

# INNOVATIVE STATE TRANSPORTATION FUNDING *and* FINANCING

*Policy Options for States*



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## Executive Summary

Governors and states have long recognized the importance of investing in surface transportation. The nation's roads, rails, and bridges provide for personal mobility and facilitate commerce and shipping. When operated efficiently, the surface transportation system can enhance the economic competitiveness of states and the nation, as well as increase safety and quality of life for users. However, a growing imbalance between use of the system and its capacity is leading to an increasingly strained system in many parts of the country. States are looking to a number of innovative funding and financing approaches to help meet the dual challenges of better managing demand, particularly in congested areas, and increasing investments in capacity.

Today, states and the federal government rely primarily on motor fuel taxes to fund the surface transportation system. Motor fuel taxes have offered revenue stability and predictability with a relatively low administrative burden. Compliance costs in paying motor fuel taxes are also limited, and there is a low risk of tax evasion. Fuel taxes can generate substantial amounts of revenue at a relatively low cost to individual users. By charging per gallon, fuel taxes provide an incentive for users to purchase more efficient vehicles.

The current transportation system is facing challenges relating to demand and investment. Nationwide, the increase in user demand is far outpacing the addition of capacity. Since 1980, vehicle miles traveled have increased by 95 percent, but road capacity has increased 4 percent. The result in a number of regions is increasing congestion, the costs of which are borne by users and the nation. In 2005 the nation wasted 2.9 billion gallons of fuel and lost 4.2 billion hours of productivity due to congestion, leading to a net economic loss of \$200 billion. While demand has been growing, investment has not been adequate to maintain and enhance the sys-

tem. The National Surface Transportation Policy and Revenue Study Commission recommended spending between \$225 billion and \$340 billion annually for the next 50 years to maintain and enhance the system, and noted that currently our nation spends less than \$90 billion annually.

There are several reasons for this shortfall in investment. A primary reason is that the largest revenue source for transportation, the current set of motor fuels taxes at the federal and state levels (which comprise the largest single source of transportation revenue for federal and state governments), is not producing adequate revenue to meet system needs. Motor fuels tax receipts are levied on a per-gallon basis, and unless the tax rate is regularly increased or indexed to account for inflation, fuels taxes can face eroding purchasing power. This shortfall is particularly acute because the cost of construction and materials has been rising and is projected to continue rising. The result is that the purchasing power of the federal government and many state governments has been declining at the same time demand is increasing.

Addressing the challenge of managing demand requires some focus on congested areas and road usage during peak periods. In most situations, users are charged for gallons of fuel consumed; they are not charged more for using scarce road space during peak periods or for the actual number of miles they travel. While not necessarily well-suited to all projects, increased use of direct user fees and peak period fees can encourage users to reduce miles traveled and shift travel to alternative modes.

Each state is facing the challenges of rising demand and inadequate revenue to some degree. However, they each have unique needs and strategic goals and objectives. In states with less population and traffic density, certain user-fee solutions may not be as feasible as they would be in more densely populated

states and regions. Governors are pursuing varied options to address these challenges, and states are pioneering new means of planning for and funding and financing transportation. Some states have worked to increase or index their motor fuel taxes to overcome purchasing power declines and to increase revenue for transportation projects. Some states also are increasing vehicle registration fees and looking to general fund revenues to fund transportation. More broadly, states are pursuing a number of innovative funding and financing options that also can help to reduce demand. Options that are discussed in this report include:

- Debt financing strategies, including state infrastructure banks;
- Tolling, vehicle miles traveled fees, congestion pricing, and other user fees;
- Public-private partnerships that leverage private capital and expertise; and
- Freight-specific strategies.

Considering the magnitude of the challenge, many states will need to consider all of these options to meet their transportation needs. As states consider which solutions to pursue, a priority is examining funding and financing options that also reduce demand. High fuel prices provide an incentive for drivers to carpool, combine trips, reduce or eliminate unnecessary trips, and consider transit alternatives. However, to more effectively manage demand, states—in coordination with federal and local partners—can implement direct user fee systems such as congestion pricing (charging users a variable toll to use a road based on how congested it is). Such strategies provide additional incentives to users to reduce miles traveled, avoid peak period trips, and shift to alternative modes. Many states are also looking at ways to increase coordination between land use planning and transportation projects to help manage demand and ensure that transportation expenditures are consistent with state growth and development objectives.

Next, states can seek to increase investment in the system in the near-term. States and the federal government have long-relied on the motor fuel tax, and are likely to continue to do so. However, states have several options to supplement motor fuel tax

revenue. Some states have looked to public-private partnerships to attract private sector capital and project expertise in order to move forward on priority projects. One type of public-private partnership, an asset lease, has the potential to provide states with significant upfront capital which can be used to fund a number of transportation priorities. However, these partnerships often require either new user fees or private collection of existing user fees (such as tolls), that provide a return on investment to the private partner. A public-private partnership strategy alone will not solve all of a state's transportation challenges, but carefully managed partnerships can complement existing revenue, accelerate project delivery, and attract private capital and expertise.

States also are looking at debt finance tools such as state infrastructure banks to leverage their federal funds and accelerate projects. Infrastructure banks can operate revolving loan funds and typically have a board that uses specified criteria to make strategic investments in transportation. After they are provided initial capital, they can provide a revolving revenue source to fund priority projects and supplement existing revenue sources.

Finally, over the long-term, states may have an interest in replacing the motor fuel tax as a primary source of revenue for transportation. One possible replacement states can look to is a vehicle miles traveled fee (using GPS or other technology to charge users for every mile driven). A miles traveled fee could provide a technological platform for greater use of congestion pricing and could be more effective in managing demand than the motor fuel tax. It also would be applicable regardless of fuel source, whereas the current motor fuel tax does not apply to many alternative fuel or electric vehicles, which may become more common in the future.

States play a key role in funding, operating, and maintaining our nation's transportation assets. With demand for transportation growing, and with states facing competing budget priorities, there is an increasing need for new funding and financing solutions. The solutions that states are identifying and implementing represent an important element in enhancing and improving the nation's transportation system.

# Introduction



A 2007 National Governors Association Center for Best Practices Issue Brief, *State Policy Options for Funding Transportation*, discussed the basic state policy options for funding transportation and outlined recent innovations.<sup>1</sup> This paper extends and updates this earlier work by: (1) providing case studies of state and international experience with a full range of policy options, (2) addressing new options that have emerged, (3) summarizing new developments in public private partnerships (PPPs), and (4) detailing financing options, such as congestion pricing, which establish a price signal to users that can both raise revenue and encourage more efficient use of the transportation infrastructure. Each chapter provides a description of a different type of innovative financing or funding approach or ways to address demand; best practices from the United States and abroad; and additional considerations for states that are considering these options.

Chapter 2 provides an overview on the challenges states face in addressing rising demand, inadequate revenue, and a need for transportation system improvements.

Chapter 3 discusses the background and the range of traditional sources of revenue for transportation with particular emphasis on the motor fuels tax. The gas tax has been the foundation of transportation finance at both the federal and state levels for more than 50 years. However, it faces reduced receipts as a result of the rising cost of oil and more fuel efficient vehicles lowering consumption coupled with political resistance to gas tax increases.

Chapter 4 focuses on debt strategies. These include investments that provide federal or state credit assistance or allow states to leverage existing public funds. While debt strategies like bond issuances have been in use for many years in the United States,

other innovative tools are relatively new and are the result of recent federal legislation.

Chapter 5 focuses on tolling and fees. While these sources have been employed for decades, there is a renewed interest in tolling. This stems from advances in technology that allow for easier collection, plus the desire to use pricing to better manage the metropolitan transportation network. Other strategies such as vehicle miles traveled (VMT) fees and variable parking charges are at the cutting edge of the newer strategies.

Chapter 6 deals with the recent interest in public private partnerships (PPPs) by discussing innovative procurement, design-build strategies, concession agreements, and other ideas.

Chapter 7 addresses freight financing strategies.

Finally, the Conclusion highlights near-term and longer-term policy advice for states as they seek to manage demand and invest in the transportation system.

This report mainly focuses on roads, bridges, and transit, with some discussion of freight-specific strategies involving other assets such as rail and intermodal connections to ports. Many of the examples in this report were drawn from presentations at the National Governors Association Center for Best Practices State Summit on Innovative Transportation Funding and Financing, held June 24–25, 2008, in Washington, D.C.<sup>2</sup> While this report discusses the potential impact of federal funding options for states, it is not within its scope to offer recommendations on what role the federal government should play in funding and financing transportation. The primary purpose is to provide information for governors and states on a variety of innovative, state-level transportation funding and financing options.

## Challenges Facing Our Surface Transportation System

The United States depends on its surface transportation system for mobility and commerce. The surface transportation system includes roads, bridges, rail, and transit. While vital to both our economic well-being and our quality of life, our surface transportation system is challenged by growth in demand that is outpacing new capacity and an inadequate level of investment. States have an important role to play in addressing each of these challenges through innovative funding and financing approaches, efforts to craft comprehensive strategies to manage demand, and initiatives to promote sustainable and equitable solutions.

### The Need to Better Manage Demand

The first key challenge for today's surface transportation system is that the increase in user demand is far outpacing the addition of capacity, leading to congestion and inefficiencies particularly in densely populated regions. As the population has grown and income has increased over the past 50 years, vehicle miles traveled (VMT) have grown from 600 billion to 3 trillion per year.<sup>3</sup> If rates of growth continued at just more than 2 percent per year, VMT could reach 7 trillion miles per year by 2055.<sup>4</sup> Although drivers have reduced VMT, down 3.3 percent during the second quarter of 2008 in response to high fuel prices, demand for transit has been on the rise, up 5.2 percent over the same time period from the previous year.<sup>5</sup>

In addition to demand for passenger transportation, there is significant and growing demand for freight transportation. One report projects that truck freight, which currently moves 61 percent of shipments by weight,<sup>6</sup> will double by 2035, and rail freight will increase by 60 percent.<sup>7</sup>

As demand has grown, the addition of capacity has lagged. Since 1980, VMT has increased by 95

percent, but road capacity has increased 4 percent.<sup>8</sup> This has resulted in congestion in many densely populated regions (although in some regions existing capacity has been adequate in meeting growing demand). There are efforts to add transit capacity, and states are working with federal and local partners to invest in new transit for metro regions. Some states and the federal government are considering increased investments in high-speed passenger rail. However, efforts to shift demand to transit and rail, particularly at peak periods of congestion, have been limited. Federal investment currently favors roads to transit by a four-to-one ratio.<sup>9</sup> The federal Mass Transit Account receives 2.86 cents from the federal motor fuel tax of 18.4 cents levied on a per-gallon basis. This poses a challenge to efforts to increase mass transit capacity as drivers reduce miles traveled and look to alternative modes, because mass transit funding is in part tied to fuel tax revenues, which decline as fuel consumption and VMT decline.

The resulting congestion-related impacts of demand growth are significant. In 2005, congestion nationwide cost drivers 4.2 billion hours of wasted time, 2.9 billion gallons of wasted fuel, and the economy \$200 billion in lost productivity.<sup>10</sup> Some economists have called for increased use of road pricing and tolls to accurately reflect costs and charge the user accordingly. The bulk of transportation funding comes from revenue sources (fuel tax, general fund, sales taxes on fuel, vehicle fees) that do not charge the user based on distance traveled or peak period use. Direct user chargers, such as per-mile fees, road tolls, and congestion pricing can be calibrated to more accurately reflect the cost of operating and maintaining facilities and the cost of using them during peak periods.

These types of price signals could help reduce peak period use and shift demand to alternative modes, such as transit. The U.S. Department of Trans-





portation (U.S. DOT) has called for increased use of congestion pricing and tolling and more public-private partnerships to reduce demand and provide for increased revenues.<sup>11</sup> A number of states are exploring increased use of tolling, congestion pricing, and mileage-based fees (discussed in later sections).

### Inadequate Investment

A second and related challenge is that the amount of investment to add new capacity and to preserve, operate, maintain, and upgrade the existing system is inadequate. To maintain and improve the nation's economic competitiveness, provide for personal mobility, reduce congestion, improve safety, and achieve environmental benefits the transportation system needs to be enhanced. The National Surface Transportation Policy and Revenue Study Commission recommended spending between \$225 billion and \$340 billion annually for the next 50 years to achieve these goals and noted that currently our nation spends less than \$90 billion annually.<sup>12</sup>

The lag in investment is attributable to a number of factors. The federal taxes on motor fuels, which provide the substantial portion of funds the federal government spends on highways and transit, are not indexed to account for inflation. The gasoline tax was last raised in 1993 and has faced eroding purchasing power ever since, compounded by rising costs for construction. State fuel taxes, which also provide a significant portion of state transportation spending, face similar challenges (although some states have recently raised their fuel taxes or indexed them to account for inflation).

States that fund transportation through general fund revenues (which account for approximately 9 percent of total state highway and transit funding) face constraints as revenue collection slows and competing priorities contend for scarce funds. While

tolls and other fees do provide additional transportation revenue, the portfolio of transportation spending, which depends primarily on the gasoline tax, has not kept pace with the needs of the transportation system. One report found that existing revenue streams would fall far short of the annual amount needed just to operate and maintain the current highway and transit system, perhaps a cumulative shortfall of \$500 billion by 2015.<sup>13</sup> It should be noted that many states are working to improve data collection and meet tangible performance goals and that such efforts can maximize the impact of transportation investments.

The results of lagging investment are evident in system deterioration. Approximately one-quarter of the nation's major roads are in poor or mediocre condition, and one-quarter of the nation's bridges are structurally deficient or functionally obsolete.<sup>14</sup> In its most recent *Conditions and Performance* report, U.S. DOT estimates that nearly 15 percent of major U.S. roadways (except rural and local) are in poor condition. More than 41 percent are in fair condition, and only about 44 percent are considered to be in good condition. For these roadways, conditions have not improved much since 1995.<sup>15</sup> Similarly, according to the latest FHWA data, more than 72,000 U.S. bridges, or more than 12 percent, are characterized as "structurally deficient." This means that their condition has deteriorated to the point that rehabilitation or replacement is approaching or imminent.<sup>16</sup>

### The State Role

States play a key role in funding transportation and in strategic management of transportation assets; thus, they are an important source of solutions to our nation's transportation challenges. States account for nearly half of all transportation revenue and

expenditures (with the federal government responsible for approximately 22 percent of revenue raised and local government raising approximately 32 percent).<sup>17</sup> States and local governments also are responsible for the vast majority of operations and service delivery.<sup>18</sup> States generate about 46 percent of total public-sector transportation revenues (compared to federal revenues of 22 percent and local revenues of 32 percent) and have responsibility for about 47 percent of total transportation expenditures (compared to just 2 percent federal and 51 percent local).

