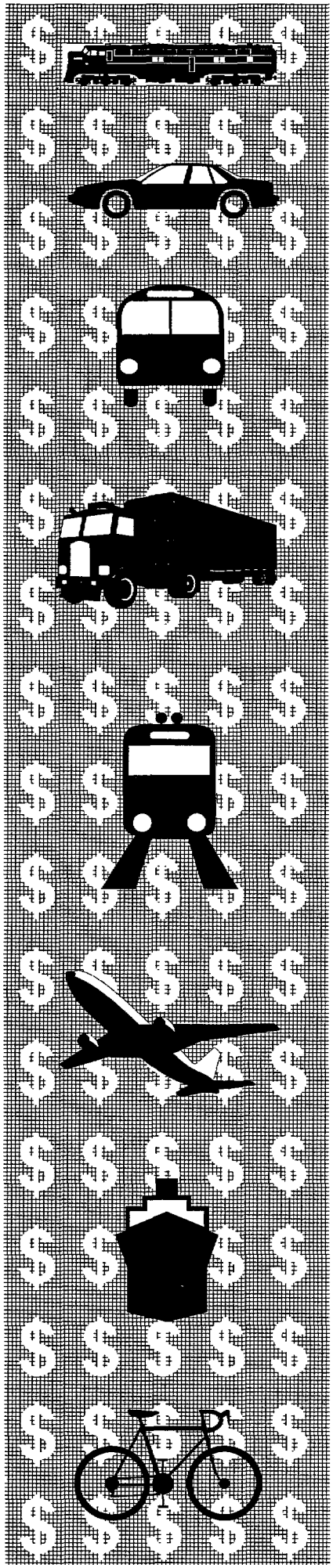

Resource Papers

Transportation Finance for the 21st Century

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PRIVATE TRANSPORTATION AND PUBLIC BENEFITS

BY

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Is 'there any sensible reason wh y we Americans should continue to maintain a Chinese Wall between public and private goods and who is allo wed to provide which? Or are we simply making life unnecessarily hard for ourselves?

WHO OWNS WHAT?

The driveway that leads to my garage was built by the private real estate developer who sold me my house. Since it's owned by me, academics like to call it "a private good." I'm responsible for clearing it of snow in the winter and otherwise keeping it operational. Whatever costs are jnvolved in doing this I pay directly out of my own pocket.

The local street that leads to my driveway was built by my town's government. It's owned by the town, also serves the driveways of my neighbors, and is therefore what academics call "a public good." The town is responsible for keeping it operational, which includes plowing it free of snow in the winter. These costs are covered by the town's revenues from real estate taxes. Which means that I pay for them indirectly.

This distinction between what people own individually and what they own collectively is the rule in most parts of the U.S. It leads to the knee-jerk assumption that the roads and other public goods we own collectively have to be the direct responsibility of government, while responsibility for the driveways and other private goods we own as individuals should be ours alone.

But things are different in the new housing development on the other side of town where my friend Tom lives. The local street that provides access to his driveway and the driveways of his neighbors is owned by the private real estate company that built the houses. The responsibility for keeping this public good operational rests entirely with the real estate company, which bills Tom and his neighbors each month for this service. Since the town government doesn't have to spend tax dollars maintaining the street, Tom and his neighbors have lower real estate taxes than I do.

When it snows in the winter, the real estate company must naturally plow Tom's street. But it also plows each homeowner's driveway at the same time. The extra cost to the company of providing Tom and his neighbors with this attractive and ostensibly free service for their private driveways is insignificant because its snow plow is already on the scene'to plow the public street.

I sometimes envy Tom. Especially when I have to shovel out my driveway after a heavy snow fall. Of course, I could always pay someone to plow my

driveway. But there's no way to coordinate this with the town's snow plowing schedule. So I might still end up having to shovel out my driveway's entrance after the town's snow plow has plowed it shut.

THE LOCAL HIGHWAY MESS

The need to find a better way of managing public roads is painfully apparent to me each morning when I drive to work. Most of my commute is on a highway that's been badly neglected by the County since it was built back in the 1960's. Its pavement is worn and rough. Its four lanes aren't really wide enough for the new generation of trailer trucks that travel them in increasing numbers. And there's a two mile stretch lined on each side by strip malls and other retail establishments, most of which were built during the 1980's. The eight traffic lights along this section are an unending source of delay for commuters like me during rush hours.

The highway's many shortcomings are a favorite topic for critical stories in our local newspaper. Why can't the County maintain the pavement in better condition? What happened to the plan announced five years ago to widen the lanes? Isn't it possible to build a by-pass around that two mile commercial stretch so through traffic can avoid those eight traffic lights and all the cars pulling out of parking lots in front of the stores?

Our newspaper delights in putting these questions to County officials. And their answers are always the same. Not enough money in the budget. Too many competing demands for County services. This year's proposed tax hike was vetoed by the County's elected Board of Supervisors. The State government always shortchanges the County in disbursing roadway funds from the state-wide gasoline tax. But underlying every newspaper story that prints these standard excuses is the same implicit theme. Better management might make all the difference. New solutions are needed.

What would happen if the highway was turned over to the same private company that owns and operates the local streets in Tom's neighborhood? This question keeps haunting me as I struggle with stop-and-go traffic along the highway's commercial strip twice each day. Could such a company build the long-needed bypass and pay for it with a modest toll that commuters like me might welcome in exchange for a faster trip to work? Would the toll revenue be enough to fund other improvements to the highway as well?

THE PRIVATIZATION CONTROVERSY

There's a typically clumsy academic name for the way local streets are

managed in Tom's neighborhood. It's called "privatization." It means having private firms become responsible for certain public goods that may traditionally have been the responsibility of government. The advantages? Better services and lower costs to the public, claim its advocates. The disadvantages? The biggest one may be the need for us to take a fresh look at that imposing Chinese Wall between the public and private sectors. Non-traditional thinking is always such a burden.

Privatization is really just a new name for an old concept. Most governments have always retained private companies to design and build public facilities like roads and schools. My town government "contracts out" to a private company the task of maintaining our local street lights and traffic signals. In fact, this company has been providing the same services to most towns in my area for years and no one considers this strange or radical.

The new wrinkle in private operation involves applying this concept to public services that have long been regarded as the exclusive preserve of government. That's why there was so much controversy in my town five years ago when the real estate company submitted its application to build the housing development where Tom now lives. The town government wanted the additional real estate tax revenue that the new houses would generate. But its budget was too tight to pay for the construction of the new network of local streets to serve those houses.

To break the impasse, the real estate company offered to build the new streets itself and apportion the cost among the purchase prices of the houses it hoped to sell. After five lengthy meetings of the town council, this arrangement seemed on the verge of approval.

But then came the question of maintaining the new streets. The town wasn't sure whether it could fit this extra cost into its very tight budget. So the real estate company offered to take on this responsibility. It would maintain the streets as well as build them, and charge each homeowner a monthly service fee to cover the cost. In return, the town would levy lower real estate taxes on the houses.

The controversy stirred by this radical proposal reached such a pitch that it even replaced the usual stories about the County highway in our local newspaper. But after several months, the proposal's financial advantages became so compelling that the town council voted five to three to pass it. With the result that Tom gets his driveway plowed free of snow each time his street is plowed, even though his total "home ownership costs" are about the same as mine.

It turns out that private ownership and operation of roads and other

transportation facilities was common practice in the U.S. during much of the nineteenth century. What finally tilted the balance the other way for roads was the passage of the Federal Aid Road Act in 1916. That set the pattern for government - and government alone - to build, own, operate, and maintain the rapidly growing networks of roads that spread across the nation during the next 60 years.

WHO PAYS AND HOW?

There's never been any shortage of ideas about how to pay for the nation's roads. At one end of the spectrum are people who think we should pay for them the way we pay for movie seats. Charge motorists an "admission fee" each time they use a road, they insist. This usually takes the form of a toll collected at some sort of barrier where drivers must stop and pay before proceeding. But today's technology can eliminate the stop and pay nuisance. It can even make it a simple matter to charge higher tolls at times when travel demand is high and lower tolls when demand is low. Just as we do for movie tickets.

Many American bridges and tunnels charge tolls. A number of state turnpikes built before 1955 have used tolls to pay off their construction bonds and cover operating costs. The concept has an elegant simplicity that can be very appealing. The amount that a driver pays in the course of a year depends on how often he uses the road. He makes his own decisions about whether the benefits of using the road for any particular trip are worth the admission fee.

At the other end of the spectrum are people who argue that the benefits provided by roads aren't confined only to drivers. By making it possible for people to travel (to work, to buy things, to deliver goods and services, to call on customers), roads provide benefits that flow through society in many complex ways. The ultimate measure of these benefits is the higher level of economic activity generated by so many people going so many places to do so many things. Therefore, the logic runs, society as a whole should pay for roads out of the general tax revenues collected by various levels of government.

Between these extremes lies a mixed bag of payment mechanisms. Most common are the various sales taxes on gasoline, tires and other things that drivers have to buy. The more a person drives in the course of a year, the more of these things he buys and therefore the more he pays in sales taxes. Which means that each driver pays for roads in rough proportion to the number of miles he drives in a year. This is a kind of indirect toll mechanism for roads in general, though it provides no incentive for a driver to use any particular road for his trip or to make that trip at any particular time of the day. It works best when the taxes collected are used exclusively to operate and maintain roads - which isn't always the case.

Over the years, the fact that government has imposed these payment mechanisms has helped lead us to the unconscious belief that roads have to be a purely government responsibility - like police and fire protection. But there's no iron law in physics or economics to insist that this must be the case.

A toll road can be built and operated by a private company just as easily as by a government turnpike authority. In fact, many toll-collecting turnpike authorities are actually profit-seeking corporations that happen to be owned by their home states rather than by private investors. But the choice of where ownership should lie is really an arbitrary one. The State of California realized this when it franchised a private company to build and operate a new toll road in the median strip of an overcrowded Southern California freeway.

In the same vein, the general tax revenues that a government spends on roads can just as easily fund contract payments to private companies that provide various kinds of road services. Ditto the sales tax revenues collected from drivers. A number of state and local transportation departments have already begun doing this.

In other words, it turns out that we have a surprising amount of leeway to decide whether roads should be operated by the public sector or the private sector. This lets the determining factor be our judgment about who can deliver the best services for the least cost. We can even make these decisions on a road-by-road basis. Just as my town did when it approved that plan to let the private real estate company build and operate the local streets in Tom's neighborhood.

What influences our judgment in making these decisions? Sometimes it can be our personal experiences. If we live in a low-income neighborhood where we depend heavily on government services and where local retail stores seem to charge us ever higher prices for poor quality goods, we may feel that government is the "more reliable" service provider. If we live in a high-income neighborhood with its own private security service and send our children to private schools, we may be more comfortable buying whatever we need from private companies.

But most of us are neither very poor nor very rich. If we bother to think at all about the questions of who should provide which services (as I do when I commute on that decrepit highway), it's usually in terms of who seems able to do the best job. Academics like to steer this discussion into the realm of philosophy by talking about such concepts as "natural monopolies", "economic externalities", and "public versus the private goods." All of which ignore what may be a more pragmatic question. Has our growing mood of disenchantment with the apparent shortcomings of government increased our willingness to rely more on private companies to provide the public services we need?

If it has, we ought to ask ourselves how profit-seeking, tax-paying private companies may be able to deliver better services at less cost than not-for-profit, tax-free public agencies. Privatization advocates cite a number of reasons. The most important are probably better management, greater operating efficiency, absence of conflicting goals, and easier access to capital.

BETTER MANAGEMENT

An important key to efficient service delivery is smart management. This requires service managers who are bright, well-trained, and strongly motivated. Don't get me wrong, fortunately the public sector does enjoy the benefits of professionals dedicated to public service who sustain the system. But, the simplest way to attract and hold on to such managers is to pay them better than the competition.

This is where public agencies are at a disadvantage. The salaries of elected officials tend to impose an artificial ceiling on how much public agency managers can be paid, which is typically lower than their counterparts in the private sector. While this ignores the realities of the market place, elected officials are reluctant to raise these ceilings by advocating higher salaries for themselves because they believe this "looks bad" to voters.

The people of my town and the rest of the American public seem to be entirely in sympathy with this salary constraint. They accept with unquestioning faith the strange idea that managers of public agencies should be paid considerably less than managers of private companies. With the result that the nation's best managers flock to higher paying jobs in private companies, since public agencies are unable to compete for them in the market place.

But could we expect our favorite professional football team to make it to the Super Bowl if it insisted on paying its coaching staff less than the competition? The same principle holds true for the "coaching staffs" responsible for public services. Few professional managers are independently wealthy. Their choices about where to work have to reflect the financial realities of supporting their families and providing for their children's education. Inevitably, they have to work where they can earn the highest salaries. For the best managers, this is rarely in the public sector.

Given our peculiarly American attitude towards government and civil servants, there seems little likelihood that this salary constraint will ever disappear. So the only practical way to assure consistent high quality management of public services may be to turn at least some of them over to private companies who are willing and able to pay top dollar for ace managers.

Joseph M. Giglio, Jr.

GREATER OPERATING EFFICIENCY

In a nut shell, efficiency means getting more bang for the buck. Part of this has to do with good management. But sharp managers have to be free to exploit every opportunity for achieving greater efficiency, which the constraints on public agencies often prevent.

For example, public agencies must lean over backward to avoid the appearance of fraud or favoritism in their purchases of supplies and services. This can lead to elaborate bidding procedures for purchase contracts, lengthy audits before bills are paid, and endless amounts of time-consuming paperwork. Public agency managers rarely have the option of simply picking up the phone and choosing a supplier based on timely delivery, quality products, and attractive prices. They're usually restricted to a small group of suppliers who have mastered the intricacies of government contracts, are willing to dot every "i" and cross every "t" (often several times), and wait months to be paid. All of which means higher costs that get built into the price of every purchase contract.

Avoiding "waste, fraud, and abuse" is the standard litany that guides public agency purchases. With no recognition of the pragmatic trade-offs that must often be made among these three demons. The standard assumption seems to be that the public would rather waste countless extra dollars to avoid any possibility of losing a single dollar to fraud or abuse. And no public agency manager can be expected to lay his career on the line to exploit more efficient trade-offs.

But the bottom-line focus of most private companies forces them to live in the real world where practical results are what count, not elaborate procedures. That's why managers working in such a culture can exploit the benefits of just-in-time inventory management, economies of scale in purchase orders, and meaningful measures of supplier performance to make their operations more efficient.

