

# HORIZON

THE FUTURE OF TRANSPORTATION

A PUBLICATION OF THE TEXAS DEPARTMENT OF TRANSPORTATION

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SUMMER 2006

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The  
Future of  
Transportation  
Finance

Where do we  
go after  
Eisenhower?

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A Quiet Crisis for Transportation Finance :: The Return of Private Toll Roads ::  
Mobility: All Roads Lead to Texas :: Thinking About the Future of the Highway Program



# Table of Contents

Welcome Letter .....	iv
<b>A Quiet Crisis in Transportation Finance: Options for Texas</b> <i>by Martin Wachs, Ph.D.</i> .....	2
<b>The Return of Private Toll Roads</b> <i>by Robert Poole and Peter Samuel</i> .....	28
<b>Mobility: All Roads Lead to Texas</b> <i>by Joseph M. Giglio, Ph.D.</i> .....	46
<b>Commentary: Thinking About the Future of the Highway Program</b> <i>by C. Kenneth Orski</i> .....	64
Submission Guidelines for Authors .....	73
Subscription Form .....	74

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# HORIZON

## THE FUTURE OF TRANSPORTATION

### WELCOME

It is my pleasure to welcome you to the inaugural issue of **HORIZON**, the policy research publication from the Government and Business Enterprises Division of the Texas Department of Transportation.

Texas is increasingly recognized as a transportation innovator, and we hope that **HORIZON** will further this innovation by advancing the discussion of transportation policy and the challenges ahead. We will do this by examining topics across all modes of transportation, reflecting the concerns of policymakers and leaders in government, industry, and the public at large, and by providing thought-provoking analysis and commentary from transportation experts.

The theme for this issue is “The Future of Transportation Finance,” and five experts in this area have contributed pieces. In *“A Quiet Crisis in Transportation Finance: Options for Texas,”* Dr. Martin Wachs of the RAND Corporation discusses the choices state and local governments should consider when determining how to finance transportation projects. Next, Robert Poole and Peter Samuel of the Reason Foundation outline the history and significance of tolling in *“The Return of Private Toll Roads.”* Dr. Joseph Giglio of the Hudson Institute, a keynote speaker at our annual Texas Transportation Forum, has provided *“Mobility: All Roads Lead to Texas,”* which highlights the need for innovative funding strategies for mobility projects. Finally, Kenneth Orski, editor of Innovation Briefs, offers *“Thinking about the Future of the Highway Program,”* a commentary that challenges all of us to engage in this important conversation.

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**HORIZON** is not meant to be an exhaustive presentation of a particular topic, but instead is intended to help us engage in the issues shaping transportation policy. We welcome your feedback and encourage you to contact our editor, John Sabala, with your comments, at [TxDOTHorizonEditor@dot.state.tx.us](mailto:TxDOTHorizonEditor@dot.state.tx.us).

**HORIZON** welcomes submissions for consideration by the editorial staff. In future issues, we plan to address specific themes. For more information on our article submission policy and the focus for our next issue, please see page 73.

We hope you enjoy this publication and look forward to receiving future issues. To subscribe, fill out the form on page 74 and fax it in or click on the link [Horizon Subscriptions](#).

We welcome you as we journey together toward a new horizon.

Sincerely,



Michael W. Behrens, P.E.  
Executive Director  
Texas Department of Transportation



# A Quiet Crisis in Transportation Finance: Options for Texas

*Testimony presented before the Texas Study Commission on  
Transportation Finance – Austin, Texas, April 19, 2006*

by Martin Wachs, Ph.D., RAND Corporation

**T**he American transportation system, among the most advanced in the world, is the product of a delicately balanced partnership of federal, state, regional, and local governments, the private sector, and hundreds of millions of system users and customers. Responsibility for this enormous, complex system is divided among many organizations and jurisdictions. These collectively finance, build, operate, and maintain local streets and roads, intercity highways, and public transit systems that provide the mobility essential to modern economic and social life. This

division of responsibility has evolved gradually over more than a century.

Transportation investments are often highly political and sometimes subject to vigorous debate. The planning and funding of transportation systems has always had to balance the priorities of many competing interests, including motorists, builders, truckers, shippers, taxpayers, and many others. It took literally decades of planning and debate, for example, to arrive at an agreement that specified the extent of and funding arrangements for the Interstate Highway System. Once the commitment was

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made to undertake the interstate system, however, it benefited from the support of a broad spectrum of interests and its completion has deeply influenced the nation.

Amid this environment of carefully crafted agreements and gradual evolution, a crisis in transportation finance has quietly emerged. Long standing approaches to finance are being abandoned, often with little public notice or debate. But the changes have been profound and it is now clear that during the coming decade, policymakers at all levels of government will be forced to rethink the fundamentals of American transportation finance.

## HOW WE GOT HERE

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### Local Transportation Finance

A century ago, almost all roads were local, and our rudimentary intercity roads, many of which were privately owned toll facilities, were completely inadequate to serve the rapid growth in vehicle travel that accompanied the widespread adoption of automobiles. Neighborhood streets and most county roads have long been and still are the responsibility of local governments. Although they make up the vast majority of the road system's lane miles, neighborhood streets carry only a small proportion of traffic by volume. Despite their generally low traffic levels, local streets are critically important because they provide private, commercial, and emergency vehicle access to residential and commercial property. In addition to being essential

to residents and employees, the access provided by local streets imparts significant value to private property by allowing postal trucks, fire engines, police cars, ambulances, trash collectors, plumbers, and many others to reach

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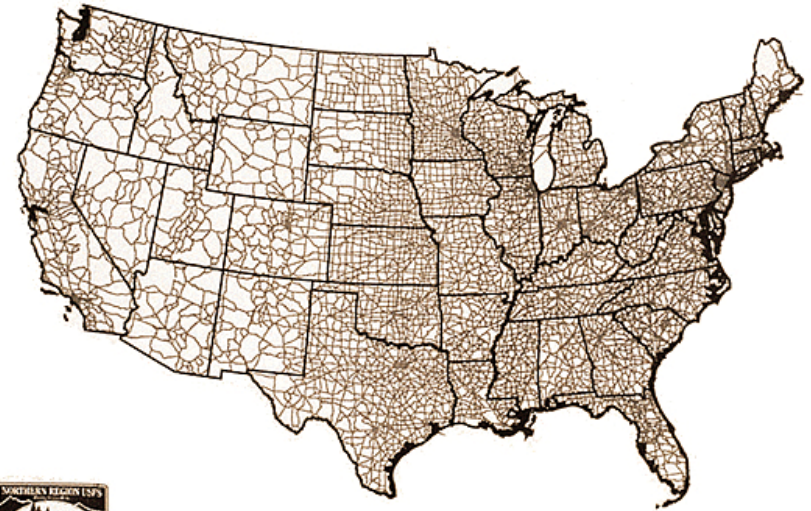
*... during the coming decade, policymakers at all levels of government will be forced to rethink the fundamentals of American transportation finance.*

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individual land parcels. Streets are also the most common channels for electric wires, gas mains, and water and sewer pipes. For these reasons, local governments have long provided and maintained such roads, financing them primarily by levying taxes on the properties that benefit so directly from the access they provide.

### State Highways and User Fees

Over time, states assumed a different, complementary transportation mission to that of local governments. In the early part of the 20th century, Americans wanted to get farmers out of the mud and to connect them to regional markets. At the same time, rapid growth in automobile use created traffic jams on existing, mostly underdeveloped roads. Gradually, states (with strong incentives from the federal government in the form of matching grants) augmented local roads by creating major routes designed for heavy longer-distance traffic. These arterials—the state highways—were



*State and federal roads*

expensive, and they quickly strained state treasuries. In the early 1920s, for example, California was devoting more than 40 percent of all its state revenues to maintaining roads and paying interest on bonds it had issued to build the roads. Despite these high levels of spending, congestion was getting worse because appetites for highway travel were growing so rapidly.

In contrast to the land-serving focus of extensive, lightly traveled local street networks, travel on state highways is more about mobility. This network serves longer-distance trips traveling at higher speeds and in greater volumes. Accordingly, the principal beneficiaries were seen to be the users of the system—motorists, truckers, shippers, and so on, rather than adjacent property owners. So from this period of financial exigency

came the revolutionary concept of “user fees.” Because the need for and costs of state roads varied in rough proportion to traffic levels, it made intuitive sense to cover the costs of those roads by charging the users. While tolls were considered at the time the fairest way to charge users, they had a major drawback. The cost of collecting tolls (constructing toll booths, paying toll collectors, revenue losses from graft and pilfering, and delays imposed on travelers) absorbed such a large proportion of toll revenues that that they often exceeded the revenues generated. Further, developing interconnected road networks required the construction and maintenance of expensive-to-build links (over waterways or through mountain passes) and some lightly used links that could not be financed entirely by locally generated toll revenues.

The solution to this dilemma came when states, starting with Oregon in 1918, adopted an alternative form of user fee—motor fuel taxes. Although they charged for road use in rough proportion to motorists' travel, and heavier vehicles paid more because they used more fuel per mile of travel, fuel taxes didn't quite match tolls for equity because they didn't levy charges at precisely the time and place of road use. However, fuel taxes cost much less to collect and administer than tolls, and soon they became the principal means of financing America's main roads. Because they were user fees, most states reserved fuel taxes exclusively for transportation expenditures; this link between state fuel taxes and transportation expenditures has been mandated by federal law since the 1930s. When the federal government decided in 1956 to finance intercity highways on a national scale, it increased

federal fuel taxes and created the Federal Highway Trust Fund, emulating the “user pays” principle that had been so successful in the states.

For better than eight decades, motor fuel taxes have paid most costs of building and operating major roads in the United States. As public policy gradually came to favor a transportation system balanced to some extent between private cars and public transit, highway user fees were also used to construct and operate transit systems. Of course, this change was objectionable to some interests because it was seen as a “diversion” of road user fees to other purposes and thus a violation of the principle that user fees were to be reserved only for the benefit of those who paid them. But, in order to keep together an effective coalition of highway, transit, construction, and



*Interstate 35 near Dallas circa 1957*

environmental interests, and recognizing that some automobile users benefit by the presence of transit in their communities, the funding of public transit, in part with highway user fees, has become institutionalized.

### **Erosion of User Fees**

Amid this elaborate system of federal and state user-fee finance, a major change in the way we finance transportation systems is now underway, yet most of the motoring public, and even many public officials, are not even aware it is happening. Federal and state fuel taxes, though still the largest source of revenue for transportation, are rising far more slowly than either traffic volumes or transportation system costs. They no longer come close to covering the costs of building, operating, and maintaining the transportation system. Because it is levied per gallon, and not per dollar or per mile, inflation and improved fuel efficiency combine to erode the buying power of the fuel tax. To keep pace with rising costs and increasing travel, the per-gallon fuel tax levy needs to be increased regularly—a significant political liability to an otherwise simple and elegant finance mechanism. But while fuel taxes have risen a few times since the early 1980s, they have fallen far short of pacing the combined effects of inflation, improved vehicle fuel efficiency, and new program responsibilities.

In 1957, as America was starting in earnest to build the Interstate Highway System, the average state motor fuel tax stood at 5.7 cents per gallon. If we

***Federal and state fuel taxes ... no longer come close to covering the costs of building, operating, and maintaining the transportation system.***

apply the consumer price index to that rate of taxation, it would be equivalent to an average rate of 39.6 cents per gallon in the year 2005. But the actual average state motor fuel tax among the 50 states today stands at only 20.3 cents per gallon. In other words, in order to simply match the per-gallon buying power of the motor fuel tax in 1957, states would have to raise their gas taxes today by an average of 19.3 cents per gallon. It is beyond the realm of possibility that they would do so. The federal gasoline tax in 1957 stood at 3 cents per gallon, and it would have to be raised to 20.8 cents per gallon to have the same per-gallon buying power today that it had in that year. Since the federal gasoline tax is today 18.4 cents per gallon, it comes closer than the states do to keeping pace with inflation, but it also falls short of staying even.

These figures on motor fuel tax rates only consider the effect of inflation on the buying power of the per gallon motor fuel tax. The fuel tax's eroding purchasing power has been compounded by increasing vehicle fuel efficiency. The average passenger car traveled 13.5 miles per gallon in 1970, and this had risen to about 22 miles per gallon by the year 2000, an improvement in fuel efficiency of 63 percent. Of course, this improvement is highly desirable and

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happened partly in response to American energy policy initiatives, including the Energy Policy and Conservation Act, which specified Corporate Average Fuel Economy (CAFE) standards. Nevertheless, improved fuel economy directly reduces per-mile revenues from motor fuel taxes. In other words, we drive many more miles-per-penny-contributed-to-trust-funds today than we did when we started building the interstate system.

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**Annual delay per peak-hour traveler**  
12 hours..... 1982  
46 hours..... 2002

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At the very same time that transportation programs have faced this relentless and systematic reduction in inflation-adjusted revenues per mile of travel, the cost of roads and other transportation facilities has risen dramatically, further straining the faltering revenue stream. Building and maintaining roads and transit facilities requires spending on land, labor, capital equipment, and materials, all of which cost much more than they once did. The Engineering Newsrecord Construction Cost Index, for example, tracks over time the average cost in 20 cities of a mix of major ingredients in the cost of transportation facilities: common labor, steel, lumber, and concrete. Between 1957 and 2005, the index rose by nearly 850 percent. Although there was a gain in construction expenditures' productivity during this time period, it is nonetheless clear that revenues have declined dramatically in relation to costs.

Despite declining revenues and rising costs, transportation programs also have been called upon to broaden highway program expenditures to address societal demands. One important example of the growth of programmatic responsibility in transportation has been increased spending on the mitigation of environmental impacts of transportation investments. For example, new highway construction projects often incur additional costs to achieve context-sensitive design. Highway projects often must incorporate facilities to collect and treat surface water runoff if they interfere with natural watercourses, and much more transportation program money is spent today on sound walls and other noise attenuation strategies than was typical 30 or 40 years ago. While increased sensitivity to aesthetic and environmental impacts of transportation is clearly in the public interest, the increased costs associated with these activities further reduce the transportation services that can be provided per dollar of expenditure, further shrinking the buying power of motor fuel tax revenues. Beyond environmental mitigations, highway projects also typically incorporate costs of job-training programs for local residents in communities through which highways pass, and for replacing businesses and residences displaced by construction; such costs per mile of road construction are growing dramatically in many metropolitan areas.

It is also worth noting that, as the transportation system grows in extent and as it ages, an ever increasing share

of expenditures is needed to operate, maintain, and renew the existing system, meaning that even less money is available for system growth. The interstate system has now matured to the point that many states face increasing financial burdens related to the replacement of pavement, bridges, and other structures that have deteriorated over decades of often heavy use. In some locations, it has also become necessary to strengthen existing facilities as new information has come to light about the impacts of earthquakes on roads and bridges.

### **Worsening Congestion a Product of these Trends**

Traffic congestion is clearly worsening in many places, and surely declining real revenues, combined with rising costs for maintenance, operations, and system expansion are among many factors that explain rising traffic delays. Between 1985 and 1999, vehicle miles of travel on U.S. roadways grew by 76 percent, whereas lane miles increased by only 3 percent. During that same period, average daily vehicular volumes on urban interstates rose by 43 percent. The Texas Transportation Institute (TTI) issues an annual Urban Mobility Report that, despite some significant limitations in its ability to accurately measure congestion, shows that metropolitan traffic congestion, especially in the largest metropolitan areas, is worsening. While the annual delay per peak-hour traveler stood at 12 hours in 1982, it had grown to 46 hours by 2002. Given the trends in rising vehicle travel and limited road capacity expansion described above,

this trend toward increasing congestion is likely to continue. The Federal Highway Administration expects vehicle miles of travel to increase by another 42 percent by 2020, with the growth rate for heavy trucks increasing faster than that for lighter vehicles. Congestion will surely worsen at some locations, especially at key bottlenecks in the transportation system.

While the recent ramp up in fuel prices may slow some of the projected growth in travel in the short term, history suggests that drivers are more likely to respond by shifting to more fuel-efficient vehicles than by curtailing driving; so unless fuel prices were to climb much higher, vehicle travel is likely to continue growing in the years ahead.