Each state has unique needs and concerns regarding transportation infrastructure funding and financing as well as unique strategic goals and objectives. While some less densely populated states and re-

gions may not face congestion challenges, and not all states face transportation funding challenges, many states face one or both challenges. Governors are uniquely situated within state government and can set priorities and pursue strategies to meet transportation needs. In most cases, governors appoint the director of the state department of transportation. Governors and state legislatures determine how states collect transportation revenue, how a state pursues transportation finance options, and how a state prioritizes transportation investments. Governors are pursuing varied options to address unique state needs, and, together with examples from municipalities and other nations, states are pioneering new means of funding and financing transportation.

# Motor Fuel Taxes



The largest single source of transportation funding—approximately 33 percent—comes from local, state, and federal per-gallon taxes on motor fuels, such as the gasoline tax.<sup>19</sup> Employing motor fuels taxes as the core funding strategy carries a number of strengths and weaknesses. Recently, as demand has begun to outpace tax revenue, some states have begun to examine the long-term viability of the motor fuel tax and consider alternatives to meeting future needs.

Oregon enacted the first state gas tax in 1919, and within 10 years, every state had followed suit. The general motivation for the states’ gas taxes was to finance the roadway system and to reduce reliance on other funding mechanisms, such as bond issuance and property taxation.<sup>20</sup> The first federal excise tax on gasoline went into effect in 1932. Revenues from the federal gas tax went to the general fund until 1956, when the Federal Highway Trust Fund was established to take 100 percent of all gasoline tax revenues and put them toward transportation funding (at first solely highways, and later transit as well).<sup>21</sup>

On the federal level, 85 percent of the receipts into the highway account of the Federal Highway Trust Fund were derived from taxes on gasoline, diesel, and special fuels in 2006, as shown in Figure 1. On the state level, the sources are more varied, but the largest share of state-generated funds also comes from motor fuel tax receipts. Together, state gas tax funds and federal funds constitute 53 percent of revenues states use for highways, which means that half of all state highway spending is derived from gasoline taxes.

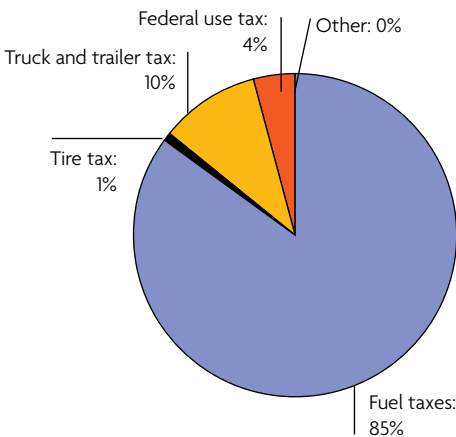
## Strengths and Weaknesses of Fuel Taxes

Motor fuel taxes are the single largest sources of revenue for transportation at both the federal and state levels. However, there is an emerging debate over whether fuel taxes are well-suited to meet long-term revenue needs and other objectives.

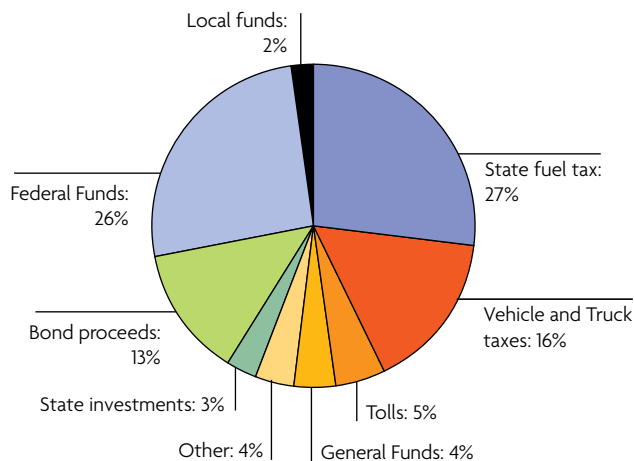
There are a number of reasons why fuel taxes have been relied upon by both states and the federal

**FIGURE 1: Revenue Sources for Highways, 2006**

Receipts into the Highway Account of the Federal Highway Trust Fund



Revenues Used by States for Highways



Source: Authors’ analysis of federal highway statistics series data.

government as a primary source of revenue for transportation funding. The collection of fuel taxes present a relatively low administrative burden, offer low compliance costs, and the evasion of tax payment is difficult.<sup>22</sup> Fuel taxes also have the ability to generate substantial amounts of revenue at a relatively low cost to individual users. A one-cent increase in federal fuel taxes on gasoline and diesel could raise \$1.8 billion per year over 10 years, according to the Congressional Budget Office.<sup>23</sup> Historically, motor fuel taxes also offer revenue stability and predictability relative to other forms of taxation. Motor fuels tax collection also poses minimal privacy concerns compared to tax options that might require the use of global-positioning system devices for collection. Additionally, by charging on a per-gallon basis, motor fuels taxes provide an incentive for users to purchase more efficient vehicles.

However, there are several challenges relating to motor fuels taxes. The first challenge is the eroding purchasing power of motor fuels taxes. The federal fuels tax (18.3 cents per gallon) and many state transportation fuel taxes (average of 31 cents per gallon) are not indexed to account for inflation. Unless they are increased at regular intervals, these taxes face eroding purchasing power over time. It should be noted that even if indexed to the price of fuel or the consumer price index (CPI), which is a measure of the cost of goods and services, motor fuel taxes still may not increase enough to account for rising costs of construction.<sup>24</sup> For example, from March 2007 through March 2008, the cost of construction inputs increased 6.5 percent while the CPI increased 4 percent.<sup>25</sup> Additionally, fuel taxes that are indexed to the price of fuel or the CPI could decrease when the price of fuel or the CPI drops, leading to decreased revenues. Some states have recently increased their fuel taxes, indexed them, or supplemented them with sales taxes (which capture more revenue as fuel prices increase) in order to preserve the purchasing power of fuel taxes.<sup>26</sup>

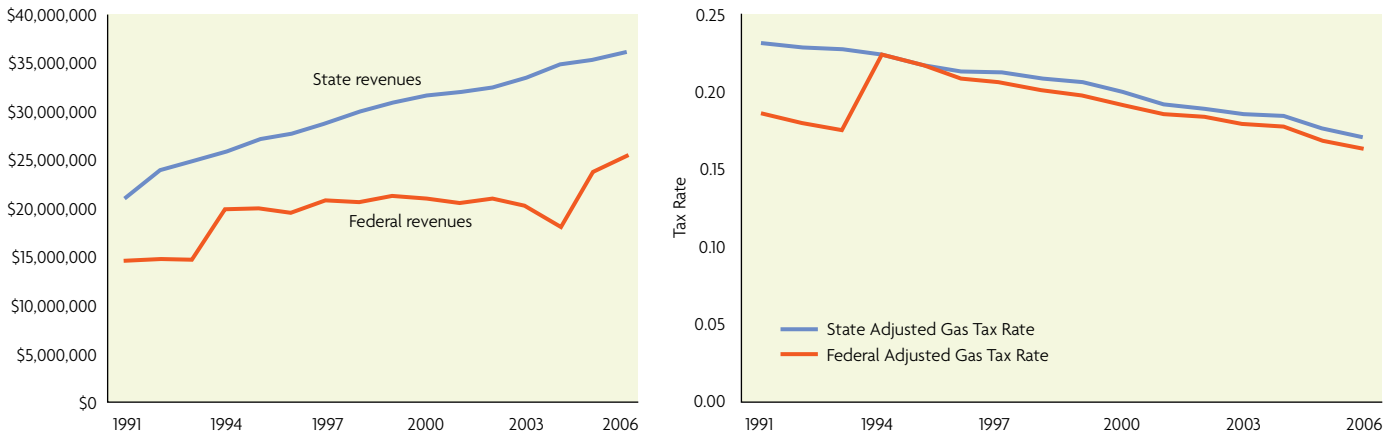
A second challenge for fuel taxes is that they are not user fees that finance a specific service or are collected only from the user of that service. This differs, for example, from tolls collected to maintain, operate, or upgrade a particular road or facility. Fuel tax

revenues are appropriated through a complex process that provides funding for a variety of transportation projects. Some states are examining the feasibility of increasing the development of user fee-based projects to diversify their transportation revenue portfolio, although not all projects (such as rural roads and bridges or certain transit projects) are necessarily well-suited to a pure user fee model.

A third challenge for motor fuel taxes is that by not charging a user fee, motor fuel taxes do not necessarily charge drivers equally for miles traveled. Since fuel taxes are collected on a per-gallon basis, the driver of a more fuel-efficient vehicle could pay fuel tax on the same number of gallons but drive many more miles than another driver of a less efficient vehicle.<sup>27</sup> While it is desirable from an environmental standpoint to promote efficient vehicles, it also is important to consider the costs of miles traveled, regardless of fuel type used, in terms of road wear and congestion. Users pay the same motor fuels tax regardless of whether the user is driving during off-peak hours on a road with ample capacity or on a congested road during peak periods. The result is that motor fuel taxes do not necessarily result in the most efficient approach to managing transportation demand, particularly as compared to congestion pricing schemes or vehicle miles traveled fees priced to manage demand. Additionally, motor fuel taxes currently apply to petroleum-based fuels but do not cover alternative fuels such as electricity.

Going forward, there are questions as to whether the current set of motor fuels taxes, left unchanged, can sustain investment needs. After years of steady growth, the collection of federal and state gas tax receipts has slowed because of factors including commodity price volatility and resulting changed driver behavior represented by declining VMT. Gas tax revenues at the federal level rose steadily for decades, reaching \$21.2 billion in 1999. Since then, total federal gas tax revenues have fluctuated, declining to \$18.2 billion in 2004. State gas tax receipts have increased steadily, and reached \$36.1 billion in 2006. The continued growth is due, in part, to states that index their fuel tax or have raised their fuel tax or that levy a sales tax on gasoline. However, adjusted for inflation, fuel taxes overall are not generating much more revenue than they were in the mid-

**FIGURE 2: Revenues from Gasoline Tax (in \$000's) and Inflation-Adjusted Gas Tax Rate, 1991-2006**



**Note:** The federal revenue figures are only for gasoline, while the state figures include revenues from state taxes on all motor vehicle fuels. Source: IRS Statistics of Income Bulletin (federal) and FHWA Highway Statistics Series (state).

**TABLE 1: Change in Revenue Sources Used by States for Highways, 2001-2006**

	Percent change	Absolute change (in \$000s)
Fuel taxes	11.0%	\$3,158,287
Vehicle and truck taxes	28.0%	\$4,183,012
Tolls	41.6%	\$1,970,828
General funds	18.2%	\$747,345
Sales and use taxes, severance taxes, and other state taxes	28.8%	\$1,112,588
Other investment income	36.7%	\$1,129,446
Bonds proceeds	26.6%	\$2,510,118

**Source:** Highway Statistics Series, various tables, various years.

1990s, which presents challenges as demand for transportation dollars continues to increase.

Growth in state gas tax revenues has lagged growth in other mechanisms for financing transportation, growing only 11 percent in six years (2001-2006), while tolling and other vehicle and truck taxes (registration fees, weight and distance taxes, excise taxes on tires and batteries, etc.) have experienced much higher rates of growth (Table 1). If the growth rate in various revenue sources continues at the rates shown in the table below, the fuel tax will become less central, unless states significantly increase their fuel taxes.

### Considerations for States

The increase in gasoline prices, the reduction in VMT, and the increasing consumer preference for more fuel efficient vehicles have led to questions

about the continued desirability of relying substantially on fuel taxes over the long-term. Some states have looked at increasing their state fuel tax or indexing it to inflation in order to preserve its purchasing power. More broadly, policymakers also are considering several options for supplementing or eventually replacing the fuel tax.

Some states have increased their fuel taxes over the last six years because the rates are legislatively tied to the rate of inflation. Such “indexing” rationalizes the process of increasing the tax rate, allows revenues to keep pace with rising costs, and avoids the acrimony of periodic increases. States such as **Florida, Illinois, Kentucky, North Carolina,** and **West Virginia** have indexed tax rates. States that place a sales tax on motor fuels include **California, Georgia, Hawaii, Illinois, Indiana, Michigan,** and **New York.**<sup>28</sup> A few others have enacted gas tax increases with an effort to explain to the public how new rev-

enues would be spent to benefit the transportation system. In **Washington**, the state instituted a 9.5-cent gas tax increase in 2005, which was affirmed by voters when put to a referendum, to fund needed transportation reinvestments. This followed a 5-cent gas tax increase in 2003.

Congress and more than 14 states have established current special commissions or study groups to identify new transportation financing strategies. Some of these commissions were established by, and report to, the state legislature (**Arizona, Nevada, North Carolina, Oklahoma, South Carolina, Wash-**

**ington, and Wisconsin**) and some report to the governor (**Colorado, Iowa, Michigan, Minnesota, New Jersey, Oregon, and Texas**). With questions about the fuel tax's role in long-term transportation revenue plans, these commissions have explored a number of alternatives to the fuel tax. While the fuel tax is unlikely to be replaced in the near future, many states are already exploring means of supplementing it with a diverse portfolio of other revenue sources (such as public-private partnerships, road pricing and tolling, and debt), and some states are exploring long-term strategies that could eventually replace the fuel tax (such as the VMT tax). Those options are examined in subsequent chapters.

## Innovative Debt Strategies



Pay-as-you-go systems, where funds are encumbered only after receipt of taxes, fees, and other revenue, have a number of advantages, including that they do not require debt financing and the future use of revenues to service the debt. However, as transportation demands have increased, construction and materials costs have risen, and revenues have spread over larger areas and among more projects, states are reevaluating debt as a way to accelerate completion of transportation projects and save costs.