Greater efficiency in service delivery also means being able to aggressively exploit the potential of new technology to streamline production and reduce costs. But there's always some risk in being among the first to embrace new technology. Managers of private companies are paid to accept and manage risk, since that's what business is all about. While public sector managers are paid to avoid risk. This is why public agencies are usually the last to adopt modern technology. Preferring not to "risk the public's money" until a better technology has been so totally proven in practice and completely de-bugged that it's often obsolete.

ABSFNCF OF CONFLICTING GOALS

In theory, a public agency should have only one goal - to deliver effective services with maximum efficiency. In practice, however, this can often be complicated by other goals, such as providing various social benefits that can take the form of more entry-level jobs for young people, higher community standards for blue collar wages and benefits, improved opportunities for women and minorities, etc. There's certainly nothing wrong with these goals. But when they conflict with an agency's service delivery goal, they can end up causing both public services and social benefits to cost more than they should.

These conflicts are easier to avoid when a private company provides public services under a government contract. In such cases, any ancillary social welfare goals would have to be explicitly stated in the contract, tending to discourage attempts to make them part of the service delivery package.

But what about the potential for conflict between effective service delivery and a private firm's "need to make a profit?" Of course, management guru Peter Drucker has always argued that "creating customers" should be the main goal for any private firm, with profit simply being one of the costs it must cover (just like paying employees and suppliers). This sounds like an ideal approach for managing public services. Unfortunately, there's little evidence that it's being widely practiced in the public sector.

As it turns out, the market place can often provide a practical solution to these potentials for conflicting goals. This can happen when public agencies and private firms are allowed to compete on price for contracts to deliver public services.

In a surprising number of cases, such open competition has enabled public agencies to become as cost-efficient as the best private firms. In other cases, private firms have found it in their best interests to shave their profit targets somewhat to win service contracts. Either result simply means that our willingness to let the market place help us choose a service provider has created the kind of environment that leads to better public services at less cost. Which is, after all, what we're supposedly after.

EASIER ACCESS TO LOW-COST CAPITAL

Most public services require investments in capital facilities. Roads are an obvious example. First we have to build them, which takes capital dollars. After a certain number of years, they wear out and we have to rebuild them. This also takes capital dollars. Along the way, the travel demands on them may become so

great that we have to expand them, requiring still more capital dollars. From one perspective (admittedly a rather narrow one), the whole issue of public versus private operation can be seen as a question of who is best able to raise the necessary capital at the least cost.

State and local governments are subject to all kinds of legal restrictions on the amount of debt they can issue and for what purpose. In some cases, debt issues must be approved in advance by voters and such referendums can often be difficult to pass. In other cases, elaborate formulas may be built into state constitutions that link the maximum amount of debt a county or city may have outstanding to some arbitrary fiscal measure - such as the value of its taxable real estate. The end result can limit the ability of state and local governments to raise enough capital to build the roads and other public facilities that today's economy requires.

Some states have tried to get around these debt-issuing restrictions by back-door means. For example, a state turnpike authority may be able to issue whatever amount of debt that its toll revenues can support. So a toll increase can open the door for additional borrowing. An amendment to its charter - or simply a less rigid interpretation of this charter - can let the authority use these new funds to build or expand toll-free state roads that it claims (with a perfectly straight face) will feed additional traffic to its toll road. Even more ingenious schemes are possible, but their overall effect tends to be marginal.

Over the years, the federal government has attempted to fill the capital gap through its various transportation assistance programs. Current law allows the feds to fund up to 80 percent of the cost of an "eligible transportation project." But this isn't nearly as open-ended as it sounds. The annual federal appropriation process, coupled with Washington's new balanced budget fetish, means that there's never enough federal aid to go around. And there's no reason to expect this to get any better.

Traditional finance theory argues that all debt should be self-financing. That is, the capital facilities it creates should generate a new income stream to cover interest and principal payments by a safe margin. But the flip side of this market-oriented restriction means that it's fiscally prudent to issue increasing amounts of debt to exploit whatever new economic opportunities are able to satisfy the self-financing mandate.

The world is awash with capital seeking investment opportunities. Large corporations, unencumbered by the arbitrary fund-raising restrictions that hamstring government, have access to this capital so long as they can demonstrate their

ability to put it to work in ways that generate enough new revenue. In other words, the future is what counts -- not the past or the present.

Many corporations have always relied on this open access to capital to finance the development of new products that they expect to sell at a profit. But what if some of those products could be the roads and other public goods we have traditionally regarded as the exclusive preserve of government? Could this help bring an end to our artificially created inability to afford the infrastructure on which our future prosperity depends?

That's how Tom's neighborhood got the local streets that our town couldn't afford to build and maintain -- streets without which none of those new houses could have been built in the first place.

THE COST OF CAPITAL

But access to capital is only part of the story. The rest of it concerns the cost of capital, which we want to keep as low as possible.

A state or municipal government can raise capital funds for its public agencies by issuing bonds whose interest payments are not subject to income taxes. All else being equal, this means that these tax-free bonds enjoy lower interest rates than the taxable bonds issued by private corporations.

On the face of it, this would seem to give public agencies a capital cost edge. But in many cases, the reality may turn out to be less simple and more interesting. It happens that the federal government provides two attractive subsidies to private companies that are not available to public agencies. Under the right circumstances, this can have a significant impact in reducing a private company's true cost of capital.

One of these subsidies is the full deductibility of interest payments in determining the company's taxable income. For many profitable companies, this can result in out-of-pocket interest costs that are competitive with tax-free debt. Since public agencies have no income tax liabilities, their nominal interest costs are identical to their out-of-pocket costs. And out-of-pocket costs are what count.

The second federal subsidy involves how private companies are allowed to deduct "depreciation" - which is the pro-rated cost of a capital facility over the years of its useful life. Even though each year's theoretical depreciation cost doesn't actually mean that the company had to lay out any cash, the Internal Revenue Service lets the company pretend it did when it computes its taxable income.

In addition, the IRS lets the company use a "tax depreciation" schedule for certain capital facilities that is more generous than normal "accounting depreciation" by allowing larger deductions in the early years of the facility's life. Since all deductions for depreciation mean lower taxable profits, the company's actual profit ("return on invested capital") turns out to be considerably higher than the theoretical profit it must report to the IRS.

In the words of the accounting profession, these tax deductions for interest and depreciation flow directly to a firm's bottom line. And their practical effect can sometimes reduce the company's cost of capital to levels that public agencies can't match. In certain cases, large corporations with solid credit status can obtain capital funds for as little as their same cost to a public agency.

CAN PRIVATE OPERATION REALLY WORK ON A LARGE SCALE?

Can private operation really work on a large scale? Not unless we change our thinking about that Chinese Wall we've erected between the public and private sectors.

In the largest sense, we must learn to see government and private companies as natural partners - not competitors - in providing the wide range of public services our society needs if it is to prosper in the future. Government has the obligation (and the power) to set standards for service delivery that focus on the welfare of society as a whole rather than the narrowly defined economic welfare of any particular company. The private sector has the ability to attract gifted managers who can meet these standards efficiently, and to attract the capital funds needed for the modern infrastructure that is essential for effective service delivery.

Once we accept the implications of this natural partnership, we can move on to the admittedly tedious process of dismantling the numerous legal and administrative barriers that dot the public service landscape. The results may surprise us -- probably in some very pleasant ways.

Private operation of the streets in Tom's neighborhood has worked so well that no one even talks about it any more. Public operation of that highway on which I must commute every day doesn't seem to work for anyone; except, perhaps, for local newspapers in search of convenient stories about "government's increasing dysfunction."

Is there a lesson here?

BOND FINANCING: ISSUES AND STRATEGIES

BY

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INTRODUCTION

The disparity between the cost of meeting current and future transportation needs and the money available to pay for such improvements is well documented at the local, state and federal levels. A range of funding sources -- including federal-aid highway funds, state gas taxes, motor vehicle license and registration fees, certain state sales taxes, and local option gas taxes -- are currently tapped to finance transportation projects. Still, virtually every state *sees requirements* outstripping *resources.*

The administration has recently announced its six-year $175 billion transportation investment program called the National Economic Crossroads Transportation Efficiency Act (NEXTEA). NEXTEA proposes to increase surface transportation funding by $17 billion, or 11 percent, over the $157 billion authorized by ISTEA. At the state and local level, a plethora of "innovative" financing concepts are being proposed and implemented. These include "start-up" toll roads, privatization, public/private partnerships, the incorporation of federal funds and federal credit enhancement into state and local projects, and the establishment of State Infrastructure Banks (SIBs). Still, needs continue to outpace resources.

In order to maximize the level of transportation improvements that can be made in a given period, government officials must look for "new" funding sources and for increasingly efficient ways to use existing resources, and must make decisions about how available funds are to be allocated. These efforts are taking place in an environment where "no new taxes" is a widely heard refrain.

The purpose of this background paper, and the panel called *Bond Financing: Issues and Strategies* that is being sponsored as part of the conference on *Transportation Finance for the 21st Century* (April 23-25, 1997 in Dallas, Texas), is to explore the use of bond financing as an option for increasing or "leveraging" funds to finance transportation projects. The paper reviews terminology related to bond financing, describes how such financing is incorporated into surface transportation capital programs, discusses advantages/questions related to bond programs, identifies the key issues involved in structuring a bond issue, and summarizes how and to whom bonds are sold.

SOME DEFINITIONS

A great variety of transportation entities -- airports, seaports, highways, toll roads, toll bridges, and transit systems -- use municipal bonds

to finance a portion of their capital requirements. From 1980 to present, transportation issuers have sold $230 billion in municipal bonds.

A *bond* is defined as "evidence of an issuer's obligation to repay a specified principal amount on a date certain (maturity date), together with interest at a stated rate". Interest earned by investors in municipal or *tax-exempt bonds* is exempt from federal income taxes and is frequently exempt from state income or personal property taxation in the state where the security is issued.

There are two major categories of tax-exempt bonds. *General obligation bonds* (GOs) are secured by the full faith and credit of an issuer with taxing power. *Revenue bonds* are payable from specific revenue sources, and do not permit bondholders to compel taxation or legislative appropriation of funds not pledged for payment of debt service. *Airport revenue bonds,* for example, are secured by airport revenues, including terminal rentals, airline landing fees, and parking, rental car and other concession revenues. *Toll road revenue bonds* are secured by tolls generated by traffic on the toll road, itself. *Highway revenue bonds* are secured by portions of a state's motor fuel taxes, motor vehicle license or registration fees, and sometimes by a portion of a state's sales tax. Revenues bonds are *non-recourse* to the taxing power of the municipality or state in which the issuing authority or department is located. The only source of repayment and security for bondholders is the specific revenues that are pledged under the bond indenture.

WHY BONDS ARE USED BY TRANSPORTATION ISSUERS

Toll road operators issue *tax-exempt revenue bonds* to finance the construction of their facilities. Toll roads are designed to be "stand-alone" projects, where construction and operating and maintenance (O&M) costs are paid from tolls generated by users of the road. Since there are no tolls until the road is completed, construction financing must come from an independent source. Usually this source is bonds. The proceeds of a bond issue are used to pay for road construction, and the debt is repaid over a 20-30 year term from toll revenues.

In the early 1950s, toll road revenue bonds were sold to finance the construction of state turnpikes such as the New York State Thruway and the Ohio Turnpike. Today, toll road revenue bonds are being sold to finance a wide range of projects. Such projects include additions, expansions, and major rehabilitation to existing toll roads and toll road systems; new toll roads such as the Transportation Corridor Agency projects in California;

public/private partnerships such as the E-470 Highway in Denver; privatized toll roads such as the Camino Columbia project on the Texas/Mexico border; and regional toll road systems such as the Orlando/Orange County Expressway.

States or state departments of transportation that issue *highway revenue bonds* do so for reasons that are somewhat different from those of toll road operators. Traditional highway revenues such as motor fuel taxes and vehicle license and registration fees are generated independently of the construction of any specific road. DOTs can, therefore, use highway revenues to finance capital projects on a *pay-as-you-go basis*. In a pay-as-you-go program, capital expenditures are timed to match cash flow. If a highway department has $50,000,000 available for capital expenditures in its annual budget, $50,000,000 can be spent on projects that year.

The concerns that are generally associated with a pay-as-you go financing program include the following. *First,* the amount of construction that can be done in one year is constrained by annual cash flow, rather than by the number of projects that are ready to be let. *Second,* the cost of projects that must be financed in future years is subject to the impacts of inflation and economic and construction cycles. *Third,* important social, economic and safety benefits are delayed.

A number of states, including Arizona, Connecticut, Kansas, Kentucky, Michigan, and Virginia, have used a variety of bonding programs to leverage their highway revenues or other state funds. The proceeds of a bond issue are used to pay for road construction, and certain recurring revenue streams are used to repay the debt over a term of 20-30 years. While the structure of highway bond programs is tailored to meet each state's constitutional and legislative requirements, the revenues that are pledged to repay debt generally include portions of a state's motor fuel taxes, motor vehicle registration fees, motor vehicle license or permit fees, and sometimes a portion of the state sales tax.

ADVANTAGES / QUESTIONS RELATED TO ISSUING REVENUE BONDS

The issuers of toll road and highway revenue bonds credit their bonding programs with addressing a number of the concerns noted above. The use of toll road revenue bonds can enable a toll road or toll road system to be built, which is then paid for by the users of the facility. With highway revenue bonds a DOT can accelerate its construction program to include more of the projects that are ready to be let, rather than having construction constrained by annual cash flow. In both cases, the availability of up-front

bond proceeds enables faster and more efficient construction, and accelerates the receipt of benefits associated with completed projects. Importantly, as discussed in more detail below, the use of bond financing enables major capital projects, which are long-lived assets, to be paid for over their useful lives, rather than by current users as is the case in a pay-as-you-go program.

While bond programs can yield significant benefits, there are issues and questions that need to be addressed. In this section, we address two such topics. The first concerns how a new or expanded transportation financing program is best established given the range of legislative, political, and financial issues that must be addressed. The second concerns questions about the costs and risks associated with a bonding program.

