been close to zero. The lower subsidy rate allows existing TIFIA funding to support twice as much federal government lending. Given that TIFIA projects require at least a 1:1 match, these new TIFIA funds could support four times the amount of infrastructure as before.

It is important to note that this recommendation can be done entirely by the administration, without any legislation. Better aligning TIFIA's credit subsidy scoring with actual performance would fit a host of previously stated administration goals, including increasing infrastructure investment, running government through a more data- and fact-based regime, and increasing nonfederal investment in infrastructure.

Lowering the average reserve required against a TIFIA loan would not alter variation in individual project credit scoring. As projects differ greatly, variable scoring can serve as appropriate discipline to deter overinvestment in riskier projects. TIFIA expansion may result in more applications from projects with elevated levels of risk. If TIFIA is expanded along other avenues that we suggest, which would require legislation, then the future risk profile of TIFIA loans may look different from how it looked in the past. A riskier future profile might suggest prudence at first, as well as higher credit scores on average. However, for future projects that are similar to those with which we have experience, we see no reason to continue inaccurately assigning credit subsidy scores that fail to take into account past performance of similar projects.

2. RESTORE THE BABS PROGRAM

A reliance on user fees to build infrastructure introduces a gap in the timing between revenue for repayment and the need for upfront funding to build the project. This gap is most often resolved by financing through the issuance of debt. As stated earlier, state and local governments are the dominant actors in the building of infrastructure, and have been dominant for nearly two centuries. Many factors have led state and local governments to issue increasing amounts of debt to pay for infrastructure, including the separation of budgets for capital projects and operating expenses, the creation of specific infrastructure authorities, and the federal tax subsidy available for municipal debt.

The development of a robust municipal debt market has been one of America's great historical advantages used to finance

infrastructure projects. The municipal debt market, however, has structural inefficiencies. Although the federal government subsidizes municipal debt by exempting the interest earned from income taxes, this subsidy may benefit the American taxpayer more than the state or local government issuing the debt. This inefficiency can be fixed through an alternative form of taxable debt, in which the federal government provides a direct subsidy to the municipal issuer rather than to the taxpayer. This innovative approach was pioneered in the BABs program, passed in 2009. BABs could take a few different forms, but they typically allowed issuers to offer a higher interest rate on bonds. In the roughly twenty months of the program's history, \$181 billion in BABs were issued by state and local governments. There were 2,275 separate BAB issuances in all fifty states, the District of Columbia, and two territories. According to DoT (2011), BABs issuers saved an estimated \$20 billion in borrowing costs, on a present value basis, as compared to traditional tax-exempt municipal debt. Unfortunately, the authorization for BABs expired at the end of FY 2010.

Unlike traditional tax-exempt municipal bonds, BABs are an attractive option for foreign investors, pension funds, nonprofits, and other individuals and institutions that do not

have U.S. tax liabilities. BABs are also attractive to municipal issuers because the federal government directly subsidizes interest costs. States and municipalities used BABs for longer-term securities in particular, which was appropriate for long-lived infrastructure projects. In contrast, most buyers of tax-exempt municipal bonds are high-income taxpayers and not very sensitive to the interest rates offered. For local governments to raise additional revenue, they often have to attract additional buyers in lower tax brackets through higher interest rates, which is both expensive and inefficient, since much of the tax-exempt subsidy goes to the higher-income taxpayers with relatively little increases in the amount of financing raised.

We propose restoring the structure of this taxable debt instrument in which the state or local issuer can opt to create a taxable debt, with the federal government providing a direct, rather than an indirect, subsidy. The federal government could choose to set this subsidy equal to a revenue-neutral rate such that this change would result in no net cost to taxpayers (i.e., the taxable earnings on the interest from the debt would exactly offset the subsidy provided). The revenue-neutral rate would likely be around 28 percent (DoT 2011). The subsidy rate could be higher for projects that are higher priority, such as

BOX 1.

Summary of Short-Term Proposals

1. Proposal: Reform the TIFIA program to increase federal funding to \$10 billion and support up to \$400 billion in projects; broaden eligibility requirements to include, for example, ports and aviation; and administratively align scoring of funded projects to accord with historical loss rates.

Rationale: Expanding TIFIA can increase infrastructure investment in the short run without increasing cost to taxpayers. Expansion to nonsurface transportation will benefit the entire transportation system and is justified based on the increasing reliance on general revenue for the HTF. Improving accuracy of scoring to align with experience will maximize efficiency.

2. Proposal: Use the Army Corps more efficiently, and reform the Harbor Maintenance Trust Fund (HMTF) to utilize HMTF's existing surplus to pay for high-priority projects; implement a competitive process whereby ports would submit proposals for funding, along similar lines as the existing Transportation Investment Generating Economic Recovery (TIGER) program run by the U.S. Department of Transportation (USDOT); and convert the harbor maintenance tax to a more traditional user fee.

Rationale: Reforms would increase the value of projects undertaken by the Army Corps and reduce the distortions created by the current ad valorem tax revenue structure employed for the HMTF.

3. Proposal: Reinstate the BABs program with a revenue-neutral subsidy rate of 28 percent.

Rationale: BABs are a more efficient way of helping state and local governments to finance infrastructure projects and are attractive to a broader segment of potential investors, as compared to traditional tax-exempt municipal bonds.