The high up-front costs associated with many transportation projects means that their costs often exceed available funds in any given year. States can use borrowing, otherwise known as “debt financing,” to address the need for revenue that will be recouped over the life of the project. Traditionally, this has been done by issuing bonds on the private market to be paid back from toll revenues, state fuel tax revenues, the general fund, or other sources. However, several new approaches for debt financing have emerged in recent years as states have endeavored to make up for gaps in motor fuel tax receipts and sought alternatives to the pay-as-you-go financing method. Innovative debt strategies include the use of bonding instruments, such as Grant Anticipation Revenue Vehicles (GARVEEs) and private activity bonds; federal credit assistance from the Transportation Infrastructure Finance and Innovation Act (TIFIA) loan program; and state infrastructure banks.

While the decision to use debt is a strategic one, it burdens the borrowing entity with future obligations. States may be reluctant to encumber their highway fund balance sheet with contingent liabilities for a variety of legal and financial reasons, including concerns related to the accumulation of highway debt. The need for some revenue stream by which to pay back the debt and interest accrued remains a key concern as well.<sup>29</sup> Additionally, bond ratings can fall if a state has

too much debt, leading to higher interest rates and, thus, higher project costs.<sup>30</sup>

Beyond the capacity to repay bonds or other types of loans, for some states debt represents a departure from the more traditional pay-as-you-go system of financing federal-aid highway projects. That is, projects are completed, maintained, and administered when the money is available—whether from state, federal, or other sources. The pay-as-you-go method became a common form of highway finance after President Eisenhower endorsed it when the Federal Highway Act was signed into law in 1956.<sup>31</sup> In addition, some states historically are averse to accumulating debt.<sup>32</sup>

### Bonding Instruments

The most common method of borrowing is to issue bonds. Bond issuers, including states, promise to pay back the loan with interest at regular intervals, by a specific date. Most bonds are rated by private companies and these ratings help gauge the issuer’s ability to pay back the bond by the due date. Repayment of bond financing necessitates a stream of future revenues, and states typically have used state taxes, fuel taxes or vehicle-related fees, and toll receipts to generate revenues.

Traditionally, states have issued two forms of bonds. The first is revenue bonds whose only security was pledged highway user revenues. The other is general obligation bonds that are backed by the full faith and credit of the state, even though the principal source for debt service was still highway user revenues. In 1893, **Massachusetts** became the first state to establish a highway department; that same year, it also became the first state to issue bonds to borrow for highway projects. Since then, every state except **Nebraska** and **Wyoming** has issued some sort of debt for transportation.<sup>33</sup>

Between 2001 and 2006, revenue from bond proceeds increased by more than 26 percent from \$9.4 billion to \$11.9 billion. Outstanding end-of-the-year state bond obligations totaled \$96.5 billion at the end of 2006, compared to \$28.4 billion in 1990.<sup>34</sup>

One advantage of bond funding is that it provides states with upfront capital to accelerate project delivery. States that issue highway bonds are able to pursue projects much faster than if they had to have all the cash in hand to advance a project. Although this imposes interest and other debt-related costs, bringing a project to construction more quickly than otherwise possible can sometimes offset these costs. For example, delaying projects can impose costs that derive from a variety of sources: higher construction costs, inflation, lost driver time, freight delays, wasted fuel, and forgone or deferred economic development.

In recent years, federal policymakers have examined strategies under which federal-aid funds can better support states that elect to accelerate projects through borrowing. In addition, a number of federal programs provide states increased flexibility in using federal funds for debt financing, most notably through GARVEEs and through the authorization of tax-exempt private activity bonds.

**Grant Anticipation Revenue Vehicles (GARVEEs).** Before the National Highway System Designation Act of 1995 (NHS Act) was enacted, states could not use federal-aid funds, authorized by the federal government to support state road construction, to pay interest and issuance costs of debt for eligible projects. As a result, states treated federal funds differently from their own state funds, which they have borrowed against for years because the tradeoffs made it worthwhile. However, under the NHS, states were provided the same flexibility with respect to use of federal transportation funds through GARVEEs.

GARVEEs refer to any bond, note, certificate, mortgage, lease, or other debt financing instrument issued by a state or political subdivision whose principal and interest is repaid primarily with federal-aid funds under Section 122 of Title 23, U.S. Code.<sup>35</sup> GARVEEs differ from standard municipal bonds or

conventional state bonds that are backed by the state's taxing authority in that the principal and interest are paid back with future federal highway or transit funds. GARVEEs can be used for almost any highway project, transit project, the purchase of transit vehicles, or connections to intermodal ports and stations. However, they cannot be used for any transportation purpose that is solely private, to build rail lines for freight, or for Amtrak's passenger rail service.<sup>36</sup>

Through the end of 2007, the total dollar amount of GARVEE-related transactions reached \$7.6 billion. Individual issuances have ranged from relatively small amounts of under \$40 million in **Arizona**, **New Mexico**, and **Ohio**, to extremely large issuances of over a half billion dollars in **Georgia**, **California**, and **Colorado**. Additionally, a \$750 million GARVEE issuance has been proposed for a single project in **Maryland** (see Table 2).

Despite these large issuances, GARVEEs are not limited to single projects. Rather, they are frequently used to finance large highway programs that encompass a variety of projects throughout the state or that are concentrated in a large region of the state. For this reason, it often is difficult to ascertain the precise purpose of the projects for which states have issued GARVEEs. Although there are several urban and rural examples of GARVEE projects, it appears that most GARVEE-funded projects are located in suburban and exurban areas.<sup>37</sup>

**Private Activity Bonds.** States also have shown burgeoning interest in financing transportation projects through the use of nonprofit corporations and other means such as private activity bonds (PABs). Recent-

**TABLE 2: Initial Financing Plan, Intercounty Connector, Maryland (in \$000s)**

Bonds backed with toll revenue	\$1,231,600
GARVEE bond	750,000
State general funds	264,900
State transportation trust funds	180,000
Special federal funds	19,300

**Source:** Maryland State Highway Administration and Maryland Transportation Authority, "Intercounty Connector Project Financial Plan Annual Update," June 2007.



ly, the Internal Revenue Service (IRS) has allowed states and local governments to issue tax-exempt PABs to finance projects that meet certain public-purpose criteria. Such projects cover areas like housing and education as well as a wide range of infrastructure projects like waste treatment and recycling plants. PABs are now limited to straight-line depreciation, and only 25 percent of the funding can be used for real estate. In addition, the total amount of private activity bonding that a state can issue is subject to annual limits.

In 2005, the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) amended the relevant IRS code to include “qualified highway or surface freight transfer facilities” as eligible projects for these tax-exempt PABs. In other words, any conceivable highway project, as well as intermodal transfer stations, is eligible for federal assistance under Title 23.

As of July 2008, approximately \$3.3 billion in PABs had been approved (but not allocated) for five different projects (for example, \$580 million was approved for the **Virginia** Capital Beltway HOT Lanes project on I-495).

Although these transportation bonds are exempt from an individual state’s caps on PABs, current law limits the total amount of activity to a \$15 billion volume cap. As of July 2008, U.S. DOT expected that the entire \$15 billion would be allocated by 2009.<sup>38</sup>

State concerns expressed with PABs to date include (1) whether private investors should be allowed to purchase (or lease for extended periods) public facilities using tax-exempt bonds, (2) deferring interest, and (3) whether it is advisable to provide public subsidies to facilitate the purchase of public assets by private entities.

### Federal Credit Assistance

Issuing bonds provides states access to private capital up front, with the obligation to pay back the bond holders at a certain date. However, states have other means of accessing capital. The federal government provides assistance to states to help lower interest rates and expand access to capital through

the Transportation Infrastructure Finance and Innovation Act (TIFIA) loan program. Through TIFIA, the federal government provides federal credit assistance to projects that meet certain criteria (such as the use of public-private partnerships and/or advanced technology) for nationally or regionally significant projects. TIFIA is intended to expedite important projects by giving project sponsors access one of three forms of assistance: direct loans, loan guarantees, or lines of credit. TIFIA credit assistance can be provided for as much as 33 percent of total project costs. Eligible projects must be supported at least partially with user charges or other non-federal dedicated funding sources but are designed to attract private investment in transportation infrastructure.

As of April 2008, state applicants had requested TIFIA credit assistance for 32 separate projects, with a total estimated project cost of about \$31.6 billion. Nearly \$3.3 billion has been approved for 10 active credit agreements, and nearly \$1 billion in retired agreements already has been used.<sup>39</sup> In Texas, for example, a TIFIA loan agreement was executed with a private partner to construct two segments of a new 91-mile tollway. Approximately one-third of the project’s \$1.3 billion total cost is a direct TIFIA loan, 15 percent of the cost is borne by the private partners, and a little more than half comes from bank loans.<sup>40</sup>

In its most recent program assessment, the U.S. Office of Management and Budget (OMB) found that although TIFIA helps fill a specific market niche by financing large, complex, and potentially risky projects, the program could be improved. Specifically, OMB cites TIFIA’s open-ended guidelines, which do not specify criteria for when direct loans should be made as opposed to loan guarantees or standby lines of credit. OMB also notes that TIFIA does not have a minimum level of private capital that must be invested for a project to qualify for the program, and TIFIA does not necessarily target projects that lack access to private capital. OMB is working to develop criteria to ensure that TIFIA offers the most cost-efficient financing options and more effectively targets projects that will leverage federal funds to attract private capital.<sup>41</sup>

### State Infrastructure Banks

In addition to bonding and borrowing, states can use **State Infrastructure Banks (SIBs)**—which are essentially revolving fund mechanisms—to finance highway and transit projects.<sup>42</sup> SIBs typically provide projects direct loans with attractive interest rates, with the revenues from repayment and interest used to fund additional loans. Some state SIBs can issue bonds as well. One key element of a SIB is that it offers states a flexible funding source, which can be tied to a set of state-established criteria that evaluate a project’s benefits (such as economic development) and significance. Thus, SIBs can be more strategic and more nimble than a typical state appropriation process and can be used to complement existing state, local, and federal transportation funding and financing. In particular, SIBs can focus their financing assistance on projects that leverage other federal and/or private capital while helping to achieve state objectives such as environmental, economic, or safety benefits.<sup>43</sup>

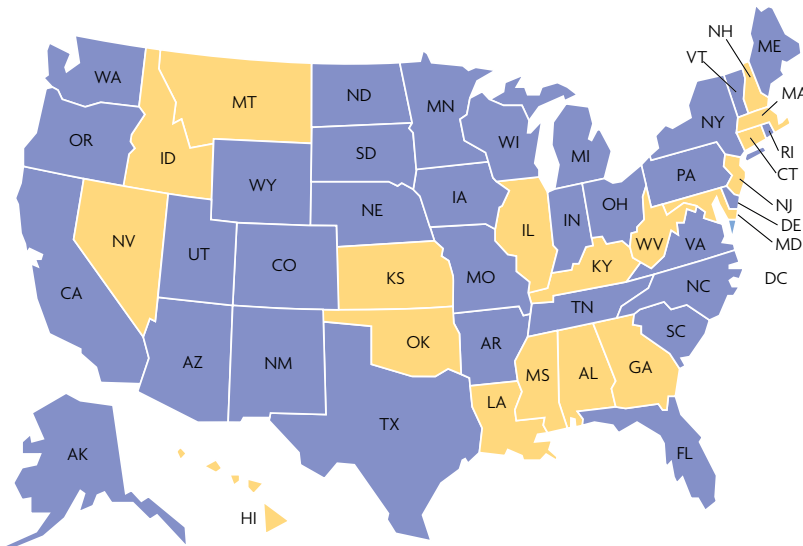
SIBs are initially capitalized with funds from a variety of sources, often in combination. States may capitalize SIBs with up to 10 percent of their federal highway and transit capital funds and must provide a match equal to 25 percent of all federal funds used for such purposes.

SIBs provide a mechanism to finance large transportation projects up front, thus allowing projects to proceed on an accelerated construction schedule. Although SIBs were initially piloted for several states through the NHS Act of 1995, it was not until 1998 when the federal government expanded eligibility for other states and provided \$150 million in seed funding—outside of regular apportionments—for initial capitalization, that SIBs became an attractive tool for states.<sup>44</sup> Since then, 33 states have established SIBs. To date, these banks have provided \$6.2 billion in loans for 596 different transportation projects.<sup>45</sup> Figure 3 shows the states where the loans have been issued, illustrating that the use of SIBs is highly concentrated.

**Ohio** used \$40 million in general state revenue funds and \$120 million in federal highway funds, including National Highway System and the Surface Transportation Program funds.<sup>46</sup> Other states—including **Arizona, Florida, and Texas**—also used some federal funding for SIB capitalization.<sup>47</sup> It is important to note that the funds are not limited to the original funding categories from which the initial capitalization is drawn.

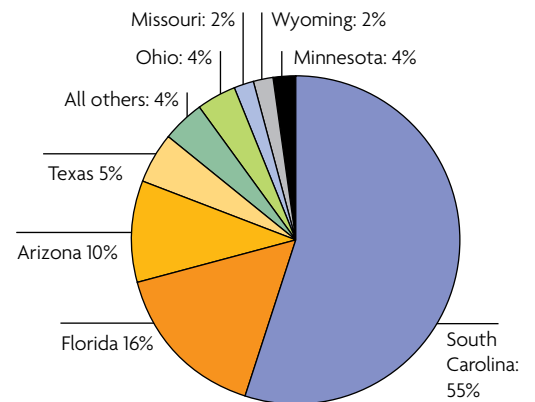
**South Carolina** is a leader in SIB financing, representing more than 50 percent of the value of SIB

**FIGURE 3: State Infrastructure Banks, or Equivalent, 2006**



Source: Federal Highway Administration, State Infrastructure Bank (SIB) Activity for Highways—2005 (Table FA-22).

**FIGURE 4: Loan Agreement Amounts (%), by State 2006**



loan agreements nationwide (Figure 4). In 1997, the state established the South Carolina Transportation Infrastructure Bank (SCTIB). The SCTIB is governed by a seven-member board including the chairman of the state DOT commission, with two members appointed by the governor, two by the speaker of the house, and two by the president of the senate. As such, the appointments are made statewide and not on a regional level. The bank's board is separate from the DOT board, yet the latter provides staff and other administrative support and works in close coordination with the SCTIB. The bank also works with the state Joint Bond Review Committee, which must approve the financial package. In situations where the SCTIB issues general obligation bonds (which has only happened once), the Budget and Control Board also must approve the issue. The SCTIB serves only as a funding entity and does not own or manage the construction or ongoing maintenance of any project.<sup>48</sup> The distribution of governance responsibilities allows several different entities, with varying interests (project finance, credit worthiness, transportation performance) to provide independent oversight of the financing scheme.