On the first topic **-- states have constitutional and/or legislative restrictions on the issuance of debt and on the allocation and use of highway user fees. In addition, the establishment of a transportation bond program will require legislative action to establish the size of the program, identify existing or new revenue sources that will be pledged over a multi-year period to repay debt, and develop guidelines for the types of projects to be financed. This last point is likely to generate discussion regarding the allocation of resources among different transportation "modes" and between rural and urban areas of a state. While the development of each new or expanded financing program must be tailored to meet specific legal, political and financial constraints, there are numerous financing programs around the country that can serve as examples for each of these issues.**

On the second topic **-- another question may be the interest expense associated with the issuance of bonds. A home mortgage analogy may be illustrative. Setting aside tax consequences, if a home buyer could pay for a house with cash, he or she would probably do so. Most home buyers, however, need to borrow the purchase price from a bank, and repay the loan over the period of ownership. Similarly, if a state government or DOT can pay for its ongoing transportation requirements with cash, that is a good option. Most state and local governments do not have this luxury, and the gap between currently available resources and current investment requirements is likely to get worse, not better. As described above, a prudent financing program can alleviate many of the constraints of a pay-as-you-go program.**

A bond financing program, like a home mortgage, leverages annual cashflow. Let us assume that a state DOT has $60 million available for its capital program annually. One option is to spend $60 million on construction

each year. In this scenario, completion of a large capital program will need to be spread over a number of years. Assuming that the impacts of inflation on construction costs will exceed a state's ability to increase highway user fees over the long term, the purchasing power of the $60 million will decrease each year. Another option is to issue bonds and use the $60 million to pay annual debt service. Assuming a 20-year final maturity on its highway revenue bonds, and a fixed interest rate of 6.50 percent, the same $60 million will support the issuance of approximately $700 million in bonds with those proceeds available immediately. Through leveraging, a DOT can greatly accelerate work on a major construction program. [As discussed below, a portion of the proceeds of a bond sale will be used to pay costs of issuance and may be used to fund a debt service reserve fund and capitalized interest. This means that not all of the $700 million in this example will be available for construction.]

An additional important point is the public policy concept of paying for capital assets over their useful lives. Several generations of users will benefit from well-constructed highways, toll roads and other long-lived capital assets. If these facilities are paid for from current cash, the full financial burden falls on current users. If they are paid for over time through a financing program, the cost is spread out over sequential users of the facilities.

ISSUES INVOLVED IN STRUCTURING A REVENUE BOND PROGRAM

Structuring a revenue bond program involves the following: identifying the issuer (a toll road authority, state, or state DOT, for example); establishing the size of the program; specifying the revenues that will be legally pledged to pay debt service; preparing the legal documentation; securing bond ratings; and pricing (setting the interest rates) and selling the bonds to investors. The following discussion reviews policy, structuring, legal, and credit issues that must be addressed during the development of a financing program.

Policy Considerations

First, the term, or final maturity, of the bonds being issued should match the expected useful lives of the assets being financed. The expected useful life of major new highway and toll road construction projects is generally held to be approximately 20-30 years. Accordingly, the majority of transportation revenue bonds issued to finance new construction have a 20-30 year term. This matching ensures that tolls or highway user fees used to pay debt service in the later years will pay for assets that are still being used.

Second, a bonding program should be sized in light of a state's overall capital requirements and in line with the size of the revenue stream that is expected to be available to pay annual debt service. Third, the authorized total size of the bonding program, and the amount of debt issued at any one point in time, should reflect the amount of construction that can reasonably be undertaken in a particular period. [A bond program can be sized, first, to yield the necessary amount of construction proceeds. Non-construction amounts (including costs of issuance, reserves, and capitalized interest) can then be added as needed.]

Structuring Considerations

Included in this category are the interest rate "mode", the amortization schedule, the term or final maturity of the debt, and the use of specific financing or pricing techniques. There are numerous variations and combinations of these elements. In this paper, we focus on the more traditional structures used by issuers of transportation revenue bonds.

Tax-exempt bonds can be structured as *long-term, fixed rate debt,* where the interest rate is locked in at the time of sale. Alternatively, debt can be structured as *short-term variable rate securities,* where the interest rate is reset periodically -- typically on a weekly basis. Historically, variable rates have been lower than fixed rates in the tax-exempt market. Variable rate debt is, however, subject to market fluctuations and interest rate risk. The majority of transportation revenue bonds have been issued as long-term fixed rate bonds. This pattern can be attributed to two reasons. First, the use of fixed rate debt is conservative because the interest rate for the next 20 or 30 years is set at the time of issuance. Second, interest rates over at least the last ten years have been low compared to historic levels, giving issuers the opportunity to lock in long-term financing at favorable rates. In today's market, the interest rate on insured (Aaa/AAA) 30-year transportation revenue bonds would be about 6.00 percent.

The majority of transportation revenue bonds are structured with *serial and term bonds* to provide for amortization of the debt on a *level debt service* basis over its term. This means that the debt is repaid in equal annual installments of principal and interest, much like the payment schedule for a fixed-rate home mortgage. The yield curve (which reflects the interest rate associated with the maturity of individual securities) in the tax-exempt market is upward sloping. The interest rate on a one-year bond may be 3.85 percent, for example, while the rate on a ten-year bond is 5.15 percent and

the rate on a 30-year bond is 5.80 percent. The structure of each bond issue, including the mix of serial and term bonds, is designed to achieve the lowest all-in cost of debt.

Another structuring consideration is the use of *capitalized interest.* In a toll road financing, for example, there are no revenues available to pay principal or interest until the road is built and traffic starts to flow. While the amortization of principal can be deferred until several years after operations begin, interest must be paid to investors during the construction period. In the typical toll road financing, interest is capitalized, i.e., a portion of bond proceeds are set aside to pay interest during construction. Capitalized interest is less common in traditional highway revenue bond structures since, as noted elsewhere in this paper, highway user fee revenues are collected and are available independently of completion or use of any particular roads, [There are dozens of additional structuring options and types of securities that can be incorporated into each bond issue. A discussion of these features is beyond the intended scope and purpose of this paper.]

Legal *Issues*

Revenue bonds are sold pursuant to a *Trust Indenture (Agreement) or Bond Resolution (Ordinance)* that formalizes the payment and security provisions for the bonds. The following are essential legal provisions for the issuance of revenue bonds:

Pledged Revenues. The Indenture identifies the revenues that will be legally pledged to pay debt service over the term of the bonds. For toll road revenue bonds, this pledge typically includes net toll revenues and, in some cases, concession revenues. Pledged revenues for highway revenue bonds can vary significantly from state to state, but generally include a portion of state motor fuel taxes, motor vehicle registration and license fees, and sometimes a portion of the state sales tax.

The revenue pledge also specifies whether bondholders will have a claim on net revenues or gross revenues. The standard pledge for toll road revenue bonds is a *net revenue p/edge.* (Net revenues are defined as gross toll revenues less O&M expenditures.) The logic behind the net pledge for toll road bonds is that toll roads must be maintained at high standards -- from their own revenues -- in order to attract users who will pay tolls. The provision is, therefore, made for O&M to be paid before debt service. The standard pledge for highway revenue bonds, on the other hand, is a gross *revenue p/edge.* The logic, here,

is that highway user fees (motor fuel taxes, vehicle registration fees) are generated independently of any particular road or level of traffic. Given this, bondholders are paid from gross pledged revenues prior to the payment of O&M.

Rate A toll road revenue bond financing requires a *rate covenant,* which states that net revenues must exceed annual debt service by a specified amount. A typical toll road rate covenant states that net revenues must equal at least 1.25 times annual debt service. This provision protects bondholders in the event of a temporary decline in net toll revenues. A rate covenant is atypical in a highway revenue bond structure for two reasons. First, given the gross revenue pledge described above, debt service coverage is generally much higher than for toll road bonds. Second is the traditional practice against obligating future legislatures to raise taxes.

Additional Bonds Test The *additional bonds test* is designed to protect issuers and investors against dilution of pledged revenues when additional series of bonds are sold. The additional bonds test will specify that historic (and sometimes projected) pledged revenues must exceed annual debt service on outstanding bonds and bonds to be issued by a specified amount. The additional bonds test in a toll road revenue bond is usually tied to the multiple used in the rate covenant. The additional bonds test in a highway revenue bond program generally requires that revenues in the most recent fiscal year (often adjusted for known changes in tax rates) provide 2.0-3.0 times coverage of existing and new debt service.

Debt Service Reserve Fund A debt service reserve fund (DSRF) is an amount of money that can be used to pay principal and interest in the event that pledged revenues are insufficient to make these payments at some point in time. A DSRF is sized to equal a specified amount of debt service (maximum annual debt service or six months of annual debt service, for example), and is usually funded from bond proceeds at the time of sale. The legal provisions underlying the bond issue, will specify the requirements for replenishing the DSRF in the event that all or a portion of this fund is used to pay debt service. The proceeds of a DSRF can often be invested at a rate equal to the interest rate on the bonds, so that the DSRF "pays for itself". The amount in the DSRF is available to the issuer at final maturity of the bond issue. DSRFs are common in revenue bond issues. The size, funding and structure of a specific DSRF will be addressed as a bond program is structured and as credit provisions are being developed.

Flow The Indenture specifies the order of expenditures from pledged revenues. As described above, the first use of pledged revenues in a toll road revenue bond issue is payment of O&M, followed by payment of debt service. The order of these flows is reversed in a highway revenue bond structure. Following these critical expenditures, revenues are typically used to replenish the DSRF (if necessary), pay debt service on subordinate lien debt, and fund reserves for major maintenance or unanticipated capital expenditures. Remaining revenues can then be spent on any use permitted under the Indenture.

Credit Issues

The *credit strength* of a bond issue (essentially the likelihood that bondholders will be fully paid) is carefully evaluated by potential investors and the ratings agencies, including Moody's Investors Service, Standard & Poor's Ratings Group, and Fitch Investors Service. The key credit factor for toll road and highway revenue bonds, like all revenue bonds, is the expected strength and stability of the pledged revenues.

For toll road bonds, the most essential credit determinant is traffic demand. The credit evaluation will include an analysis of the following: the level of forecast traffic; the expected mix of traffic (passenger vs. commercial vehicles, commuter vs. long-haul traffic, and business vs. recreational travel); economic factors that could impact traffic and, therefore, toll revenues; the perceived elasticity of traffic demand to increases in toll rates; and the possibility of competition from free roads in the toll road corridor. An important source of information for most toll road issues is the traffic and revenue report. This report is prepared by professional traffic consultants, and is intended to provide an independent analysis of the likelihood that net toll revenues will be sufficient to pay debt service and meet the rate covenant during the forecast period.

A toll road issuer's ability and willingness to increase tolls if necessary to meet the rate covenant is very important, as is the speed with which increases in toll rates can be implemented. Additional important credit factors include management's ability to run an efficient toll road operation (including long-term planning for maintenance and capital improvements), and legal provisions as described above.

A key element in establishing the credit of a highway revenue bond program is an assessment of the diversity and stability of the pledged revenue stream. A broad range of economic factors influences the purchase and use of motor vehicles, the consumption of motor fuels, and, ultimately, the level and timing of collections of highway user revenues. The level of government support for a highway revenue bond program is also very important. This support includes the degree to which constitutional and/or statutory provisions dedicate highway user taxes to transportation programs, and the ability and willingness of state administrations and legislatures to increase the tax rates or the amount of specific taxes that go to fund transportation requirements. Finally, strong legal provisions, as discussed above, provide significant credit strength.

Investment grade ratings range from "Aaa/AAA" on the high end (usually reserved for the strongest state general obligation bonds) to "Baa/BBB-" on the low end. Potential buyers evaluate these credit ratings as part of their investment decision for each revenue bond issue. In addition to being viewed as a stronger credit, bonds with higher credit can generally be sold at lower interest rates (assuming similar market conditions). The majority of transportation revenue bonds are rated in either the "A" or "AA" category.

Revenue bonds are frequently sold with municipal bond insurance. Several companies provide bond insurance for tax-exempt issuers. The bond insurer guarantees to pay principal and interest when due in the event that an issuer's revenues are not sufficient to make these payments on a timely basis. Based on this commitment, an insured issue is rated "Aaa/AAA", reflecting the credit rating of the bond insurer rather than the underlying rating of the issuer. The issuer pays a *bond insurance premium* equal to a percentage of total debt service over the life of the bond issue. The premium is paid to the insurer at closing of the bond sale, and is funded from bond proceeds. The decision about using bond insurance is generally based on an economic analysis. If the present value debt service savings (resulting from selling "Aaa/AAA" bonds) exceed the cost of the insurance premium, the issuer benefits from selling insured bonds.

HOW REVENUE BONDS ARE SOLD AND WHO BUYS THEM

Bond issues are sold pursuant to arrangements between issuers and investment banks (underwriters). Such arrangements can provide for either a competitive or negotiated sale. In a competitive sale, several underwriting syndicates submit sealed bids to buy an issuer's securities for resale to investors. The issuer awards the bonds to the syndicate that offers to buy

the bonds at the lowest all-in interest cost. In a competitive sale, the underwriter is not involved in developing the credit, structuring the bonds, or pre-marketing the issue. General obligation bonds (secured by the broad full faith and taxing power of the issuer) are often sold at competitive sale.

The majority of revenue bond issues are sold through negotiated sale. In this case, the issuer selects a senior manager and several co-managers through a competitive proposal process. The criteria for selecting the investment bank that will serve as senior managing underwriter generally include the following: experience in structuring and selling revenue bonds that are similar to the bonds the issuer plans to offer; the ability to develop a strong credit structure, but one that maintains important flexibility for the issuer; the ability to market and sell the revenue bonds to a broad range of investors; and the ability to sell the bonds at the lowest possible interest rates. The reason that the majority of revenue bonds, such as toll road and highway revenue bonds, are sold through negotiated sale is that these financings are complex. These issues benefit from attention to developing the credit, structuring the bonds, and introducing the bond offering to investors through a well-developed marketing program.

The buyers of revenue bonds include individual retail investors, money market funds, bank trust departments, investment advisors, property and casualty insurance companies, and intermediate and long-term bond funds. Each of these investor groups focuses on a specific maturity range. In the current market, most retail investors buy bonds with maturities ranging from one to ten years, while long-term bond funds seek the longest and highest yielding maturities (the 20-year and 30-year term bonds). Each set of buyers also has specific credit criteria. Most retail investors limit their purchases to highly rated securities, while property and casualty companies and bond funds -- who can conduct their own detailed credit analyses -- may buy lower rated bonds.

CONCLUSION

The intent of this paper has been to describe the "traditional" use of bond financing in toll road and highway programs. In order to meet funding requirements that are ever-increasing, bond programs are being used for a full range of projects, including start-up toll roads and public/private partnerships. Some of the new projects incorporate "innovative financing" support. A $135 million lSTEA loan from TxDOT, for example, formed part of the original capital structure for the President George Bush Turnpike being built by the Texas Turnpike Authority. Other examples include federal lines of credit that provide operational support in the event that revenue generated in

the early years of toll road operation is not sufficient to pay debt service. Such credit enhancements were used in both the San Joaquin Hills and the Foothill/Eastern toll roads in California. A number of states are exploring ways to leverage funds that will be available to the SIBs. We can expect both "traditional" and "innovative" bonding programs to continue to play an important role in meeting transportation needs.