### **Further Erosion of User Fees Likely**

There is every reason to believe that the trends described above are likely to continue and probably to intensify. The political climate is one of wariness for any kind of tax increase, even increases to transportation user fees. While a transportation user fee can arguably be seen as something other than a tax—President Reagan made this argument when the federal motor fuel tax was last raised—the distinction between a user fee and a tax is too subtle a point to sway many legislators today. During the recent debate over reauthorization of the federal surface transportation program, there was a strong consensus among legislators that motor fuel taxes should not be increased in order to expand the federal transportation program. And,



*TxDOT hybrid vehicle*

while a few states like Wisconsin and Washington have chosen to increase their gasoline and diesel fuel taxes, they have without exception failed to raise their levies at a sufficient rate to keep pace with the combined effects of inflation and improving motor fuel economy.

Compounding this general aversion to tax increases are rising motor fuel prices. While such price increases typically have only modest effects on driving behavior, most legislators do not wish to incur the wrath of their constituents by even discussing possible increases in the motor fuel tax rate while the pump price of gasoline is fluctuating between \$2.50 and \$3.50 per gallon. This is despite the fact that gasoline and diesel prices in the U.S. remain well below retail prices in most other industrial nations, and tax rates here are well below those in other countries. While the effects of wars and natural disasters on fuel prices are likely

to ebb and flow over time, the long-term trend toward higher fuel prices is likely to continue, due to continuing growth in international demand for petroleum and the actions of international oil production cartels. Here in the U.S., relatively fixed refinery capacity, coupled with the need for particular “boutique” fuel mixes in some regions for different seasons of the year to comply with federal air quality standards, contributes further to the upward pressure on fuel prices. It is worth noting that when confronted with rising gasoline prices in recent years, several state legislatures and the U.S. Congress held hearings to investigate the possibility of lowering motor fuel taxes in an effort to compensate for the rising retail price of fuel at the pump.

#### **Longer Term Energy Issues**

Some might dismiss current reluctance to raise motor fuel taxes as a matter of

political will that could change over time, but there are additional reasons to think that the motor fuel tax is not a viable revenue base for transportation over the long term. The recent introduction of hybrid vehicles is an indication of what may well be a long-term transition away from petroleum-based fuels. While one could view the explosive growth of gasoline-electric hybrid vehicles as just another step in improved fuel economy, hybrids still make up only a small proportion of the vehicle fleet, so their effects to date on fuel tax revenues collected per vehicle mile have been minimal. But at the federal level and in some states, incentives are being put into place to accelerate the shift to hybrids. Federal tax credits and state programs allowing hybrid vehicles carrying a single occupant to use high-occupancy vehicle (HOV) lanes are early indications of even more aggressive incentives that could follow; though rising fuel prices likely will do far more to motivate motorists to purchase hybrids and other high-mileage vehicles than federal or state incentives. In addition to hybrids, advances in conventional engine technologies—such as variable cylinder management systems and increasingly sophisticated variable timing control systems—are ushering in a new wave of fuel efficiency improvements. Eventually, the long promised breakthrough in electric battery technology could occur, making purely electric vehicles more feasible than they have been heretofore. And hydrogen fuel-cell technology, seen by many to be promising over a longer time horizon of 20 or more years, may

one day be commonplace. Thus, the list of emerging clean, efficient motor vehicle propulsion technologies over both the short- and longer-term is long and growing.

It is impossible to anticipate with precision the likely market penetration of hybrid, electric, or hydrogen fuel cell vehicles. More important than any particular technology are increasing concerns with global warming and the links between the use of carbon-based fuels of all sorts and the concentration of greenhouse gases in the atmosphere. What is likely to be a growing national commitment to the reduction of the production of greenhouse gases is foreshadowed by the California Energy Commission’s current program aimed at automobile engines. It could become national policy to reduce the burning of fossil fuels in order to slow growing concentrations of greenhouse gases. Should this happen, basing our system of transportation finance on the sale of carbon-based fuels at both the federal and state levels via the motor fuels tax will be increasingly problematic. A national policy requiring reduction in the use of fossil fuels and a fuel tax based system of transportation finance is inherently in conflict, since growth in revenue for the highway program comes only through increasing use of fossil fuels. This conflict between environmental and fiscal policy objectives is likely to dominate federal transportation policy debates during the coming two decades.

Traditional federal and state motor fuel taxes will undoubtedly produce many

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billions of dollars in transportation revenues in the years ahead, but we are necessarily in a transition to a new system or systems of transportation finance. Despite its many virtues, all evidence suggests that the fuel tax's days are numbered, though what that number might be remains the subject of considerable debate. Whether it is 10 years or 20, the successors to the fuel tax should be reflectively and deliberately chosen.

## **POSSIBLE FUTURE POLICY DIRECTIONS**

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If motor fuel tax revenues will become increasingly inadequate to support the operation, maintenance, and expansion of the transportation system in coming decades, we must begin to consider alternative ways of establishing a strong and stable financial base for that system. Included in consideration of the alternatives must be attention to the transition from the current system to any future system.

### **Increased Reliance on Borrowing**

One response to decreasing production of revenue through motor fuel taxes has been increased borrowing. Often referred to as “innovative finance,” debt financing of capital facilities for transportation has increased over the last decade. Reliance on loans takes two forms. First, federal and state programs are making it easier to borrow public funds. For example, “grant anticipation revenue vehicles” (GARVEEs) and “grant anticipation notes” (GANs) are short-term loans of

federal funds to transportation agencies that commit future federal and state trust fund distributions in advance of when they would normally be received in order to complete funding packages needed to build projects today. State infrastructure banks also have been created to provide “revolving funds” that enable projects to be built through borrowing and funds to accumulate in the banks through the repayment of the principal plus interest. Second, efforts to interest international sources of private capital—from banks, retirement funds, and the like—to invest in highways and bridges are growing. In most cases, these projects commit to repaying the borrowed capital over 20 or 30 years or more, usually from the proceeds of tolls or other fees charged to users.

Borrowing is a good way to finance large public capital investments with high, up-front costs that provide benefits to users for years, even generations. Debt financing makes sense when the annual stream of expected benefits from a project (discounted to the present) exceeds the annual principal and interest payments for the project (also discounted to the present). Common examples of bond-financed projects are schools, dams, and sewage treatment plants. Borrowing money by issuing low-interest, tax-exempt bonds spreads the cost for a new public facility over time in rough proportion to the actual benefits from that facility. The low interest costs of tax-exempt bonds and the rough matching of costs and benefits to users over time make borrowing to finance

public facilities appealing in many respects. Paying off the loans floated to build transportation projects is, of course, a long-term financial obligation that requires agencies to acquire revenue throughout the life of the project to repay the capital and to meet interest obligations.

A century ago, most states relied heavily on bonds to develop their road infrastructure. As the road system expanded, however, the cost of new road projects constituted a smaller and smaller share of the ongoing cost of building and maintaining the entire system. The cost of the road system became more regularized from year to year and less like the irregular, “lumpy” expenditures on schools or water treatment facilities traditionally financed with bonds. In addition, there emerged in the 1920s a simple, straightforward way to directly charge drivers for their use of the expanding road system: motor fuel taxes. Thus, in the 1920s the large scale, regular, and continuous nature of road expenditures and the opportunity to directly charge road users led to the adoption of a “pay-as-you-go” philosophy in road finance discussed earlier. So, between the introduction of the gas tax in the 1920s and the 1980s, states and the federal government largely held to this pay-as-you-go user fee approach, using bonds only to pay for tolled bridges and tunnels and a few “turnpikes.”

But as money for transportation improvements has grown increasingly tight over the past two decades, states

have increasingly turned to borrowing to pay for non-bridge and tunnel road projects. This is because borrowing is a politically appealing way to finance transportation. Bonds raise revenues without directly increasing taxes (though, of course, long-term debt service obligations do increase) and they generate this revenue starting immediately. Also, the large, visible public capital projects paid for with bonds tend to be popular among voters.

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*... borrowing to pay for transportation projects can be a good idea (such as when the debt can be retired directly from facility tolls or other user fees)...*

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Because the states and federal government mount large and approximately equal-sized transportation capital programs each year, the benefits of debt financing are more immediate than ongoing because debt service obligations in subsequent years reduce the funds available to pay for new projects. In other words, while borrowing to pay for transportation projects can be a good idea (such as when the debt can be retired directly from facility tolls or other user fees), it can also simply be a way to put off, for a few years, the politically difficult task of restructuring transportation finance. And unfortunately, many recent decisions to debt-finance transportation projects have been motivated by a desire to get needed projects off of the ground as traditional revenue sources have run dry rather than by dispassionate calculations of expected benefits and costs.

The long-established “pay-as-you-go” system provides a useful fiscal discipline that bonds do not; it is all too easy for public officials to promise popular projects without specifically committing the tax revenues needed to retire the bonds. And, despite the advantages of tax exemption, interest payments make bond-financed projects considerably more expensive than those paid for with current revenues. One evaluation of the benefit of financing roads with bonds in Texas found that the overall benefit to the state would be reduced if bonds were issued. Bonds were expected to improve pavement and operating conditions during the few years just after issue, but conditions were then expected to deteriorate later when available highway revenues were reduced to cover debt service obligations. In California, bond issues have recently been accompanied by lists of projects. These lists often include economically inefficient projects chosen for political reasons. Thus, while loan financing may have merit for selected and specific projects like major toll bridges, borrowing is often a costly way to finance transportation.

### Electronic Toll Collection

While tolls were considered by many observers at the dawn of the automobile era to be ideal user fees, they were rejected, as noted above, because of their high costs of administration. But nearly a century later, rapid and dramatic advances in technology have revived the potential and promise of tolls. A new breed of information technologies—including onboard computers, global

positioning systems (GPS), digital maps, and wireless communications—now make it relatively easy and cheap to measure and record vehicle travel by road segment and time of day, even across different states and jurisdictions. Such technologies effectively open the door to numerous tolling options long proposed by transportation economists but never before deemed feasible or practical. There are today over 90 projects underway around the world in which innovative electronic tolling applications are already in place or in the advanced stages of development. They incorporate a variety of pricing schemes, ranging from facility congestion tolls to area congestion tolls to weight- and distance-based user fees and insurance charges. Of these, by far the most technically advanced plans with the greatest revenue potential are proposals to replace the fuel tax with a general-purpose, network-wide, distance-based user fee for automobiles and trucks.

Although exact implementation details for distance-based user fee proposals vary, the technical strategy, in its simplest form, works as follows. To determine and record travel information, each vehicle must be equipped with an onboard unit that integrates these components: a GPS receiver, a set of digital maps showing jurisdictional boundaries, an odometer feed, a rate table for computing distance charges, and some form of wireless communication technology for reporting billing data. During each trip, the computer repeatedly checks the GPS receiver to determine geographic location,

**Express Lanes Toll Schedule**  
Effective July 1, 2006  
Westbound  
Riverside Co. Line to 55

	Sun	M	Tu	W	Th	F	Sat
Midnight							
1:00 am							
2:00 am				1.15			
3:00 am							
4:00 am				2.20			
5:00 am				3.60	3.45		
6:00 am				3.70	3.60		
7:00 am				4.05	3.95	1.60	
8:00 am	1.60			3.70	3.60	1.85	
9:00 am				2.95		2.30	
10:00 am							
11:00 am	2.30						
Noon							
1:00 pm						2.60	
2:00 pm	2.60			1.85			
3:00 pm							
4:00 pm					2.30	2.75	
5:00 pm	2.75						
6:00 pm					2.70	2.30	
7:00 pm						1.85	
8:00 pm	2.30						
9:00 pm				1.15			
10:00 pm							
11:00 pm							

**Express Lanes Toll Schedule**  
Effective July 1, 2006  
Eastbound  
55 to Riverside Co. Line

	Sun	M	Tu	W	Th	F	Sat
Midnight							
1:00 am							
2:00 am							
3:00 am				1.15			
4:00 am							
5:00 am							
6:00 am							
7:00 am							
8:00 am	1.50						
9:00 am				1.85			
10:00 am	2.30						2.30
11:00 am							
Noon						2.80	
1:00 pm	2.70	2.55		2.80	4.35		
2:00 pm		3.70		3.80		2.70	
3:00 pm		3.95		4.20			
4:00 pm	6.65	7.25	7.75	8.50			
5:00 pm	2.30	5.90	7.75		7.25		
6:00 pm	3.95	4.70	4.20	5.00	4.75	2.30	
7:00 pm		2.80		4.00	4.40		
8:00 pm		1.85		2.55	4.00	1.85	
9:00 pm						2.55	
10:00 pm						1.85	
11:00 pm							1.15

*Toll schedule for State Route 91 in California; charges are varied based on high-volume traffic times*

and then it compares this information with digital maps to establish the current jurisdiction. Each mile traveled (based on the odometer feed) is then sorted and stored by jurisdiction, and the computer uses this information, along with the rate table, to keep a running total of fees owed to different authorities (for example, different states).

Periodically, this information is transmitted to a billing agency so that charges can be levied and fees paid. This can occur, for example, via dedicated short-range communications when the driver refuels, in which case the fees

could be simply added to the fuel bill. Alternatively, data could be uploaded to a billing agency such as a credit card company on a monthly basis, and the vehicle owner could be billed electronically. To prevent toll evasion, onboard equipment must be tamper-resistant; some units are programmed to perform regular checks against the odometers to ensure that the units have not been turned off during any period of operation. Jurisdictions may also choose to mount roadside devices that can communicate with passing cars to verify that onboard units are installed and operational.



Rendering of an electronic high-speed toll pass plaza

Such distance-based fee proposals are, without question, ambitious, yet several states in the U.S. have already launched efforts to evaluate the feasibility of per-mile electronic tolling. In 2001, the Oregon Legislature commissioned the state's Department of Transportation to develop a long-term vision for road finance, which resulted in a detailed proposal for a mileage-based road fee, now being tested in and around the city of Eugene, Oregon. The Minnesota Department of Transportation pooled resources with 14 other states (California, Connecticut, Iowa, Kansas, Michigan, Missouri, North Carolina, Ohio, Oregon, South Carolina, Texas, Utah, Washington, and Wisconsin) and the Federal Highway Administration to fund a proposal, developed by researchers at the University of Iowa, for a multi-

jurisdictional (state-to-state) mileage fee.

While these American proposals are just now being tested, distance-based electronic tolling has already gained considerable traction in other parts of the world, most notably in Europe. Austria, Switzerland, and Germany have all recently launched automated, weight-distance truck tolls across their national highway networks, and the United Kingdom is planning to develop a similar system in the next few years. The Netherlands had developed plans to implement a distance-based fee applying to both trucks and passenger cars, but the idea was shelved in 2002 with the election of a more conservative government. More recently, the cities of Copenhagen, Gothenburg, and Helsinki have experimented with distance-based

user fees, while the European Space Agency, eager to find applications for its upcoming Galileo global satellite system, has begun to lay out specifications for a pan-European, distance-based road tolling system. While many of these European experiments have cited fiscal shortfalls as a central motivation, they have also explicitly focused on other important objectives such as accommodating increased travel among European Union member countries, managing congestion, encouraging shifts away from single-occupant autos, tracking burgeoning truck travel, and providing incentives for the purchase of cleaner-emission vehicles.

**... distance-based electronic tolling has already gained considerable traction in other parts of the world, most notably Europe.**

The move towards electronic tolling is well short of a juggernaut. The idea continues to be met with considerable skepticism, and in some cases, outright hostility, among some transportation interest groups, voters, and elected officials. The most common objections are related to privacy and environmental issues. For those concerned with privacy, the prospect of onboard equipment that could allow the government to track and monitor drivers without their consent or knowledge is chilling indeed. Meanwhile, environmental advocates worry that distance-based pricing schemes would take the form of flat mileage fees accounting for neither fuel economy nor

emissions differences among vehicles. Replacing the existing fuel tax with such a flat fee would effectively eliminate one of the few, tax-related policy incentives for purchasing more fuel-efficient vehicles. California Assemblywoman Fran Pavley neatly summed up both of these objections saying:

*People who drive fuel-efficient, less polluting cars would have exactly the same tax burden as people driving huge gas-guzzlers...Allowing the government to track Californians' movements everywhere they drive is a totally unacceptable Big Brother-type intrusion....Invading our privacy and providing a disincentive for people to drive clean-air vehicles would be a terrible U-turn in public policy. This one belongs in the scrap heap.*

Such concerns are understandable, and public suspicions are certainly not allayed by sometimes histrionic press coverage. A recent Los Angeles Times article discussing the Oregon pilot test, for example, reported that "tracking devices send a signal to a GPS satellite following the car." Such language paints an alarming image for anyone concerned about privacy, but GPS satellites don't follow cars at all. Rather, a GPS receiver in the car uses signals from the satellite to determine its own location. Such misrepresentations aside, it becomes evident, when one digs a little deeper into the details of distance-pricing proposals, that both privacy and environmental concerns can be addressed through appropriate technological and programmatic design.