The SCTIB is capitalized by a variety of state sources. In 1997, it received an initial one-time infusion of \$66 million from the state's general fund. In fiscal year 2007, 38 percent of its revenues were derived from proceeds from the state's truck registration fees (currently about \$63 million each year), 16 percent from a portion of the state gasoline tax (\$26 million), 18 percent from state vehicle taxes (\$30 million), and 6 percent from intergovernmental agreements for specific construction projects (\$9 million); the remaining 23 percent came from investment earnings (\$38 million). During 2007, expenses exceeded revenues and decreased the bank's net assets by about \$45 million.<sup>49</sup>

The federal guidelines for how to screen eligible projects currently provide limited details and allow any project eligible for federal highway or transit assistance to be a candidate for SIB financing.<sup>50</sup> Some states, however, have detailed criteria for project eligibility based on their individual needs. **Florida**, for example, allows for any project that provides

for increased mobility yet it also specifically calls out intermodal connectivity.<sup>51</sup> **Ohio**—which has entered into the largest number of agreements (82) by far—established its SIB specifically to foster local project contributions and uses a rating system that prioritizes that goal.<sup>52</sup> **Arizona's** selection process is a point-rating system based on financial considerations, economic benefits, and safety. It requires applicants to choose between “mobility” or “air quality and environmental impacts” for the final criteria.<sup>53</sup> **South Carolina's** eligibility criteria for projects are that they must be \$100 million or more and provide public benefit in “one or more” of the following areas: economic development, mobility, safety, quality of life, or general welfare.<sup>54</sup>

### Considerations for States

Perhaps the most pressing concern for states considering debt finance is the current economic outlook. As credit markets have tightened considerably, states seeking to issue bonds or access credit and private capital have encountered challenges. As will be discussed later, the economic situation has led several state public-private partnership arrangements to be cancelled. In addition, states seeking to issue bonds on the municipal market to fund a variety of capital projects, including transportation, are in many cases reconsidering and waiting for the current tightness in the credit markets to ease.

The average cost for states and municipalities to borrow over a one-year term rose 83 basis points (each basis point is 1/100th of a percent) over a two-week period in September 2008.<sup>55</sup> With large debt issuances, this considerably increases costs for states to borrow money. Some analysts expect that as lenders become more risk-averse, the difference in cost of borrowing between AAA-rated states and AA- or A-rated states may increase significantly. Recently enacted federal legislation is intended to ease the tightness in the credit markets.

Although the short-term outlook for borrowing may be challenging, using innovative debt finance tools to accelerate transportation project delivery still offers advantages. Costs for construction materials are projected to continue to rise. The use

of comprehensive cost-benefit analysis will assist states that are seeking to weigh the benefits of accelerated delivery with the costs of borrowing, particularly in the current market.

As states continue to employ debt finance, those states using SIBs may want to consider how to refine their project selection criteria to deliver the

best results based on state objectives. States may look to include economic, mobility, safety, regional significance, overall project cost, leveraging of private capital or other sources, environmental benefits, impacts on congestion, and other criteria to fully evaluate SIB project applications.

## Tolling and Fees



The use of tolls—a charge for passage across a bridge or along a road—to fund and finance transportation in the United States is older than the national highway system. While tolls currently provide only a small share of total transportation revenue, many states are revisiting the use of tolls to help generate needed revenue, address capacity expansion, and manage urban congestion. Complementary to tolling, states are exploring user fees: directly charging users for the time and point of access, miles driven, or even the parking spaces they use. As with tolls, these user fees can allow state and local officials to access private capital, leverage existing public assets, and price transportation facilities to encourage more efficient use of transportation assets. Innovative approaches to tolling and fees include enhanced use of traditional toll authorities, congestion pricing, vehicle miles traveled (VMT) fees, and variable parking fees. Some of these approaches may not be as well-suited to less densely populated regions but could be more widely implemented in more densely populated regions.

### Enhancing Traditional Toll Authorities

The most widely deployed user fees in the United States are tolls. Since the 1990s, several factors have led to resurgent interest in tolling. These include (1) revenues from fuel taxes rising more slowly than program costs, (2) widespread adoption of technological advances in electronic toll collection systems, and (3) the interest in pricing schemes to reduce demand and improve system performance by efficiently allocating scarce road space. In addition, tolling has the ability to leverage an early infusion of capital to advance major projects more quickly than with a pay-as-you-go strategy.

While other nations rely heavily on toll revenues, in the United States, toll revenues represent only

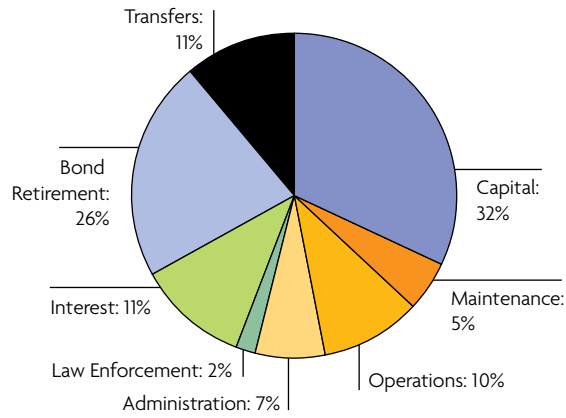
about 5 percent of total highway user fees and taxes. In contrast, toll revenues in Spain represent 46 percent of the road network budget. In Norway, the figure is 32 percent of the entire surface transportation budget, including metropolitan transit.<sup>56</sup>

While toll revenues fund only a small share of state transportation infrastructure, they remain widespread. Toll facilities in the United States account for nearly 5,100 miles of roads, bridges, and tunnels. There are currently 101 toll roads or bridges in the United States operated by 85 different regional, state, and local agencies or entities. Of these entities, 55 are special tollway, bridge, tunnel, or port authorities specifically designated for operating the facility. Nine are state departments of transportation, and 18 are local governments. Other entities include a parks authority and a public development corporation. In some U.S. metropolitan areas, regional agencies are responsible for the key highway facilities. They provide policy oversight for the facility and have the authority to set toll rates, sell bonds, and approve budgets and contracts, as well as a number of other responsibilities.

For states with toll authorities, the use of toll revenues remains a key policy issue. About 90 percent of the toll revenue collected by toll agencies and entities is dedicated to the facility on which it is collected. Almost one-third of the revenue is spent on capital; one-quarter goes to operations, maintenance, and administration; one-third is for interest and bond retirement; and 11 percent is transferred elsewhere. Figure 5 describes the uses of revenues from tolled facilities.

While bond covenants require that toll revenues be applied first to debt service and bond retirement, an increasing number of toll authorities are expanding the types of activities fundable with toll receipts. In addition some tolling entities operate more than

**FIGURE 5: Disbursement of Receipts from Toll Road and Crossing Facilities (Excluding Ferries), 2006**



**Source:** Federal Highway Statistics Series, Disbursements of State Toll Road and Crossing Facilities SF-4B; and Disbursements of Local Toll Facilities LGF-4B, 2007.

just the toll facilities. In these entities the revenues are shared among the various operating entities and may be used for other state needs. In the **New York City** area, the regional Port Authority operates bridges, tunnels, bus terminals and bus lines, port facilities, and the main airports. In 2007, more than \$15 million in revenue from the **New Jersey** Turnpike Authority was transferred to other public purposes.<sup>57</sup>

Another example of expanded use of toll revenues is the San Francisco Bay Area Toll Authority

(BATA) in **California**. BATA, created by the state in 1997, administers and collects and allocates the revenues from seven state-owned bridges. The authority, which shares the same governing board with the region's Metropolitan Transportation Commission, the Metropolitan Planning Organization (MPO) for the region, must prioritize the toll revenues to those bridges but it also can reprogram funds for other regional projects, including transit and roadway improvements.<sup>58</sup>

As highlighted in Box 1, new tolling technology has helped enable wider deployment of such toll projects. In **Texas**, the Central Texas Turnpike Project uses tolls and a variety of bonding and credit enhancement tools to fund an entire system of multi-use corridors (e.g., road, transit, pipelines, broadband, etc.) located throughout the state.<sup>59</sup>

Because of the variety of uses for toll revenue, states are seeking to develop new toll projects. These projects tend to be on newly constructed facilities in fast-growing states and represent a large portion of major new highway mileage.<sup>1</sup> As such, **Texas** and **Florida** are among the leading states in building new tollways, with a combined 67 projects underway and 23 new projects in operation.

States wishing to adopt new tolls often do so through legislation. According to the FHWA, state legislation to authorize toll roads share some com-

### Box 1: Tolling Technology Developments

Recent advances in state-of-the-art communications and pricing technologies have been deployed to encourage market responses to congestion. In particular, electronic toll collection (ETC) tags, which enable drivers to pay without stopping at toll booths, are now widely available. These systems use transponders mounted on vehicles that are identified by readers located in dedicated and/or mixed-use lanes at toll plazas. They have been proven to minimize crashes, reduce harmful emissions, save fuel, and decrease roadway delays.<sup>60</sup> A recent survey of toll collection agencies found that nearly all toll collection plazas have ETC capability. Similar technology is used in congestion pricing strategies abroad. In London, for example, cameras mounted around the perimeter of the congestion charge zone send images to a data center where special software "reads" the license plates of vehicles that enter the zone. Matches are made of the license plate numbers to determine whether a fee should be imposed, which occurs by regular mail.<sup>61</sup>

<sup>1</sup> As might be expected, tolling as a finance strategy for new roadway and bridge capacity is often more politically feasible than the conversion of a non-tolled lane, highway, bridge, or tunnel into a tolled facility. Such conversions are often unpopular because the user now has to pay for use that was previously free.

mon provisions: (1) creation of an authority or commission; (2) delineation of the district within which the entity operates; (3) details and legal issues about the entity's governing board; (4) authority to issue bonds and to set and raise tolls; (5) the ability to invest bond proceeds to cover operating, maintenance, and repair obligations; and (6) constraints on the use of the funds.<sup>62</sup>

### **Congestion Pricing**

Congestion pricing is a relatively new tolling approach whereby roadway use is priced to reduce demand to most efficiently use the road's capacity and to raise revenue. The core principle of congestion pricing is that the price of accessing available roadway capacity should be higher at the places and the times of day when demand for highways (and thus the benefit from using them) is greatest. If a bridge toll, for example, is raised during periods of highest congestion, travelers are more likely to delay less essential trips to off-peak hours, use less crowded alternate routes, use public transit, or form car pools.<sup>63</sup> Congestion pricing has been adopted in some heavily congested U.S. metropolitan areas and is under consideration elsewhere. Variations include tolling the entire roadway (usually a bridge or tunnel), tolling one or more existing lanes (while remaining lanes remain untolled), tolling new capacity (one or more lanes), and imposing a "cordon fee" that charges any vehicle that enters a designated area, such as a city center.

Benefits of congestion pricing include reducing demand at peak times, which in turn helps to extend the life of the existing infrastructure. For instance, the FHWA found that two congestion priced lanes can move the same amount of peak traffic three times as quickly as four untolled lanes.<sup>64</sup> According to U.S. DOT, congestion pricing, if adopted in all areas of major congestion, could reduce the need for new roadway capacity by \$20 billion.<sup>65</sup> Additionally, U.S. DOT suggests that increased use of tolling could help states tap into up to an estimated \$400 billion in private capital through the use of public-private partnerships (discussed further in the next chapter).<sup>66</sup>

**Congestion Pricing of Entire Road.** Congestion pricing works most effectively when an entire road is tolled. This is the primary form of current congestion pricing approaches. It is most frequently applied to bridges and tunnels, which are often already tolled to amortize the costs of construction, operation, maintenance, and reconstruction. In these cases, the bridge or tunnel toll can be increased, beyond the need for such expenses, to serve as a congestion management strategy. The fee also can vary by time of day or by vehicle type, for example, to discourage commercial vehicles during rush hour. Often the congestion portion of the fee is applied only on the trip into a city as a way to encourage use of alternative, available transit during rush hour, with no additional fee when leaving the city.

**Congestion Pricing on Existing Lane.** A second form of congestion pricing is to toll one or more existing road lanes. Typically, this is done by converting a high occupancy vehicle lane (HOV) to a high occupancy toll (HOT) lane. Creation of a HOT lane allows low-occupancy drivers who are willing to pay the toll to access available space on the lane alongside HOVs. As long as the other existing lanes remain free, this system typically meets little public resistance since the vehicles paying the HOT toll are occupying excess space not used by the HOVs. To date, there are no examples of projects converting all lanes of a non-tolled road to a tolled road (other than by raising bridge and tunnel fees).

The **Minnesota** Department of Transportation and the Twin Cities Metropolitan Council are working with federal partners to convert bus-only lanes to "priced dynamic shoulder lanes," or PDSLs, on I-35 in Minneapolis. Transit vehicles and carpoolers will be allowed to use the lanes without a charge. Single-occupant vehicles will be allowed to use the lanes by paying a toll that varies depending on traffic volume. The toll revenues will be used to initiate a bus rapid transit (BRT) network in the corridor, which includes vehicle purchases, and the construction of stops and other infrastructure such as park-and-ride lots. Transit fare reductions also will be funded through the toll revenues.<sup>67</sup>

**Congestion Pricing of New Capacity.** A third form of congestion pricing is creating HOT lanes by building new capacity (e.g., a new lane) rather than converting a free lane into a tolled lane. This helps address general resistance to new tolls as well as equity concerns that more affluent drivers are allocated greater access to public space previously open free to all users.