4. Proposal: Adjust the gas tax for inflation and to rise (but not above or below set thresholds) when the price of gasoline falls, and vice versa.

Rationale: The gas tax is an efficient form of a user fee, and varying the tax inversely with the price of gasoline will reduce fluctuations in the after-tax retail price of gasoline.

those that cross jurisdictional lines or involve multiple modes of transportation, or are specified as projects of import in the national strategy.

3. USE THE HMTF AND THE ARMY CORPS OF ENGINEERS MORE EFFICIENTLY

The Army Corps plays a critical role in improving critical ports and waterways and responding to natural disasters. Signature projects of the Army Corps include the Panama Canal, the Pentagon, and the Kennedy Space Center. The Army Corps has also worked on lower-profile but nonetheless economically significant projects, such as dredging harbors to enable ships to pass, restoring beachfronts after hurricanes, and producing nearly a quarter of the nation's hydropower.

In view of the critical role the Army Corps has played for more than 200 years and the growing importance of infrastructure resilience in the face of increasingly volatile storms, we propose increasing the Army Corps' activity in the short run. This can be accomplished without additional costs to taxpayers by more fully utilizing the HMTF. The HMTF was established for the operation and maintenance of harbors as part of the Water Resources Development Act of 1986 (U.S. Congressional Research Service [CRS] 2011). The funds collected go into a trust fund; it takes a separate appropriation from Congress to spend the money from that fund. In past years, the HMTF collected more than it spent, resulting in a surplus that approached \$8.5 billion at the end of FY 2014 (DoT 2014). The latest version of the Water Resources Development Act, enacted in 2013, addressed this issue by authorizing HMTF spending equal to the prior year's receipts plus accrued interest. This should reduce the build-up of the HMTF, although to the extent revenues continue to grow, the fund will continue to grow as well. In addition, there is evidence of significant undercollection of funds, potentially near \$500 million (CRS 2013). U.S. Customs and Border Protection should collect these funds immediately.

In light of the current high level of need for increased harbor maintenance, due to historical underinvestment as well as the ongoing expansion of the Panama Canal, we propose more-aggressive use of the existing surplus in the HMTF to fund high-priority projects. To best leverage these funds, we advocate a competitive process whereby ports would submit proposals for funding, somewhat analogous to the existing Transportation Investment Generating Economic Recovery (TIGER) program run by USDOT. The TIGER program already evaluates and accepts port projects, having approved thirty-one such projects to date (USDOT 2015h). Aspects of this competition could include enhancement of economic competitiveness, leverage of nonfederal funds, environmental sustainability, and resilience.

The harbor maintenance tax is an ad valorem tax that, similar to a sales tax, is a direct share of the value of cargo. This system of revenue capture is at odds with other transportation-related taxes, including tolls and motor fuel taxes, which are aligned more with the cost of the use of the infrastructure. A ship of a given size takes up the same space at a port regardless of what it carries—wheat or iPads, cotton or BMWs. Although trucks are not taxed based on the value of their cargo, ships are. Using an ad valorem system for one mode of transport is unnecessarily distortionary. We propose that this ad valorem tax be changed to a user fee. One proposal to do so was authored by Senators Murray (D-WA) and Cantwell (D-WA) in their bill, the Maritime Goods Movement Act for the 21st Century (2013).

4. REFORM THE GAS TAX

The HTF was established in 1956 as a means of financing the U.S. Interstate Highway System; today it provides funding for the construction and maintenance of many U.S. and state highways. Since the early 1980s the HTF has also helped pay for public transit projects. However, as noted above, the federal gas tax that largely supports the HTF has been declining in real terms since 1993. Moreover, the cost of infrastructure maintenance and new construction has increased over the past decade, largely because of growing demand from developing countries such as China, and proceeds from the gas tax have paid for considerably less. Starting in 2008, the HTF has periodically been in deficit, with authorized expenditures exceeding revenue generated, and Congress has employed stopgap measures to transfer more than \$50 billion of general revenue to shore it up (CBO 2014). With fuel economy expected to improve, and growth in the total number of miles driven expected to slow, the fiscal condition of the HTF will only deteriorate further if the status quo remains (CBO 2014).

Without adding to the deficit, the alternatives facing Congress in the immediate term are to:

1. Let the HTF program lapse or sharply curtail spending;
2. Continue to transfer general fund revenue into the HTF to make up for recurring shortfalls; or
3. Reform the existing user fee that supports the HTF, primarily the federal gas tax.

We support the last choice: reforming the federal gas tax so that it generates more revenue, at least during periods of relatively low retail gasoline prices. In our view, having users pay for infrastructure in rough proportion to the benefits they receive is more economically efficient and fairer than using general revenue.

We propose two specific reforms. The first is in the spirit of a proposal that was developed and recommended by a bipartisan

group including former senator Bill Bradley (D-NJ), former governor Tom Ridge (R-PA), and former U.S. Government Accountability Office (GAO) comptroller general David Walker. They called for a gas tax that would vary inversely with gasoline prices (Bradley, Ridge, and Walker 2011): the tax would fall when retail gasoline prices rose, and vice versa.⁶

To their proposal, we would add a minimum and maximum on the gas tax. The minimum would be set below the current 18.4 cents per gallon tax rate, so it would be possible for the tax to be lower than it is today if gas prices rise considerably. The maximum would be set at a level substantially greater than the current rate.