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***Tolls set to account for vehicle weight, emissions, or the use of congested facilities may thus increase the equity of transportation fees across users and increase efficiency in the use of the system as well.***

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Each of the distance-based pricing proposals currently being tested or in operation ensures that users' privacy can be protected, and several ingenious strategies seek to achieve this aim. In the University of Iowa proposal, for example, drivers would periodically download billing data from the onboard unit onto a smart card, and then upload the data to the billing agency via a card-reader at a filling station or on a home computer. The transfer process would be divided into two transactions. The first would upload user identification and total amount owed. Then a second, anonymous connection would report the division of the bill to different jurisdictions. Jurisdictions would thus receive the appropriate revenues, but the government would never know where or when any individual had traveled, only the total amount owed.

To address environmental concerns, mileage-based tolls could be set to vary by vehicle-emissions class. This approach has already been employed in the German weight-distance truck-toll system, where the distance charge is 50 percent higher for the most polluting vehicles than for the least polluting ones within any given weight class. Such adjustments could be

applied to passenger vehicles as well as trucks. Many transportation analysts are intrigued by electronic tolling because it permits variable charges to reflect the numerous costs (congestion delays, damage to road beds, vehicle emissions, etc.) that users impose on the system. Such variable pricing strategies are already being explored in many places. The Puget Sound Regional Council, for example, is currently performing a trial of network-wide congestion tolls using onboard computers equipped with GPS receivers and digital road network maps.

Another common objection to tolling—electronic or otherwise—is that motorists already pay for the roads through user fees, mostly in the form of motor fuel taxes. Thus, asking drivers to then pay electronic tolls to drive on some facilities or in some areas, it is argued, constitutes “double taxation.” The salience of this argument depends on how narrowly or broadly one defines transportation system costs. Here we can consider both the direct costs of building and maintaining a roadway, and the indirect costs (noise, emissions, delays imposed on other drivers, etc.) that users impose on the system. With respect to direct costs, building a roadway can vary dramatically from place to place. Bridges and tunnels, for example, can be vastly more expensive per mile to construct than roadbeds on dry, flat land. But absent tolls on bridges, the revenues generated through fuel taxes don't vary from facility to facility. Further, heavy vehicles typically impose many times the wear and tear on roads per mile

traveled than passenger vehicles, yet fuel taxes paid per mile tend to vary far less. Likewise, when motorists squeeze their vehicles onto crowded freeways during rush hour, they can impose surprisingly large levels of additional delay on the vehicles backed up behind them. While delay costs imposed on other drivers are not directly linked to the cost of building or maintaining the road system, they are nonetheless quite significant. Tolls set to account for vehicle weight, emissions, or the use of congested facilities may thus increase the equity of transportation fees across users and increase efficiency in the use of the system as well. For example, truck-weight fees that vary by axle weight can encourage truckers to purchase vehicles with more axles in an effort to reduce their fees, and in the process, substantially reduce the damage that trucks do to roadways.

Concerns over double taxation from tolls are also allayed when electronic tolls are

placed on new or added highway capacity rather than on existing highways, since the electronic charges can clearly be aligned with the incremental costs of those new roads (although fuel taxes for other roads are also paid while using new toll roads). Perhaps more significantly, when electronic tolls are used to replace existing motor fuel taxes rather than charged in addition to fuel taxes, this issue of double payment is moot. For example, travelers can be billed at lower rates to cover maintenance and operating costs when traveling on roads whose capital costs were borne by fuel taxes in the past, while paying higher rates per mile to drive on roads for which debt is currently being repaid.

Switching to a distance-based user fee system would require a major investment in new technology, as well as developing new administrative capabilities within government, or through private contractors, to manage the program





Should the transition to electronic tolling be revenue neutral or should fees be set to fund the backlog of existing maintenance and construction needs? Should fees vary by vehicle weight and/or emissions class? Should heavy trucks be charged more to travel on secondary roads, where they do the most damage, than on more heavily-engineered highways? Should urban areas be allowed to layer congestion tolls on top of base fees? Which of these ideas is the public prepared to accept? In London and Southern California, less sophisticated congestion pricing programs have successfully increased vehicle flows and reduced delays with little or no public outcry. But whether network-wide schemes would be received as calmly is far from clear.

Finally, depending on how these policy questions are answered, tolls could be structured to increase transportation system efficiency, effectiveness, and equity or they could be set to disproportionately benefit powerful entrenched interests.

Indeed, while some are promoting the potential to improve efficiency, effectiveness, and equity, others oppose electronic tolling precisely because it opens the door to variable fees that address these issues. Trucking interests, for example, could be expected to push for flat, per-mile tolling to avoid paying higher variable tolls for operating heavier or more-polluting vehicles. At the same time, manufacturers of large sport-utility vehicles, already stinging from lagging sales due to recent increases in fuel prices, might be expected to lobby against the inclusion of per-mile emissions or fuel-efficiency fees.

In short, while distance-based pricing offers the potential to price for a variety of indirect costs like vehicle weight, emissions, or delays imposed on other drivers, whether or not such strategies would survive the political bargaining process is very much in doubt. Reopening the long-settled questions of who should pay for roads and how they should pay

entails considerable risk and uncertainty for nearly everyone. If raising both the motor fuel tax and other established transportation taxes had not become so difficult politically, it's likely that the development of electronic tolling systems would be moving along much more slowly.

### **Local Option Transportation Taxes: Moving Away from User Financing**

A potential shift to electronic road charges in proportion to distance traveled, modified by vehicle weight or fuel efficiency, is an example of a strategy that builds upon our long history of financing transportation facilities through user fees. While these approaches appear to be advancing rapidly in Europe, they are being implemented far more rarely in the U.S., though they are starting to be considered in many places. Meanwhile, it is fair to say that our country has gradually been shifting the financial burden for transportation away from user fees and toward general taxes and fees, such as sales taxes, that fall upon all citizens regardless of the extent to which they use the transportation system. In contrast to the "drive less, pay less" fuel tax user fee, light or occasional users of the transportation system tend to pay far more per mile traveled with sales taxes, while frequent, heavy users of the transportation system tend to pay far less.

A surge in local ballot measures has been taking up at least some of the slack caused by the relative drop in fuel tax revenues at the state and federal levels.

Before 1980, few states encouraged or even permitted their cities or counties to levy their own transportation fees, except for the property taxes traditionally used for neighborhood streets and county roads. In the 1970s, major metropolitan areas adopted permanent sales taxes to support the development of new transit systems; in the 1980s, several states authorized local jurisdictions to use ballot measures to raise revenues for transportation purposes. The pace accelerated during the 1990s, as 21 states either adopted new laws authorizing local option transportation taxes or saw dramatic expansion in their use.

During calendar year 2002, American voters considered 44 separate general transportation tax ballot measures and in calendar year 2003 they considered 43 more. About half of these measures were approved, and some of the measures were the second or third attempt to pass a measure in a given jurisdiction. Only a few of these measures involved user fees like fuel taxes. Local sales tax increases were by far the most common taxes considered in these measures, but some voters also enacted vehicle registration fees (arguably a user fee, but more accurately a form of personal property taxation), taxes on real estate sales, local income or payroll taxes earmarked for transportation, and taxes on new real estate developments.

These sales taxes are the fastest growing source of money for transportation in California, and in many other states as well. The popularity of local sales taxes

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for transportation can be attributed to four important characteristics:

**1) Direct local voter approval:**

These measures typically result in projects and services near voters' homes and workplaces, so they personally can appreciate them and anticipate their benefits. In an era of growing distrust of politicians, these measures provide tangible direct local benefits.

**2) The taxes have finite lives:**

Voters enact transportation taxes that will persist typically for 15 or 20 years unless specifically reauthorized by another popular vote. Voters thus have a sense of control over their money. If projects don't live up to their expectations or if they fully accommodate growth and reduce congestion, the taxes could end.

**3) Specific lists of transportation projects:**

The taxes may be used only to build certain projects or fund specific programs named in the ballot measures, and politicians' discretion to spend the money is severely limited.

**4) Local control over revenues:**

The money raised locally is spent locally and for local benefit, under the control of a local transportation authority, assuring citizens that the money will not leak into other jurisdictions.

These provisions give citizens more

direct control over the transportation investments they pay for than is typical with motor fuel taxes, though this direct control stems from the local voter approval process and not the fact that the funds are typically raised from non-transportation sources. Nonetheless, surveys of voters and interviews of local politicians regarding these measures find that local control is the single most politically attractive aspect of local option transportation taxes.

Sales taxes are also lucrative because they have a broad base. While fuel taxes are paid only by motorists on fuel purchases, sales taxes are paid by many more people purchasing a much wider range of goods. Thus, even small sales tax increases can generate significant sums of money. One county, for example, estimated that a 1 percent general transportation sales tax produces as much revenue as a motor fuel tax increase of 16 cents per gallon. While the annual tax paid by households might be the same between these taxes, small increases to a frequently paid tax have proven much more palatable politically.

The most consistent trend in sales tax expenditures shows operations and maintenance of existing facilities receiving far less funding than new capital projects. Voters are believed to favor measures that create new rail lines or highway bypasses and that they are unimpressed by plans to restripe pavement or repave deteriorating road surfaces. However, the content of expenditure plans varies widely from county to county and from measure

to measure, reflecting differences in local priorities. Rural counties are more likely than urban ones to put control of sales tax revenues in the hands of local jurisdictions and to spend most of their revenues on highway projects, streets, and roads rather than on public transit.

Each county that collects and administers a transportation sales tax has a designated transportation authority to oversee use of the funds. Thus, the creation of county transportation authorities has significantly expanded the planning and delivery of transportation improvements at the county level. But stronger county-level decision making may also weaken the regional planning mandate, particularly where counties are part of larger multi-county metropolitan planning organizations. Indeed, poorly coordinated transportation planning among local governments is what prompted the federal government to mandate the creation of metropolitan planning organizations (MPOs) back in the 1960s. But during the current era of rising local control over transportation funding, state and federal funds may

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*Supporters of local transportation taxes tout the benefits of enumerating specific projects in the ballot measures. But in approving project lists, voters limit the transportation agencies' flexibility to respond to changes in conditions or needs during the life of the measures.*

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be diverted to build projects that complement county projects, rather than addressing the priorities of metropolitan planning organizations. Opportunities to plan regionally also suffer where a large proportion of sales tax revenue is returned directly to local jurisdictions within a county.

Supporters of local transportation taxes tout the benefits of enumerating specific projects in the ballot measures. But in approving project lists, voters limit the transportation agencies' flexibility to respond to changes in conditions or needs during the life of the measures. Revenue shortfalls, cost escalations, or changing political sentiments about projects may mean that over time, agencies will want to deviate from the list of voter-approved projects. Transportation authorities face pressure to expend funds in accordance with the ballot measures and to deliver on the commitments made by local political leaders regardless of changing budgets or shifting political priorities. This pressure can have serious drawbacks. There can be many obstacles to the completion of projects administered by transportation authorities, and the transportation authorities are not usually required to base their implementation priorities on project cost-effectiveness, or to spend sales tax revenues on mitigating potentially damaging environmental consequences of voter-mandated projects.

Transportation tax referenda around the nation are often assumed to be nothing more than a new and politically expedient way of raising needed revenue—of filling

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the gap in revenue created by slowing increases in motor fuel taxes coupled with improved vehicle fuel efficiency. But local option transportation taxes may be doing much more than that. In addition to raising money, they are gradually but inexorably changing the way we plan and finance transportation systems in several fundamental ways:

1) The growing popularity of sales taxes is gradually but steadily shifting the financial base of our transportation system from user fees to general taxes paid by all citizens, regardless of their direct reliance on the transportation system. Economists have long argued that user fees have at least some tendency to induce more efficient use of the transportation system; higher fuel taxes might, for example, encourage motorists to acquire more fuel-efficient vehicles. In contrast, general taxes provide no incentive for greater transportation efficiency of any sort. And, while sales taxes and fuel taxes are both income-regressive (meaning that people having lower incomes pay a higher proportion of their incomes in each of these taxes than do people having higher incomes), the effects on the poor of user fees are tempered by the fact that those who pay them always benefit from them, while sales taxes burden non-users as well as users. On the other hand, it can also be argued that in 1920, only 10 to 15 percent of all citizens were highway users,

while in 2005, almost everyone is a transportation system user. If nearly all citizens are system users, some argue that it is no longer as useful as it once was to distinguish between user fees and general fees.

- 2) The rising use of county transportation sales taxes and the growing role of metropolitan transportation planning are consistent with a national trend toward devolution of transportation decision-making authority, but federal policy and the rise of county tax measures are in fundamental conflict. While Congress and many states are devolving transportation decision making to the regional level by enhancing the powers of metropolitan planning organizations, county sales taxes can actually undermine the influence and authority of those organizations by focusing resources and decision making on counties and other smaller units of government.
- 3) Local transportation taxes are increasingly limiting the transportation policymaking authority of elected officials by requiring that transportation funds be spent strictly in accordance with the language of the ballot measures over fairly long periods of time. Project lists are also gradually eliminating the flexibility necessary to adapt to changing needs.
- 4) While transportation planners and engineers often apply analytical

procedures like benefit-cost analysis to determine which investments should be selected, ballot measures proposing local transportation taxes substitute election campaigns—sometimes derisively called “beauty contests”—for such systematic analysis. Many believe that greater reliance should be placed on analysis of project cost effectiveness, but by listing popular projects in the sales tax measures, we are gradually limiting the relevance of systematic analysis in project selection. While local control and direct democracy are American ideals, it is probably not appropriate for voters to preempt the application of technical expertise in the design and management of transportation systems.

- 5) Raising transportation revenues through local tax measures creates clear incentives to support projects that produce local benefits while giving lower priority to projects within local jurisdictions for which benefits accrue largely to through-travelers. For example, in 2003, one of the factors resulting in the defeat of a local transportation sales tax measure in Northern Virginia was the argument that people would be taxing themselves to alleviate the impacts of congestion caused largely by heavy trucks passing through Northern Virginia on trips taking them between Atlanta and New York.

## Considering the Possibilities

Motor vehicle travel continues to grow even faster than the population. But even as the demand for roads continues to increase, the road system has expanded little in recent decades. The buying power of the principal source of revenues to operate, repair, and expand the road system—the motor fuels tax—continues to wane. Despite sometimes strong political support for increased spending on transportation, the fuel tax is unlikely to make a major comeback anytime soon. This is because popular and political unhappiness with unstable and seemingly ever higher fuel prices, political anxiety over increasing reliance on foreign oil, and growing concerns over the link between fossil fuel use and global warming make broad-based support for reestablishing substantially higher fuel tax levies as the mainstay of surface transportation finance unlikely.

Further, the central role of the federal government in surface transportation planning and finance is also faltering over time. For most of the 20th century, transportation (mostly highway) planning was the product of a close partnership between the federal government (first the Bureau of Public Roads and later the U.S. Department of Transportation) and the state departments of transportation. The federal government contributed expertise and funding in the form of matching grants to build, operate, and maintain projects favored by federal officials, while the states contributed local funding and were responsible for actually building,



*Newly constructed highway in Texas that was constructed by a Regional Mobility Authority and will use tolling to pay for it*

operating, and maintaining the systems. Over time, similar matching grant programs led to federal partnerships with metropolitan planning organizations and public transit agencies.