INTELLIGENT TRANSPORTATION SYSTEMS AND HIGHWAY FINANCE IN THE 21ST CENTURY

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Rapid progress in the development of intelligent transportation system (ITS) technology has set the stage for new approaches to financing transportation systems and services. In this paper we explore how ITS and related technologies can be applied to collect user charges from operators of motor vehicles. User charges -- principally fuel taxes and registration fees -- constitute by far the largest source of revenue for financing the construction and operation of highways in the United States. ITS technologies are very likely to play significant roles in the collection of user changes in coming years, but several important issues must first be resolved.

In this paper, we first discuss the nature of transportation user changes. We explain several underlying principles that should be taken into account when structuring user charges and discuss common problems that exist with contemporary methods for charging users of transportation systems. Then we explore current ITS capabilities as they relate to roadway pricing and the collection of user charges. Finally, we contemplate a series of public policy issues that need to be addressed for ITS technologies to play a central role in financing highways through progressive methods of collecting user charges.

PRINCIPL FS OF USER-BASED FINANCING

User charges in transportation represent an application of pricing to what are generally public facilities. While advanced technologies have the potential to implement progressive pricing and revenue collection approaches, it is crucial to have a clear sense of the public policy objectives that are being pursued. A useful point of departure may be to consider what these policy objectives might be; that is, why does society price the use of facilities such as highways?
Conceptually, there are four policy bases for pricing the use of public facilities. Society prices to:

- Generate revenue
- Cover the cost of providing service
- Influence behavior to induce greater or less use of a facility
- Achieve equity or other social objectives

Meri s of Cost-Based User Charges

Although the general purpose of this conference is to explore methods for collecting enough revenue to enable quality and appropriate transportation services to be provided (the first two bullets above), the points made in the last two bullets

also are highly germane. For example, if operators of heavy vehicles could be enticed to use highways with good load-bearing capacities instead of traveling on roads that incur costly damage by such vehicles, it would cost society less to operate the road system. Reducing the cost of providing transportation services can be just as fiscally beneficial as generating additional revenue to defray costs. Also, from a societal perspective, it is desirable to price use of transportation facilities equitably. If costs (i.e., damage to the roadway) are brought about by one type of vehicle more than another, equity would dictate that the vehicle imposing greater costs should be assessed a higher user charge (1).

Currently, the principal methods for levying user charges at the federal and state levels are motor fuel taxes and registration fees. In 1995, the states collected $27.1 billion from taxes on motor fuel and another $11.9 billion through registration fees (2, pp. IV-59 and IV-61). Federal user charges, almost entirely motor fuel tax receipts with some additional revenue from heavy vehicle registration fees, added another $ 18.1 billion (p. IV-67). [Incidentally, tolls collected by the states equaled $3.5 billion (2, P. IV-67).] Combining federal and state sources, motor fuel taxes accounted for 65.4 percent of all highway user charges.

The two primary methods of charging highway users are not entirely satisfactory from the perspective of "horizontal" equity (charging users commensurably with the costs they impose or occasion on the road system). The motor fuel tax is unable to charge users equitably because fuel consumption does not increase with vehicle weight nearly as much as does pavement and bridge damage. [Suppose, for example, that an auto attains a fuel efficiency of 24 miles per gallon, and a semi-trailer truck achieves six miles per gallon. The truck will pay four times as much motor fuel tax (assuming to differential in fuel tax rates between gasoline and diesel fuel). If on a particular type of road, the truck occasions 20 times more cost than does the auto, the auto user has a revenue-to-cost ratio five times greater than the operator of the truck.] Registration fees do not vary with the amount of travel and hence system use and wear. Neither registration fees nor motor fuel taxes require auto users delaying others and contributing to increased air pollution on congested highways to compensate society for imposing such costs. Horizontal equity argues for financing mechanisms that more closely reflect the cost to society of serving trips made by different vehicles on various types of roads.

In addition to horizontal equity, cost-based road pricing would require travelers to pay for the external costs they impose on others. The three primary types of external costs generated by road users are:

- Congestion delays

- Environmental degradation

- Safety reductions

For a road pricing system to be economically efficient (whereby users pay the full costs of their travel), all three types of external costs should be paid by users (i.e., costs should be "internalized") (3). Doing so would enable two policy objectives to be attained:

- Users would take into account the full costs they occasion when making decisions regarding road use. They may choose to travel at a different time or operate cleaner (less polluting) vehicles.

- Society could be compensated by highway users for the external costs these users generate.

In summary, cost-based user charges help enable several important public policy objectives to be attained. Current mechanisms for charging users generally are deficient in that the amount users pay is not closely related to the costs they occasion. [Appendix E of the 1982 Federal Highway Cost Allocation Study estimates that if in 1981 highway users had paid the full cost occasioned, roughly $60 billion -- about three times the actual amount collected -- would have ben raised by user charges at all levels of government (4, p. E-601.1 New approaches that would substantially improve governmental units' abilities to implement cost-based user charges become feasible with certain ITS technologies.

Problems of Collection

One way to think about transportation finance is that the total amount of revenue generated through user charges is less important than is the revenue net of expenses incurred in collecting it. An example is tolls assessed to users of toll roads. It is not uncommon for the administrative costs associated with collecting tolls to constitute 15 to 20 percent of the revenues collected (5, Table T-3).

Similarly, users often bear various forms of transactions costs. Delays at toll collection booths may be at least as onerous to travelers as the tolls themselves. Likewise, procuring permits for travel through various states can be a major inconvenience to interstate truckers. The American Trucking Association contends that the weighted average cost borne by trucking companies of complying with licenses, permits, and registrations is $197 annually per vehicle (6, p. 7).

Another problem related to collecting user charges is evasion. The Federal Highway Administration has estimated that 15 to 25 percent of the diesel fuel tax

is evaded (7, p. 67). A commonly cited problem with weight-distance taxation (whereby heavy vehicles are assessed a per-mile fee based on registered weight) is that some truckers may use less traveled roads (that are damaged more by trucks) to avoid being assessed a user charge. The rate of evasion for weight-distance taxation is at worst comparable to that for motor fuel taxes (8, p. 23).

A final user charge collection problem is related to the emergence of alternative fuels. As growing numbers of vehicles are powered by engines that consume fuels other than gasoline or diesel fuel, one must question the long-term efficacy of the motor fuel tax. Even in the short run, substantial improvements in fuel efficiency for virtually all motor vehicles, including semi-trailer trucks, portend significantly reduced fuel tax receipts per unit of distance traveled.

An Ideal System of User Charges

Given the myriad difficulties with current mechanisms for charging to charge operators of motor vehicles for use of roadways, it is instructive to contemplate the attributes of an ideal system of transportation user charges. We can then explore the extent to which ITS technologies would permit society to approach this ideal system. Based on the foregoing discussion, an ideal system of transportation user charges assessed to operators of vehicles operating on public roads would include the following attributes:

- Low cost of collection for both agency and user
- Stable revenue stream
- Users who occasion higher costs (e.g., road damage by heavy vehicles and contributions to congestion delays by autos) would pay more
- Low evasion rate
- Influence users to operate on appropriate roads and to spread traffic across time periods
- Unaffected by method of vehicle propulsion

How well can ITS technologies help governmental and private organizations move to user-based financing systems that embody the desirable attributes just listed? To contemplate this question, we explore general types of ITS technologies currently in use and more sophisticated approaches that may lie in the future.

CURRENT ELECTRONIC TOLL COLLECTION

The first electronic toll collection (ETC) facility on a roadway in the United States was installed in 1987 (9, p. 2). Since then, ETC systems have become commonplace. In 1995, of the 180 toll highways in the U.S., 87 had ETC capabilities (5, Table T-l .) As Figure 1 shows, 17 states now have or are constructing toll highways with ETC capabilities. According to Kolb (10), 32 additional ETC systems are scheduled to be completed by 1998. In fact, ETC technology has become the principal ITS approach for generating revenue from users of highway systems. It is significant that ETC systems enable several of the attributes of an ideal system of user changes to be incorporated. Specifically, ETC allows the following:

- Low cost of collection,
- Variable pricing by vehicle type or time of day,
- Low evasion rate, and
- A stable revenue stream.

By replacing toll booths with electronic technology, ETC eliminates the queues that reduce the performance of the tolled facility, thereby reducing travel time and irritation on the part of travelers. Likewise, the operating agency greatly reduces its labor costs. In fact, the Oklahoma Turnpike Authority has experienced a drop in its annual costs of toll collection per lane from $176,000 to $15,800 with the use of ETC technology (11 p. 15).

Equally important, ETC systems enable tolls to be collected on facilities where traditional manual collection stations would not be feasible. On its Tappen Zee Bridge, the New York State Thruway installed ETC technology at a site where expansion of manual collection stations was not possible. The Authority also was able to replace eight manual collection stations with five electronic lanes because while a manual lane can accommodate only 350 to 400 vehicles per hour, ETC lanes can serve about 1,000 vehicles per hour (1 1, p. 15).

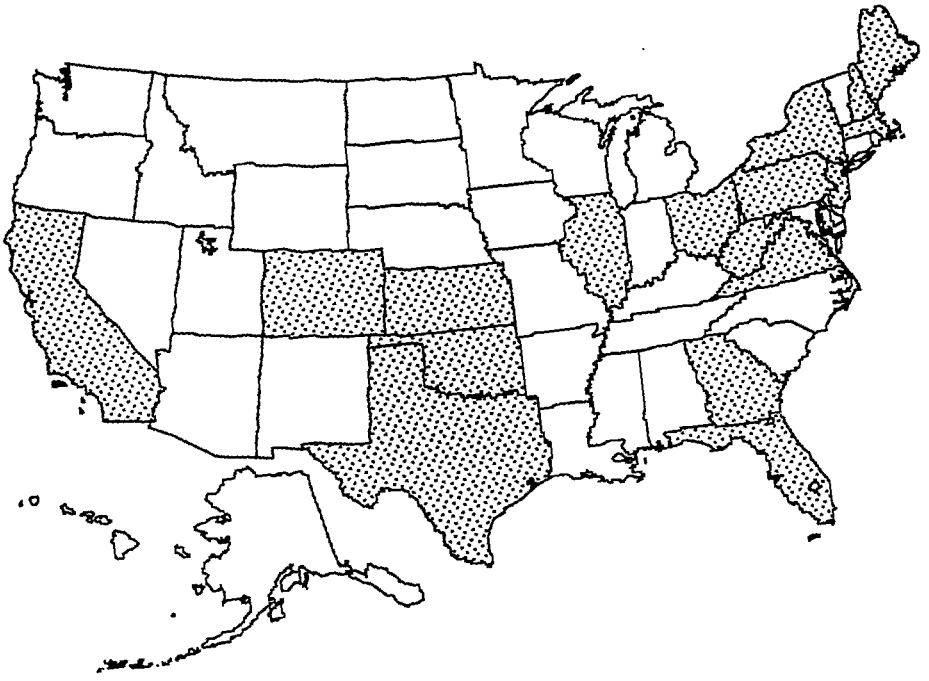

FIGURE 1 States with electronic toll collection facilities, 1996
Sources: FHWA (5, Table T I), Kolb (10), and Hartje (74, p. 60).

Basically, ETC systems embody one of two types of technology. One is automatic vehicle identification (AVI) systems consisting of vehicle-based transponders (a type of transmitter) and highway-based detection units (receivers). The other type of technology uses recording mechanisms in vehicles and no transponders. These recording mechanisms enable a prepaid "smart card" to be inserted and debits to be issued as the vehicle passes a triggering device at a charging point, although various billing options also are possible. Each of these two approaches is briefly described.

Automatic Vehicle Identification

AVI is the most common type of technology used for electronic toll collection in the United States. The transponder units are simple, compact, and inexpensive electronic devices that operate similarly to a single channel citizens band radio; transponder units have a unique vehicle identification encoded in a digitized format (72, p. 61.) [Pietrzyk and Mierzejewski (73, pp. 22-23) observe that the cost of a transponder unit ranges from $5 to $50, depending on the technology used.] It is possible to encode the type of vehicle, state in which it is registered, and other salient information such as chassis configurations of larger trucks.

Detection units consist of either directional antennae or induction loop detectors embedded in pavement. Both types of detection units can reliably read vehicle identification codes, even when vehicles travel through the toll plaza at highway speeds (74, p. 61). These units are connected to a simple microprocessor or data storage unit. Periodically, data from detector units are transferred to a processing center. The center aggregates charges for each vehicle and generates billing statements which are sent to the vehicle's owner.

A common concern about AVI is privacy, given that a centralized data processing facility would have information on a vehicle's travel patterns (75, p. 240). Najafi et al. (72, p. 63) contend that steps can be taken to minimize the infringement on privacy, such as matching tolls assessed by a vehicle with the name of its owner only for the purposes of billing and reviewing a contested fee. After a period of time, identifying numbers could be scrambled. Where significant tolls are charged, video cameras occasionally are used to verify contested charges and to identify vehicles without operable transponders. Provision can be made to also destroy videotapes after a reasonable time period.

From a public policy perspective, AVI systems have at least two important capabilities. One is to levy congestion tolls on crowded urban freeways or arterials. Changeable message signs can be used to inform travelers of the prevailing toll; higher tolls can be assessed during congested periods to encourage ride sharing or shifting trips to other time periods. A second important capability is to substantially

reduce and almost eliminate the transactions costs associated with toll payment. Vehicles with transponders can proceed through toll booths without even reducing speed.

Vehicle Recording Mechanisms

Much less common than AVI technology are on-board recording mechanisms coupled with relatively simple triggering devices at roadside or embedded in the pavement. Vehicle-based recorders mitigate the privacy problem because travel information is stored on board the vehicle itself. It also is possible to use either prepayment in the form of "smart cards" or a billing procedure. In the case of billing, the stored information can be downloaded periodically at a designated site, much as household utility meters provide the basis for charges.

Within urban areas, it is possible to establish a cordon line around a designated area such as the central business district. When a vehicle operates within this area, the recording device receives data from the vehicle's odometer, enabling per-mile charges to be levied. An application using distance-based fees within a cordon line has been under consideration in Cambridge, UK (16, p. 322). The greatest disadvantage of in-vehicle recording devices is enforcement. Not only must a triggering mechanism communicate with the vehicle to confirm that the user charge has been recorded, the triggering mechanism must ascertain that an operable recording device is present in the vehicle. Pietrzyk and Mierzejewski (73, p. 30) stress the need for a video camera to record the license plate of a vehicle that fails to communicate with a triggering mechanism. There are limits, however, as to how many cameras would be cost-effective.

In summary, existing ETC systems are best suited to applications on a limited number of toll highways or on urban freeways. The need for detectors or triggering mechanisms along the road makes ETC system use problematic in low-traffic rural areas or in many urban settings.