We propose to gradually phase in this variable tax, to give consumers and businesses the opportunity to understand it and prepare for it. In addition, we would index the minimum and maximum levels to an agreed-on measure of inflation. Otherwise, the costs of maintaining transportation investment will rise with inflation, but the funding to pay for these investments will not.

These reforms should help stabilize prices at the pump, thus allowing users to better plan their budgets and anticipate costs. If this variable tax had taken effect a year ago, the HTF would have received more revenue and the nation's infrastructure would have benefitted from the sharp fall in world oil prices.

Although revenue would vary from year to year depending on the price of gasoline, transportation funds nonetheless could be appropriated based on expected revenue over a ten-year window and therefore would be less sensitive to fluctuations in annual tax revenue raised. The federal government already budgets over multiyear periods using projected gasoline tax revenue, which can deviate substantially from estimates. While our proposal would require more-detailed modeling and greater annual deviation between estimated and collected revenue, it is still quite possible to set constant multiyear funding levels based on this new formula for collection.

Chapter 5. Proposals for the Longer Term

Our next set of proposals aims to modernize the infrastructure financing system over the longer term. We propose three specific elements. First, in an attempt to better align the costs and benefits of infrastructure investment, we call for upgrading user fee technologies. This would involve additional federal spending for research and development and to incentivize and support localities in their efforts to modernize the types of user fees available to finance infrastructure projects. Second, we call for a federal platform to facilitate cooperation among states and municipalities through pooled procurement. Third, we call for the creation of a national infrastructure strategy. While acknowledging that it is outside the scope of this paper to detail a national strategy, we emphasize the urgent need for one and call on federal actors to commit themselves to developing and implementing a long-term cohesive vision for infrastructure investment in the United States.

1. UPGRADE USER FEE TECHNOLOGIES

Our first long-term proposal focuses on user fees, rather than on an infrastructure bank or other approaches, because these fees or tolls are the best mechanism for aligning the costs and

benefits of infrastructure investment. Furthermore, a valuable role for additional federal spending is to incentivize and support localities in their efforts to expand the types of user fees available.

In an ideal world, beneficiaries would simply pay for the cost and maintenance of a given infrastructure system. Reality is far more complicated, however. Transaction costs of collecting assessments on beneficiaries can be substantial, though modern technology may make that process more efficient. Identifying beneficiaries may not be as simple as it appears at first glance, especially given the long duration of infrastructure assets. Distributing costs is another challenging task, particularly when dealing with projects that cross state and jurisdictional boundaries and/or involve multiple modes of infrastructure. Our solutions address aspects of these issues.

The classic user fee model is the toll road, for which each driver pays a toll in exchange for driving on a road that is typically well maintained and has less traffic congestion. However, there are usually beneficiaries of infrastructure who are not users or whose benefit is in great excess to their use. For example, businesses located along newly constructed toll roads become

BOX 2.

Summary of Long-Term Proposals

1. Proposal: Promote collaboration among USDOT, private industry, and academic researchers to develop new mechanisms for collecting user and beneficiary fees based on state-of-the-art technology. Federal incentives would be provided for states, localities, and related authorities to adopt standardized user fees.

Rationale: User fees are an efficient way to fund infrastructure investment, and the means of collecting fees from users and beneficiaries will change with the evolution of transportation technology. In addition, such technology is a public good.

2. Proposal: Create a national, electronic platform for pooled procurement to reduce costs.

Rationale: Scale economies in purchasing could reduce costs for infrastructure operators and increase stability for manufactures.

3. Proposal: Appoint a commission to develop a national strategy for infrastructure investment. Projects that are deemed consistent with the national strategy would receive more-generous federal funding, such as through a higher subsidy rate for BABs.

Rationale: A national strategy could guide infrastructure investment more effectively, and connecting funding mechanisms to the strategy could ensure that the commission's recommendations are implemented.

more accessible to consumers, increasing the businesses' revenues. Consider also the property owners of the land around the toll road, particularly around the access points: studies have shown that their land's value will rise, often substantially, as a result of the new infrastructure (DoT with the Council of Economic Advisers 2010; Garrett 2004; Weinstein and Clower 1999). Those who benefit but are not users should be willing to contribute to this infrastructure investment as long as their benefits outweigh their contributions. However, reaching these beneficiaries and determining how and how much they should pay can be far more challenging than simply setting a toll.

Federal infrastructure policy has long recognized the wisdom of having those who benefit from infrastructure—regardless of whether they directly use it—pay for its construction and use. For example, the federal gas tax has been used to pay for public transportation since the Reagan administration. The logic is that in congested areas every driver benefits from reduced traffic when others utilize public transportation instead of roads. Indeed, recent research has found that average highway delays increased by 47 percent when transit service unexpectedly ceased (Anderson 2014).

Our proposal for upgraded user fee technologies

Fundamentally, infrastructure is a long-term investment and should be paid for over the long term—and it should be funded permanently, not just temporarily. Innovative financing programs can lead to new mechanisms through which a steady fee stream can ensure the durability of the investment.

We propose federal incentives for states and localities to expand their capacity to collect user fees for the financing of new infrastructure. The need for these new funding sources is clear, as inflation-adjusted revenue from gas taxes may have already peaked (CBO 2015a). Vehicles that are more fuel efficient, the potential growth of alternative-fuel vehicles, and shifting attitudes among millennials toward vehicle ownership and driving all indicate that revenue derived from the traditional gas tax will struggle to keep pace with the cost of maintaining the existing system.