As the joint federal and state commitment to building the great Interstate Highway System has been replaced by a more scattershot program of highway system maintenance, limited capacity expansion, environmental mitigation, and alternative travel modes, federal transportation leadership has faltered. In each of the post-interstate transportation bills passed since 1990, the number of special funding categories has increased, while the number of earmarked projects has skyrocketed (to more than 6,300 in the 2005 legislation). Many of these projects would not survive the benefit-cost scrutiny to which program-funded projects are typically subjected. In addition, the “strings” attached to federal matching grants, in the form of procedural and environmental rules and regulations

have increased over the years, while the relative federal contributions of highway revenues and public transit subsidies have fallen. This, in no small part, has led to the rise of county transportation taxes and transportation agencies described above. So while the federal government remains today the central player in surface transportation planning and finance, the federal program is far less focused, and less compelling, than it once was.

We are thus in a difficult situation to be sure, but not an irresolvable one. There is a wide variety of public policies available that elected officials at the federal, state, and local levels can use to address the chronic cost-revenue squeeze in transportation finance. These include greater reliance on borrowing, shifts to alternative forms of user fees, such as electronic tolls or mileage-based charges, greater reliance on general taxes and fees that are not directly linked to the use of the transportation system, or some combination of these approaches.

Forging consensus on who should pay for transportation systems, and how they should pay, will be necessary to avoid a prolonged period of instability and crisis in American transportation finance.

*NOTE: My testimony was based on scholarly publications that in many cases were co-authored by my colleagues and with graduate students, whose contributions I gratefully acknowledge. In preparing this testimony, I drew heavily upon the following published and soon-to-be published works.*

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# The Return of Private Toll Roads

*Private concessions offer an alternative to managing American highways*

by Robert Poole and Peter Samuel, Reason Foundation

**I**n little more than 12 months, beginning in late 2004, the following events occurred: A Spanish toll road company proposed to invest \$7.2 billion to build the first leg of the Trans-Texas Corridor (TTC), a major highway, rail, and utility corridor running north-south from Oklahoma to Mexico. A global consortium agreed to pay \$1.8 billion to lease, toll, operate, and maintain the Chicago Skyway for 99 years. And an Australian toll road operator bought out a struggling public-private toll road in Virginia.

These events illustrate a growing trend in highway investment. The reality today is

that, increasingly, the public and private sectors are looking toward partnerships to build, operate, and maintain highway infrastructure in the United States.

During the 1980s and 1990s, investment in new highway capacity lagged considerably behind the growth in automobile travel and freight movement. In the future, improvements in the fuel efficiency of automobiles and the growing availability of alternative fuel sources will increasingly affect highway revenues from gas taxes. At the same time, public and political support for increasing fuel taxes, which have served as a traditional source of highway funding, was and continues to be weak.

Public Roads, March/April 2006

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In this environment, as federal, state, and local departments of transportation (DOTs) look for solutions to improve safety and mobility on the nation's roadways, global capital markets are just beginning to see the U.S. highway sector as a potential investment opportunity.

How the U.S. responds to these forces will help shape the country's highway system in the 21st century. What follows is an overview of the emerging rebirth of toll roads in the U.S. landscape and strategies for making the best use of this model through long-term concessions to private toll operators.

### THE CHALLENGE OF HIGHWAY INVESTMENT

“One key element of surface transportation, now and in the future, will be toll roads,” says Gary Hausdorfer, chief executive officer of Cofiroute USA, a private toll road company. “Neither state nor federal levels of highway funding are sufficient to keep pace with demand.”

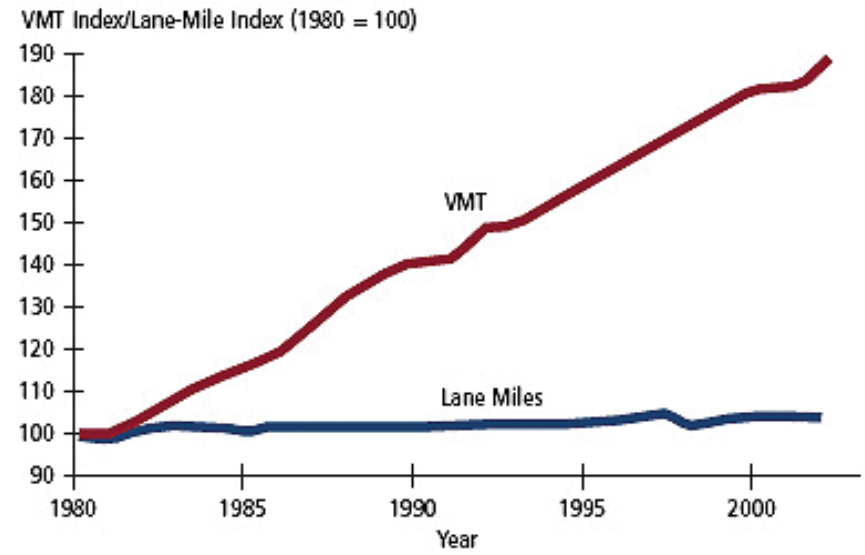
The most commonly used reference for assessing the adequacy of highway investment is the Federal Highway Administration's (FHWA) biennial Conditions & Performance Report to Congress. The 2002 edition reported that federal, state, and local capital investment in the nation's highway system in 2000 totaled \$64.6 billion. But based on projected increases in automobile and truck vehicle miles traveled (VMT), as estimated by the states, the annual

investment needed to maintain the asset value and expand the capacity of this tremendous resource was \$75.9 billion. In a no-growth society, bridging that \$11.3 billion annual gap might be enough to solve the highway investment challenge. But with the number of VMT increasing every year and truck VMT growing at an even faster rate, simply maintaining the existing system is not sufficient to address the nation's mobility needs.

FHWA analysts estimate that the nation could be investing \$106.9 billion per year if all potential improvements having a benefit-cost ratio of 1.0 or greater were made. This estimate points to a much larger gap of \$42.3 billion per year – or 65 percent more than the U.S. currently is investing. In The Bottom Line report, published in 2002, the American Association of State Highway and Transportation Officials (AASHTO) offered an even higher estimate of \$125.6 billion for improving the physical condition and performance characteristics of highways and bridges over 20 years. Both estimates send the same message: the nation is not investing enough in the system upon which both personal mobility and most freight movement are based.

The new Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) legislation has helped to increase federal investment in highways. But because the fuel taxes used for highway development and maintenance are not indexed for inflation or automobile fuel

### Vehicle Miles Traveled and Roadway Lane Miles Growth Index, 1980 to 2002



economy, today's federal-plus-state gas tax, in real (inflation-adjusted) terms, produces between 2 and 3 cents per mile driven (in light vehicles). That is about half of what the gas taxes of the 1960s and 1970s produced, when much of the interstate system and many core urban freeways were built. Many of the systems built during those decades now need major reconstruction, in addition to capacity expansion, but the resources are inadequate to complete the task.

As shown in this figure, VMT has far outpaced the addition of new lane miles of roadway in the United States since 1980.

From 1980 to 2000, while VMT grew by 82 percent, highway miles increased by just 4 percent. One symptom of rapidly growing VMT is that urban freeway systems are now choked with traffic. The 2005 edition of the annual Urban Mobility Report produced by the Texas Transportation Institute (TTI) estimates that it costs motorists \$63 billion per year in lost time and wasted fuel sitting in traffic congestion. Although some may argue that adding capacity is not the answer, each year TTI's data show that those few urban areas that added capacity to nearly keep pace with VMT growth have the least increase in congestion, while those that add little or no capacity suffer the most from congestion.

## A NEW MODEL: LONG-TERM CONCESSIONS

The three highway projects cited earlier are based on a model for highway finance, management, and operation known as the toll-funded, long-term concession. Under this approach, in exchange for the right to collect tolls for a long period (typically anywhere from 30 to 99 years), a private firm or consortium will design, finance, build (or rebuild), operate, and maintain a large-scale highway project.

In 18th-century Britain, the concept was used to develop hundreds of turnpikes in the pre-auto era. The U.S. imported the model, where it became the principal means of developing bridges and highways between towns and cities in the Eastern states, many of which still bear the name “turnpike” or “pike” 150 years after they collected their last tolls. And when the West was settled in the second half of the 19th century, again this model was used to develop important mining roads and intercity roads in California, Colorado, Nevada, and other states. The concession model also saw a limited revival in the early days of the automobile era, with the Long Island Motor Parkway (1908), the Ambassador Bridge in Detroit (1929), and the Detroit-Windsor Tunnel (1930) as prime examples. Most of the toll bridges on the upper Hudson and Delaware Rivers, on the Mississippi River, and in the San Francisco Bay Area, also were developed using this model. Some became insolvent during the Great Depression and were taken

over by state agencies. Others were bought up by state and bi-state agencies with the expectation that they would become toll free.

According to researchers at the Reason Foundation, several factors prevented the full-fledged development of a private toll road industry in the automobile era. First, the highly publicized scandals surrounding the New York Bridge Company and the frauds committed during construction of the Brooklyn Bridge in the 1870s gave toll bridge charters a bad reputation. Second was the invention of highway trust funds supported by dedicated motor fuel taxes. This form of highway funding proved highly effective and inexpensive to collect. The fuel tax was quickly adopted by every state, thanks to the Good Roads Movement in the late 1800s. Also, the invention of the state toll road agency provided a way to fund large-scale projects with toll revenue bonds, with the cost advantage of being able to issue the bonds at tax-exempt rates. The Pennsylvania Turnpike became the model for a host of other state, and later urban and regional, toll authorities that built and maintained some of America’s most important highways.

But Europe had neither highway trust funds nor tax-exempt bonds. So as the need for limited-access motorway networks became obvious after World War II, first France and then Italy, Spain, and Portugal rediscovered the toll-funded, long-term concession model. All four countries developed

their large, national motorway networks using this model. Many of the toll road companies started out as state-owned and retained majority state control, but in the last decade, most of them have been privatized. Thus, Western Europe today has a thriving private toll roads industry that has started investing in Latin America, the former Eastern Europe, and the United Kingdom.

One of the newer adherents to this model is Australia. Toll road companies operating under long-term concession agreements have developed and now operate nearly all of the urban expressway capacity added since the early 1990s in the country’s two largest cities, Melbourne and Sydney. Another major city, Brisbane, now seems to be moving in the same direction. Australia’s leading toll road firms also have gone global, acquiring ownership stakes in overseas toll roads and even developing toll road mutual funds aimed at long-term investors.

## WORKABLE FOR MAJOR PROJECTS

The long-term concession model appears to work well with large-scale highway, bridge, and tunnel projects for several reasons. First, these are precisely the kinds of projects that are the most difficult to develop using traditional highway funding. Amassing a large sum of money like \$2 billion for a single project in one location is both financially and politically challenging. But if the economics of the project “pencil out” (that is, there exists an unmet demand

## STEPS IN THE CONCESSION PROCESS

1. Select qualified, third-party legal and financial consultants to advise the state on all aspects of the process.
2. Appoint a qualified and respected selection and negotiating panel.
3. Publish a timetable for the selection process.
4. Prepare informational materials on the history and present state of the facility.
5. Commission a professional traffic and revenue study.
6. Release a formal request for expressions of interest to potential proposers.
7. Release informational materials to potential proposers and the public.
8. Release the results of the traffic and revenue study to the public, although independent assessments by bidders are encouraged.
9. Issue a request for conceptual proposals and qualifications to potential proposers.
10. Select the best three to five potential proposers (short list) and formally ask them for detailed proposals.
11. Review proposals by selection panel.
12. Negotiate with best proposer, holding others in reserve.

and a willingness to pay), then the capital can be raised in exchange for a suitable, long-term right to toll.

Second, it is megaprojects that pose the greatest risks of cost overruns, schedule slippage, and traffic shortfalls under public ownership. With a properly structured long-term concession, these risks can be shifted to the private sector. Because the flow of toll revenues depends on the project getting finished on time (or early), the concessionaire has a powerful incentive to ensure that its design-build contractor delivers the project on schedule. And with a financing structure in place, based on acceptable estimates of what drivers are willing to pay, it is crucial to keep project costs within budget so toll revenues will cover operating and debt-service costs.

In this model, the concessionaire also does not have an incentive to cut corners on design or construction, because it will have to operate and maintain the project for the life of the concession. The minimum in construction standards might decrease short-term development costs, but would likely increase long-term operating and maintenance costs.

Innovation is a third reason for looking to this kind of long-term, public-private partnership. Private firms appear more willing than public agencies to take risks and “think outside the box” to solve difficult problems. For example, it was a private company operating under California’s pilot program for long-term concessions that invented the

value-priced, congestion-relief tollway. California’s 91 Express Lanes in Orange County, which are located in the median of State Route 91 (S.R. 91), rely on an electronic toll-collection system with a variable toll based on both the time of day and day of the week to achieve a smoother traffic flow.

*“... [Because] no one wants to propose additional taxes of any kind, road charging and public-private partnerships become the alternative.”*

*- Gary Hausdorfer  
CEO, Cofiroute USA*

In France, a private toll road company (whose U.S. subsidiary was a major shareholder in the company that developed and now operates California’s 91 Express Lanes) resolved a 30-year impasse in completing the missing link on the A86 Paris ring road by developing it as a congestion-priced, deep-bore tunnel beneath (rather than through) historic Versailles.

And in Melbourne, Australia, a private toll road company linked three existing freeways into a network, using a combination of tunnels and elevated construction (with a “sound tube,” similar in function to a “sound wall” in the U.S., except in the shape of a cylinder, to minimize noise) through dense urban areas.

“Sooner or later, more and more transportation officials will embrace



*State Route 91 in California*

congestion pricing,” says Cofiroute USA’s Hausdorfer. “Why? To encourage fewer cars on the road. Whether it is higher tolls at peak hours or general road charging, the commuting public will come face to face with a very different form of public policy. [Because] no one wants to propose additional taxes of any kind, road charging and public-private partnerships become the alternative.”

In Ontario, Canada, the concession agreement for the 407 Express Toll Route (407 ETR) set a number of policy objectives that needed to be met. According

to Imad Nassereddine, vice president for traffic operations and planning at 407 ETR Concession Company Ltd., the main objectives included: operating the 407 ETR as an open-access, all-electronic toll collection system; requiring the concessionaire to adhere to provincial safety and environmental standards in the design, construction, and operation of the highway; and providing congestion relief to the alternative public highways. To relieve congestion, a separate tolling agreement was established whereby the road users’ willingness to pay would directly affect the setting of toll rates.

“Research . . . [shows] that customers mainly value three factors in their decision to use the toll highway,” Nassereddine says. “These include the time savings achieved, the reliability and convenience of the trip, and safety of the highway.”

## CAPTURING INNOVATION

The long-term concession model can be applied to developing new capacity as well as taking over and modernizing existing toll roads. The arguments for enlisting investors rather than following the traditional U.S. model of a public toll authority are twofold. First, many public toll facilities are fully borrowed (that is, they are unable to sell additional bonds), making them unable to take on major new projects. Second, during the

competitive bidding process, private investment groups sometimes devise innovative approaches to adding new capacity, potentially bringing to the table new ideas that the public sector had not considered.

In Southern California, for example, inspiration from the private sector led to the notion of having variably priced express lanes in the middle of the Riverside Freeway. It took a law (AB 680) inviting investor proposals to produce the idea for the 91 Express Lanes. “It is doubtful whether a public agency could have implemented such a radical, untried scheme, in addition to carrying out the intense marketing and customer relations needed to get it to work,” says Carl B. Williams, former director of the Office of Public-



Virginia drivers on HOV lanes

Private Partnership at the California Department of Transportation. “It was a risky project, and public agencies do not tend to reward risk taking, at least not to the extent that the private sector can with stock options and bonuses for those who succeed and dismissal for those who fail.”

Similarly, the toll lanes currently being negotiated for use on the Washington (D.C.) Beltway (Interstate 495) in northern Virginia rescued a traditional Virginia Department of Transportation (VDOT) widening project that was collapsing under a barrage of local opposition. Under the Virginia Public-Private Transportation Act, a private company proposed a widening scheme that would almost eliminate the need to acquire extra right-of-way (and thereby remove hundreds of homes), which reduced the project cost from about \$3 billion to about \$1 billion. This alternative approach transformed the political situation.