NEW ELECTRONIC USER CHARGE COLLECTION TECHNOLOGIES

For larger area coverage, such as entire states or even nations, an approach that is independent of roadside devices would be attractive. A promising method applying ITS technologies for collecting user charges is based on satellite communications. Automatic vehicle location (AVL) is an information system that uses a global positioning system (GPS) or other technology to provide real-time information about a vehicle's position. [The global positioning system (GPS) uses a $10 billion satellite positioning and navigation system procured by the Department of Defense; there is no fee for receiving signals from this system (77, p. 32). Currently, there are 24 satellites and 6 terrestrial control stations that regulate the

satellites,' operation (18).] A receiver on board a vehicle uses GPS signals (through triangulation) to record the vehicle's position. The record can be used to generate an electronic log of a trip. Receivers capable of providing ground positions within 100 meters currently sell for less than $200, and more expensive units provide accuracy within a few meters (79, p. 34). Many of the larger trucking firms now are using GPS technology aboard their vehicles.

Applying GPS Technology

It is likely that the low cost of GPS technology will have major implications for highway finance. The U.S. Bureau of the Census currently offers digital coordinates for virtually every significant road segment in the United States. These defining coordinates are available via TIGER (topographically integrated geographic encoding and referencing) files in a CD--ROM format. Using readily available geographic information system (GIS) software, an on-board computer can integrate GPS information with geographic files derived from TIGER files stored in the computer to establish which road the vehicle is traveling.

Charging Autos. For autos, GPS technology offers two primary advantages over motor fuel taxes. First, it is possible to charge the same per-mile rate for comparable autos regardless of the type of fuel they burn. Alternative fuel use, however, could be encouraged by charging a lower per-mile rate for environmentally friendly vehicles or those that are fuel-efficient. A second advantage of GPS technology is that pricing the use of roadways would be facilitated. As Gomez-Ibanez (20, p. 345) points out, there are two separate reasons for charging higher user charges on congested highways. One is to encourage efficient use of existing highway capacity and the other is to finance eventual expansion.

The CD-ROM file containing road segment identifiers could include a code for those segments on which a different charge is to be levied during specified times of day. Even better would be a simple on-board electronic receiver linked to the vehicle's on-board computer. Transmitters located along major urban highways could send current pricing signals to the vehicle. Changeable electronic signs could inform drivers of current user charges, and the same information could be provided via a radio station to enable drivers to decide in advance whether or not to use the congested highway. When the stored use data are downloaded, the appropriate charge could be applied, as in the case of a congestion toll.

Charging Trucks. For trucks, GPS technology offers important advantages as well. For example, the user charges for heavy vehicles could be structured in line with the costs occasioned by these vehicles when operating on different standards of roads. Federal and state highway cost allocation studies have estimated the relative magnitudes of costs occasioned by different vehicle types operating on

various classifications of roads, and these estimates could constitute the basis for the relative levels of user charges. [A new federal highway cost allocation study with updated cost responsibility data will be released during 1997. It was mandated by the Intermodal Surface Transportation Efficiency Act of 1991.]

Figure 2 provides an overview of how GPS technology could be applied to levy user charges for heavy vehicles (perhaps those weighing over 15,000 pounds).

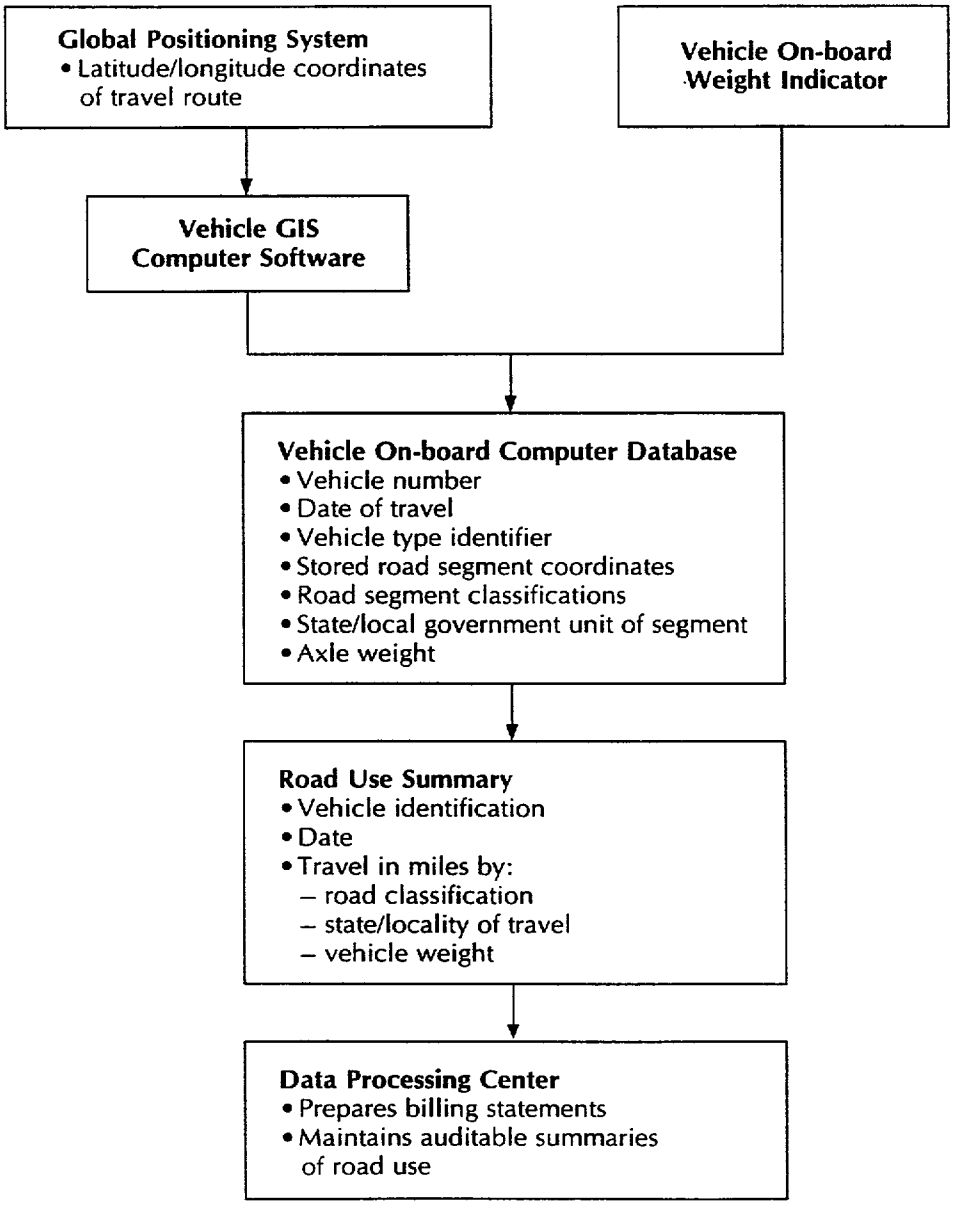

FIGURE 2 ITS approach to charging heavy vehicles for road use

The process of determining the appropriate user charge for trucks would be more involved than would be the case for autos. Two key inputs to the on-board computer would be: 1) GPS coordinates fed into GIS software and 2) information on the current weight of the vehicle. As with autos, the on-board computer would integrate the GPS/GIS information with geographic road files (based on census TIGER files) to identify the road on which the truck is traveling. In the case of trucks, the on-board computer would merge data on the road classification with data on vehicle weight and mileage traveled.

Road segment-specific truck user charges would thus be feasible. The importance of being able to vary user charges by truck weight and pavement classification is underscored by the conclusions of Small et al. (7). They show that the cost occasioned by trucks of a given size and weight vary by more than 100 times, depending upon the road classification on which they are traveling (Table 3-10). Likewise, on many specific road classifications, the costs occasioned by trucks of different weights and configurations vary roughly by the same order of magnitude (Table 3-9).

The Need for On-board Weight Indicators

We mentioned that a key component of a GPS system for assigning user charges to heavy vehicles is a vehicle weight indicator. It is important to distinguish this indicator from the pavement-based weigh-in-motion (WIM) scales that are seeing increasing application on major highways. WIM scales allow heavy vehicles to be weighed with minimal stopping at weigh/inspection stations. When used in conjunction with automatic vehicle identification (AVI), WIM scales enable participating trucks to be granted operating clearances at points downstream. We should stress that WIM technology has not evolved to the point where vehicles can be weighed accurately at normal highway speeds; WIM, however, greatly reduces delays at weigh stations. [The most extensive application of WIM to date is along the entire length of Interstate 75. Advantage 75, a consortium of six states (Florida, Georgia, Kentucky, Michigan, Ohio, and Tennessee) and a Canadian province (Ontario) is applying WIM along with automatic vehicle identification (AVI) and automatic vehicle classification (AVC). There are 29 weigh/inspection stations along I-75, and approximately 4,000 transponder-equipped trucks are participating in the operational test (27, p. 5).]

There are two reasons why WIM scales would not be adequate for the GPS-based approach being discussed. First, it would not be economically feasible to install these scales along low volume, low standard roads. Second, even along nearly all major highways, the spacing of WIM scales would be too great to adequately record changes in vehicle weights as cargo is added or off-loaded. Research has been ongoing to develop a reliable, cost-effective electronic weighing

system that operates on board heavy vehicles. It is not necessary that the weighing system be able to record the vehicle's weight while in motion. After each time cargo doors are closed, a reading could be made automatically before the vehicle is placed in motion.

On-board weighing systems are beginning to see use in such specialized applications as logging trucks in the Pacific Northwest. Because it is difficult to estimate whether a loaded truck is within state weight limits, these systems have been developed to avoid overweight fines. With further refinement, this existing technology is likely to be a suitable component of the ITS system for charging heavy vehicles to use the road system. [One supplier of on-board vehicle weighing systems, Creative Microsystems, claims its Loadman system has an accuracy within one percent as a vehicle is loaded on location. Data collected on the firm's systems can be processed using the firm's software which is compatible with a Windows 95 operating environment (22). To the best of our knowledge, there are over 20 firms supplying various types of on-board vehicle weighing systems.]

ISSUES RELATED TO ITS FOR COLLECTING USER CHARGES

It is significant that GPS technologies for assessing user charges would enable most of the attributes of an ideal system of user charges described earlier to be incorporated, as follows:

- A stable revenue stream would exist
- Users who occasion higher costs would pay more
- Incentives could exist for users to operate on appropriate roads and to spread traffic across time periods
- The type of propulsion system in the vehicle would be unimportant

Despite these major advantages, several issues exist. Paramount is the cost of outfitting each vehicle with an on-board GPS receiver and computer. The computer must have sufficient memory to store regional road files, necessary software, and associated segment classification data, as well as a record of the vehicle's travel since the previous data download. Because TIGER files combined with road segment classification data can be stored in a CD-ROM format, storage internal to the computer could be significantly reduced, however.

For GPS technology to be justified as a means for collecting road user charges, national application would be advisable and probably necessary. [A national system of charging truckers electronically would eliminate the myriad

permits and fees now required by many states. Trucks could operate coast-to-coast without any administrative interruptions.] Investment in the required on-board computers would be made more attractive to vehicle owners if,

- The motor fuel tax at both the federal and state levels of government and various state-level permits were replaced by a user charge system based on GPS technology, and

- GPS technology and the on-board computer had practical utility quite beyond facilitating the collection of user charges.

A good example of the latter point is on-board navigation systems, already available in parts of the United States. These systems vary in their features, but generally they provide real-time information to the driver regarding present location and routing to selected destinations.

The Need for Continued Research

Most of the technology discussed in this paper is readily available at the present time. As ETC technology and new approaches for collecting user charges electronically see broader application, market forces very likely will accelerate refinement and capacity growth. There already are about 60 GPS equipment and service providers in the United States (23, p. 22).

While GPS technology has progressed rapidly, several limitations need attention. Errors from GPS can result, depending on topography and tall buildings that interrupt the line-of-sight signals (18, p. 208). Dead-reckoning capabilities during brief periods of poor signal strength may require simple analog vehicle tracking inputs to the computers on board vehicles.

In a similar vein, on-board computer technology needs to further evolve. While these computers will be subjected to heat and vibration, reliability is important if a multi-billion dollar system of road user charges is to depend on them. A growing experience base is emerging, as more trucking firms use GPS technology for automatic vehicle location (AVL) applications. Movement toward a national heavy vehicle user charge system based on GPS technology would provide a stimulus for developing lower-cost, reliable on-board computers that build on the knowledge gained through experience in the field.

Political Factors

Adoption of intelligent transportation systems (ITS) technology to charge users of the U.S. highway system is certain to be far more dependent upon political

than technological factors. Highway user groups are likely to question the pending investment in on-board technology to enable users to be charged for their travels.

An argument can be made for governmental assistance in the development and initial application of new technology necessary to implement progressive methods of charging those traveling on the nation's roads. To the extent that the costs of enforcement and revenue loss through evasion experienced by federal and state agencies would be substantially reduced and equity among road users would be improved, it would be good public policy to help underwrite the expense of this new technology.

To be sure, for ITS technology to be applied in collecting road user charges, a high level of cooperation among the states will be necessary. There is ample precedent for this cooperation; for example, the International Registration Plan (IRP) involves reciprocal agreements that enable trucks registered in one state to operate on the roads in another. Similarly, states have agreements whereby motor fuel taxes paid by interstate truckers when they refuel in a given state are distributed to the states in which travel actually occurs.

Yet there have been significant differences among the states in terms of highway financing policy. States with weight-distance taxes have seen other states levy retaliatory taxes, and problems associated with issuing trip permits are well known. It will be necessary for states to agree that the benefits of a national system of user charges embodying ITS technology outweigh the costs.

Perhaps a logical place to begin is for the federal government, in collaboration with the states, to embark upon an accelerated research and development program to make automated user charge systems operational. Following suitable levels of field testing, the nation well may determine that cost-based user charges with ITS technology will indeed by the centerpiece of highway finance in the 21 st century.

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PUBLIC-PRIVATE PARTNERSHIPS ARE THE ANSWER; WHAT IS THE QUESTION?

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INTRODUCTION

As we approach the 21st Century, the highway improvement delivery system is evolving under the combined influence of several forces -- the increasing diversity of transportation problems and solution needs, continuing public resource constraints, the "right sizing of government, global trends towards commercialization and privatization and the value of enhanced performance. In response to these factors, new forms of project delivery are being developed -- based on a wider range of revenues and financing methods, new project development processes and new institutional relationships.