The Commonwealth Transportation Board in **Virginia** recently approved a HOT lanes project, which would add two new lanes in each direction to a portion of the Capitol Beltway located in Virginia, largely within the existing right-of-way corridor. Similar to the Minnesota plan, transit and three-person carpool vehicles in Virginia will be allowed to use the roadway without paying a toll. Other drivers will be assessed a charge according to real-time traffic conditions. The 14-mile project, which broke ground in July 2008 and is expected to cost between \$1.4 and \$1.5 billion, is being developed as a public-private partnership between the Virginia DOT and Fluor-Transurban to design, build, operate, and maintain the facility for 75 years.<sup>68</sup> Fluor-Transurban is putting up \$349 million in cash and will be responsible for repaying federal bonds and loans. Virginia is contributing \$409 million in federal and state highway construction funds, which will pay for needed improvements such as new bridges, ramp repairs, and connecting the HOT lanes to the I-395/I-95 interchange in Springfield. Future plans including expanding the HOT lanes network along the I-395/I-95 corridor and potentially congestion pricing of the Dulles Toll Road and the I-66 Corridor.

**Cordon Pricing.** Under cordon pricing, a fee is charged for any vehicle that enters the cordoned area, usually a city center. In these cases, all from outside the United States, the justification for cordon pricing is that vehicles entering the cordoned area impose costs (e.g., congestion, air pollution, carbon emissions, road damage, quality of life) inequitably on residents and businesses in the city center. Many cities have some type of cordon pricing system, and the experiences of Singapore, London, Oslo, and Stockholm (described in detail in Box 2) have demonstrated the potential to achieve a variety of benefits. Additional lessons can be learned from the recent

attempt at introducing cordon pricing in New York City, which would have been the first comprehensive example of this approach in the United States.

The primary objectives of cordon pricing begin almost uniformly with the desire to reduce traffic congestion in the urban core by reducing automobile traffic. Other objectives include increased accessibility to the urban core and environmental benefits from reduced vehicle emissions.<sup>69</sup> However, as with road pricing, cordon pricing can yield additional revenues that can fund additional bus capacity, bicycle and pedestrian improvements, or projects to provide alternative transportation through other modes within the cordon zone.

Singapore introduced the first cordon pricing program in 1975, charging drivers to enter downtown during morning rush hours. It moved to a fully automated electronic charging system in 1998 and expanded the system to include variable charges throughout the day. The result was a 13 percent reduction in traffic and a 22 percent increase in vehicle speed. London introduced its cordon pricing system in 2003, which led to a reported 15 percent reduction in traffic in the central city without significant impact on the surrounding local roads, as drivers switched primarily to public transit. In 1986 Bergen, Norway, adopted a toll ring around the city, and from 1990 through 2003, other cities in Norway, including Oslo, implemented congestion pricing systems.<sup>70</sup> Oslo's toll ring system is helping to finance transportation projects, with 20 percent of revenues going toward public transportation. Traffic volumes have been reduced up to 10 percent despite a relatively low toll rate.<sup>71</sup>

Stockholm introduced cordon pricing as part of a six-month pilot in 2006, where it was shown to achieve a 22 percent drop in vehicle trips, a 5 to 10 percent reduction in traffic accidents involving injuries, and a 14 percent decline in exhaust emissions. In addition, retail sales in central Stockholm shops increased compared with the same period the previous year, including significant increases in grocery sales in central neighborhoods. Initial public acceptance of cordon pricing grew from 30 percent to 55 percent during the trial, and the residents voted to continue the program. In 2008, acceptance was at 67 percent.<sup>72</sup>



## Box 2: Stockholm Congestion Pricing

### Actions

- Travel forecasting conducted to define cordon area: city center chosen
- Increased transit services Aug. 2005
- Initiated test congestion fee Jan. 2006
- Ended test congestion fee July 2006
- Referendum Sept. 2006 (yes 53%)
- Restarted congestion fee Jan. 2007
- 18 gateways to city center
- Fee charged upon entering and exiting
- Fee varied by time of day (1-2 E)
- Fee varied by time in zone
- Maximum total charge 6 E/day
- No charge evenings and weekends

### Lessons Learned

- Need clear goals articulated up front
- Goals: reduced congestion, clean air
- Net revenues (profit) not a goal
- Acceptance helped by “just a test”
- 10-15% less traffic achieved
- 30-35% less queuing time achieved
- Program approval went from under 30% (initial) to 67% (2008)<sup>73</sup>
- Key benefit was less travel time, less queuing
- Transit ridership up marginally
- 5% of drivers paid 30% of fees
- 50% of all regional drivers paid fee at least once every two weeks

**Source:** Gunnar Söderholm, “The Stockholm Trial: Congestion Charging and Improved Public Transport Aimed at Reducing Traffic Jams and Creating a Better Environment,” presentation at State Summit on Innovative Transportation Funding and Financing, Washington, D.C., June 24–25, 2008.

Mayor Michael Bloomberg’s PLANYC for **New York**<sup>74</sup> would have established a first-in-the-U.S. congestion pricing zone. The proposed area was located on the island of Manhattan, south of 60th Street and bordered by the East and Hudson Rivers. PLANYC, which ultimately did not gain the necessary approval by the state legislature, was originally awarded a \$354 million Urban Partnership grant by U.S. DOT. The plan’s main objective was to reduce congestion, but it also was expected to raise a significant amount of revenue.

Under PLANYC, drivers who used the toll crossings of the bridges or the tunnels to Manhattan would be charged the difference between the toll and the congestion charge, which was set at a daily rate of \$8 for cars and commercial vehicles and \$21 for trucks entering from outside the zone. Transit buses, emergency vehicles, taxis, and other for-hire vehicles and vehicles with handicap plates would not be charged the fee. Taxi trips that began in, ended in, or touched the zone would pay a \$1 surcharge. Net revenues were projected to be \$491 million a year

and would be used to improve the region’s mass transit system.

Although the City Council approved the plan and public opinion polls indicated that more than 60 percent of New York City residents supported the plan, others expressed concern that the mass transit improvements did not sufficiently benefit those residents outside Manhattan who would have their bridge (but not subway or rail) access to Manhattan tolled. The city failed to gain state legislative approval for the plan, and the U.S. DOT award was subsequently withdrawn and funds distributed to other U.S. cities.<sup>75</sup> These concerns highlight the importance of calibrating benefits with costs in such proposals.

A proposed variation on the New York City proposal, examined in an independent study commissioned by Ted Kheel of Nurture New York’s Nature, called for elimination of all transit fares on the Metropolitan Transportation Authority’s (MTA) extensive rail and bus system. A 24-hour \$16 cordon charge for passenger cars and a \$32 charge for trucks coupled with taxi fees and additional parking charg-

es would generate \$4.2 billion annually. This would more than replace the \$3.5 billion the MTA currently collects in tolls and transit fare box revenue while still providing another \$500 million annually for transit improvements.<sup>76</sup>

### Vehicle Miles Traveled (VMT) Fees

Vehicle miles traveled (VMT) fees charge drivers directly for each mile traveled. States are exploring VMT fees as a long-term solution for transportation funding, as well as for a number of related reasons. A VMT fee could reduce reliance on the motor fuels tax and allow for a more efficient and flexible form of revenue. Unlike the motor fuels tax, the VMT fee would be unaffected by greater use of more efficient vehicles. In addition, it provides a price signal that encourages drivers to minimize roadway congestion. Another advantage of the VMT fee is flexibility: It allows pricing to vary depending on the actual cost of capacity, allowing for higher fees when congested and lower fees when traffic is free-flowing. VMT fees also can be directed at segments of users, for instance commercial trucks.

In its simplest form, a VMT fee could be applied through periodic odometer readings in conjunction with annual vehicle registrations or inspections, although efforts to avoid evasion would be necessary. A vehicle dashboard display can reveal the exact cost per mile on a real-time basis, providing a feedback mechanism that is likely to modify driver behavior. More sophisticated approaches involve the use of global positioning system (GPS) receivers that can upload information automatically to refueling stations.

VMT fees could be paired with congestion pricing to provide a disincentive for non-essential and peak period trips. While this would maximize the efficient use of a road asset, the technology necessary to implement a VMT fee system might be prohibitively expensive to retrofit existing automobiles. Thus, the transition to a VMT fee system could take a number of years.

Perhaps the most strenuous objection to a VMT fee is that it taxes activities that are both critical to the execution of daily tasks (e.g., getting to work,

shopping, medical appointments, seeing friends, etc.) and necessary for a growing economy. While there is a historical correlation between VMT growth and GDP growth, the two are not necessarily related. In fact, VMT nationwide has been stable or declining for the past four years (2004–2008) while the U.S. economy has continued to expand at an average pace of more than 3 percent per year. Two additional objections to VMT fees, beyond their technical feasibility, are privacy concerns and eliminating the incentive for drivers to buy more efficient vehicles in order to save fuel.

Based on a number of recent studies, VMT fees appear to be gaining support as alternative long-term system financing options become more difficult. State transportation agencies from across the country also have supported the idea of VMT fees, with phase-in beginning about 2025 as issues of system architecture and interoperability are resolved and gas tax revenues fail to meet system financing needs.<sup>77</sup> The congressionally established National Surface Transportation Policy and Revenue Study Commission also endorsed VMT fees, as has the Transportation Committee of the National Conference of State Legislators. Although the test group in the Oregon pilot program, described below, consisted of only several hundred drivers who received a small compensation for participating in the pilot, it is worth noting that a full 91 percent of participants supported a statewide transition to a VMT fee structure.<sup>78</sup>

**Oregon VMT Pilot Program.** In 2006–2007, the Oregon DOT equipped 285 vehicles in the Portland area with GPS receivers identifying the location of the vehicle and its speed, then registering the amount of miles driven within certain zones at certain times (i.e., in-state, out-of-state, urban area, and rush hour). The receiver registered the mileage driven in each zone and uploaded the information to a central database automatically at refueling stations.

The Oregon pilot program required a revenue neutral VMT fee, meaning the charge to users would be approximately the same as the gas tax but applied on a mileage basis instead of a fuel consumption basis. In the Oregon test, fees were assessed based on the

mileage driven within each zone, adjusted by time of day for those charged a congestion fee during rush hours. The VMT fee was then charged to the vehicle owner's credit card. The pilot project established the technical feasibility of this type of road pricing while reducing driver use of the system during rush hour by 22 percent (for those charged a congestion fee on top of the VMT fee). The cost of retrofitting filling stations with automatic vehicle reading devices was estimated at \$35 million statewide, with annual administration charges of \$2 million.<sup>79</sup>

The Oregon DOT addressed the privacy concern by using a recorder that could register only the mileage driven in specific zones at specific times in summary form. As each mile is recorded by zone, the previous recordation is erased, making it impossible to associate driving behavior with any specific location at any specific time. States wishing to explore this approach could modify the amount of privacy to user preference, ranging from no travel data recorded to all travel data recorded, audit ability, and driver validation.<sup>80</sup> For the latter concern, the elimination of the "gas guzzler" penalty resulting from VMT fees can be addressed by adding an additional VMT tax that can be adjusted to add a multiplier for gas guzzlers or a discount for gas-sippers.

**VMT Fees for Trucks.** Another example of a VMT charge is in use on the Autobahn in Germany, where trucks pay a variable VMT tax based on total vehicle emissions as well as total miles traveled. The Netherlands plans to implement a VMT tax for trucks by 2011 and one for passenger cars beginning in 2014. Like the Oregon test, the Netherlands scheme will use GPS to track road usage by location and time of day. However, it goes beyond the Oregon scheme by combining the per-kilometer tax (initially a flat rate but capable of varying between road category and time of day) with other fixed transportation taxes such as a 25 percent sales tax on new cars, a vehicle tax based on the price and weight of the car, and a tax based on the type of fuel used. All these taxes will be bundled into one so that users will pay these taxes based on kilometers driven. The goals are to (1) discourage unnecessary driving by translat-

ing all fixed costs of driving to variable costs, (2) meet obligations under the Kyoto Protocol to reduce carbon emissions, (3) reduce traffic congestion, and (4) provide funds needed for road maintenance. The system will protect the privacy of users by using safeguards similar to those piloted in Oregon. While the Netherlands is in the process of working out technical requirements and pursuing pilot programs to test different VMT tax system technologies, it has set an objective that the overall cost of implementing the system should equal 5 percent or less of total system revenues.<sup>81</sup>

With respect to freight, such a VMT-based fee could be in a form of a federal weight-distance tax on commercial trucks (or some subset thereof) to more closely align truck VMT charges with the costs imposed on the system, especially by heavy trucks. The scheme could then be expanded to include all trucks and, eventually, to all system users. This would follow the German and Dutch models for phase-in of VMT financing schemes. In these countries, with the required technology now in place, experts say nationwide VMT schemes could be brought online within six years.<sup>82</sup>

### Variable Parking Fees

Parking fees, like road or mileage charges, can vary by time of day or amount of available parking spaces. Variable parking fees charge different rates based on the number of available spaces—higher when there are fewer available spaces, lower when there are more. They are in contrast to traditional flat rate fees that offer a parking space at a fixed price per hour, usually through use of a meter. This free or mispriced parking supports more automobile use than if parking is priced to recover its costs. Because parking fees are a municipal, not a state, responsibility, this strategy is not a revenue option for states, but it can help reduce demand on related infrastructure maintained and operated by the state.

In the past, the primary barrier to variable parking was technological. However, advanced meters now exist that allow parking to be programmed for varying rates on a real-time basis. Electronic meters

and other systems also are available to accommodate various payment methods and rates.

Variable parking fees offer some of the same potential benefits of congestion pricing, such as reducing non-essential and peak-period trips. For example, variable parking fees can encourage short shopping trips, generate high turnover rate during peak hours, and reduce the traffic congestion associated with drivers looking for parking spaces. It can also be used to raise revenue, but that revenue tends to be for the benefit of municipalities.

Charging market rates for on-street parking has been shown to both generate substantial net revenues for local streetscape improvements while increasing retail sales and, therefore, sales tax revenues.<sup>83</sup> Because streetscape improvements are often paid from state funds, and municipal sales tax revenues are the largest source of funding for transit operating subsidies, well-crafted parking fee policies can help (1) reduce VMT, (2) fund non-motorized improvements, and (3) offset the costs of local transit services. The net reduction in the overall transportation finance burden on states and localities from widespread adoption of such policies can be substantial. Thus, the primary benefits of this strategy for states tend to be the demand reduction aspects.