We propose that the federal government support this expansion through three main roles:

1. Assist in developing and standardizing collection of new beneficiary fees;
2. Subsidize the projects that these new fees support, particularly among early adopters, with direct support and provision of insurance; and
3. Create new and more-efficient financing structures.

This new system could help promote the infrastructure investment in research and development that America needs. It would build on the American tradition of strong local

control in project delivery and selection while positioning the federal government in areas where it has long held a comparative advantage—the facilitating of standardization and applied research.

The exact collection of fees will vary, reflecting political will, technology, and economic circumstances. We propose allowing flexibility for state and local governments to develop revenue collection mechanisms that work in their region. By providing matching funds, the federal government could empower state and local governments to improve collection of revenue from users and beneficiaries. This federal subsidy could be more generous for projects that involve multiple jurisdictions and multiple modes of transportation.

The federal government would also create innovative financing tools that will allow states and localities to more efficiently coordinate beyond their existing municipal boundaries. Since new types of user fees are inherently riskier than standard user fees, they would likely require higher costs to finance from skeptical creditors, even if they would be worthwhile in the long run. This creates an even stronger rationale for and greater benefit from federal action than traditional infrastructure finance.

We are not identifying a single type of desired revenue collection because the pace of technological change is so rapid. For example, all-electric cars do not pay traditional gas taxes even though they still use the highway and roads system. Also, car-sharing services like Uber and Lyft may change the economics of driving and of parking privately-owned vehicles (Shontell 2015). Driverless cars are another potential technological game changer. Such rapidly changing transportation technology is causing the nature of beneficiary fees to change. However, it is also making possible new forms of beneficiary fees that take advantage of GPS and other mobile devices.

These new technologies also potentially alter the way in which we use infrastructure. For example, the provision of free or highly subsidized parking is a significant use of our existing infrastructure. By one estimate, the cost of free parking is \$1,750 per space built and about \$400 annually in maintenance (Litman 2012; Stromberg 2014). As evidence that free street-side parking spaces are valuable, a new app allows users to essentially sell their street parking space to another driver through a private, online transaction (McMillan 2014). Innovation that creates more-efficient use of existing infrastructure should be prioritized, especially if it reduces the need to build more infrastructure.

The advent of new technology to reduce the transaction cost of collecting user fees has been a significant development over the past twenty-five years, starting with electronic toll collection (Samuel 2012). States and local agencies have increasingly

been deploying electronic toll collection as well as capturing revenue from windfall increases in property value as a result of infrastructure investment (e.g., taxing so-called incremental financing districts). This revolution in new and advanced forms of collection from infrastructure users and beneficiaries has created more-efficient methods for revenue streams to support infrastructure. However, the local nature of these efforts results in fragmented, highly regionalized systems that could benefit from greater standardization. As the International Bridge, Tunnel, and Turnpike Association (2010, supplementary appendix) stated, “The net result is that technical interoperability and commercial interests have created a regional patchwork of different [electronic toll collection] systems across the country, operating as E-ZPass in the Northeast/Midwest; SunPass in Florida; FastTrak in California, and so forth.”

The federal government should establish national revenue collection standards. These standards should include interoperability of electronic toll collection such that a single pass can work throughout the country. The creation of a single smartphone application that would function similarly to transponders such as E-ZPass is one potential approach. Furthermore, requiring—and providing funds for—existing toll plazas on roads and bridges that receive federal support to switch to electronic collection, particularly with high-speed lanes, would reduce travel times, congestion, and corresponding air pollution.

A national standard for defining and implementing congestion pricing would be another useful system. Congestion pricing can include (a) variable-rate tolls based on road congestion as well as (b) fixed prices for driving into core areas of a major metropolitan area. The latter (b) is sometimes referred to as cordon pricing; it has been successfully adopted in London and Singapore, and was used successfully on a trial basis in Stockholm. The former (a) can shift demand for infrastructure away from peak times, as has been used to some extent in Florida, Maryland, and California, among other places (USDOT 2006).

Another national standard could include mechanisms for state or local government to collect additional tax revenue from districts in which property values increased as a result of new infrastructure (i.e., value growth above a specified baseline). An example of such a mechanism already in use is the incremental finance district, also known as tax increment financing, in which local governments define a geographic area to benefit from improved infrastructure and earmark increased property tax revenues in that area to pay for the infrastructure investment. Currently, states legislate the use and parameters for these types of districts, but there is little guidance on how states should most effectively structure these districts.

A fourth potential standard would involve a master framework for the terms of debt issuance for project finance.

By standardizing the terms of debt issuance, whether through BABs or other vehicles, investors could more easily access, digest, and potentially amalgamate project debt. Reducing transactional costs for infrastructure users, beneficiaries, and investors will lead to greater investment in infrastructure.

The federal government can also build on the initial launches of centers for infrastructure investment within USDOT and the Environmental Protection Agency (White House 2015). Combining these centers into one national center for infrastructure investment and standardization could further reduce transaction costs, improve efficiencies, and enhance effectiveness. Although infrastructure responsibilities are spread across multiple federal agencies, as demonstrated by the creation of multiple centers for infrastructure investment, we believe the value of creating a one-stop shop for the consumer (state and local infrastructure providers and investors), as well as the potential for learning and standardization between modes of infrastructure, outweighs the benefits of creating specialized but siloed centers. Thus, given the large role that transportation plays among all types of infrastructure, we call for combining the centers at USDOT. Part of this combined center would act as a hub for affiliated institutes focused on developing and promoting user-fee technology. This hub would serve to bring together the wide universe of professionals, academics, market participants, infrastructure providers, and government officials involved in infrastructure design, construction, operation, and finance. Creating such a national hub for technology development could help spur greater innovation, standardization, and collaboration.