Finance and institutional roles are inextricably linked. The introduction of new sources of revenue and financing methods alters the project development process itself. These alterations, in effect, reallocate the traditional functions of both public agencies and private-sector entities and also introduce increased private sector responsibilities. The resulting new configuration of sectoral roles and the related organization of the attendant risks and rewards constitute "public-private partnerships."

Over the last 10 years, a few "pioneer" states have experimented with various forms of public-private partnerships. The 1980's experiments were generated by project-specific requirements -- in regions experiencing major facility needs where conventional financial resources and delivery system were inadequate for major new projects. Inspiration was taken from international models and contemporary examples of commercialization in other sectors where direct user financing, private management and turnkey development are the norm.

Throughout the nineties, federal, state and local government transportation programs have continued to be constrained by a combination of the "4-Ds": deficits, downsizing, devolution, and deregulation -- shrinking their financial and institutional capacity. In response, ISTEA and subsequent federal actions have progressively enhanced the flexibility and leverage of the federal aid program and specifically encouraged the commingling of toll and other public and private resources, cost-sharing arrangements with private road development entities, new forms of project delivery such as turnkey development and new frameworks for program finance such as state infrastructure banks. NEXTEA proposals continue this trend. Exhibit 1 presents the key milestones in this federal legislative history.'

Despite their apparent potential, public-private partnerships are still in the experimental stage with few completed implementations. But there are several projects with precedent-setting features in the late stages of development. Furthermore, valuable lessons have been learned through policies developed, models created, deals negotiated (and derailed). Mainstreaming these promising new approaches requires integrating new policies and procedures into the transportation infrastructure

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development activities of both public agencies and industry. This paper aims at setting a context for discussion of the issues surrounding these developments.

The question, therefore, is: "What promising new resources procedures, roles, and relationships, for improved highway delivery are suggested by the current constraints, opportunities and the lessons to date?"

I. THE ANSWER: NEW REVENUES/NEW ROLES: THE FEATURES OF 21ST CENTURY HIGHWAY DELIVERY SYSTEMS

KEY FEATURES OF PUBLIC-PRIVATE PARTNERSHIPS

New approaches to the delivery of major highway facility and service improvements involve mobilizing combinations of different revenue sources and related financial methods with required supporting departures from the conventional road development process. Together these innovations lead to new models for public agency and private entity roles and relationships.

The Objectives of these innovations has varied from project to project and within programs but have generally included:

- Generating additional financial resources -- above and beyond conventional federal and state motor fuel and vehicle taxes -- in the face of general increases in capital needs
- Accommodating important but expensive improvement projects which would otherwise dominate program budgets
- Controlling (eliminate) cost overruns, given limitations imposed by tax revolts and politically constrained budgets
- "fast tracking" project development to accommodate/match service needs and to respond to the pace of needed economic development and other land-use programs
- Avoiding extended procurement and disruptive phased build-out cycles
- Improving efficiency and performance in term of integrating of life cycle economics and quality assurance
- Responding to customer markets for special services (premium and special services such as hot lanes or intermodal facilities)
- Operating the systems in real time to minimize incident impact
- Accessing and deploying the latest technology for "intelligent systems" and longer life cycle facilities
- Obtaining a single point of responsibility for increased accountability
- Avoiding the necessity to add staff in a downsizing environment

These objectives are accommodated through various combinations of modification to the traditional highway funding and project development process in terms of revenue sources, finance methods, development procedures and the use of special expertise from private sector entities. This "toolkit" of features include:

- New revenue sources
  - Tapping new sources of revenue through greater reliance on direct user charges

through tolls and other types of beneficiary assessments in an effort to augment scarce conventional legislated tax resources
  - Commingling various revenues sources including public – local, state, and federal -- and private funds to maximize leverage of scarce public funds
  - Provision of premium services – at a price -- in response to the demands of specific customer market segments
  - Incorporation of private road developer/service provider equity in partnership to reduce public-sector budget impacts
- Efficiency and financial risk reduction measures
  - Single point of control and responsibility
  - Guaranteed construction costs and schedules to minimize unanticipated cost overruns
  - Incorporation of life cycle costs and the best available operational technology to improve efficiency
  - Use of private debt and equity financing to finance early project development and capture earlier benefits than possible with pay-as-you-go financing
  - Outsourcing of roadway operations and management (with cost guarantees) to minimize permanent pubic agency staff burdens and costs
  - Quality assurance to improve project performance
- Schedule control
  - Turnkey-based "fast track" delivery with program and construction management to reduce construction disruption and provide improved service earlier
  - Use of liquidated damages/early completion incentives to spur design/construction on-time/on-budget project delivery
- Innovation and new market response
  - Origination of project concepts as a market response -- outside the conventional state and metropolitan planing process to provide incentives for innovation
  - Incorporation of "best available" technology (ITS, ETC) from the private sector to improve project efficiency
  - Experience with provision of market-based services and prices and insulation of public sector from customers in association with priced projects
- Outsourcing for specialist expertise to maintain "right-sized" government
  - Capitalizing on investment market financial and marketing expertise
  - Reliance on an enterprise model (self-sustaining entity with professional business management) to produce the most efficient project development

Some of these features are linked. That is, certain forms of "innovative" finance require changes in the project delivery process and, therefore, new roles for private entities and new relationships between public agencies and private entities. For example, debt financing to provide new investment-based improvements requires a reliable mechanism for repayment revenues to attract investors -- or an outside guarantee. Tolls from user beneficiaries are usually the source for such debt repayment. Often there is no additional source of loan repayment or non-project guarantees beyond project earnings that can be built into the project financing (the project sponsor is a corporation and there are no significant assets). While there are a variety of financial means to "enhance" the credit of such loans in an insurance-like manner, the cost of such "non-

recourse" finance is reduced if all forms of risk to project completion, schedule, cost and demand can be eliminated.

Conventions of "project finance" include several arrangements within the structure of project delivery systems to reduce the risks of delay, cost overruns, or over-forecasts and to transfer the risks to the party best able to control those risks. These include: contractors bearing the risk for project design and construction costs and completion schedule via turnkey contracts and incentives/disincentives; careful management of the project development process through private program management; access to latest financial technology expertise; outsourcing road operations and maintenance etc. All of these risk management activities involve changes in public vs. private sector roles. Indeed, a core activity of developing an effective partnership is the allocation of project risk and rewards in the most realistic and cost-effective manner while still protecting private and public partners' basic non-project objectives.

THE POTENTIAL **OF INCREASED PRIVATE SECTOR INVOLVEMENT**

The set of innovative features, described above, in various combinations constitutes major change in the project development process, which, in turn, requires a range of new expertise as well as the development of new policies, laws, programs administrative procedures, and related organizational changes.

However, the conventional publicly administered, federally standardized project development process has traditionally had little contact with the private investor enterprise, management and financial expertise or the related performance and management innovation characterizing other public utilities. Power and telecommunications networks in the United States, by contrast, are increasingly deregulated, privately managed, multi-regional, investor-owned, commercial enterprises financed from user fees. Similar trends are apparent in water and waste management.

In transportation infrastructure, however, the public agency defines the product, manages the process, makes the key decisions and takes (on behalf of the public at large) all the risks related to cost, delay, quality, and customer satisfactions. The private-sector role -- in the form of design and construction entities -- has been limited to arms-length vendor status, supplying competitive low bid services for a fee confined to sequential design/bid/build processes under public-agency specifications/oversight. This type of arms-length service provision lacks the incentives of continuing beneficiary involvement, equity stakeholding, or full ownership normally associated with the entrepreneurial and profit-driven orientation to improved products, production, or performance in a free-enterprise economy.

At the same time, there are private-sector entities prepared to provide the needed resources -- both capital and expertise -- that involve arrangements placing private entities in new roles vis-a-vis the public agency. These entities include not just contractors and engineers, but also international investors, developers and other service providers such as maintenance specialists, technology providers, etc. The new roles include suppliers of technical resources normally not found in public highway agencies, providing new forms of service such as combined design and construction,

and in some cases the introduction of private financial resources. Each of these new roles represents a business opportunity related directly or indirectly to transportation improvements -- real-estate, engineering, construction, transportation technology, and finance program management -- to access additional fees, earn higher profits, consider equity investments and, in general, to expand in related business areas.

From the public-sector perspective, consideration of contracting to private entities certain services previously undertaken by public agencies and agency staff can be the logical response: first, expanding activity and accessing needed specialist expertise without taking on additional staff; second, accessing new sources of investment capital independent of tax-constrained funds.

Increasing involvement by private entities in new roles within the highway development process may be considered a spectrum including: more fee services, new fee risk/reward relationships related to specific services (such as the liquidated damages/completion fee incentives within design-construct contracts), developer/contractor taking equity or debt positions as part of compensation for services to private ownership, developer contractor taking financial risk related to project performance as owner or lender. Within this spectrum there is a fuzzy border regarding the type and level of stakeholding in project performance that may be expected to provide the basis for increased private investment in improved technology, management, and customer service. This range of new private-sector roles include:

- Project and/or construction management (as public authorities agent)
- Operations and maintenance
- Turnkey design/build fixed fee contractor (with the contractor at risk)
- Full service provision finance/design/build/operate/maintain (DBOM) -- on a fee basis
- Developer finance/build/operate/transfer (BOT) of a publicly programmed and planned project or an equity owner or partner with the public sector
- Sponsorship including project origination with finance/design build operate rights under contract (franchise or concession)

PUBLIC PRIVATE PARTNERSHIPS

This restructuring of agency and private entity functions in the delivery of highway facilities and services is generically known as “public-private partnerships,” which can be defined as a “change in roles and relationships based on a new mix of complimentary public and private resources (expertise, technology, finance) pooled towards a common objective -- while still achieving the partner’s respective separate objectives.” The involvement of private sector entities in these new roles and new forms of stakeholder relationships on a “peer” basis with public agencies in the highway development process constitutes a profound change in the highway service delivery process.

II. CURRENT STATE OF PLAY: ALTERNATIVE PARTNERSHIP MODELS FOR ROAD DEVELOPMENT

PUBLIC-PRIVATE PARTNERSHIPS PROJECTS IN PROGRESS

There are over 25 highway and bridge projects in various stages of development involving innovative mixes of revenues with private entities in roles beyond fee design and construction.

Exhibit 2 is a selection of projects in the most advanced stage of development. As indicated in the exhibit, the innovation in finance and project delivery is focused at present on larger projects, many of which are over $200m. Projects at this scale can substantially preempt a state DOT's capital program and might -- without tolls and other innovative finance -- be impractical. As can be seen, all these projects involve design/build project development, and typically have private road development entities providing financial, operational and maintenance services as well.

MODELS OF PUBLIC-PRIVATE PARTNERSHIP

These projects expand the range of project delivery models. The range now encompasses those using conventional finance and delivery approaches (but using the full financial and project delivery flexibility now within the federal aid program) to fully privatized toll roads at the other extreme, and include such "hybrids" as: ISTEA-based developer-sponsored public private partnerships with public resources-sharing, the non-profit variant, and innovative public authority toll roads. The principal features of these models are compared below:

- Traditional free road with conventional funding/development (This model *encompasses traditional major road development.)*
  - State agency owner and developer
  - Private firm provides limited services for fees
  - Tax funds (capitalizing on new Federal flexibility)
  - Pay-as-you-go project segments
  - Sequential design/bid/construct on a lowest cost bid basis
  - Project permitting public
  - All risks public
- Advanced "Free" Road Utilizing Innovative Finance /Turnkey Project Delivery (This *model has been focused on large road reconstruction projects such as I-75 Salt Lake.)*
  - State agency owner and developer
  - Turnkey fixed-price design/construct and maintenance with incentives/disincentives
  - "Innovative finance" possibly including debt finance against public tax fund guarantees
  - Project permitting public
  - All risks public

- Innovative Public Toll Road *(This model has been focused on large new road projects such as the TCA toll roads in Orange County, CA.)*
  - State/local agency as owner developer
  - Revenues from users/beneficiaries (tax-exempt debt)
  - Mix of toll revenues, assessments, state/local funds as loans/grants/credit
  - Private firms provide some (turnkey to full finance/DBOM) services for a fee
  - Private entities may defer payment or take equity as part of fee
  - Project permitting public
  - Most risks public; private contractors may risk fees, some equity
- Non-Profit Community Association Developer Toll Road *(This model is increasing/y used in several public-p&ate partnership projects in WA, AZ, MN, SC and VA.)*
  - Community non-profit corporation as owner/developer
  - Revenues from users (tax-exempt toll-backed debt)
  - Mix of toll revenues and state/federal/local funds as loans/grants/credit
  - Private firm provides multiple services (finance/DBOM) for a fee
  - Private firm may also take equity or deferred compensation
  - Local government role as sponsor
  - Financial advantage of tax-exempt debt
  - Project permitting public
  - Most risks public; private may risk fees, some equity
- Private/Developer-Sponsored Toll Toad *(This model was used in the Dulles Greenway and SR-91 Expressways in Orange CA and is under negotiation for several of the larger projects listed in Exhibit 2.)*
  - Private firm as owner (finance/develop/operate/maintain on a BOT or BTO basis) participating in project revenues (or losses)
  - Revenues from users/beneficiaries (toll-backed taxable debt)
  - Mix of toll revenues, assessments/contributions and state/federal/local funds as loans/grants/credit)
  - Finance with developer equity, venture capital, taxable debt
  - Public sharing of total project cost or some component such as permitting
  - Turnkey design/build contract
  - Project permitting public or private
  - All or most risks private

THE MODEL SPECTRUM

The model spectrum is organized around finance, development procedures and roles. Finance is a key determinant in the spectrum and with its point-of-departure resources confined to state and federal fuel taxes and other dedicated motor vehicle-related tax and fees (combined under new programming flexibility available within the federal-aid program) with successive “innovations” adding beneficiary sources such as assessments, use of publicly guaranteed debt (pledging taxes and apportionments) and, finally, tolls (supporting taxable or tax-exempt debt) and various forms of credit enhancement. It should be noted that the addition of beneficiary funds and non-transportation sources often involves new roles for local government (local authorities) as project developers or co-funders.

The most significant departure from convention is the reliance on tolls as a source of revenues, albeit tolls mixed with conventional state and/or federal tax funds. Indeed, the hallmark of the most innovative finance is the commingling of toll, state tax and other local and private property assessments with some type of direct or indirect federal support.

As indicated in Exhibit 2, a large number of public-private toll projects are utilizing community non-profit association as a development vehicle. Al 963 IRS ruling (63-20) permits a state to establish a local community-based, private, non-profit corporation (usually called "association") to act on the state's behalf in issuing project revenue bonds and developing a project. By virtue of its public benefits, the association is empowered to issue tax-exempt debt. The lower cost of tax-exempt debt in project finance can be a compelling factor to private sector interests interested in promoting new toll roads even though IRS restrictions do not permit long-term private involvement in ownership or contractual relationships as with more straight-forward franchises-style privatization. Nonetheless, private development entities interested in road development business such as design and construction companies and property developers are been working closely with local and state governments to capitalize on this model. The partnership relationship is typically structured in terms of fees-for-service covering finance as well as design/build/operate/maintain services (DBOM).