The original VDOT proposal was more standard, featuring barriers separating the toll lanes, four sets of breakdown shoulder lanes, and high-speed ramps at all the interchanges. The private company proposed the same widening scheme—from 8 travel lanes to 12—but eliminated a pair of breakdown lanes. The company also proposed deferring some interchange improvements.

VDOT and the private company are working to incorporate some of VDOT’s planned interchange improvements into

the scheme. And to ensure that enough funding will be available to cover the additional work, an Australian toll road company agreed to commit more than \$100 million in “patient capital” (a long-term equity investment that does not need to earn a return during the early years when toll revenues are hardest to predict). This example shows how the private sector can bring both ideas and capital to a project.

## Virginia

Other unsolicited proposals are in various stages of consideration in Virginia. Two groups proposed major enhancements to the two-lane, reversible, high-occupancy vehicle (HOV) facility including the Shirley Highway (Interstate 395) and Interstate 95 from the Beltway to the Fredericksburg area, about 64 kilometers (40 miles) south of Washington, D.C. In December 2005, the VDOT commissioner selected one firm for VDOT to negotiate an agreement with in order to further develop the high-occupancy toll (HOT) lane concept. The selected proposal suggests converting the facility to HOT lanes by adding a third lane to about 45 kilometers (28 miles) of the existing two-lane, reversible facility, extending the facility southward about 32 kilometers (20 miles). Other enhancements would include installing new entry and access points and ramps at the Springfield Interchange and other locations and improving park-and-ride and bus facilities. Negotiations are underway between VDOT and the private sector partner, but innovative aspects under consideration are

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substantial private sector investments and a possible concession arrangement.

In 2002, VDOT solicited proposals for upgrading the 523-kilometer (325-mile) Interstate 81 corridor, an overstressed four-lane interstate with heavy truck traffic both ways. After an extensive review process and touring I-81, Commissioner Philip Shucet directed VDOT to enter negotiations with a private company selected as the potential operator of I-81 corridors. Negotiations are still under way toward a comprehensive agreement.

Concurrent with the review of private proposals, VDOT has been conducting the National Environmental Policy Act study on the entire length of the corridor. The study will serve as a basis for making an informed decision before proceeding with any design and construction improvements.

The private sector proposal considers innovative financing mechanisms, such as truck tolling and Transportation Infrastructure Finance and Innovation Act (TIFIA) loans, along with traditional formula funding from gasoline tax sources. The scale of the anticipated improvements proves that innovative financing tools could represent more than just a supplement to traditional formula funds.

### California

Southern California is another area with potential for new toll projects and private sector innovations. A major new

toll road, the South Bay Expressway (S.R. 125 South), is being constructed under a long-term concession held by a private company based in Chula Vista, California. The \$635 million toll road, due to open in late 2006, is 15 kilometers (9.3 miles) long and will serve the rapidly developing communities on the eastern fringe of the area and provide a new connection to the Otay Mesa border crossing to Mexico.

Currently the company is negotiating with the California Department of Transportation and local agencies for a 10-year extension of the concession, from 35 to 45 years. In exchange for the extended concession, the company proposes covering the cost of adding a single HOV lane in each direction on the I-805 freeway within the franchise zone.

“The South Bay Expressway, or S.R. 125 South, as it was formerly known, has been a line on the map since 1959,” says Greg Hulsizer, chief executive officer of California Transportation Ventures, Inc., the owner/operator of the South Bay Expressway. “It wasn’t a regional priority for funding, and there likely wouldn’t have been funding for a long time into the future. So the use of the private concession model is bringing this new transportation alternative to life. It would have been literally decades before it would ever be funded with public funds.”

At least four tolled megaprojects are being considered in the Los Angeles,

California area. As an alternative to a contentious 9.6-kilometer (6-mile) surface road, for example, transportation officials are considering building an 8-kilometer (5-mile) tunnel that would serve as the missing link in the Interstate 710 (I-710) freeway in South Pasadena.

Further north in Glendale, local officials, including the Los Angeles County Board of Supervisors, the city of Palmdale, and the Southern California Association of Governments, are considering a proposal to tunnel under the mountains of Angeles National Forest to improve the connection to Palmdale. The facility would cut 45 minutes off the trip over the mountains. With tunnels measuring 17.4 kilometers (10.8 miles) and 7.6 kilometers (4.7 miles) plus about 8 kilometers (5 miles) at grade, the project is estimated to cost less than a surface highway – a reflection not only of the challenges inherent in building a road through such rugged topography, but also of improvements in tunneling technology.

A third tunneling project, under consideration by the Orange County Transportation Authority and the Riverside County Transportation Commission, would link the Foothill/Eastern Toll Road in Orange County to Interstate 15 (I-15) in Riverside County to provide an alternative to the S.R. 91 Riverside Freeway and the winding S.R. 74 Ortega Highway through the mountains of Cleveland National Forest. This tunnel would be about 22.5 kilometers (14 miles) long.

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***... in Texas, the primary focus is not on privatizing the existing regional toll authorities, but instead on seeking investor involvement in concessions for new roads to address soaring traffic growth.***

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A non-tunnel project would add truck lane capacity in the corridor following the I-710 freeway from the ports of Los Angeles/Long Beach to intermodal yards, then eastbound along the S.R. 60 Pomona Freeway. Truck volumes in this area are among the highest in the country because of a heavy concentration of truck-related businesses. The project would connect the growing array of warehousing and logistics businesses in Riverside and San Bernardino Counties and then go north along I-15 toward Nevada. With Mountain State-style triple trailer rigs and other longer combinations operating behind jersey barriers, such truck lanes could improve mobility and safety in the regional transportation network. The enhanced productivity of managed truck lanes, totaling some 117 kilometers (73 miles) in urban areas and 277 kilometers (172 miles) to the Nevada state line, would provide the basis for toll financing.

California Governor Arnold Schwarzenegger’s administration is supporting a bill to facilitate concession agreements, which are envisioned to be open for negotiation for investors, nonprofits, and public toll agencies alike.

## Indiana

Indiana is also pursuing the concession model. In September 2005, Governor Mitch Daniels announced that his administration would seek investor proposals for a long-term concession to take over the Indiana Toll Road. In January 2006, Daniels announced the winning bid: a joint venture by toll road companies from Spain and Australia bid \$3.85 billion for the 75-year concession. Daniels also announced that 228 kilometers (142 miles) of the planned Interstate 69 southwest of Indianapolis will be built as a toll road and that the state will seek investor proposals to build and operate the facility as a concession.

“The Indiana Toll Road is an economic engine for northern Indiana,” says Indiana Department of Transportation Commissioner Tom Sharp. “For 50 years it has served as a vital east-west link in facilitating the movement of commerce across the United States.”

He continues, “Grants and no-interest loans generated from Indiana Toll Road revenues assist local communities with transportation improvements at little or no cost. The latest grants are being used to upgrade and integrate air and rail transportation systems for passengers and freight. The Indiana Toll Road is a successful model [that] Indiana plans to use for future toll highway projects.”

## CONCESSIONS ON EXISTING AND NEW FACILITIES

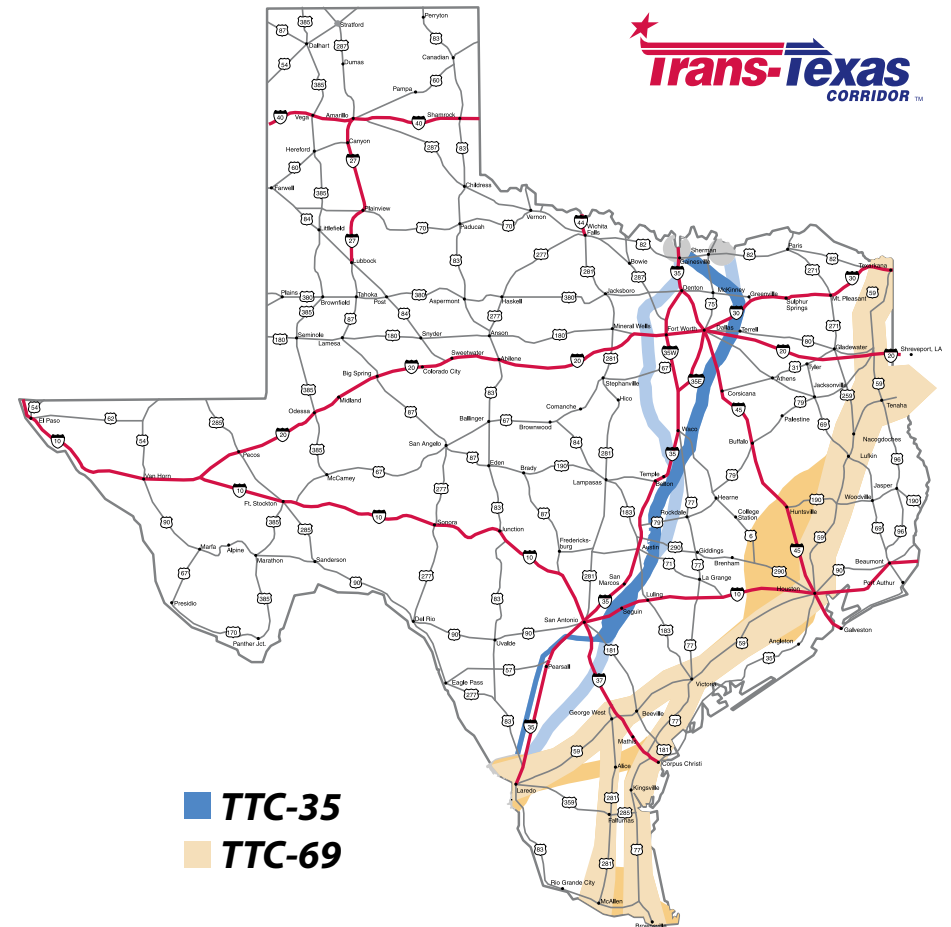
Although the concession model may be

applied equally to existing toll facilities and to new ones, the distinction is not clear-cut. Many existing toll facilities need considerable investment. According to the proposed concession agreement, the Indiana Toll Road (now operated by a state toll authority), for example, could be improved by widening its western commuter section, modernizing its toll system, and repaving.

In considering a long-term lease for the state-operated New Jersey Turnpike, New Jersey would likely make extension of the dual-dual (dual roadways in both directions) roadways south of Interchange (IC) 8A a condition. The state already announced that it wants to widen the existing six lanes that extend some 32 kilometers (20 miles) from IC-8A to IC-6 to four roadways of three lanes.

By contrast, in Texas, the primary focus is not on privatizing the existing regional toll authorities, but instead on seeking investor involvement in concessions for new roads to address soaring traffic growth. In addition to embarking on the TTC project noted earlier, the Texas Department of Transportation now requires that all major new projects forwarded from its regional offices be assessed for toll feasibility.

Further, Texas defines the term “comprehensive development agreement” (CDA) as including both the traditional public toll authority model and the concession model. The Central Texas Turnpike Project, covering some 105 kilometers (65 miles) of toll roads



under construction in the Austin area—including State Highway (SH) 130, SH-45 North, and Loop 1—is being constructed under a CDA that covers design, build, and operations but excludes financing. The exclusion of financing and the fact that the toll revenues will go to the state make it a public authority toll road.

The first TTC project (TTC-35)

may mark the start of using the full-fledged concession model. The winning proposal for the first TTC-35 project involves a 50-year concession. (For more information, see “Trans-Texas Corridor” in the July/August 2005 issue of Public Roads.)

In Colorado and Georgia, state legislation allows private toll roads to operate along with two major state toll facilities,

E-470 and GA-400 respectively. There, the concession model would be used almost exclusively to build new toll roads. In North Carolina, where no toll facilities currently exist, the North Carolina Turnpike Authority is considering a concession for the Mid-Currituck Bridge, a proposed new multilane facility connecting U.S. 158/NC-168 at Barco, N.C. on the mainland to Corolla, N.C. on the Outer Banks.

### WHY SELL OR LEASE AN EXISTING TOLL ROAD?

When Chicago leased the Skyway for 99 years for \$1.8 billion, the city earned

a substantial return on the arrangement. In fact, according to a city press release, the mayor plans to set aside \$875 million to establish a \$500 million long-term reserve fund and a \$375 million mid-term annuity the city can use to smooth the effects of economic cycles and stabilize the need for additional revenues. Further, the city plans to use \$463 million of the proceeds to retire existing Skyway debt and \$392 million to pay off other existing city obligations.

By contrast, in 2002, the city earned a profit of approximately \$8.4 million from Skyway tolls, which is a return of a



*Rendering of one possible concept design for the Trans-Texas Corridor*

mere 0.4 percent on the capital value of \$1.8 billion as revealed by the successful concession bid. Therefore, one way to determine if taxpayers would be better off holding onto a toll road or selling it is to compare the relative rates of return.

A second consideration in deciding whether to lease an existing toll road is how the proceeds will be used. If the proceeds are dedicated to other needed infrastructure investments for which the government would otherwise have to borrow, the transaction is more likely to be viewed by the public in a positive light. For example, nearly one-third of the proceeds from the concession of the Indiana Toll Road (or roughly \$1.35 billion) are earmarked for the counties of Lake and Porter and the five remaining counties that surround the toll road.

All of this presumes that the state can find a buyer experienced in owning and operating toll roads, with the capabilities needed to manage such an asset and deliver quality service to its customers. It also presumes that adequate protections for the public interest, such as adherence to proper maintenance standards and avoidance of monopolistic pricing, can be included in the terms of the concession agreement.

### WHY USE CONCESSIONS ON A NEW TOLL ROAD?

Choosing to use concessions on a new toll road offers a number of potential benefits. As noted earlier, one benefit is the private sector's ability to be innovative and think outside the box

in coming up with creative solutions to difficult problems. Second, funding a large project all at once can facilitate completing the project and delivering its benefits to the public years, or even decades, sooner than with traditional procurement methods. But the latter benefit would also be available using public toll authorities. What else does the private sector bring to the table? A more robust financing approach is one feature.

As illustrated by the Washington Beltway express toll lanes example, conventional all-debt financing fell short of what was needed by \$200 million. But because equity (rather than assets for collateral) is patient capital, investors are willing to wait longer for a larger return. The concession approach made it possible to finance a larger and more serviceable project. A mix of equity and debt also is less vulnerable to default in the early years of a new toll road, when traffic may be less than what was forecast. With a project 100 percent funded by debt, the debt-service burden that must be met by toll revenues is higher than if only, say, 65 percent of the project is funded with debt that must be serviced like clockwork in those critical early years.

Another advantage is risk transfer. In a long-term concession, the company or consortium takes on the risks of cost overruns and inadequate traffic, relieving the state and its taxpayers of the burden. This is especially important on megaprojects, where those risks are larger in magnitude.

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## TO TOLL OR NOT TO TOLL

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The long-term concession represents a major new approach to providing and managing highway infrastructure. Some in the transportation community will welcome the opportunity to breathe new life into 20th century institutions. Others may approach the concept reluctantly or do so out of financial necessity. What seems clear, however, is that in a changing world, stepping beyond highway “business as usual” can open doors to improving the delivery and operation of the nation’s surface transportation system.

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*Peter Samuel is a journalist who has specialized in toll roads issues for the past 10 years. He produces TOLLROADS news, a Web-based news service and has authored or coauthored policy reports on toll roads issues. He is a senior fellow with the Reason Foundation.*

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## TIPS FOR PLANNING LONG-TERM CONCESSIONS

- 1** Pay for professional advice. Dealing with global companies requires the state to have legal and financial expertise on its side of the table, with comparable experience in long-term toll concession agreements. If such expertise does not exist in-house, the state should be prepared to pay for it in the marketplace.
- 2** Ensure an open process. The more open the process, the better, except that there will always be a need for some temporary confidentiality. For example, bids should be sealed so the bidders offer what they are prepared to pay, not just enough to beat the next bidder. Also consider allowing proposers to keep some of their ideas confidential until all proposals are submitted. At the same time, the public needs to be assured that the selection process is fair, so confidentiality should be kept to a minimum and be maintained only as long as essential.
- 3** Protect road users from monopoly. To a certain extent, concessioned toll roads represent a new form of public utility in the U.S., bearing at least some characteristics of a monopoly. Accordingly, it may be necessary to regulate either the toll rates charged or the overall rate of return that can be earned under the agreement to protect the public. Generally, these provisions are best incorporated into the concession agreement, to be enforced by the state DOT, rather than subjecting the toll road company to regulation by a public utility commission unfamiliar with toll roads. In addition, so-called “non-compete clauses,” which limit the degree to which the state can build parallel non-tolled roads, must be used judiciously, as it is extremely difficult to predict potential needs 40 to 100 years into the future.
- 4** Provide for future modifications. A 35-, 50-, or 99-year concession term is a long time. No one knows what the world will be like in 20 years, let alone 50. So it makes sense to spell out in the agreement procedures for dealing with future needs, such as major additions to the toll road or allowances for a future administration to buy it back before the end of the agreement. The more the risk of unknowns can be minimized through such provisions, the better the deal that the state will be able to secure.