Despite technological advances, market-based on-street parking is relatively new, so no studies on VMT reduction or other benefits exist. However, in one study of a 15-block area in West Los Angeles, **California**, underpricing of on-street parking that encouraged drivers to cruise for available spaces was estimated to generate more than 3,500 unnecessary VMT per day.<sup>84</sup> In Old Pasadena, California, merchants supported conversion of free on-street parking spaces to \$1-per-hour metered parking on the condition that net revenues would be reinvested to finance public amenities in the metered area. By 2001, net revenues reached \$1.2 million, or \$1,712 per meter per year. The city bonded against these revenues to finance an “Old Pasadena Streetscape and Alleyway Project” plus other public amenities. Old Pasadena soon yielded higher sales tax revenues per square foot of retail space than other retail districts in Pasadena, including Pasadena Plaza, a nearby shop-

ping mall that offered free parking. In 2001, Plaza Pasadena was demolished in favor of new storefronts modeled on Old Pasadena.<sup>85</sup>

U.S. DOT has worked with municipalities on several variable priced parking programs, funding the startup costs in San Francisco and San Diego, **California**; King County, **Washington**; and Chicago, **Illinois**, under its Value Pricing Pilot Program.<sup>86</sup> In conjunction with the program in Chicago, the city will implement rapid-bus service, which combines the frequency of commuter rail with the flexibility and cost savings of bus service. These programs differ to some degree in terms of how the fee varies by time of day or level of demand, the extent of the area covered, whether off-street as well as on-street parking is covered, and other details. Because U.S. DOT funds a certain percentage of startup costs on a competitive basis, states and cities can retain a higher percentage of net revenues.

Surveys indicate that up to 75 percent of urban traffic congestion is caused by vehicles seeking on-street parking, and motorists spend an average of 3.5 to 13.9 minutes finding street parking.<sup>87</sup> Although implementation of parking pricing has overcome some technological barriers, wide adoption still requires the involvement of a number of private and municipal stakeholders. While the state role may be limited, variable parking fees could be designed to complement regional pricing strategies that would not only have an impact on statewide VMT while but provide a marginal increase in local revenues.

### Considerations for States

Expanded use of tolling and pricing, particularly congestion pricing of entire roads and of existing roads (such as converting HOV lanes to HOT lanes), can face public opposition for a number of reasons. These include concerns regarding equity for low-income users who have to pay for road access that was formerly free and how the revenue is used. However, states can design tolling in a variety of ways that address these and other concerns. For instance, to address equity concerns, states can recycle revenues into additional funding for public transit and

### Box 3: Public Support for Tolls and Pricing

A recent synthesis study of 110 public opinion polls on road tolls and pricing conducted between 2000 and 2007 indicated support for road tolling and pricing as a transportation financing mechanism, when compared to other sources such as fuel taxes.<sup>88</sup> While the polls showed higher rates of approval when sponsored by the tolling authority or agency responsible for the project (as opposed to the media or opponents), 59 percent of the polls rated as having “high validity” (objective and appropriate protocols) demonstrated support. Factors affecting public support included:

- The public wants to see the value—to individuals, communities and society;
- The public wants to react to specific examples—where road pricing is a choice, not punishment;
- The public cares about use of revenues—with a clear preference that funds go to highway and transit projects, not agencies;
- The public learns from experience—if the public already has a choice to use a tolled facility, it is more supportive than if it is simply a future possibility;
- The public uses knowledge and available information—it wants to know the mechanics of how it will work;
- The public believes in equity but wants fairness—people want to have a choice, and they prefer the choice be based on individual needs and preferences;
- The public wants simplicity—simple, clear, and easy to understand mechanisms; and
- The public favors tolls over taxes—because the tolls are generated and applied locally. Also, tolling represents freedom of choice; only users pay.

### Box 4: Pay-as-You-Drive Insurance

Several states are experimenting with Pay-as-you-Drive (PAYD) car insurance, which assesses the cost of car insurance based on the number of miles a vehicle is driven during a given period rather than as a fixed annual fee. This turns a fixed cost of driving into a variable cost, thus providing a price signal to drivers to use the road more efficiently. The **California** Department of Insurance is investigating ways to implement PAYD insurance in order to complement statewide planning objectives, including increased affordability, consumer savings, and increased traffic safety and emission reductions. According to a new study by the Brookings Institution, nationwide adoption of PAYD insurance would reduce annual insurance costs for about two-thirds of all car owners while reducing VMT by about 8 percent.

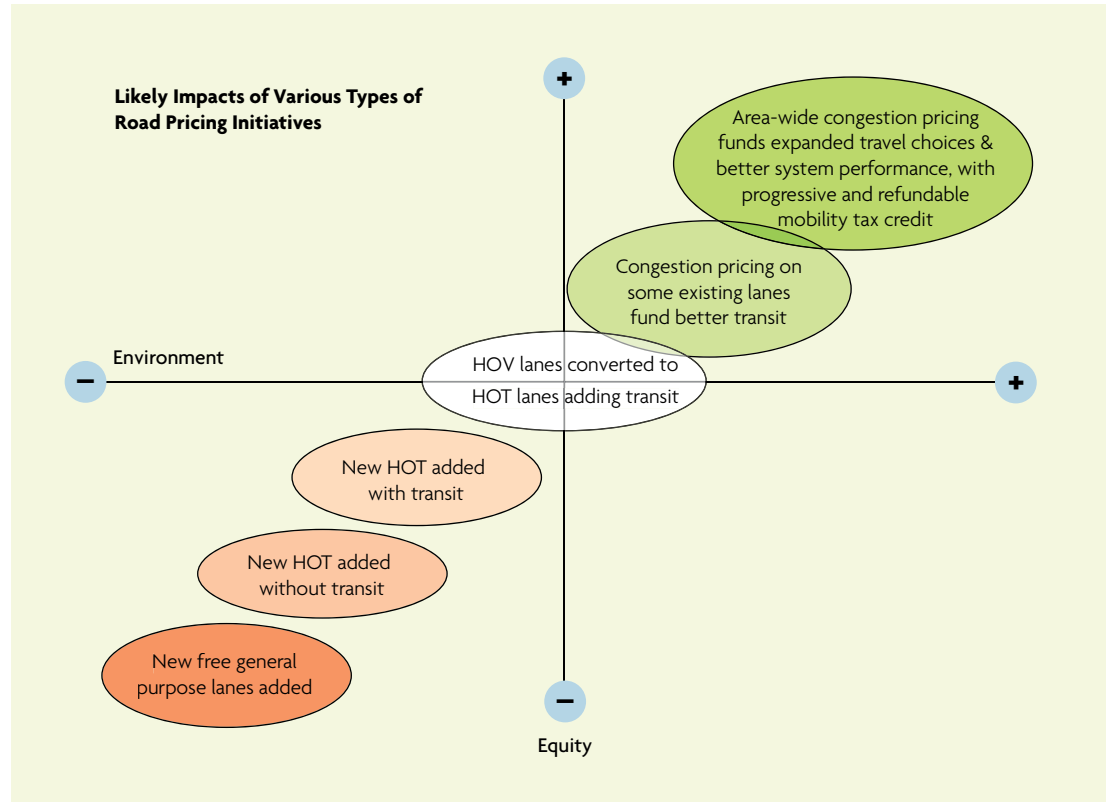
travel alternatives. Moreover, states need to weigh concerns against the benefits that can be achieved. In less densely populated regions, tolling and congestion pricing schemes may not be as feasible as in more densely populated regions.

Recent public opinion polling on tolling and pricing offers a number of insights into public concerns and how such concerns can be addressed. As described in Box 3, there are concerns with seeing a clear value from the project, a preference for revenues going toward highway and transit projects rather than agencies, the need for simplicity, and a desire to maintain choices through tolls versus taxes.

As these polls indicate, an important implementation factor for all congestion and cordon pricing

strategies is how the revenues generated by these user fees are spent. This was a critical issue in the cordon pricing effort that was attempted in New York City, as described previously. Experience has shown that the equitable distribution of toll revenue is more important than the equitable distribution of congestion-relief benefits. For example, in Sweden where drivers are charged a fee for entering the city of Stockholm, it is estimated that motorists pay \$3 in tolls for every \$1 of benefit they receive from congestion relief.<sup>89</sup> However, there are benefits for those who take advantage of increased transit service as well as general benefits to the city, such as reduced air pollution. These tradeoffs between equity, environment, and

FIGURE 6: Potential Impacts of Various Types of Road Pricing Initiatives



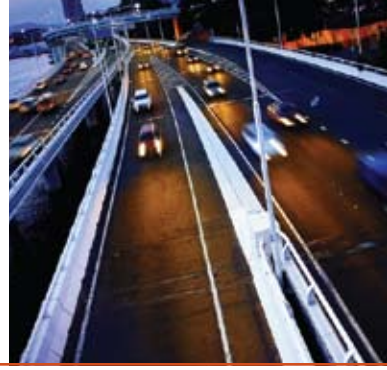
financing needs are reflected in Figure 6, which shows that cordon pricing that reinvests net revenues to create more travel choices yields the highest net benefits.<sup>90</sup>

Tolling, congestion pricing, VMT fees, and parking pricing offer a number of benefits including raising revenue. In addition, they (along with complementary approaches, such as pay-as-you-drive insurance detailed in Box 4) can help to reduce congestion, reduce demand, reduce air pollution, and avoid wasting fuel. In all cases, states considering new tolling and fees may want to consider how these individual tools can be used in coordination to achieve the greatest effect. Although a congestion pricing system on one road into a center city might be somewhat effective in reducing congestion and air pollution while raising revenues, a more comprehensive system that includes all roads and incorporates other elements such as a VMT fee or parking

pricing could exponentially increase benefits and revenues.

In thinking comprehensively about tolling, congestion pricing, VMT fees, and parking pricing, states may also want to focus efforts on coordinating transportation and land use planning. While not strictly a financing strategy, efforts to coordinate transportation projects with land use development can contribute to better demand management. Many states, including **California, Maryland, Massachusetts, New Jersey, and Pennsylvania**, focus their capital investments in communities with land use plans that can accommodate growth and that have adequate transportation infrastructure. States may also want to coordinate efforts across multiple cabinet agencies or form subcabinets on growth and development to comprehensively address transportation and land use coordination. **Arizona** and **Virginia** are examples of states with growth subcabinets.

## Public Private Partnerships (PPPs)



An emerging strategy for transportation finance is known as Public Private Partnerships (PPPs). PPPs, according to the FHWA definition, are contractual agreements formed between a public agency and private sector entity that allow for greater private sector participation in the delivery of transportation projects.<sup>91</sup> PPPs typically involve significant participation by both sectors and take into account the objectives of each sector.

PPPs have been successfully implemented in a number of states and around the world, notably in Europe and Australia. The primary benefits of PPPs for states or other public sector entities include access to significant private capital, the potential for reduced costs and accelerated project delivery, sharing or shifting project risk, and the opportunity for more efficient management. Challenges for the public sector include concerns with public acceptance, how to determine appropriate levels of return on investment for the private sector, how to ensure fair rates for users, and the need for enhanced expertise in legal and financial areas.

PPPs can take a variety of forms, including management and operations PPPs; asset leases; and private financing and management of new facilities (which could include long-term concession agreements for design, construction, finance, operation, and maintenance). There also are some specific PPP finance models that relate to transit.

### Asset Leases

Asset leases are a type of PPP in which the public sector leases an asset, such as a toll road, a bridge, or an airport, to the private sector. The private sector provides an upfront payment or an agreement for revenue sharing (or both) to the public sector

in exchange for the lease. During the term of the lease, the private sector manages and operates the facility and, in turn, receives a return on its investment, typically from user fee revenues such as tolls. There are several variations on the asset lease, including the availability payment model, which will be discussed later.

Asset leases, sometimes known as concession agreements, can apply to the lease of existing or new facilities. Lease agreements can run up to 99 years. In some cases private sector operators will competitively bid on who can provide the lowest tolls to operate and maintain a facility. Two highly visible examples of asset leases involve the city of Chicago, **Illinois**, and the state of **Indiana**.<sup>92</sup> These deals raised significant public revenues: \$1.8 billion for a 99-year lease of the Chicago Skyway Toll Bridge and \$3.8 billion for a 75-year lease of the Indiana Toll Road. In the Skyway example, these revenues were used for refinancing city debt, schools, and the creation of a \$500 million “rainy day fund.” The Indiana Toll Road funds were used to fund the state 10-year highway construction plan, and a certain portion of the revenues were set aside for transportation projects in the localities through which the toll road passes. **Pennsylvania** also is considering an asset lease for its Turnpike (see Box 5 for details).

Because the public sometimes perceives contracting with a private entity to operate a facility for a period of time as relinquishing control of a public asset, states may encounter some opposition to asset leases. However, most of the public debate revolves around the specific terms of such agreements.<sup>93</sup> Key issues include:

- **Control over the toll structure**, including the range of toll increases allowable over the term of the lease and public oversight of such increases;

- **Non-compete clauses**, under which the concessionaire may be given the right to prohibit public investment in toll-free, competing roads or bridges within a defined distance from the leased facility that may divert traffic, and thus toll revenue, from the facility;
- **Public or private utility access** to or across the facility, especially if the public agency seeks to retain the right to co-locate bus service, a transit facility, or other public utilities or services along the leased corridor;
- **Term of the lease**, especially very long leases, which the concessionaire needs in order to claim depreciation and, thus, tax benefits but which may lock the leasing agency into terms that may prove inadequate or unfair based on evolving public needs for the facility; and
- **Revenue allocation**, both in terms of the locations in which public revenues received under such leases are spent (either within the communities affected by the lease or other areas of the state) and the uses of such revenues (either for similar transportation projects, all transportation projects, or non-transportation uses as well).

### Box 5: Pennsylvania Turnpike Lease Proposal

Pennsylvania is considering leasing the 550-mile Pennsylvania Turnpike. The state received a bid by a private consortium to lease the turnpike for 75 years for a total of \$12.8 billion, including \$2.3 billion for payoff of existing turnpike debt. In return, the consortium would be allowed to increase tolls by 25 percent in the first year and 2.5 percent or the rate of inflation thereafter. The revenues, net of debt retirement, would be placed in the Pennsylvania State Employees Retirement System and would yield an estimated \$1.1 billion annually for expenditure on transit road and bridge projects throughout the state. The private consortium's bid recently expired after the Pennsylvania legislature did not authorize the lease during the last legislative session, and Governor Edward Rendell has indicated the state will continue to pursue the turnpike lease next year. An alternative proposal to lease I-80 to the Pennsylvania Turnpike Commission in order to toll it was not approved by the federal government.