The project development spectrum also incorporates the introduction of related project development procedures -- especially turnkey design and construction providing fixed-price guarantees as well as the potential of substantial time savings (with earlier revenues) and the cost savings of substantially reduced public agency efforts. More recently, major projects are experimenting with adding guaranteed maintenance into turnkey procurements.

THE RELATIVE ROLE OF PRIVATE SECTOR IN THE MODELS

These new approaches present a series of technical and institutional challenges to the existing highway development institutions. The complexities of understanding and administering the commingling of public funds with private funds, especially within the context of contemporary project financing structures, and the challenges of negotiating equitable and responsible approaches to mitigating and sharing the risks -- both public and private -- that are introduced by guaranteed prices and schedules, reduced margins for error, money cost of delay and non-standard or innovative technologies such as ETTM require special technical and managerial expertise. These challenges underlie a third vector across the model spectrum -- the use of special project management consultants and advisors to develop and administer new forms of agreement and to provide oversight and quality assurance of private entities performing new types of service.

Contractual arrangements placing private entities in these new roles -- such as providing design and construction on a fixed cost and schedule basis -- have shifted certain previously uncosted risks from the public sector (taxpayer) to the private entity. The risks involved in new private entity roles include financial costs of delay in permitting, liquidated damages for failure to meet construction deadlines, construction

cost overrun losses for turnkey contractors, shortfalls in traffic revenues due to changes in economic context or competition, and the resultant costs to equity or credit instruments and risks to corporate reputation

The benefits of these changes in the delivery system roles, and risks are presumed to move the project delivery process towards increased efficiency. However, each incremental increase in private sector responsibility involving changes in traditional roles and responsibilities brings with it the need to develop the appropriate institutional framework. The slow rate of project development where both innovative finance project delivery and private-sector roles are combined reflects both the number of "agenda" items such projects impose on state and local governments -- ranging from new policies to new administrative mechanisms and the need to custom tailor agreements and the counterpart costs and risks to private-sector entities that expend potentially unrecoverable resources in such endeavors.

At the project level, there is a wide range of issues to be addressed relating to private-sector risks and rewards as well as public-sector counterpart concerns regarding preservation of the public interest. Many of the required commitments at the project level benefit from state-level legislative authorization. But equally important, capitalizing more broadly on the benefits offered by the models developed to date requires "institutionalizing" a supporting framework in policy, budget, programs, negotiations and public education.

III. "BUT FOR": THE PATH TO MAINSTREAMING--CHALLENGES AND LESSONS

"BUT FOR" ISSUES

There has been slow progress in moving public-private partnership projects to implementation. In part this relates to the limited candidate projects. While the early public-private partnerships were "greenfield" projects where resistance to tolling was not encountered, more recent candidates have begun to focus on logical targets for new forms of finance and partnership. These include high-volume facility reconstruction (principally interstates), major bridge reconstruction, and network pricing chosen to mainstream highway development processes. There are more than a dozen projects for which project agreement negotiations have been completed and an equal number of projects that appear to be moving into the negotiation stage.

There has been enough experience to identify some of the key issues suggesting that serious robust long-term programs will involve continuing institutional evolution to account for/prepare for change in functions, roles, relationships, risks and rewards at all levels. The discussion below addresses some of the key challenges at various levels in mainstreaming public-private partnerships -- policy/legislative, budget and finance negotiation, and risk sharing and policy.

POLICY AND LEGISLATION

Many of the conventions of highway project development are embodied in state (and federal law as well as administrative procedures. Some issues are even constitutional. Legislative clarification of the authority of state or local government agencies to depart from the existing conventions of project finance and delivery, such as those contemplated n public-private partnership issues, is essential for a successful program. The basis requirements include authorizations to:

- Seek and develop new forms of agreements with public and private entities (including outsourcing, franchises, etc.
- Employ partnerships for a wide range transportation improvements (including roads improvements, new technology
- Use private and public entities to conduct the complete range of necessary activities and new roles
- Employ new forms of finance (including tolls and private equity commingled with state and federal funds, pricing)
- Execute new forms of contractual arrangements such as outsourcing , turnkey, franchising and project selection, and procurement processes (RFPP, negotiation, competition

Starting with California and Virginia in the mid-eighties, 43 states have now developed legislation focusing on authorizing some form of new public-private partnership approaches to highway finance and development. Subsequent states built on the California and Virginia models, gradually incorporating the experience from previous local projects or project level negotiations as well as responding to local circumstances, experience and the predilections of the drafters, either legislators or project developers. Most bills also conform with the opportunities offered by ISTEA regarding the use of federal aid.

Legislation has been developed according to two basic approaches: broad and permissive or explicit. The most recent state legislation efforts have attempted to provide the responsible agencies with flexibility to deal with a range of projects, leaving the details to the project agreement level.

Exhibit 3 illustrates the wide range of state legislative approaches, including the short and general (Washington) to the longer and more specific (Colorado) as well as states that have updated their legislation after first round program experience (Virginia and Arizona). California's legislation authorizing totally privatized projects (AB 680) and public toll projects (Orange County TCA) are included for comparison.

Approaches of these states regarding sectoral roles and road development sponsors -- either private or public toll road development -- varied depending on the attitude of the state highway agencies and the presence or absence of a public toll authority, perception regarding attractive projects and the presence of strong private or local government road development interests. The more active states include AZ, OH, WA, OR, MN, FL, SC, VA and TX.

Since few projects that are authorized in legislation have yet moved into implementation, the principal check on legislation has been the experience of the projects for which project agreements or franchises have already been negotiated. Indeed there has been an iterative relationship between project agreements and improved legislation that indicates that many of the issues later encountered at the project level are better handled in enabling legislation. Key issues that project experience suggests need to be covered in enabling legislation include:

- Ability to impose tolls
- Pilot program vs. program integration authorization
- Ability to commingle federal, state, and private funds
- Exception from conventional procurement
- Ability to award exclusive franchises
- Conformance with ISTEA/NHSDA features
- Ability to negotiate agreements that allocate risk and rewards
- Exercise of eminent domain and granting of other property rights
- State vs. local project reviews authority and related opportunities for community involvement
- Private use of public right-of-way
- Ability of sponsor to impose fees tolls
- Exclusive rights to provide a public service for a profit
- Protection of private-sector project concepts (intellectual property)
- Conformance with applicable state standards and criteria
- Rights in ownership and spatial and temporal extent
- Non-compete clauses

Partnership programs illustrate several ways in which efficiency and equity are maximized within the concept of monopoly franchises. Low-bid approaches are increasingly inapplicable as the range of services being sought involves a larger number of performance features. Furthermore, the inclusion of unsolicited projects as part of a public-private partnership program to promote innovation (as in the case of several states legislation) makes proposal comparisons difficult.

One approach is through the maintenance of competition in the procurement process. Some states (such as Virginia) have adopted an approach that allows competitive proposals for unsolicited projects.

Other states have developed selection criteria by which they rate proposals -- solicited and unsolicited. In Colorado, for example, in addition to soliciting competing proposals to unsolicited submissions through a public notification process, state policy also state that unsolicited proposals must meet certain specific tests. They must be:

- Innovative and unique
- Independently originated
- Not an advanced version of a known department requirement that can be acquired thorough competitive means
- Sufficiently detailed
- Technically and economically viable
- Contributory to department's mission
- Based on proposer's qualification

- Adherent to department standards

A'third approach to ensuring efficiency is through technical and financial oversight. A convention is developing that subjects the key contracts and subcontracts of private road development or turnkey contractor entities to the oversight of the public's partner's own engineering consultant program manager or general engineering consultant.

The fourth approach is through regulation. Any agreement (such as a franchise) that permits private profit based on exclusive access to/use of a public resource (such as right-of-way) suggests oversight to assure equity. Two generic approaches have emerged: regulating the rate of return or regulating prices (cost of services). There appear to be significant advantages to rate of return in that it provide incentives to the franchisee for efficiency and pricing flexibility.

KEY POLICY/LEGISLATIVE ISSUES FOR DISCUSSION

1. How can the legislative development process and the resulting legal mandates be used to most strongly support a commitment to innovative finance and tolling, project delivery, and public-private partnerships?
2. What is the best approach to "regulate" monopoly provision of services within a profit -making context that will provide incentives for both private and public partners?
3. Are special "policy approvals" required for toll projects or public-private partnerships and at what level of government?
4. What is the most useful legislative strategy regarding level of detail and discretion as between the broad and permissive vs. the detailed and specific?
5. Is there a need for model legislation?

PROGRAM AND BUDGET DEVELOPMENT

Most public partnership projects are still handled outside the regular planning, programming, and budgeting process. While this may reflect the pilot status of many state public-private partnership programs, it also indicates the gradual pace of confronting the programmatic implications of limited resources other than through conventional program retrenchment.

Planning is affected by different approaches taken to project origination. Most states allow project sponsors to propose partnership projects -- regardless of their STIP, TIP status. Oregon and Arizona have also solicited specified projects with the intent of negotiating the best deal. A key challenge that lies ahead is the problem of systematically integrating unsolicited projects, which may not be currently programmed into plans and programs, together with the problems of dealing with proposals that involve converting roads programmed as "free" into toll projects within the metropolitan planning process.

A key challenge will be to build both toll and tax-supported projects into the states and regional plans and TIPs using such logic that attract the necessary legislative and pubic support. There is a difficult transition facing many states where certain projects that may be in the back end of state and metropolitan programs, long

"promised" to supporters as "free" projects, may be among the most logical candidates for tolling. Some MPOs, such as those in North Central Texas and Houston, are developing logical approaches to this challenge.

Projects to be developed with new revenues sources (tolls and other beneficiary fees) require a strong revenue base -- which means traffic levels sufficient to cover costs of development, operations, and finance, even where public partner cost-sharing is involved. Two factors have substantially limited the inventory of attractive projects. First, STIPs typically include most of the long-standing major facility improvements with a legacy of promises regarding priority on the use of tax funds. As a result, the strongest projects from a project finance perspective appear "committed" to their beneficiaries' "free" projects, the cost of which will be shared with the entire state taxpaying community. Second, a major role for new resources should be the task of reconstructing and improving the upper level highway system, which carries a high percentage of total traffic. The existing restriction on tolling interstates removes the facilities with the highest traffic levels from consideration for direct user finance.

The programming point-of-departure is focusing toll financing on projects that meet certain logical criteria including:

- Sufficient opening day traffic to support operations and maintenance costs and a substantial portion of capital costs recognizing that commingling extends the financial support envelop of tolling
- Projects where tolling is physically convenient from an operational perspective
- Projects which cannot otherwise reasonably expect to be funded conventionally because of high costs or relatively low-priority claim on public funds
- Projects where the local user community accepts the logic of toll financing
- Projects where there is private project development interest

Budget and program are interrelated. Programming must reflect the availability of resources and public and political support. Projects that demand resources considered beyond conventional funds assumed "reasonably available" have, in many cases been eliminated, postponed, or piecemealed. New resources and project delivery methods can, in some cases, support such otherwise financially unfeasible projects. This process has been confused by the potential for state- and federal-level earmarking that can discourage interested parties from facing the budget limitation realism essential to generating support to tolling.

Coupled with the programming process is the development of financial administration that is capable of integrating a series of different of approaches to funding future projects. The advent of SIBs and the growing acceptability of tolls are introducing potential options that need to be integrated into the short and long term plans and budgets. Three key challenges must be met. First, "Innovative Finance" within the conventional federal aid program has substantially increased the flexibility regarding the use of federal-aid in combination with state tax funds or other revenues sources. Second, the future financial program must be capable of accommodating a large number of uncertain variables that would part of assessing the schedule and delivery of a program of several debt-financed projects including future interest rates, revenue streams, credit worthiness and a set of associated risks. When commingling of

public and private resources is considered, a third level of complexity is introduced in terms of, the appropriate mix from a feasibility or leverage perspective. Finally, the potential for a state infrastructure bank to provide loans and lines of credit as well as general loan repayments and fees introduces interactive and inter-temporal dimensions. These complexities are a long way from pay-as-you-go program financing.

Some states have already structured SIB operations, but none have fully integrated debt financing as a systematic option within the programming and budgeting process or developed a process that deals with the iterations among future revenues (as related to toll levels and individual project cash flow), capitalization (as related to the potential leverage of finance on both project and tax-based revenue streams) and the financial support poultices that can be applied variously (loans, grants, credit).

One issue that is currently affecting the viability of partnership projects and the choice of institutional model is tax treatment of debt. There appears to be a potential conflict within state government between transportation interests that support tax-exempt finance as the least expensive approach to more feasible projects vs. state financial agencies that are concerned about the potential impact of the risk of tax-exempt bond issues against the states credit -- even though there is not direct legal responsibility.. Tax treatment issues will continue to inhibit more vigorous private investment in transportation projects as long as the constraints against private involvement in federal tax law remain

KEY BUDGET AND PROGRAM ISSUES FOR DISCUSSION

1. How can private-sector origination best be meshed with the existing state and metropolitan plans and TIP development processes?
2. Should innovative finance, project delivery and partnerships be limited to large scale projects only?
3. What are the appropriate criteria for allocating financing mixes and strategies (especially toll vs. non-toll) among projects?
4. How can financial realism be best encouraged in state and metropolitan budgeting and resources allocation?
5. What technical tools are most needed at the state level to support financial program development?
6. How can the varying debt-related tax treatment concerns be reconciled within state programs?

NEGOTIATION AND RISK MITIGATION

The principal focus of new forms of public-private partnerships is to develop roles, responsibilities, and relationships that can most effectively tap the respective strengths and unique resources of each partner. New roles and responsibilities, by definition, introduce new and relatively unknown potential for both reward and risk (monetary, service, political). Each partner starts with different objectives and constraints that may be unfamiliar to the other. Cultural and institutional differences between the public and private sector include such issues as “time is money” or “my boss can’t afford a visible program failure.” Development of an effective partnership consists of recognizing these different objectives and constraints in a structure of formal

arrangements designed to promote each partner's rewards and reduce each partner's risks --while still capitalizing on each partner's strengths.