# Mobility: All Roads Lead to Texas

*Keynote Address presented to the Texas Transportation Forum  
June 8, 2006 – Austin, Texas*

by Joseph M. Giglio, Ph.D., Hudson Institute

**I**t is particularly appropriate to be in the state capital of Texas to celebrate the 50th anniversary of the Interstate Highway System. This system represents a triumph of the past and is one of the wonders of the modern world, while Texas represents the bright promise of the future and a challenge to all of us to build on the success of the Interstate Highway System.

Back in the mid-1950s, when the federal government was gearing up to build the Interstate Highway System, President Eisenhower called upon his old Army buddy, General Lucius Clay, to head a commission to recommend the best way to finance it. The Clay Commission reported back that interstate highways

should be built as toll roads, using toll revenues to cover operations and maintenance costs, as well as debt service on self-liquidating Treasury bonds that were issued to fund the construction.

Does this idea sound familiar? Of course it does. It is one of the core approaches adopted by the Texas Department of Transportation to meet its future surface transportation needs in an economically sound and businesslike manner. The motorist should pay for access to highways in accordance with how many miles are traveled, just as he/she pays for access to seats in a movie theater to see the latest Hollywood blockbuster.

To be accepted by motorists, however, it may be necessary to offer them money-

back performance guarantees in the form of trip time savings. Highways must clearly link their prices to a certain minimum average traffic speed to assure drivers that they are getting the speedier travel times and other service benefits that they paid for. If the average speed falls below the set minimum for any reason, motorists will be charged progressively less. Such performance guarantees would have a dual effect. First, they would enable motorists to make meaningful trade-offs between the value they place on travel time savings for each trip and the price they pay to use highway lanes. Second, performance guarantees would provide incentives for highway operators to intensify their focus on providing better service to their customers because service and toll revenues are directly related.

As it happened, the 1950s-era Congress opted for a “pay-as-you-build” financing approach rather than tolls when it wrote the authorizing legislation for the Interstate Highway System. This legislation levied a tax on motor vehicle fuels to provide a funding source for the construction and maintenance of these new highways and it also created the Highway Trust Fund as the repository for these tax revenues.

But as the decades passed, the buying power of these fuel taxes shrank because their rates were not indexed to reflect cost inflation. Today, fuel tax revenues buy only about half as much construction as they did in the 1960s and 1970s. And as we all are aware, the air is leaking out of the Highway Trust Fund.

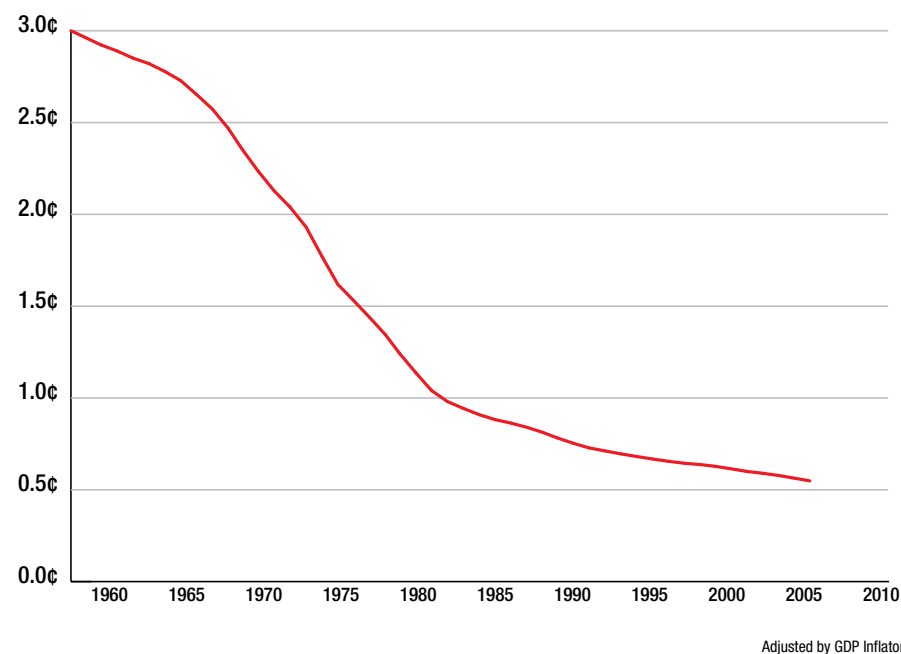
At the same time, traffic volumes on interstates and other roads have been growing as the national economy expands. Between 1980 and today, vehicle miles traveled (VMTs) on the nation’s roadways have virtually doubled while total roadway lane miles have scarcely increased at all. A rising proportion of these existing lane miles are currently worn out and badly in need of repair.

***Today, fuel tax revenues buy only about half as much construction as they did in the 1960s and 1970s.***

Needless to say, this has led to a rising chorus of national hand-wringing about the plight of the American surface transportation system and the dangers it poses to continued economic growth. The discussion is accompanied by dramatic estimates of the enormous sums of money that would have to be spent over the next decade (or two or three) to restore and expand the nation’s roadways, but there is little practical discussion about where this money would come from. Indeed, trying to explain the dimensions of these numbers to the uninitiated is like trying to explain psychology to someone who has never met a human being.

It certainly will not come from the federal government, whose projected levels of budget deficits leave it powerless to address many important national problems.

**Loss of Buying Power of the Original 1957 Federal Fuel Tax**



A February 2006 report from The Brookings Institution places the long-term federal budget deficit at nearly 11 percent of Gross Domestic Product (GDP) during the lifetime of our children. Eliminating this deficit is estimated to require either a 43 percent reduction in federal spending or a 45 percent increase in tax revenues. Actions of this magnitude are too frightening for Congress and the White House to even think about, so both continue to hide behind the usual budgetary smoke and mirrors. The longer the federal government avoids facing up to this problem, however, the more drastic its corrective actions will have to be.

This crisis is further compounded by some looming needs that will be very expensive to meet. The most important of these is the growing likelihood that the federal government will have to take over the entire private pension system, whose dollar magnitude dwarfs that of Social Security and whose management inefficiencies have left it increasingly unable to meet its commitments to the nation’s senior citizens. That is why so many large corporations in the steel, air transportation, automobile manufacturing, and other backbone industries have been falling all over themselves to get out of the private pension business, even to the extent of seeking refuge within Chapter 11 bankruptcy laws.

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***By demonstrating the viability of its new solutions to transportation funding, Texas can go a long way toward bringing an end to “ivory tower” debates about what approach is better in the abstract.***

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The growing number of retirees in America translates into political clout that will make it impossible to sidestep this problem. Retirees will increasingly demand that after a lifetime of hard work, their “fair share” of the national GDP be used to protect their standard of living. Retirement groups’ growing ability to make or break political careers in Washington means that Congress will have to regard meeting retirees’ as one of its highest priorities.

These examples of “cold shower” reality underscore why we cannot and should not expect the federal government to take the lead in funding badly-needed investment in transportation, regardless of its importance to future economic growth. We will have to increasingly depend on the states to find imaginative ways to supplement fuel taxes by harnessing new resources, including those of the private sector.

With its growing population and expanding economy, Texas has taken these challenges seriously by beginning to develop practical solutions to the transportation funding issue. And thanks to the National Security Agency, the rest of the country now knows about

this work.

One of these solutions is the adoption of the Clay Commission’s concept of supporting roadways directly through motorist user charges. Texas has taken this concept, however, and further expanded it. Rather than only allowing private firms to act as suppliers of contract services, Texas has enabled them to become owners and operators of roadways in partnership with government.

These efforts certainly bode well for both the future of Texas and the future of surface transportation throughout the United States. By demonstrating the viability of its new solutions to transportation funding, Texas can go a long way toward bringing an end to “ivory tower” debates about what approach is better in the abstract. There is no substitute for a sense of practical reality when it comes to making serious policy decisions about our national transportation future.

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**THE ALLEGED MAGIC OF FREE MARKET PRICING**

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Those of you who took economics courses in college may recall the simple-minded diagrams that your professors chalked on the blackboard to illustrate how the free market sorts out the complex interactions between supply and demand. The seemingly unerring ability of the marketplace to come up with the right price to fairly allocate the supply of scarce goods and services has a certain breathtaking magic about it. This

leaves us, however, with the impression that the marketplace must have been the brilliant invention of some highly sophisticated economists who liked to nibble on differential equations between meals.

The reality of the marketplace is much different. It is a natural outgrowth of the restless human instinct to trade goods back-and-forth amongst ourselves. This instinct is hardwired into our DNA at least as strongly as the instinct to reproduce. It bursts forth like an aggressive sunflower in every social setting where human beings congregate.

We even saw it happen in German prisoner-of-war camps during World War II, where Allied POWs actively traded the contents of their twice-monthly Red Cross packages, using cigarettes as the common currency to grease the process. We see it happening today in the open-air stalls lining Canal Street in Manhattan’s Chinatown. Tourists and stall operators alike, using cheap electronic calculators to bridge the language barrier, haggle for the best prices on Chinese-made reproductions of upscale wristwatches, high-fashion perfumes, and Mont Blanc writing pens.

These natural marketplaces exist everywhere. When governments attempt to stamp them out in the name of greater social respectability or to protect the interests of more established and politically connected business firms, they simply move underground, much like the marketplaces for illegal narcotics.

The irrepressible vitality of these natural marketplaces has led many economic theorists to argue that unregulated free market capitalism is the only sensible way to allocate the supply of scarce goods and services among those who want them, or simply put, “let the marketplace decide.” This includes parceling out access to scarce roadway lane space according to how much each motorist is willing to pay.

Today’s technology allows us to do this without subjecting motorists to the hassles of stop-and-go toll plazas and fumbling for change. In theory, we could even let motorists bid up the price of toll road access during high-demand periods to whatever level reduces aggregate demand sufficiently to ensure average traffic speeds of 55 mph, 40 mph, or whatever speed we wish.

The resulting free market prices for roadway access would supposedly signal roadway operators about how much lane space to supply and if these operators are private business firms competing for profits, the end result would be an optimal supply of roadway lane space based on what motorists are actually willing to pay. What could be more rational in terms of maximizing the public interest?

Of course, critics of these theories like to remind us that most markets do not work that way in the real world. First, there is the issue of economies of scale. In many cases, the unit cost of supplying



goods or services, like roadway lane space, depends on the size of the supplier. Large suppliers tend to be more cost-efficient than small suppliers, so they can use temporary price-cuts to drive small suppliers out of business. As critics never tire of pointing out, economic history has repeatedly demonstrated that the end result is a small number of large suppliers left to dominate a marketplace, administering prices with quasi-monopolistic power.

This result violates one of the basic requirements of a truly free market—a large enough number of suppliers so that none has a market share great enough to set prices on its own. This protection exists to insulate the market from those who manage large monopolies, whose natural instinct is to maximize profits by raising prices without regard for the larger needs of society. The potentially harmful impact this could have on the supply of roadway lane space is enough to undercut the free market argument for allowing private firms to own and operate roadways unregulated.

A second problem with a free market approach is the distinction between discretionary goods and essential goods. Many economists refuse to recognize this distinction as they wander around in their “fairylane” world of perfectly competitive markets where all buy-and-sell transactions involve only discretionary goods. Free markets work best when all buyers and all sellers can equally reject transactions if the market price does not suit them. Our recent

experience with rising gasoline prices reminds us, however, that there are a great many goods and services in the real world that are anything but discretionary. Those who depend on their automobiles to travel to work or their trucks to move their goods to market know all too well that motor vehicle fuel is an essential, not a discretionary, good.

The American commitment to free market capitalism often seems little more than skin deep. We embrace it wholeheartedly when it provides us with the goods and services we want at reasonable prices. We even sit still for regular price hikes in discretionary goods like movie tickets because we have the option to stay home instead and watch television while we wait for a new film’s DVD release at our local video rental store.

But when we have to confront large price hikes for an essential good like motor vehicle fuel, all bets are off. We nod with approval at dark mutterings about “conspiracies” by the monopolistic private oil companies to rig prices. We respond eagerly to elected politicians who talk about imposing price controls on motor vehicle fuels, or taxing away the “unconscionable profits” of the oil companies and returning the proceeds to the average motorist.

This does not mean that we are, at heart, a nation of closet socialists. Rather, it means that we recognize that the marketplaces for both essential and discretionary goods and services

***Like motor vehicle fuel, roadway lane space is an essential good. Therefore, its supply must reflect the larger transportation needs of society as a whole, not just the profit-maximizing goals of private toll road operators.***

are distinct from each other and must observe different rules. Like motor vehicle fuel, roadway lane space is an essential good. Therefore, its supply must reflect the larger transportation needs of society as a whole, not just the profit-maximizing goals of private toll road operators. As every successful businessman instinctively knows, one of the surest pathways to higher profits is to provide the customer with as little as you can get away with while charging him the highest price that the traffic will bear. Of course, the government is always looking for something for nothing.

As author and playwright George Bernard Shaw is rumored to have observed, both capitalism and religion have a long history of bringing out the worst in people. Be that as it may, the offsetting social benefits of both are too great for us to consider abolishing either one. Instead, we must find ways to artfully manage them, incentivize them, lead them gently by the nose, and generally hoodwink them into enhancing their advantages to society while diminishing their disadvantages. That is why it is wrong-headed to dismiss the concept of private toll roads as unleashing the rapacious forces of

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capitalism on the hapless motorist. There are things we can do to exploit the benefits of marketplace pricing on behalf of society. The following example illustrates what I mean.

On May 22nd of this year, the federal Bureau of Labor Statistics released a report that tracked trends in U.S. consumer spending over the past century. One of the most striking trends it documented was the huge decline in the portion of income that the average American family spends on food—one of the most important essential goods. Between 1901 and 2003, the percentage of family income spent on food fell from 43 percent to just 13 percent.

Among the many factors that contributed to this dramatic decline during those years, one of the most significant was the improvement in technology. American

farmers are able to grow more food at less cost on fewer acres. But the downside for farm products in the free market of 1930s-era America was falling prices. The average farmer was pushed to the wall financially and growing food for the American public increasingly became a road to ruin for many of them.

At the time, the federal government responded by using tax dollars to subsidize American farmers by paying them the difference between the low free market prices for their produce and the prices they needed to receive to make decent livings by farming.

Back East, in urbanized blue states like the “People’s Republic of Massachusetts” where I happen to live, such farm subsidy programs would be regarded as outrageous examples of welfare run amok; about as ridiculous as having the



federal government buy poems from Boston’s longhaired poets who cannot sell them to *The New Yorker* magazine. But the fact remains that we still benefit from the low food prices that would be impossible without federal farm subsidies.

Making marketplaces work effectively to allocate the supply of essential goods may require some imaginative, even economically unorthodox, government action. But ideological orthodoxy scarcely matters in the real world. What matters is finding practical ways to make things work. This applies in spades to the whole issue of supplementing fuel tax revenues with roadway pricing to fund the modern and high-capacity transportation system that our economy demands.

### THE TRADITIONAL CONCESSION MODEL

In today’s climate, the most obvious and popular way to implement roadway pricing is to follow what has become known as the concession model. This approach involves a state or local government granting a private firm the right to operate a toll road as a profit-seeking business for a particular period of time. The toll road in question can be either an existing link that the government already owns or an entirely new road that the private firm will build as well as operate. Opening up important links of the nation’s roadway network to private operation in this manner may be the most practical way to generate the

immense amount of new capital needed to restore the condition of the roadway network and to expand its capacity at the same time.