### Availability Payment PPPs

Similar to asset leases, availability payment PPPs typically involve finance, operations, and maintenance and sometimes design and building as well. The key distinction is that instead of the private sector operator being compensated primarily from toll revenue, the operator is compensated by the public sector based on performance metrics for the project. These could include metrics based on how well the facility is maintained, for example.

In addition to helping to access private capital for financing public sector transportation projects, availability payment PPPs are an important means of sharing the risks involved in any major infrastructure project. Such risks include costs associated with regulatory delays, right-of-way issues, easements and other costs of construction, changes in cost of capital, costs of facility closure resulting from natural disasters or accidents (performance risk), costs of revenue shortfalls (in the case of tolled roads), and liability costs.

The availability payment PPP allows the public agency to outsource operations and maintenance and set performance standards (pavement condition, snowplowing, accident clearance, traffic flow, etc.) for the private partner, possibly even more stringent than those imposed on itself. Instead of the private operator tolling for revenue (making revenue contingent on use of the facility), the availability payment PPP model typically provides that the private contractor will be paid by the public agency based on conditions of performance. These may include the facility being open and available to traffic (or riders) at levels of agreed-upon performance.

**Port of Miami Tunnel.** In **Florida**, the state DOT, Miami-Dade County, and the Port of Miami are pioneering a new model for financing the cost of building, maintaining, and operating a truck tunnel under Biscayne Bay to connect the Port of Miami with off-port warehousing and rail facilities. This tunnel will facilitate freight traffic to and from the port. The financing scheme is based on the availability fee model. Under this model, the winning concessionaire, a



consortium called the Miami Access Tunnel Consortium (MAT), agrees to finance, design, and build the tunnel over a 47-month period, then operate and maintain it for another 31 years. Once open, MAT will receive quarterly availability payments based on the availability of tunnel sections to public use over the remaining years of the concession.<sup>94</sup> The construction cost is estimated at approximately \$750 million.

MAT is seeking a TIFIA loan from U.S. DOT to help the consortium raise the upfront capital for the project. Under this arrangement, MAT will be able to access low-interest federal loans. Florida will receive a performance guarantee through this PPP because payments to the concessionaire will be dependent on the tunnel being open to traffic during the concession period. If certain performance measurements relating to maintenance, congestion, incident response, or other mutually agreed-upon factors are not met, payments will be reduced. This provides an incentive for the operator to achieve good performance and provides the public with a level of confidence that it will get full value for its money.

Whether the tunnel will be tolled is not yet resolved, but control over this decision, and the fee structure if tolled, remains in the hands of the public owners. The concessionaires are paid by the state to operate and maintain the facility and keep it performing up to certain standards. The concessionaires would not receive toll revenues (these would go to the state), reducing the risk to the concessionaires if toll revenues from port tunnel traffic do not meet forecast growth projections.<sup>95</sup>

**Missouri Bridge Repair and Reconstruction.** To address challenges related to bridge repair and reconstruction, **Missouri** initially proposed to use an availability payment model PPP as well; however, the state had to find a different financing solution as a result of recent changes in the credit markets.<sup>96</sup>

In 2007, the Missouri Highways and Transportation Commission launched the Safe and Sound Bridge Improvement Program. The purpose was to work with a private entity to repair and maintain 802 structurally deficient bridges throughout the

state that were too small to attract private capital. While all of the selected bridges required repairs amounting to less than \$8 million per bridge, the total cost of such repairs was well over \$1 billion. The state sought proposals from private companies to repair and maintain the bridges through a PPP.

The winning bidder was Missouri Bridge Partners, a coalition of construction and design companies. Per the resulting agreement, the state would not pay the costs of repair until the partners hit milestones based on the number of repaired bridges (first payment after 150 bridges repaired, with incremental payments at 300 bridges, 500 bridges, and project completion), which the partners would then maintain in good condition for at least 25 years. This would have represented a transfer of public risk to the private partners, who were required to secure their own financing.

However, in September 2008, Missouri announced that the private partners were unable to secure private financing at the price the state had budgeted per year (\$50 million) for the program and that private financing would have cost between \$65 million and \$74 million per year. The cost escalation of the private proposal stemmed, at least in part, from limited access to credit in the financial markets.<sup>97</sup> Now instead of private financing, the state will issue bonds to cover the cost of the program, and it will be responsible for the long-term maintenance of the bridges.

### Private Financing and Management of New Facilities

In addition to leasing existing transportation facilities, states can utilize PPPs that involve the private sector taking on the responsibility of designing, building, financing, operating, and maintaining (DBFOM) a new facility. In some cases the same model is used but without private sector financing. This is called the Design, Build, Operate and Maintain (DBOM) PPP. The benefit of either approach for a new facility is accelerated project delivery and, as a result, less total cost. The potential downside is the possibility of less project oversight. A well-written

concession agreement with the private partner can help protect the public sector's interest and achieve its objectives. **Florida, Texas, and Virginia** are among the leading states utilizing tolls and PPPs to finance new road construction.<sup>98</sup>

Similar to asset leases, DBFOM PPPs can involve the private sector receiving toll revenues or other user fees from the facility that it designs and builds and then operates for the public sector. One concern with DBFOM PPPs is that these projects might be moved to the front of the project queue because of the availability of private capital, drawing resources away from publicly financed projects that may be more critical. This is even more problematic when the project also requires substantial public investment that displaces other long-planned projects. Following are several examples of DBFOM PPPs.

**South Bay Expressway.** The 10-mile South Bay Expressway located near San Diego was designed and constructed and is operated through a PPP between California and California Transportation Ventures, Inc. (CTV). The \$635 million toll road, which connects the commercial port of entry in San Diego to the regional freeway network, was financed through a combination of funding sources. The financing sources included a \$140-million federal loan provided by U.S. DOT under the TIFIA program, local funds, and private equity capital. After 35 years, the South Bay Expressway will be turned back over to Caltrans from CTV.<sup>99</sup>

**Melbourne Toll Road.** In Australia, CityLink is a large toll road project in and around the city of Melbourne. This project is unique for several reasons. One is its ownership: The 14-mile project to link the region's existing roadways was built by a private company under a long-term, public-private concession agreement. The \$1.9 billion (U.S. dollars) project is completely owned and operated by Transurban, a toll road developer based mostly in Australia. Transurban built the new capacity of the project as a series of tolled roadways and also added tolls to roads that were upgraded or otherwise enhanced. Transurban receives the revenues from those tolls

that are collected. The project is also unique in that it is exclusively electronically tolled (i.e., it does not use any conventional toll booths); it is almost entirely built as a series of ramps, bridges, and tunnels; and it employs sound tubes that encircle the road rather than using sound barriers to reduce noise.<sup>100</sup> That the project was built as a partnership with a private company is largely credited for the technological innovations.

**International PPPs.** Outside the United States, many countries have begun implementing specialized units throughout various governmental agencies to assist with the expanding opportunities for public-private partnerships (PPPs). These "PPP Units" provide divergent services based on the needs of the department or agency, but all share the common goal of protecting the public's interest by providing critical assistance regarding PPPs.

Canada maintains one of the most well-funded and expansively responsible PPP units. Formed in 2007, PPP Canada Inc. administers a \$1.2 billion fund to support and invest in PPP infrastructure projects, in addition to providing other public units and private firms with valuable information regarding the PPP process. The unit and its fund operate within a broader Canadian infrastructure plan, Building Canada, which committed \$32 billion over seven years to promote a growing economy, a cleaner environment, and more prosperous communities. In addition to the federal unit, Canadian Provinces also may maintain their own PPP units. For example, British Columbia's Partnerships BC, a company owned by the province, offers a range of functions from guidance materials to contractual monitoring.

Ireland utilizes two separate units to split the tasks of informing and financially supporting PPPs. The Central PPP Policy Unit's primary responsibilities are to develop the framework, including legislation, to support the PPP process while also disseminating best practice information. The companion program, the National Development Finance Agency, operates in the financial sector by applying commercial financial evaluation standards to ensure the Exchequer maximizes the public investment returns. The agency also

oversees the procurement process in the health, justice, and education sectors. Since 2005, both units have received votes of confidence from the central government by receiving expanded responsibilities.<sup>101</sup>

The United Kingdom, home to the Private Finance Initiative, maintains a broad range of PPPs. One of the widest ranging is Westminster's agreement with Network Rail (NR), which was established in 2002 and is responsible for the all of the country's rail infrastructure. NR is still considered part of the state because of its managing members and "not for dividend" status, but it may leverage private sector funding and maintains multiple income streams. One of its major projects was the modernization of the West Coast Main Line. In addition to NR, the Newcastle and Sunderland metro system was physically extended and modernized via multiple PPPs. The management of London's Underground system and the redesign of King's Cross Station also are conducted under separate PPPs. Finally, multiple light rail systems throughout the country are managed by private firms.

Following the U.K. model, Germany has privatized certain aspects of its transportation systems. There are currently 22 tolled projects on federal highways that have been pre-financed by the private sector, amounting to 4.2 billion euros (including 1.4 billion euros in capital costs).<sup>102</sup> Efforts to privatize some bridges and tunnels have proven more challenging because stakeholders did not anticipate that drivers would divert their routes—even traveling great distances—to avoid paying bridge or tunnel tolls. As a result, this privatization scheme is now under further study.

Several examples of PPPs for new high-speed rail and light rail projects exist in other nations. The Charles de Gaulle (CDG) Express—a high-speed rail link between Charles-de-Gaulle airport and downtown Paris—is a PPP involving no public expenditures. A new extension of the French high-speed rail system (the Train à Grande Vitesse, or TGV) from Paris to Bordeaux also is a PPP that does require public investment. A local light rail system in Rennes, which was built from the ground up between 1997 and 2002, was partially financed through the private sector. France and Spain have a joint PPP to construct

a new high-speed passenger and freight passage between Perpignan and Figueras. An Italian firm, NTV, is set to become that country's first private sector operator of high-speed rail routes beginning in 2011. Melbourne recently opened a new, award-winning multimodal station—the Southern Cross Station—which was built and is managed by a private consortium; in turn, the consortium receives revenue each year from the government.

### Transit-Related PPPs and Value Capture Financing

Transit PPPs are a form of procurement for new capacity that incorporates project revenues as well as interests in surrounding real estate. While tolls, road pricing, and parking charges are ways to generate substantial revenue to build and operate transportation facilities, the most notable way to attract private money for transit development is through its connections with real estate.

Value capture refers to a type of financing where non-transportation users, primarily adjacent property owners who benefit from transportation projects, contribute to the costs of such projects. It is often proposed as a way to use public taxing authority to help finance rail transit through taxes on nearby private development, in some ways mimicking the link between private rail transit and private land development a century ago.

The idea is that rail systems, by improving accessibility, will increase land values. The increment over any pre-existing property value can then be taxed, thereby "capturing" the benefit that accrues to private landowners by virtue of the public rail investment and helping to defray rail construction or operating costs. Although the idea of value capture has been discussed in policy circles for years, it is employed in relatively few places and most prominently in the form of benefit assessment districts in metropolitan areas like Miami, **Florida**; Los Angeles, **California**; and Denver, **Colorado**.<sup>103</sup>

For example, construction of a transit station is likely to increase land values in the walking radius near the area. The local government could choose

to dedicate the taxes from the incremental increase in property values to repaying bonds issued for its construction, an approach known as tax increment financing (TIF).

Alternatively, private property owners could choose to create a special tax district that would allocate costs of the project to beneficiaries. In most states, a vote of the affected landowners is required. The general principle at work here is known as value capture financing, where non-transportation users, primarily adjacent property owners who benefit from transportation projects, contribute to the costs of such projects.

It should be noted that the revenues generated by value capture financing schemes generally do not flow directly to the state. However, they are becoming an increasingly important source of local match revenues to state projects, as such contributions grow as a percentage of total state project costs. In 2004, it is estimated that such specialized taxes and contributions amounted to \$15.4 billion for highway projects (\$3.8 billion federal and state, \$11.6 billion local) and \$9.5 billion for transit projects (\$3.6 billion state, \$6.1 billion local), for a total of \$24.9 billion.<sup>104</sup> Table 4 details the role that specialized taxes, such as TIF or special tax districts, play in funding highways and transit.

Transit-oriented development (TOD), while not specifically a form of PPP, is an example of public sector coordination with the private sector. TOD is focused development that incorporates one or more transit stations (possibly more than one mode) and tends to create value for the surrounding property owners. TOD can include mixed-use development

such as combining shops, restaurants, offices, and apartments or homes in a single planned area. Even without explicit value capture policies in place for TOD, if rail transit increases land value, property tax collections will increase. Furthermore, some rail transit agencies own land near stations and those authorities have begun to pursue development on that land as a way of providing additional revenue through PPPs. Such joint-development projects of the Washington Metropolitan Transit Authority (WMATA) in the Washington, D.C., area, for example, have netted \$8.2 million annually in recent years.<sup>105</sup> However, since WMATA only owns relatively small parcels around stations areas (because it was not afforded powers of excess condemnation) most of the benefit from the significantly increased land value accrues to private developers.<sup>106</sup>

As demand for TOD increases as a result of a variety of factors (e.g., better projects, higher costs of gasoline, smaller households) developers are beginning to offer upfront payments to bring transit stations to their properties. Station development along the 20.6-mile, 23-station Hudson-Bergen Line paralleling the Hudson River in **New Jersey** was partially funded by developers, who subsequently developed new housing around these stations conservatively estimated to have a value of \$5.3 billion.<sup>107</sup>

In 2000, New Jersey Transit opened the first phase of its 21-mile, \$2-billion Hudson Bergen Light Rail system through a DBOM contract. The agreement was the first of its kind in the United States for a major transit service. The state partnered with the 21st Century Rail Corporation, whose members include Washington Group International, which

**Table 4: Highway and Transit Revenue Sources Allocated by Type, Mode, and Level of Government, 2004 (Billions of Dollars)**

Type of tax or fee	Highway				Transit				Highway and Transit			
	Federal	State	Local	Total	Federal	State	Local	Total	Federal	State	Local	Total
User fees	\$28.6	\$51.5	\$2.8	\$83.0	\$5.6	\$0.5	\$11.0	\$17.1	\$34.1	\$52.1	\$14.0	\$100.1
Specialized taxes	\$0.3	\$3.5	\$11.6	\$15.4	\$0.0	\$3.4	\$6.1	\$9.5	\$0.3	\$6.9	\$17.7	\$24.9
General taxes	\$2.0	\$7.4	\$21.7	\$31.1	\$1.4	\$3.9	\$6.7	\$12.0	\$3.4	\$11.3	\$28.4	\$43.1
Total	\$30.9	\$62.5	\$36.1	\$129.5	\$6.9	\$7.8	\$23.9	\$38.6	\$37.9	\$70.3	\$60.0	\$168.2

**Source:** NCHRP 20-20-24(49), Future Financing Options to Meet Highway and Transit Needs, Cambridge Systematics, et. al. February 2007 at 2-11. Based on data from Federal Highway Administration Highway Statistics and Federal Transit Administration National Transit Database.

operates and maintains the system, and Kinkisharo USA, which maintains the vehicle fleet. In this case, the rail line's construction takes into account the broader goal of the state support for TOD. However, because real estate development benefits are not usually integrated with the functions of design/build operators, strong incentives from the public partner may be necessary to make the development benefits attractive to the private partner.