2. FACILITATE POOLED PROCUREMENT

As discussed earlier, state and local governments are often the actors making investment choices about infrastructure, from the asphalt for highways to road signs to public buses. The dozens of state governments and the thousands of local governments usually make these investments in isolation, without necessarily coordinating with other agencies, even if they are purchasing similar products. This decentralization of payers for infrastructure results in the loss of economies of scale. One of the classic values of economies of scale comes from purchasing power: larger purchasers are able to negotiate better prices. These costs are therefore generally higher for smaller infrastructure providers, which also tend to be located in areas that are more rural. The benefits from solving this coordination problem—and realizing the benefits of economies of scale—may largely go to smaller infrastructure providers.

This problem was recognized previously with the creation of the pooled procurement program in the Transportation, Treasury, and Independent Agencies Appropriations Act of 2004. This act and subsequent legislation created five pilot programs to facilitate the coordination and pooled procurement by transit agencies across the country. These pilots each contained only a limited

number of transit operators, typically in the same geographic region. As an incentive, the federal government agreed to pay for 90 percent of the cost of items purchased through the pilot program, far greater than its typical matching-grant rate. To be clear, there were no additional federal funds directly provided, only a waiver of state and local match levels down to 10 percent. Overall, the pilots were found to be ineffective, as “the additional Federal share allowed in the pilot program did not sufficiently induce greater use of pooled procurement” (USDOT 2010). Difficulties in forming consortiums, the administrative burden on the agency leading the procurement, and unwillingness to cede control by participating agencies to the lead agency were all cited as challenges to successful pooled procurements (USDOT 2010). Given the potential benefits to agencies, especially those operating in smaller jurisdictions, the question becomes how to overcome these organizational challenges to support pooled procurement.

Our proposal for pooled procurement

We propose a two-pronged effort to promote pooled procurement. The first prong is the creation of a national platform for pooled procurement. This would be an electronic system, open to all infrastructure operators where they could search for and post information regarding their needs for procurement. The federal government would serve only as the platform operator; it would not be involved in any additional way in actual procurement or negotiation. However, creating a national platform would vastly expand the network of potential agencies that could work together. In the long run this may not even need to be operated by the federal government. It may well be that once the federal government creates this platform, it can eventually be spun off to the private sector or a broad consortium of public and private operators in a cooperative model.

Platforms for bringing together infrastructure projects are already occurring regionally, such as the West Coast Infrastructure Exchange, a partnership among California, Oregon, Washington, and British Columbia designed to encourage “public sector decision-makers . . . to develop best practices and access hands-on training in innovative financing and maintenance methods” (West Coast Infrastructure Exchange n.d.). Expanding this idea nationally as well as broadening its scope to include pooled procurement as a focus could generate significant value.

The second prong consists of direct incentives in terms of federal funding. Rather than simply getting a higher federal match rate, localities that can demonstrate cost savings through pooled procurement should receive additional federal grants explicitly tied to infrastructure funding. Rewarding innovative cost savings from procurement through a race-to-the-top style incentive system might be enough to overcome the organization gridlock and existing impediments to coordination.

3. CREATE A NATIONAL INFRASTRUCTURE STRATEGY

Our nation would benefit from a national infrastructure strategy. The current decentralized nature of our infrastructure system poses fragmentation problems, both in terms of public participation (federal, state, and local) and in terms of type of infrastructure (highway, transit, port, airport, water system, etc.). Poor accounting systems that do not adequately keep track of or incentivize wise investment create another problem. Simply calling for increased infrastructure investment misses a key area where policy makers could considerably improve the current framework: more-carefully managing investments to ensure that projects with the greatest return are selected for investment. Maximizing returns on investment is a simple policy object but one that proves highly difficult to achieve with respect to infrastructure.

A national strategy should not be confused with a one-size-fits-all approach. Infrastructure needs vary substantially based on local and regional factors. A perfect example of this is high-speed rail, which may work very well between certain cities, such as those in the Northeast corridor, from Washington, DC, to Boston, but not nearly so well between cities in less-populated parts of the country. There may be compelling cases for intensive air travel corridors between areas such as Los Angeles and San Francisco, which is the busiest air corridor in the country (USDOT 2015a). Thus, a national strategy needs to allow for regional variation and substantial state and local input.

Finally, a national strategy must consider the interaction between infrastructure networks. A strategy for ports that focuses on the Gulf Coast coupled with a strategy for freight rail that focuses on the eastern seaboard would be a failure. Current transportation infrastructure policy is heavily focused on individual modes, with each working internally to develop its own strategy (if there is one at all). In some instances the data necessary to measure how well our current infrastructure system works are not even collected, as the GAO found: “There was not a federal source of data that could reliably be used to analyze freight truck trends from 2007 to 2012, because, among other things, the data do not sufficiently distinguish among classes of trucks” (GAO 2014).