At the moment, a popular variation of the concession model calls for a state or local government to lease an existing toll road that it owns to a private firm for an extended period of time. A widely cited example of this variation is the Chicago Skyway Toll Bridge (Skyway) deal. In early 2005, following a competitive bidding process between three parties, the City of Chicago granted a 99-year lease on its wholly-owned 7.8 mile toll road to a private consortium composed of the Spanish Cintra Concesiones de Infraestructuras de Transporte company (Cintra) and the Australian Macquarie Investment Holdings company (Macquarie) in return for an up-front cash payment of \$1.82 billion (that’s “B” as in “bonanza”). The terms of the lease obligate the Cintra-Macquarie consortium to invest some \$70 million over the next four years to modernize the Skyway, including the installation of electronic toll collection technology. At the same time, the consortium has the right to increase toll rates at regular intervals during the lease term according to a schedule that links toll rates to local inflation plus an attractive premium. The justification given for this example of contractually-blessed, quasi-monopolistic pricing power is that Skyway motorists can choose to pay a higher price for shorter trip times and other premium roadway services while still retaining the option to make lower-priority trips on



*Representatives from Zachry, Cintra, and TxDOT signing an agreement for the Trans-Texas Corridor*

paralleling toll-free local roads. The size of Chicago's cash windfall from the Skyway lease has caused this variation of the concession model to light up the eyes of many other state and local governments that also own toll roads. For example, the state of New Jersey is seeking to lease both of its high-volume toll roads—the New Jersey Turnpike and the Garden State Parkway—to one or more private firms to help bail out its cash-strapped state government. And the state of Indiana recently awarded a 75-year lease to a pair of offshore private firms for its Indiana Toll Road (that connects to the Chicago Skyway) for a cash price of \$3.85 billion.

But quite apart from the size of these

cash windfalls is how governments can use them. Again, the Chicago Skyway deal provides a useful example. According to Chicago's city government, the city plans to use \$463 million of its \$1.82 billion lease proceeds to retire existing municipal Skyway bonds. It also plans to use \$392 million to retire other city debt, \$500 million to add to its reserve funds, and \$375 million to establish a city government budget balancing annuity to ease future demands on general tax revenues. In effect, Chicago is removing much of the capital previously invested in the Skyway from the city's roadway system. It also raises the question—when is a toll a tax? In contrast, my old friend, Indiana Governor Mitch Daniels, has announced that he will use

all the proceeds from the Indiana Toll Road lease to fund a badly needed state roadway improvement program that has been stalled for lack of funds.

The temptation for states and local governments to follow Chicago's example and liquidate newly-acquired transportation capital and use it for other pressing demands is the greatest flaw in the concession model. Though it seems hard to resist, giving in to this temptation is scarcely sensible in view of the nation's need to increase, not decrease, its stock of transportation capital. This would be like a homeowner drawing down his home equity credit line to pay for a cruise to Alaska rather than replacing a leaky roof or an old heating system.

A second flaw in this Skyway variation is that the leased-out toll road effectively ceases to be part of the region's overall roadway system in a functional sense. To paraphrase the classic Roman Catholic adage about priests, the toll road may continue to be "in the region" physically, but it is no longer "of the region" from a planning perspective. The private firm holding the lease will have its own ideas about how much future capacity the road should provide and how it connects with the region's other roads. Inevitably, these ideas will be driven by the fact that the firm is a private business and its primary concern must therefore be the financial welfare of its owners. A state or local government may not have any meaningful input into these policy considerations.

A more sensible variation of the concession model is the one that Texas is pursuing. The Texas model involves having government grant to private firms the right to build and operate new toll roads in key transportation corridors. This grant requires the private firm to meet certain performance standards concerning lane capacity, toll rates, and connections with existing roads. This variation encourages the private sector to become a working partner with government in serving the needs of the public by modernizing and expanding the nation's roadway system.

The most dramatic example of the Texas model is the proposed Trans-Texas Corridor (TTC), which represents an entirely new, developmental approach to a multi-modal, 21st century transportation corridor. Plans for the TTC call for the following:

- It will be built by a partnership of private firms and the Texas government to accommodate future growth in the movement of people and goods along Interstate Highway 35, the state's high-demand north/south axis, where existing capacity is already fully saturated.
- It will incorporate the best concepts of 21st century transportation thinking, including providing separate, interstate-quality highway lanes for cars and trucks, new rail lines for safer and more efficient goods movement, and modern utility and

telecommunications links.

- Roadway tolls and other user charges paid by those who wish to purchase access to these facilities will financially support this entire project.

This model is obviously a far cry from the “cherry picking of low hanging fruit” approach taken when simply selling off an existing government toll road to the highest bidder for cash to be used for non-transportation purposes. Instead, the Texas model accomplishes three important goals:

1. Adding to the nation’s stock of transportation capital rather than diminishing it.
2. Creating badly needed new transportation capacity that is properly integrated with the existing network.
3. Harnessing the financial and management resources of the private sector to meet the needs of society in partnership with government.

## BUILDING ON THE TEXAS MODEL

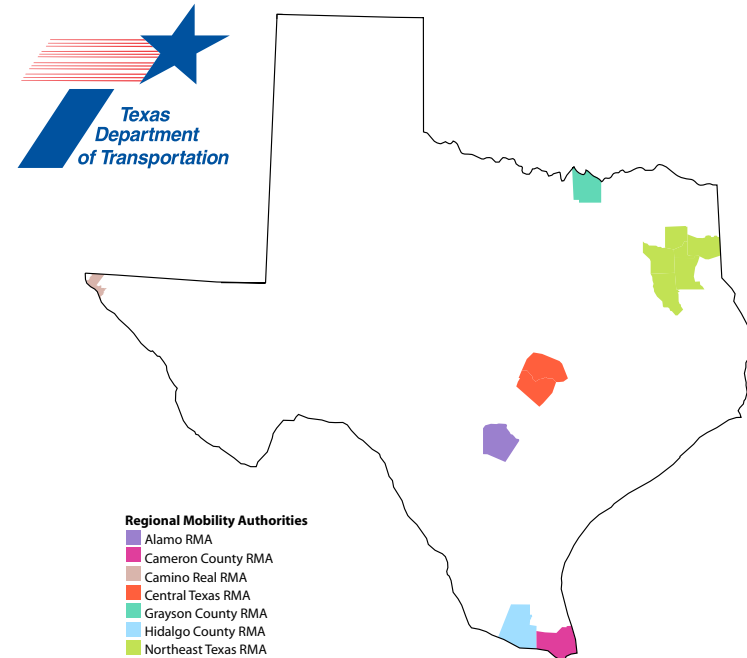
The Texas approach represents a brand new model for meeting our transportation needs. One of the most fascinating things about it is how it can stimulate creative thinkers in the transportation world to carry these concepts even farther. For example, a key feature of the Texas model is that it allows individual regions of the state to

establish their own Regional Mobility Authorities (RMAs) to deal with local transportation problems. This can even involve implementing tolls on some of their local roads to fund expansion. It does not require a great leap of the imagination to realize that with a little creative thinking or “salsa,” as I like to say, this Texas concept could produce some interesting possibilities with national implications.

For instance:

- A state or local government could have the option of establishing a new commercial entity in a particular region to take over ownership and management responsibilities for all of the region’s roadways.
- It could operate these essential systems as a coordinated, fully self-supporting transportation enterprise by implementing variable rate tolls on its high volume, limited-access highway links.

The most obvious candidate regions for such a roadway enterprise would likely be those centered in major urban areas like Houston, Dallas/Fort Worth, or even Boston, where traffic volumes are high and the economy is critically dependent on efficient roadway transportation. But this does not necessarily rule out low-density, rural corridors connecting metropolitan regions as potential candidates to extend the self-supporting roadway concept statewide. The crucial first step is to define the physical boundaries of a candidate region in such a manner that it includes



### *New Regional Mobility Authorities for addressing local transportation needs*

sufficient limited-access highway links for toll revenues to support the region’s secondary and local roads as well. This would remove funding responsibility for the region’s roadway system from hard-pressed state and local government budgets.

Unlike the traditional concession model, the Texas model with its RMAs points the way toward gradually weaning large chunks of the national roadway system from their current dependence on fuel taxes. It could also serve to generate a fresh source of transportation funds, supplementing fuel taxes through a market-based revenue structure built around economically sensible motorist

user charges.

Roadway enterprises like RMAs can be commercial corporations that operate in much the same way that they do in the standard concession model. They can support themselves by selling access to their highway lanes to motorists who seek travel time savings from superior roadway services yet still retain the option to make lower-priority trips on toll-free roadways.

A significant advantage of this quasi-private (as opposed to wholly public) status is the broader range of capital sources that would be available to the roadway corporation for reconstructing, modernizing, expanding, and otherwise

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enhancing the physical assets of their roadway systems. Among the most important of these sources is private equity from the roadway corporation's shareholders. This so-called "patient capital" is unavailable to conventional, state-owned toll road authorities and reduces the need for debt capital, providing additional financing flexibility that can mean savings on overall capital costs.

The private status of a roadway enterprise like an RMA also enables it to take full advantage of the benefits of new technology for enhanced traffic management, greater travel safety, and integrating motor vehicles into an effective travel information network. Although some of this technology is already available, more is just over the horizon, and it promises to radically change the transportation world. Its implementation will mean better service to motorists and should be brought online as soon as possible. For sure, we need to consider the implications of these new technologies for traditional toll agencies and even concessions, but I am obliged to disclose that I am a major advocate for open-road tolling. Please consider that if open-road tolling had existed on the Long Island Expressway, Sonny Corleone would be alive and still with us today.

Implementing this new technology successfully, however, requires an entrepreneurial approach to strategic planning. Government agencies, unfortunately, have the reputation of

being risk avoiders. Their managers may win promotions for saving money, but they do not receive stock options for taking entrepreneurial leaps that pay off. By contrast, the climate in which private entities operate encourages their managers to embrace risk and develop practical strategies for controlling it. This can mean that we enjoy the benefits of new technology sooner rather than later.

Inevitably, critics will insist that having governments establish such profit-seeking roadway enterprises could expose the public to some of the worst features of unbridled capitalism. Chief among these features is the inability to avoid placing financial goals ahead of community welfare. The fear is that this commercial reality will influence considerations of operating and pricing policies. If the owners are limited to private investors buying equity shares solely for annual dividends and future capital gains, so the argument goes, these considerations will inevitably lead to minimum service to motorists and maximum toll rates.

In this sense, such a roadway corporation would be no different from the private firms that are at the heart of the concession model. Any purely commercial instincts would have to be reined in by some form of government oversight. But to many people, this means the kind of bureaucratic, regulated utility approach that state governments have traditionally used in the past for private firms who were granted monopoly franchises to supply telephone and

electric power services.

But there may be better options. For example, there is no reason why a roadway corporation should be limited to a single ownership class of private investors. An obvious second class of owners would be the state and local governments that own the region's existing roads. Governments would turn these roads over to the corporation in exchange for equity shares rather than cash (as in the standard concession model). Apart from precluding any withdrawal of previously invested capital from the region's roadway system, this arrangement would give the roadway corporation a class of owners whose agendas are very different from those of purely profit-seeking private investors.

In crude terms, the leaders of state and local governments pursue votes rather than dollar profits. Their success depends on creating the perception that they are providing good services to the public at a minimum cost. In the context of the operating and pricing policies of a roadway corporation, this translates into pushing for high quality service to motorists while keeping toll rates as low as possible. At the board of directors' level, this provides the corporation with a useful countervailing influence to the profit-maximizing bias of the private investor class of owners. Ideally, policy debates between these two influences within the corporation's board will lead to healthy compromises that achieve decent service to motorists within the broad constraints of financial reality.

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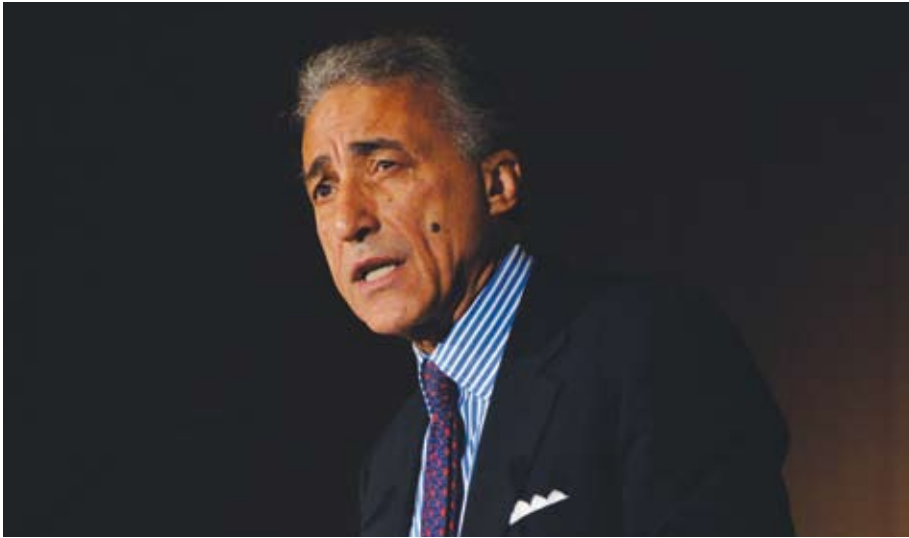
*... the climate in which private entities operate encourages their managers to embrace risk and develop practical strategies for controlling it.*

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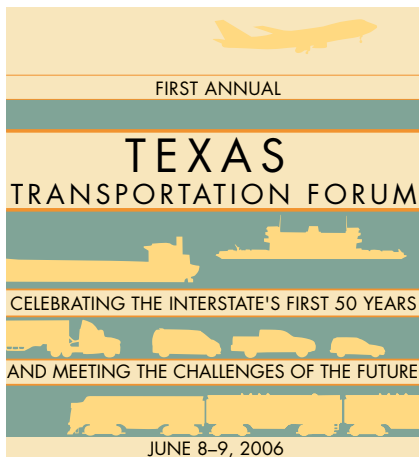
But in the real world, it can also pose the danger of policy stalemates. That is why the roadway corporation should have a third class of owners whose agendas make them a natural referee.

This third group would have a broader agenda than simply making money from its equity investments in the roadway corporation because its overall revenues would be closely linked to the region's level of economic activity. Potential candidates for this class would be a particular region's commercial banks, major utilities, large retail chains, trucking and other transportation logistics companies, and similar firms. These owners would have a direct financial stake in seeing that the corporation provides better transportation as a means of supporting healthier regional growth because it would translate into improved roadway services at prices that motorists regard as reasonable.

In other words, this third class of owners would see equity participation in the roadway corporation as a mechanism for leveraging greater profits from its main businesses through the growth of the region's economy. Therefore, its influence at the corporation's policy level would lie in the direction of striking a sensible balance between the service-maximizing



*Dr. Joseph M. Giglio delivering the keynote address at the Texas Transportation Forum*



goals of the government owner class and the profit-maximizing goals of the private investor class.

The different agendas of these three classes of owners would likely result in some spirited policy debates in meetings

of the roadway corporation's board of directors. This is exactly what is needed to develop operating and pricing policies that provide good service to motorists within the broad constraints of financial reality. Such debate might also eliminate the need for excessive, external regulation of the roadway corporation by government seeking to protect the public interest.

## CONCLUSIONS

Back in the 1960s, movie director Sergio Leone made a series of so-called "spaghetti westerns," starring Clint Eastwood. Each movie was about a small group of tough gunslingers that instinctively mistrusted each other. But they had to learn to work together in order to achieve a common goal, even if this meant always sleeping with one eye

*The important thing is that Texas finds practical ways to build the new transportation projects it needs and in the process, gives other states and the federal government workable examples of how transportation should be managed in the 21st century.*

open. After the usual macho snarling and bloodshed had played itself out, this arrangement turned out to be a surprisingly effective way to get the job done.

In the more genteel environment in Texas, we are likely to see some overtones of this spaghetti western tradition as work as innovative roadway projects are developed. There is the natural rivalry between the state and local governments for control of project planning and oversight. Both have a nagging distrust of the profit-seeking ambitions of private firms whose mouths water at the prospect of collecting toll road revenues, while private firms generally regard government as an endless swamp of bureaucratic delays, obstructions, indecisiveness, and always looking for something for nothing.