### Considerations for States

PPPs can raise a number of public concerns, perhaps most visible of which is the concern by the public that PPPs will lead to higher tolls for roads and less public control over key transportation assets. The priority for states in pursuing PPPs is to craft a concession agreement that takes into account all of the state's objectives. For example, if a state is concerned about the private partner raising tolls too high too quickly, the concession agreement can stipulate terms for when tolls can be raised and by what percentage. The concession agreement also can stipulate key performance terms that the private operator must meet and specify how emergency situations can be handled (such as eliminating tolls during disasters).

With PPPs, there are correlations between how much risk the public sector is shifting and the rate of return private operators will expect. The bottom line for states and for users, however, is that nothing in a PPP offers states new revenue. While PPPs can offer access to capital, it is with the expectation that private partners will see a rate of return likely through user fees. States can work with private sec-

tor partners to craft agreements whereby the state shares in profits or caps private sector profits at a certain point. However, in order to receive attractive bids, the private sector will want to see the opportunity for a stable rate of return.

Clearly defining and communicating objectives and roles and providing a forum for substantial public input can increase public acceptance and improve PPP arrangements. States are taking steps to address these concerns, and with each new concession agreement, policymakers have the ability to incorporate lessons learned and inform the structure of subsequent deals. The **Indiana** and Chicago PPPs are providing project experience that other states such as **Utah** and **Pennsylvania** and metropolitan areas such as Houston, **Texas**, are studying as they pursue their own PPP initiatives.

It should be noted that not all projects may attract private capital and interest. Projects that are not well-suited to a user fee model may be more creatively packaged to attract private interest. Using an availability payment model, and possibly creating an aggregated package of assets such as bridges or roads, could enhance private interest even where user fees are not an option.

While states are expanding their focus on PPPs and dedicating personnel to them, the examples of intensive PPP government units in other nations point to the need for expertise within government on PPPs. States also may need assistance from outside legal counsel, consultants, and other partners to ensure that all concerns are addressed before entering into a PPP agreement.

## Freight Financing Strategies

Freight transport plays a large and growing role in the U.S. economy. According to the U.S. Bureau of Transportation Statistics, trucks haul about 65 percent of the freight value, 58 percent of freight tonnage, and 32 percent of the ton-miles of total shipments. In most U.S. metropolitan regions, freight trucks represent close to 10 percent of roadway vehicles. Measured in tons, railroads carry approximately 30 percent of intercity freight and 47 percent of U.S. freight in ton-miles.<sup>108</sup> The number of containers handled at U.S. ports also is growing rapidly. Between 1995 and 2001, the number of containers moving through the top 10 U.S. ports grew by 47 percent, and container traffic across the United States has increased 6.6 percent over the last decade.<sup>109</sup>

Freight demand growth in ton-miles is expected to increase 92 percent by 2035, but the interstate highway system and the connections with ports and rail facilities are not designed to handle this level of volume.<sup>110</sup> In fact, some key roadways are bottlenecked, causing congestion.

The costs of shipping for businesses operating in the United States had been declining through the latter half of the last century. However, as congestion grows and fuel prices rise, logistics costs are rising as well, growing to 9.5 percent of gross domestic product (GDP) in 2005 as compared to 8.6 percent of GDP in 2003.<sup>111</sup> This was the largest rise in the past 30 years, and at least one-third of the increase in costs is believed to be a result of congestion and inefficiency in the transportation system.

Alongside its economic benefits, the growth in freight transport has created new challenges for states, including additional traffic bottlenecks in key regions or cities and environmental impacts. For example, truck freight traffic is now rising more than twice as fast as passenger traffic (3 percent annually as compared to about 1.5 percent annually for passenger

cars). This demand has been outpacing the road and rail capacity for intermodal containers, especially near port facilities and in congested urban areas.

States can use several options to upgrade and improve their capacity to move freight. For instance, some federal loan programs specifically target freight finance. Additionally, states can consider increased use of PPPs and increased freight-focused user fees. These options mirror those discussed earlier, but are modified for freight. In addition, some states are examining the potential for truck-only lanes or roads to facilitate freight movement while reducing freight-related congestion on roads and highways.

### Federal Loan Programs

Under the Railroad Rehabilitation & Improvement Financing Loan (RRIF) Program, U.S. DOT is authorized to provide up to \$35 billion total in direct loans and loan guarantees to states. Up to \$7 billion of this is reserved for projects benefiting freight railroads other than Class I carriers. The financing may be used to (1) acquire, improve, or rehabilitate intermodal or rail equipment or facilities, including track, components of track, bridges, yards, buildings, and shops; (2) refinance outstanding debt incurred for the purposes listed above; and (3) develop or establish new intermodal or railroad facilities.

### PPP Opportunities

States also may take advantage of several public-private financing opportunities under key federal provisions of the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). Section 1808 of SAFETEA-LU prioritizes funding for states and metropolitan planning organizations (MPOs) to implement congestion-relief and diesel



retrofit projects with private partners. In addition, as described earlier, states have used TIFIA and SIBs to build or expand state freight rail projects, including intermodal facilities related to freight transportation. In Maine, an Intermodal Freight Transfer Facility is owned by the City of Auburn, **Maine**, and leased to a private sector intermodal transportation firm. The \$3-million, 37-acre intermodal facility is expected to redirect truck traffic to rail by making possible 36-hour service between Auburn and Chicago.

The Alameda Corridor, a rail expressway connecting the ports of Los Angeles, **California**, and Long Beach to transcontinental rail yards near downtown Los Angeles, is a partnership among the port authorities; railroad companies; and government at the local, state, and federal level. These two ports are the major gateways to Asian markets, and the cities, ports, nearby communities, and policymakers desired to improve freight movement and minimize effects on local communities. The result was a project designed to create an efficient connection to all domestic markets via Los Angeles' primary rail facility. The project cost more than \$2 billion, and the county elected to enact container fees to finance the debt. The project was completed and payments on the debt are 10 years ahead of the repayment schedule as a result of unexpectedly high cargo levels.

Another rail financing project is the upgrading of the Heartland Corridor, which connects Columbus, **Ohio**, to Hampton Roads, **Virginia**. The agreement among the FHWA, three states, and Norfolk Southern Rail is expected to reduce truck traffic in Virginia and reduce delivery times by up to one day between the mid-Atlantic and the Midwest. The deal also works in concert with an arrangement between Norfolk Southern and the Columbus Regional Airport Authority, which constructed an intermodal

facility adjacent to Columbus' airport. The project is estimated to cost \$151 million, \$95 million of which is expected to come from the federal government; \$10 million from a Virginia rail enhancement grant; and nearly \$1 million from an Ohio rail development commission grant, with the remainder (about \$45 million) to come from Norfolk Southern railroad. West Virginia will contribute some additional funding.<sup>112</sup>

### User Fees

Beyond these federal and private funding partnerships, states are examining direct freight-related user fees, such as adding a charge to each imported shipping container and using the revenues to fund necessary road or rail infrastructure capacity expansions. **California** considered and rejected legislation that would have added a \$60 charge to shipping containers passing through the ports of Los Angeles/Long Beach and Oakland to fund pollution and congestion-mitigation strategies such as fixing grade crossings. Had the bill become law, it would have raised about \$400 million annually.<sup>113</sup> The legislation was based on a successful pilot program involving two ports in Southern California.

As discussed earlier, several nations including Germany and the Netherlands have instituted or are in the process of instituting a truck VMT fee. In addition to providing a new revenue source, a truck VMT can help shift freight traffic to rail or waterways and reduce on-road congestion. VMT fees on trucks also can help test technology for wider implementation. For example, Germany found that its VMT fee for trucks, implemented through a PPP, reduced the number of miles traveled without cargo because it gave operators new incentive to maximize the efficiency of trips taken.<sup>114</sup>

### Truck-Only Roadways or Lanes

In **California, Texas,** and other states, truck—only toll lanes—toll roadways or lanes for exclusive truck use—are being studied as one approach to enhancing freight mobility. The preliminary findings show that urban truck lane facilities would need to overcome challenges that include truck trips of short lengths, limited travel-time savings, and significant construction costs.

### Considerations for States

In seeking to reduce freight congestion—and ensure that the nation’s freight transportation system enhances competitiveness and contributes to economic growth—states have a number of issues to consider. For example, one issue is whether the fees charged for truck access to public infrastructure are properly aligned with the actual impacts on infrastructure; another is whether public policies support shifting freight travel to rail or waterways.<sup>115</sup> To some extent, efforts to address regional congestion challenges may also improve freight movement on highways.

States may not have the immediate funds on hand to pursue necessary improvements to freight transportation. Therefore, tools such as increased user fees, PPPs, and truck—only toll lanes or roads—particularly when used in combination—can be potent options for helping states finance freight transportation improvements. Freight strategies, such as truck VMT fees, can set the stage for wider implementation of new revenue forms as has been the case in Europe.

Still, there are clear opportunities. For example, a study of **Ohio’s** interstate highways indicates that the worst bottlenecks caused up to 2,500 hour of truck delay per day, which wastes fuel, creates more air pollution, and is inefficient for shippers. It is projected that by 2010, these bottlenecks would affect up to \$309-billion worth of freight shipments, costing shippers up to \$200 per hour of delays.<sup>116</sup> Efforts to alleviate this congestion by reconstruction would lead to up to \$3.4 billion in travel time savings by 2030 and would produce a benefit/cost ratio of between 10 to 1 and 16 to 1. Moreover, addressing freight rail congestion challenges also benefits commuter rail, which, in turn, may help offset commuter demand on the nation’s highway.



## Conclusion

Governors and states—and the nation as a whole—face a number of challenges in funding and financing a transportation system that meets the nation’s needs and achieves strategic objectives. State and federal revenues both are falling below the levels needed to maintain and enhance the system, and demand is outpacing capacity, resulting in congestion in many regions. In addition, users are grappling with high fuel prices, and, in some cases, aging and structurally deficient infrastructure.

It is outside the scope of this report to address the federal role in funding and financing transportation. Given the challenges that have been outlined, many states are looking to explore a variety of strategies to meet their transportation objectives. States and governors may want to consider the following options to ensure their ability to fund and finance surface transportation needs, in order of priority:

- **Work to implement revenue strategies that manage, reduce, and shift demand.** To reduce congestion and avoid the need for new capacity, efforts to manage and reduce demand should be a top priority.
  - There are a number of tools states—and where applicable, municipalities—can implement to help manage demand, including congestion pricing, tolling, variable parking fees, and pay-as-you drive insurance. These tools may not all be as feasible to implement in less densely populated regions, but can help to manage demand in congested regions. A less direct option to manage demand, but one that could raise revenue, is to raise fuel taxes.
  - States also can endeavor to coordinate land use and transportation planning and shift demand to transit alternatives.

- In the near-term, states may consider increased use of rapid bus service, which requires much less infrastructure investment and lead time than light rail or commuter rail, can be dependable and frequent, and could be facilitated by the designation of bus-only lanes or shoulders. Transit capacity in many areas is strained; thus, efforts to reduce vehicular demand and shift some users to transit must be met with increased investments in all forms of transit or creative means of expanding transit capacity over the long-term.

- **Consider revenue alternatives.** States have long-relied on motor fuel taxes, both for state revenues and for federal funding.

- In the near-term, motor fuel taxes can be supplemented by increased use of tolling, congestion pricing, and PPPs. States can consider all of these revenue options, and they may want to use each of them to diversify revenue streams and achieve other strategic objectives. PPPs do not offer new revenue and will not alone solve all of a state’s transportation challenges. However, with carefully managed concession agreements, states can use PPPs strategically to complement existing revenue, accelerate project delivery, and provide capital and expertise where needed.
- State infrastructure banks, through their revolving loan function, also offer states the opportunity to finance more projects, and can be tied to strategic state criteria. States can consider how best to achieve benefits from the use of infrastructure banks and can examine the possibility of requiring projects to leverage private capital and/or federal and local funds to receive SIB funding.



- **Consider long-term revenue replacements for the motor fuel tax.** Over the long-term, the motor fuel tax may become less aligned with state objectives.
  - For example, as states seek to manage demand and increase the use of alternative fuel or electric vehicles, motor fuel taxes becomes a less reliable source of revenue because they are tied to petroleum consumption. Many states and the nation have expressed a desire to reduce and eliminate their use of petroleum in the transportation sector. Yet, if states rely on

the motor fuel tax for revenue, achieving reductions in the use of petroleum would mean fewer dollars for infrastructure.

Over the long-term, the VMT tax could serve as a replacement for the motor fuel tax. The VMT tax is aligned with state objectives in terms of reducing miles traveled, could provide a technological platform for greater use of congestion pricing, and would be applicable to alternative fuel or electric vehicles.



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## NGA CENTER DIVISIONS

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- **Education** provides information on early childhood, elementary, secondary, and postsecondary education, including teacher quality, high school redesign, reading, access to and success in postsecondary education, extra learning opportunities, and school readiness.
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