Congress has recognized the increasing importance of strategic planning and, as part of MAP-21, directed USDOT to establish a national freight strategic plan. Wisely, Transportation Secretary Ray LaHood filled the Freight Policy Council, the organization tasked with developing this plan, with leadership from multiple transportation modes (highways, rail, ports, and airports; USDOT 2012). Yet, this plan for freight needs to be part of an even larger, more-comprehensive strategy to move goods and people, and provide basic services (telecommunications, power, water) in ways that complement

each other. A broader national infrastructure policy with input from all stakeholders is the right way to start.

Our proposal for a national infrastructure strategy

We propose the creation of a national strategy for American infrastructure through a commission of federal, state, and local parties, including infrastructure operators and private companies. This commission, which could be created through legislation or by executive order, would be responsible for developing a comprehensive national infrastructure strategic plan. This would build on the strategic plans already created on a modal basis within the federal government, such as the freight strategy discussed above, along with the strategic plans developed by states, metropolitan planning organizations, and private infrastructure partners. The commission's first task would be to identify where there is convergence with these various existing strategic plans and where there is divergence. It would further analyze and identify national goals and priorities. Ideally, the strategy would identify which modes of infrastructure are most cost-effective in addressing key challenges in certain corridors and regions. The commission would also make recommendations for improving available data on infrastructure use and needs in a way that balances individual privacy rights. This national strategy could guide subsidies for more-generous funding and financing of infrastructure investment.

A national strategy would provide a unique opportunity to look at our infrastructure systems and the investment that is necessary to create and maintain those systems from a user's perspective. For example, it would work to unify freight investment strategies with port investment decisions. This would maximize the efficiency and effectiveness of both networks. The strategy would ensure that investment to build high-speed rail between cities corresponds with investment in strong public transit in those cities.

The national strategy should help coordinate infrastructure investment at a high level. However, there are significant efficiencies that could be gained from enhanced coordination at a local or granular level. Our proposal focuses on governance improvements at that level. We call for increased coordination within geographic areas among different infrastructural modal providers. An example is the highway department communicating with the water department, so that when major improvements need to be made by both parties, construction crews dig only once (see box 3). We also propose increased coordination among the same types of infrastructure providers coordinating across geographies. For example, multiple subway systems use similar rail cars. Coordinating long-term planning and purchasing through pooled procurement could lower costs for the subway systems and allow the private manufacturers who build the rail cars to achieve greater stability and long-run profitability.

BOX 3.

Dig Only Once

Aligning construction schedules at the state and local levels could produce significant savings by combining activities. A simple example is coordination between the crews for local water systems and road maintenance. Planned water infrastructure improvements, such as expanded pipe capacity or replacing aged pipes, require digging up roads and sidewalks. This work should occur simultaneously with regular road repaving. This would save costs for both of the infrastructure providers, as well as reduce side-effect costs such as traffic congestion due to roadwork.

This simple commonsense solution is not as easy to implement as it may seem. It requires public and/or private water systems, which tend to operate on the municipal or regional level, to coordinate with road maintenance, which is often at the state or county level. Aligning timing for major and minor projects requires significant advance joint planning. Making sure that work schedules and zones are able to occur on a simultaneous schedule requires logistical precision. Competing priorities, including emergency and other unforeseen problems that alter scheduling, are unavoidable. Furthermore, negotiations to split the direct savings from combining work will not be costless, and the value gained from reduced externalities such as traffic congestion and service disruption will not be internalized.

Nonetheless, the savings are worth pursuing. The federal government could establish a pilot program, similar to what the Obama administration did with respect to project permitting. This pilot program would be open to infrastructure providers of any form and would be coordinated at a regional level. To incentivize participation, the federal government should provide expedited project and permitting review, including eliminating duplicative requirements that exist across infrastructure modes. Simply put, if the highway department has a permit it would apply for the water company and vice versa. To the extent that federal grants or funds are used for such a project, at a minimum there should be no penalty for the dual use of those funds, while there should be a creative exploration of methods to provide additional funding for coordinated work that reduces costs.

Chapter 6. Questions and Concerns

Any large- and small-scale proposals that seek to address the infrastructure challenge will raise legitimate concerns. Among the concerns that must be addressed are:

1. The regressive nature of user fees;
2. The risks stemming from user fee adoption;
3. Whether sufficient demand exists for the federal financing proposed; and
4. Concerns about the ability to finance projects across modes of transportation.

A brief discussion of each concern follows, with an understanding that any of these concerns could merit a more in-depth conversation.

1. THE REGRESSIVE NATURE OF USER FEES

User fees that are not tied to income (which is the case for almost all governmental fees) are inherently regressive, meaning that lower-income individuals pay a higher share of income toward the tax than do higher-income individuals. This is generally true for the gas tax, highway tolls, and bus fares. In general, we share a desire to raise revenue for public goods in a progressive—or at least, nonregressive—manner. Yet with regard to infrastructure, there are several reasons to be less concerned with the regressivity of user fees.

The benefits of infrastructure are largely progressively distributed. First, if users benefit equally from the service, then the benefits, as a share of income, are distributed progressively. Second, to the extent that users have a choice whether to use the infrastructure and pay the extra fee, then there is an added level of protection against regressive fees. (For example, lower-income drivers could shift away from driving on toll roads.) Furthermore, the provision of alternatives (such as public transit) is often available on a subsidized and progressive basis. Third, the benefits of building infrastructure, specifically job creation, are progressively distributed. Research from the DoT shows that 80 percent of the jobs created in the top three sectors (construction, manufacturing, and wholesale and retail trade) are jobs that typically pay in the middle range of wages (DoT with the Council of Economic Advisers 2010).