But too much is at stake for these entities to simply throw up their hands in frustration. They need each other and the rest of us need them. So we can expect to see lots of haggling and posturing as state and local governments and private firms circle each other warily. In the end, however, they will cobble together

compromises that may be different for each project but still manage to get the job done.

Will they be messy? Yes. Will they be time-consuming? Sure. But that is the way the real world works. Ideas are not born from a kind of "Immaculate Conception." To paraphrase the German philosopher Arthur Schopenhauer, every worthwhile idea goes through three phases: first, it is ridiculed; second, it is opposed; and finally, it is regarded as self-evident. The important thing is that Texas finds practical ways to build the new transportation projects it needs and in the process, gives other states and the federal government workable examples of how transportation should be managed in the 21st century. We will travel by the light of your work.

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# Commentary: Thinking About the Future of the Highway Program

by C. Kenneth Orski, Innovation Briefs

**A**s we celebrate the 50th anniversary of the Interstate Highway System and embark upon a major reassessment of its future this year, we must not fail to take note of two emerging trends that may fundamentally affect the way we shall go about developing, financing and operating new highway facilities in the future. The first trend is a growing acceptance of tolls and variable road pricing, as a means of augmenting existing highway revenue, financing new infrastructure and managing highway demand. The second trend is the private sector's increased interest and willingness

to assume an active role in the financing, construction and operation of toll roads.

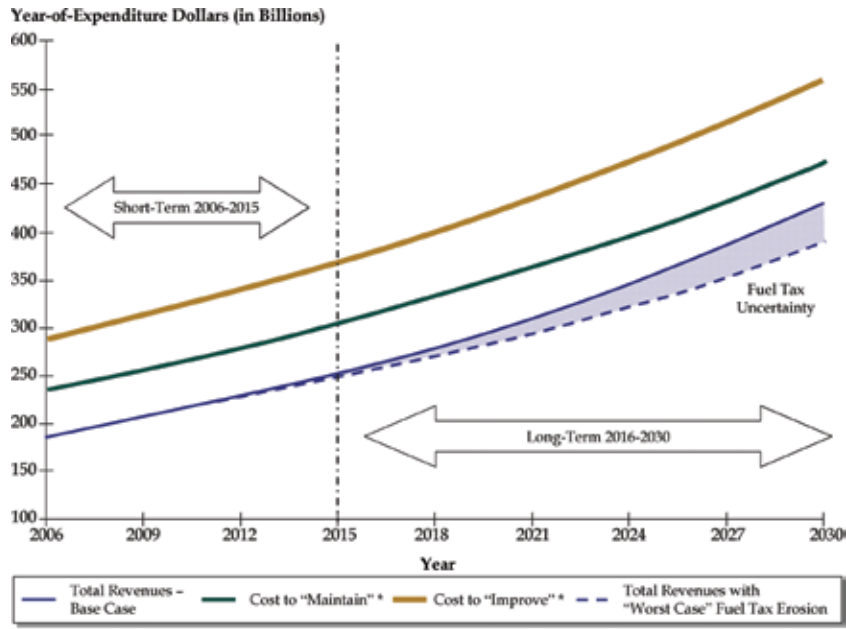
## GROWING USE OF TOLLS

There no longer is any doubt that the federal fuel tax, at its current level, cannot adequately support our future highway investment needs. The Highway Account of the Trust Fund is expected to run dry soon after the start of the next reauthorization cycle, less than three years from now. Highway Account obligations authorized in the current surface transportation authorization (SAFETEA-LU) exceed the projected

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Projected Annual National Highway and Transit Needs and Revenues 2006-2030



\* Note: Cost to "Maintain" and "Improve" represent updates of AASHTO Bottom Line Capital Needs to 2006 with addition of annual state and local costs of administration, maintenance, and operations (O&M).

Source: FHWA

Highway Account receipts by more than \$12 billion according to a February 2006 CBO/Joint Committee on Taxation estimate. In other words, the spending levels established in SAFETEA-LU cannot be sustained beyond fiscal year 2009.

Some observers believe that the pressure to alleviate this imbalance by raising motor fuel taxes in the next Congress will prove to be irresistible. But this is by no means certain. A lot will depend on the attitude of the next administration, the political complexion of the next

Congress, and the degree of public concern over gas prices prevailing at

the time (currently approaching \$3 per gallon). It is instructive to recall that congressional reluctance to raise the fuel tax is not exactly new. Since 1956, Congress has raised this tax only five times, with the last increase occurring 13 years ago, in 1993. Nor do states appear any more willing to raise their own fuel taxes. Many of them have not done so for years.

Eventually, a mileage-based tax may replace the fuel tax and provide a more adequate source of funds. But implementing a mileage-based tax system would involve difficult problems of transition both at the state and federal levels. It is, at best, a solution for the

... tolling has reached the tipping point. From here on out, it will have every-growing importance in future highway investment decisions.

distant future. A recent Transportation Research Board report concluded that the fuel tax will be with us for at least the next 15 years.

Hence, for the immediate and near-term future, tolls look like the most practical and logical way to supplement the eroding value of the gas tax. Electronic toll collection technology, already embraced by a majority of toll road authorities, has eliminated the chief practical objection to tolls. By the end of this decade, "open-road tolling" is expected to become nearly universal.

Tolls offer another advantage. They provide a capability to manage traffic demand on the nation's highways. By varying tolls with fluctuating demand levels, highway operators can maintain free-flowing traffic conditions at all times and offer the driving public the option of congestion-free travel even in rush hours. The benefits of variable pricing are evident every day on the State Route 91 (S.R. 91) Express Toll Lanes in Southern California which carry twice as many vehicles at speeds three times as fast as the adjoining toll-free lanes.

In the past year, tolling has gained a number of new converts. Congress has relaxed existing restrictions on tolling of

## A FUTURE SCENARIO

What eventually may emerge in heavily congested urban areas is a two-tiered system of roads. Supplementing existing toll-free roads will be networks of new, express toll lanes offering congestion-free travel for a fee. As the toll-free lanes become saturated with traffic, motorists, shippers, and truck-fleet operators will switch to the free-flowing premium toll lanes in sufficient numbers to ensure their political success and financial viability.

This is not a far-fetched vision. Already today, commuters in Northern Virginia's Dulles Corridor are offered two parallel routes into Washington—one, a toll-free state route (Route 7); the other, a privately financed and operated toll road, the Dulles Greenway. Tens of thousands of commuters are opting to pay a daily fee of \$10.80 on the free-flowing Greenway in order to avoid the stop-and-go traffic on the state route.



Dulles Greenway

the interstates, several states have created new toll authorities, most highway interests have dropped their opposition to tolling, and federal policy has become overtly supportive of tolling and road pricing. Even the press seems to have embraced the concept of highway pricing. The term “Lexus Lanes,” once used by journalists as a pejorative shorthand for high-occupancy toll (HOT) lanes, is gradually disappearing from usage as evidence accumulates that even drivers of modest means choose to pay a toll when they are pressed for time.

So my first conclusion is that tolling has reached the tipping point. From here on out, it will have ever-growing importance in future highway investment decisions. Indeed, it is quite conceivable, even likely, that variably priced toll lanes will constitute the bulk of all future additions to the nation’s highway capacity.

## A BIGGER ROLE FOR THE PRIVATE SECTOR

As has become evident in recent months, many fiscally-strapped states are searching for innovative new ways to finance highway infrastructure and all of them involve the use of private capital.

One approach involves leasing existing toll roads with a proven record of stable and growing traffic to private investors in return for front-end capital. Recently, the state of Indiana has done just that, using the \$3.8 billion proceeds to fund an ambitious, 10-year program of highway improvements, including construction of an extension to Interstate Highway 69. Several other fiscally-strapped states with profitable toll facilities are contemplating similar moves.

Some other states, such as Texas, Virginia and Oregon, are entering into partnerships with private companies

to build new toll roads or add new toll lanes, using mostly private funds. In exchange, these companies obtain the right to operate the facilities and collect tolls over long periods of time. Recently, Pennsylvania has also expressed interest in such arrangements. And last month, Utah became the 23rd state to enact a law that allows private firms to finance, build, and operate new toll roads.

There are several reasons for this groundswell of private sector interest in highway infrastructure. The global capital markets have discovered that public infrastructure offers attractive, long-term investment opportunities in the United States. Foreign toll road owners and operators, notably Australia’s Macquarie Infrastructure Group, Cintra, and Transurban, are in discussions with a number of our state and toll authorities concerning possible long-term toll road concessions. “The biggest potential growth market is the U.S.,” Macquarie’s chief executive officer Stephen Allen, told us. His company’s activities in Oregon suggest that Macquarie intends to use the concession model to develop new roads as well as invest in existing toll roads in the United States.

There are signs that our own private investment community is beginning to wake up to the challenge, spurred, no doubt, by competition from abroad. In March, the Carlyle Group, a large and respected U.S. private equity fund, announced that it intends to start investing in the transport infrastructure sector. Carlyle’s CEO, David Rubenstein, said in

## HIGHWAY PRIVATIZATION ABROAD

In Europe, virtually all major toll road authorities have been privatized. Italy’s state-owned toll authority, Autostrade SpA, was sold to private investors in the late 1990s (and will soon be merged with Spain’s Abertis Infraestructuras, another private firm). In France, the three largest toll enterprises in which the government had retained controlling interest—Autoroutes Paris-Rhin-Rhone (APRR); Société du Nord et de l’Est de la France (SANEF, operator of the Autoroute du Nord and Autoroute de l’Est); and Autoroutes du Sud de la France (ASF, operator of the Autoroute du Sud)—were put up for sale in late 2005. Their privatization is currently in the process of being completed. By the end of 2006, 8,175 kilometers (5,109 miles) of France’s toll roads will be in private hands, according to the French toll road association, AFSA. Likewise, in Spain and Portugal, all major toll roads are in private hands.



announcing the new initiative: “The U.S. is finally starting to realize what the rest of the world has learned, that private dollars can help alleviate persistent infrastructure challenges.” The possibility of significant tax depreciation benefits offered by long-term concessions has very likely played a role in Carlyle’s decision (see sidebar below). What has also played a role are reports of Macquarie having quintupled the value of the capital originally invested in the toll roads, generating a 30 percent internal rate of return in the process.

Macquarie’s success has not gone unnoticed by U.S. investment banks. Both Goldman Sachs and JPMorgan Chase are reportedly planning their own multibillion dollar infrastructure funds. Other investment banks are not far behind, attracted by the possibility of earning lucrative transaction fees as well as profiting from returns on equity investment. “There will be room for many participants in the market,” JPMorgan’s chief investment officer Mark Weisdorf, was quoted as saying. There are unconfirmed reports that several, large U.S. pension funds are also assessing the merits of infrastructure investments, perhaps influenced by the successful experience of Australian pension funds that have provided as much as half of the capital for the Macquarie Infrastructure Group.

From the public sector’s perspective, the growing willingness of private risk capital to invest in public infrastructure is (or should be) welcome news. As a recent report by Fitch Ratings points out, states

and toll road authorities should be able to obtain a higher price for their assets from equity investors than from lenders. Bondholders require the certainty to be repaid regularly on specific dates, thus constraining the size of the transaction. Equity investors, on the other hand, are willing to forego immediate rewards (and assume a larger risk) in the expectation of ultimately receiving higher returns on their investment.

Private sector involvement may also benefit the public interest in other ways. Private toll road operators are likely to bring a higher standard of customer service, achieve more timely and cost-effective completion of planned improvements, and introduce a higher rate of innovation into their operations. They offer access to private equity capital that can speed up project delivery by many years. They can also raise toll rates to control demand or fund needed improvements without being influenced by fear of a negative political reaction (although they will be constrained by the terms of the toll rate-setting schedule in the concession agreement).

So my second conclusion is that we may be on the verge of a fundamental change in our approach to financing highway infrastructure—an approach where private capital, rather than tax dollars, becomes the chief source of financing capacity expansion. Private investment, in turn, could lead to a new generation of market-driven, utility-type operating entities that would offer a high level of service and customer responsiveness.

## **UNDERSTANDING THE TAX BENEFITS OF TOLL ROAD CONCESSIONS**

The tax treatment of the up-front payment for a lease concession depends on the substance of the value being acquired. In the case of an existing toll road, the value consists of two things: first, a long-term leasehold estate in aged tangible physical assets (the toll road itself); and second, an intangible asset in the form of a license to impose and collect tolls. The up-front payment is likely to be allocated first to the fair market value of the tangible physical assets. The balance, if any, would be allocated to the license to toll. A portion of the up-front payment also may be treated as pre-paid rent.

Assuming the payment is financed with equity and taxable debt, the portion of the payment allocable to the tangible physical assets may be depreciated on an accelerated basis according to each asset class under federal income tax rules. Most of the assets for a highway project are subject to accelerated depreciation over 15 years. However, this tax treatment is available only if the lessee (concessionaire) has “tax ownership” of the toll road. (Without tax ownership, this portion of the payment would have to be amortized over the full lease term.) A variety of factors determine whether a party that is not the owner of fee title will, nevertheless, be treated by the Internal Revenue Service as the owner for tax purposes. The most important of these factors is whether the remaining design life of the asset at the time of the transaction is less than the term of the lease. If the lease term exceeds the design life at inception, barring other countervailing factors, the lessee should have “tax ownership.” In the case of the Indiana Toll Road, for example, the lease term is 75 years for an aged asset. Therefore, it is likely that Macquarie/Cintra concluded it will have tax ownership and will be eligible for the accelerated depreciation. The portion of the payment allocable to the tolling right is amortized over 15 years on a straight line basis. Any portion of the payment treated as pre-paid rent is amortized over the full term of the lease.

In summary, toll road concessions can involve very substantial amounts of accelerated depreciation, normal depreciation, and amortization. These benefits can, in turn, be transferred to institutional and other investors looking for tax depreciation shelters.

*We are indebted to Fred Kessler, (fkessler@nossaman.com), partner in the law firm Nossaman Guthner Knox & Elliott, LLP, for the above analysis.*

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## IMPLICATIONS FOR FEDERAL TRANSPORTATION POLICY

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If I am correct in my conclusions that toll roads and private capital will assume a major role in future highway investment decisions, then two consequences are likely to follow. First, the Highway Trust Fund, relieved of the burden of financing new roads, will find itself under less pressure because it will only have to meet the need for maintenance, reconstruction and rehabilitation of existing federal-aid facilities. Second, with states assuming primary responsibility for construction of new capacity, the federal-aid highway program will be able to focus primarily on the preservation and enhancement of the interstate system. This is a vital mission in its own right.

All of this is not to say that taking care of existing highway assets is the only possible future for the federal-aid highway program. But if the federal role is to expand beyond custodianship of the existing system, the highway program must recapture a clear sense of mission—the kind of national, purpose-driven consensus that inspired the interstate highway program 50 years ago but that has largely disappeared since the interstate system's completion in the late 1990s.

One example of a bold, new national transportation vision would be the creation of urban networks of premium toll lanes to provide the option of reliable,

congestion-free travel to every resident of large metropolitan areas. Such a vision may, in fact, find its first embodiment in the National Capital Region, where both Virginia and Maryland are committed to implementing a network of express toll lanes, with Virginia using private funds. The governors of both states have agreed to jointly explore how to tie their projects into a unified, region-wide network of congestion-free toll lanes. Planners for the Metropolitan Washington Council of Governments are currently conducting a study of such a network.

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**... an approach where private capital, rather than tax dollars, becomes the chief source of financing capacity expansion.**

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Another example would be the construction of a national system of truck-only-toll (TOT) lanes in freight-intensive corridors to provide premium-level service to shippers and freight carriers. Here, the objective would be to enhance trucking productivity while helping to improve highway safety and decongest existing freeways. (Both ideas have been advanced in recent reports by my colleague Bob Poole and myself.)

As we look beyond the current surface transportation authorization, we will need to think in bold terms. That is the surest way of sustaining public support, justifying increased funding, and ensuring the continued vitality of the nation's highway infrastructure.

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