Finally, there are often substantial benefits from infrastructure that escape easy quantification, such as the utility of traveling outside congested periods or areas, broader economic and productivity gains, and the health benefits from living in walkable communities. These free benefits may be distributed progressively, or may be distributed to those on the lower end of the socioeconomic spectrum who do not pay the user fee.

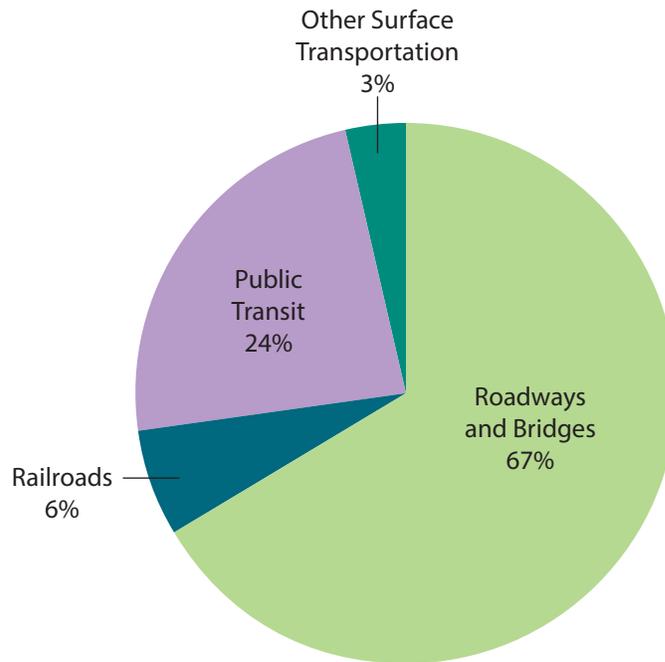
2. THE RISKS STEMMING FROM USER FEE ADOPTION

As with most infrastructure, state and local governments and infrastructure operators will be the ultimate decision makers as to whether to adopt a user- or beneficiary-fee model. Adopting new technology comes with additional costs and risks. Developing and implementing new forms of fee collection can have higher upfront costs and uncertainty about revenues if the technology does not function as expected. In order to promote adoption, we believe that the federal government should provide subsidies to early adopters of such systems, subject to oversight. These subsidies can take the form of direct payments, below-market interest rates, flexibility in terms of existing federal matching requirements, and explicit acceptance of tail-risk outcomes. We define tail-risk outcomes as the potential that the infrastructure asset fails to generate any substantial revenue as compared to estimates (e.g., less than 10 percent of projected revenue).

Subsidizing early adoption would also promote standardization, particularly given the long lead times of infrastructure projects. For example, imagine if such a subsidy program were announced today with a generous but declining subsidy level: State and local governments and infrastructure providers would have a strong incentive to adopt these forms of revenue and standardize collection. While some projects would move quickly through planning and so receive subsidies, others would undoubtedly hit unexpected snags and delays. The world of infrastructure projects is rife with such unexpected delays. However, as the early adopting projects demonstrated success and the perceived level of risk diminished, the private financing system would be increasingly comfortable providing capital. As government subsidies fall over time, market participants would be willing to provide financing on more-generous terms, balancing some of the decrease in subsidies. Thus, we believe that even as initial subsidies fade, our financing system will have enough momentum to sustain itself at the state and local levels.

FIGURE 2.

TIFIA Project Loan Allocation, by Project Type



Source: USDOT (2015b).

Note: All TIFIA projects (retired and active) are included. "Other Surface Transportation" includes road and/or public transit projects at airports, ferries, and intermodal transit centers.

3. WHETHER SUFFICIENT DEMAND EXISTS FOR THE FEDERAL FINANCING PROPOSED

One critique of the TIFIA proposal is that it relies on a build-it-and-they-will-come basis. While we can definitively show excess demand for the current level of funding, we cannot definitively show sufficient demand for the size and scale of our proposal. In addition, the robust and highly developed municipal finance market, which offers a substantial federal incentive in the form of an exemption from federal tax, would appear to be a viable alternative. As credit market conditions return to a more-normal state post-financial crisis, the competitive value proposed by programs such as TIFIA may decline. In fact, during several years of the credit boom in the 2000s, few eligible projects applied for TIFIA funds.

We believe that if there is to be an imbalance between the supply and demand for infrastructure financing, it is in the nation's interest to err on the side of having too much financing available rather than too little. Furthermore, knowing that additional financing is available may encourage planners to think for the longer term. This can be particularly true for infrastructure projects that are built to levels predicted by future demand rather than current demand. For example,

certain interstates that are congested today opened years ago to low traffic volumes and public accusations of overbuilding.

Rather, an alternative criticism of our proposals, particularly in the short run, is that we are not being bold enough. The potential that federal government support is not compelling relative to alternatives, including the municipal bond market, is real. If the municipal credit market can offer better terms that provide sufficient incentive for a project to get built, then that is a good outcome. If infrastructure is created to meet demand without the support of these proposals, we would see that as a victory. But why take this unnecessary risk?

4. CONCERNS ABOUT THE ABILITY TO FINANCE PROJECTS ACROSS MODES OF TRANSPORTATION

One of the major problems within federal infrastructure policy has centered on the difficulty in creating policies and programs that work through multiple modes, or types, of transportation. For example, TIFIA was criticized for effectively favoring road projects over transit projects (Baxandall 2012). As of April 2015 roadway and bridge projects received two thirds of all TIFIA loans, public transit received just under a quarter, and railroads and other surface transportation projects received 6 percent and 3 percent, respectively (USDOT 2015b).

However, changes to the program contained in the recent surface transportation reauthorization, MAP-21, have allayed concerns of some critics (Transportation for America 2012). The government has taken steps to work more proactively across transportation modes, such as the changes within USDOT's Credit Council to provide enhanced multimodal analysis (GAO 2012).

On a more fundamental level, the diagnosis of the problem of a lack of multimodal cooperation should not preclude a multimodal solution. By enhancing the multimodal

capabilities of programs like TIFIA, and encouraging projects that cross modes, these proposals offer incentives to correct past mistakes. In addition, the requirement to rely more on revenue generated from infrastructure, through user and beneficiary fees and ancillary economic growth, ought to encourage cooperative thinking. Including more modes of transportation with shared vested interests in building infrastructure will also likely enhance cooperation. The alternative to solving this project would be greater central control of a single entity of multimodal scope, which is a far more radical proposal than this one.

Chapter 7. Conclusion

There is little dispute that the United States would benefit from enhanced infrastructure investment. The barrier has been finding a politically viable solution to the financing challenge. An infrastructure overhaul is timely for macroeconomic and employment reasons. Public borrowing rates are at historical lows, and the lower cost of funds today will result in greater net benefits for society in the long run. Also, while the labor market has rebounded significantly from the economic recession, sectors that contribute heavily toward infrastructure, such as construction and manufacturing, remain slack and would benefit from greater demand.

Breaking the political logjam on infrastructure financing is imperative. In the near term, we propose an enhanced and

strengthened TIFIA program, a restoration of the BABs program, an expanded Army Corps, and reform of the gas tax, to responsibly increase infrastructure investment without raising taxes for the American people. In the longer term, we propose mechanisms for the federal government to promote better utilization of user fees, a federal platform for pooled procurement, and the creation of a National Infrastructure Strategy Commission that would aim to better coordinate and finance projects aimed at bolstering America's backbone. If adopted, these proposals would put our nation back on track to build and maintain infrastructure that is critically needed to advance economic growth and prosperity through the twenty-first century.

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Endnotes

1. As of March 26, 2015, the yield on the 10-year Treasury note was about 2 percent.
2. The federal tax on diesel fuel is 24.4 cents per gallon; this level is also unchanged from 1993 (USDOT 2015i).
3. This point has also been made in a recent Hamilton Project discussion paper by Kahn and Levinson (2011).
4. For a current portfolio of TIFIA-financed projects, see USDOT (2015b).
5. On the other hand, the higher federal match means fewer nonfederal resources are needed for a project of a given size, and this could increase the chance that a given project will be funded.
6. Technically, their proposal varies with the price of oil and applies to upstream oil purchases. While there are good arguments for imposing the tax on oil, whether it is used for transportation fuel or other purposes, we propose taxing gasoline to align the tax with a user fee.

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Highlights

Roger C. Altman of Evercore, Aaron Klein of the Bipartisan Policy Center, and Alan Krueger of Princeton University offer seven proposals to address the lack of investment in the nation's infrastructure and improve its financing. These proposals—four of which would be implemented in the short run while three would be implemented in the longer term—would reduce inefficiencies, create jobs, and spur economic growth.

The Proposal

Expand TIFIA. The federal government would expand the amount of funding available through the Transportation Infrastructure Finance and Innovation Act (TIFIA) from \$1 billion to \$10 billion annually, expand eligibility to nonsurface transportation infrastructure projects such as airports and seaports, and improve internal accounting to increase the amount of private sector financing that can support TIFIA projects.

Bring Back BABs. The federal government would restore the Build America Bonds program to provide a direct interest subsidy to support infrastructure projects financed by state- or locally issued debt, at no net cost to the federal government.

Expand Utilization of the Army Corps of Engineers and Harbor Maintenance Trust Fund. The federal government would more effectively employ the Army Corps to carry out high-priority projects funded with the \$8.5 billion Harbor Maintenance Trust Fund surplus.

Reform the Gas Tax. The federal government would index the gas tax to inflation and have it vary inversely with the price of gas to promote price stability and shore up the Highway Trust Fund.

Modernize User Fee Technologies. The federal government would incentivize state and local governments to adopt new forms of user and beneficiary fees to finance infrastructure projects, while also encouraging innovation in user fee technologies.

Encourage Pooled Procurement. The federal government would establish a national platform and provide funds to state and local governments to encourage pooled procurement of materials and equipment.

Develop a National Infrastructure Strategy. The federal government would create a commission charged with longer-term strategic planning and coordination between the many modes of the nation's transportation infrastructure. Their strategic plan would guide subsidies for infrastructure investment.

Benefits

These proposals would help increase infrastructure investment by expanding financing, more-efficiently using existing funding sources and developing new sources, lowering costs, and improving coordination and planning across levels of government. Increased infrastructure investments would reduce economic inefficiencies and costs from deferred maintenance, boost economic competitiveness, create jobs, and encourage economic growth.



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