These abstractions are ultimately tested in the context of specific projects-related negations between willing partners in the form of contractual documents. It can be said, regarding "progress" in public-private partnerships, that the existing negotiated partnership agreements that have been developed (although not yet implemented) are the greatest success story to date and a reasonable basis for general optimism about the future of partnerships. Substantial technical resource both from the public sector and private sector have been focused on development agreements that carefully lay out definitions, scope, standards, procedures, rights and obligations, liabilities and warranties, defaults remedies, etc. Within these documents, considerable attention is focused on mitigating the risks at various stages of project development.

These risks may be shared by both public and private partners in different degrees -- although the implications of outcomes are quite different institutionally. Each sector also has unique risks. Project failure can mean business failure to the private sector and returns on the investment, direct or indirect, are the critical measure of success. The public-sector partner has risks that are public interest, bureaucratic, and political, relating to program success and impact on other programs and organizational unit success.

Three well known but problematic risks continue to be permitting traffic and revenue, and political uncertainty. The key uncontrollable market risk relates to traffic and revenue forecasts. Toll projects, especially greenfields, can be substantially dependent on future development rates and patterns. Forecasting the timing of such development is notoriously uncertain. A recent survey of toll project forecasts found more than half substantially below their forecast during early years. It is less well recognized that debt financing -- especially with private equity involved -- is at the mercy of administrative and political risks of delay, such as permitting and other approvals -- and can render many projects unfeasible.

Critical to the success of a partnerships, therefore, are legal and related arrangements that mitigate risk to the satisfaction of each partner. Exhibit 4 lists sample strategies for risk mitigation for both the public and private partner.

The reverse side of risk identification and mitigation is reward sharing. This is a relatively new issue to the transportation public sector since "profits" or excess revenues (beyond those utilized in operations, maintenance, reserves, interest on borrowed capital) have been irrelevant in user fee-based public authority toll roads where there are no "owners" with equity interest other than the state itself. In public authority toll roads, interest paid to private debt holders is really a cost, while other revenues are dedicated by bond covenants to various types of improvements.

The interest of pubic agencies in toll roads -- especially given the burden of innovation and being the messenger of tolls to interest groups -- is bound to be affected by the degree to which the departments can expect to generate additional resources from revenue-generating projects. There are two related issues: the ability of the state

to receive compensation and the ability of the DOT to control its disposition. Other transportation public agencies, such as port authorities, may generate excess revenues earned by specific activities defined as “profit centers,” but those moneys are usually used to cross-subsidize activities that do not cover costs or to expand operations etc. State revolving load funds for transportation projects now offer such an opportunity. In. most SIB proposed arrangements, profits and/or special fees from public-private partnerships are deposited with the fund and re-lent or granted to other future projects -- so that public-private partnerships projects fund each other.

KEY NEGOTIATION AND RISK MITIGATION ISSUES FOR DISCUSSION

1. Is there a recipe for staging negotiations to get broad buy-in from affected parties in a staged fashion to control costs and risks?
2. How can “rewards” for public sector be more clearlyidentified and captured?
3. Should increased “hybridization” and cost-sharing be pursued to expand public leverage and provide opportunities?
4. How can agreements minimize preemption of future pubic sector road operations programs such as ITS and pricing by accounting within agreements?

POLITICAL ISSUES

Innovative finance is caught in a political policy transition dilemma. It is widely agreed that there are inadequate conventional resources to improve, preserve and operate the existing highway system at a performance level consistent with the rest of the economy. But state legislatures are reluctant to consider increased in state taxes in a continuing environment of tax revolts.

At the same time more direct user/beneficiary assessments are often resisted on several grounds by key interest groups. Some transportation provider interests -- whose programmatic and institutional traditions are based on tax-based pay as you go finance -- believe that the current shortage of public funds will be remedied politically at both the national level and within their region and that supporting tolls would undercut this desirable eventuality. Other more local interests see tolls as having to shoulder the full burden of projects locally, and groups opposed to major highway improvements for other reasons can draw on a historical anti toll prejudice in some regions.

Public-private partnerships as a concept has also encountered some political and interest groups resistance especially where public private partnerships are seen as a partisan or ideologically-driven program. or where labor or industry groups see changes as threatening their current position. In most cases these issues have been resolved. However, it may be expected that expansion of application of tolls, turnkey contracting, changes in procurement, etc. more generally into the overall program will generate a broader political dialogue at the state level just as the applicability of tolls on the existing Interstate has at the national level.

Many of the projects being considered for toll finance require major investments out of scale with resources available. In some cases however, public support has been undercut by agency and political failure to communicate the limitations of tax-funded options. Here leadership has proven crucial. This reluctance to be the bearer of what

may be perceived as "bad news" is not surprising since political leadership is often equated with being able to import financial resources. In an apparent attempt to sidestep this issue, some state public private partnerships legislation gives local communities that veto authority over the use of tolls, a unique power as compared to conventional road development. Nonetheless, each of the projects that has moved as far as negotiation is usually associated with one or more "champions" who have a conviction regarding the benefits of a custom-tailored for of project finance and delivery.

These experiences suggest the need for more focused effort at public education that places the need for tolls and assessments in a broader local and state context including an awareness of the states' fiscal capacity, the equity of tolls and pricing compared to tax-based approaches for many projects and the potential of ETTM technology to eliminate the inconvenience of tolling. It may also suggest the need for continuing federal/state/local/private cooperative effort to identify key barrier issues or outstanding opportunities and together consider strategies, research and experiments to support further progress

POLITICAL ISSUES FOR DISCUSSION

1. What form of public dialogue can support public education in the advantages of augmenting taxes with direct user fees for certain types of projects?
2. Should toll projects be subject to a different form of local community input into the planning process?
3. Should FHWA work with SDOTs to develop and expose model approaches and variants and incorporate alternative finance and project development processes into the state and metropolitan planning and programming processes?

IV. NEXT STEPS: DEFINITIONS OF PROGRESS

Many of the basic strategies for dealing with shortfalls in conventional transportation infrastructure resources have been identified. New "models" have been developed. Each combines several elements – new forms of project finance, project development procedures together with the appropriate agency and private roles, rewards and risk mitigation – in a form appropriate to specific institutional contexts and projects. There is a wide range of possible variants that can be custom-tailored to circumstances

Because many of the projects on which such innovation has been focused themselves are large, progress in moving projects through the development process has been measured, and this pace has been further slowed by the need to develop new procedures for the first time and incorporate a wide range of both formal clearances and informal consensus-building

The "deal flow" does not yet add up to an industry -- with standards, procedures and a wide range of competing players -- such that the newer models can be treated as conventions. There is still a wide range of issues that must be resolved for any individual project on a custom-tailored basis at the state local (project) level. "Progress"

-- if it is defined as more projects using a broader range of revenues sources in ever yet more efficient financial structures and project development processes -- will depend on institutionalizing finance with its many variants at the overall program level within state and metropolitan transportation improvement program frameworks. This in turn will require a broader consensus at all levels of government that innovative finance, tolling, turnkey and public-private partnerships are not longer experimental or pilot programs, but are an integral part of a 21st Century Transportation Infrastructure Delivery Process.

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Exhibit 1. FEDERAL LEGISLATION COMPARISON

LEGISLATION	*KEY FEATURES*
ISTEA (1991)	• Allows conversion of free federal aid roads (non-interstate) to tolls roads for reconstruction . Permits the commingling of federal aid with toll-based revenues . Permits up to 50% federal aid for new toll road construction • Permits loans and grants to public or private entities • Establishes congestion pricing pilot program
NHS Designation Act (1995)	. Establishes state infrastructure bank pilot program • Removes limits on advance construction and permitted flexible match . Makes interest and insurance eligible for federal reimbursement • Permits loans to non-tolled projects with dedicated revenues • Expands federal aid share of toll projects to 80%
Federal Acquisition Reform Act (1996)	. Allows accommodation of turnkey project delivery options
NEXTEA (Administration Proposal 1997)	• Proposes permission to toll Interstates . Converts congestion pricing to value pricing program and expands program flexibility . Clarifies review of innovative finance in TIP development . Provides funds for federal credit enhancement for nationally-significant toll projects . Establishes/funds SIB program

Exhibit 2. EXAMPLE ACTIVE PUBLIC PRIVATE PARTNERSHIP PROJECTS					
NAME	**SCOPE**	**PARTNERS**		**ESTIMATED COST**	**STATUS**
		PUBLIC	**PRIVATE**		
Mark Clark Expressway: Charleston, SC	RFP for Finance /DBOM proposal for an expressway extension	South Carolina Dept. of Transportation	URS Greiner J.A. Jones Capital & Construction /PBIDC	Construction Cost US $150m	Feasibility studies are underway. Enabling legislation amend-ments proposed
Toll Bridge: WSDOT Tacoma Narrows Bridge	RFP-based Finance/BTO proposal to improve SR 16 corridor, double-deck or replace existing Tacoma Narrows bridge.	Washington State DOT	United Infrastructure Co.	Construction cost US $400m	Studies proceeding Development agreement awaits advisory vote
Toll Motorway: SR125 San Miguel Expressway	RFP-based Finance/BTO franchise 10 - in southeastern San Diego County	California Dept. of Transportation, City of Chula Vista	California Transportation Ventures (CTV): (PBIDC Brinckerhoff, Transroute International.)	Construction cost US$400m	35-yr., Franchise signed 12/90. $132.5m state funding for connector routes being negotiated
Atlantic City Casino Toll Road	RFP for $330m turnkey construction of core improvements to existing roads and new toll tunnel/ access road to Marina section of Atlantic City.	NJ Dept. of Transportation/SNTA	Mirage Resorts	Construction cost US $405m; turnkey contract . MOU shares construction risk; local project add-ons with state	Mirage/NJDOT preparing for turnkey, competitive bid in '97.
Toll Motorway: Camino Columbia, TX Toll Road	Finance/BOT project under historic law for 22-mile, two-lane truck/ hazardous freight tolled bypass around Laredo.	Camino Colombia. Inc., Texas DOT	Camino Colombia Inc., Brown & Root Inc. (builder and equity sponsor), Carter & Burgess Inc.	Construction cost US$80m; concession	Awaits Texas DOT commission approval, and completion of Mexican link.
Toll Motorway: Foothill/Eastern, Calif., Toll Road	RFP based turnkey contract for 28.6 miles of express tollways in a new corridor linking the River-side Freeway with I-5, I-405 in Orange County, CA	Transportation Corridor Agencies	Silverado Constructors: FCI, Sukut Construction, Wayss & Freytag (Germany), Obayashi Corp. (Japan).	Construction cost US $1500m; turnkey with contractor subordinated debt and USDOT credit	Under construction
Toll Motorway: HOT Lanes, Phoenix	Unsolicited Finance/ DBOM proposal for adding automated high-occupancy and SOV toll lanes to five freeways in eastern Phoenix. (MetroRoad)	Arizona DOT/MetroCorp non-profit Community Assoc.	HDR Project Services Corp. (Bouygues)	Project cost US$2o00m;	Proposal made 8/96. Conditional approval prior to negotiations
Toll Motorway: I-895 Connector, Richmond, VA	Unsolicited proposal for Finance/DBOM for an 8-mile connector road to I-895 near Richmond	Virginia DOT)	Fluor Daniel/Morrison Knudsen	Construction cost US $250m; concession	CTB approved conceptual plan 5/96. Final Review.

Exhibit 2. EXAMPLE ACTIVE PUBLIC PRIVATE PARTNERSHIP PROJECTS					
NAME	**SCOPE**	**PARTNERS**		**ESTIMATED COST**	**STATUS**
		PUBLIC	**PRIVATE**		
Toll Motorway: James River Parkway, VA	Unsolicited proposal for Finance/DBOM for 17-mile uncompleted portion of Powhite Pky to I-64.	Virginia DOT	Brown & Root Inc., Dewberry & Davis	Construction cost US $255m;	Conceptual plan approved 5/96.
Toll Motorway: Minnesota Highway 212	RFP-based finance/DBOMr Extension of Highway 212 from Eden Prairie to Cologne.	MN Dept. of Transportation./Community non-profit authority	Interwest/DLR Group Infrastructure Corp.	Speculative cost US $195m;. Come sate support	Eden Prairie vetoed 9/96. Options being developed.
Toll Motorway: Route 1, Delaware	RFP based Finance/BTO Proposals for accelerated completion of Route 1 toll road.	Delaware DOT.	Build Delaware: George Lynch Inc.; Granite Construction; URS Greiner Engineers; Fluor Daniel Consortium	Speculative cost US $240m;	Proposals submitted 8/96 under review by DelDOT.
Toll Motorway: Route 168 South, VA	Unsolicited Finance/DBOM proposal for Route 168 South to Outer Banks beaches from Chesapeake, VA	Virginia DOT, City of Chesapeake Chesapeake Expressway Assoc.	PBIDC /JA Jones Construction, & Capital.	Construction cost US $110m; State approved funding of $48m .	Proposal being evaluated..
Toll Motorway: S. Mountain Toll Road, Phoenix	RFP-based Finance/ DBOM for23-26 mile four-lane toll road in Phoenix.	Arizona DOT/CNon-profit Commuity Assoc.	Interwest Arizona Group: Interwest Mgt; Sundt Corp.; HNTB Inc.; Inca Eng.	Project cost US$370m; management contract	Attorney General review completed. Under tech evaluation
Toll Motorway: Southern Connector SC	RFP-based Fiancee/BTO proposal for 17.5 -mile, four-lane southern Connector toll road bypass of Greenville, SC between I-185 and I-385.	SC Dept. of Transportation/ Non-profit community assn.	Interwest Management Group/Wilbur Smith Assoc./Florence & Hutcheson/Thrift Brothers Inc..	Construction cost US$ 136.7m; joint development agreement	Feasibility study negotiated. Legislation pending
Toll Motorway: SR 520 Corridor Improvements	RFP for Finance/DBOM for Five-mile segment of SR520 between Interstate 5 and Bellevue.	Washington State DOT./Washington Transportation Partners: Assn.	PBIDC/Morrison Knudsen.	Construction cost US$ 440m;	Agreement negotiated. Proceeding subject to studies, advisory votes and approvals
Oregon Toll Roads	Finance/BTO for Newberg -Dundee Bypass and Tualatin-Sherwood Hwy	Oregon DOT	NA		Environmental planning procurement process underway
Toll Motorway: SR 522	Finance /DBOM contract for safety upgrade via phased improvements to SR 522: initially 10.5-mile 4-lane tollway expanding existing road.	Washington State DOT/522 Community Assn.	Iterwest Management Group, INCA engineers.	Construction cost US$155m;	Studies proceeding Development agreement awaits advisory vote

Exhibit 3. EXAMPLE STATE MODELS OF PUBLIC/PRIVATE PARTNERSHIP LEGISLATION

INSTITUTIONAL ISSUES	ARIZONA CH. 25 Arizona Statutes (as amended in 1995)	CALIFORNIA AB680	CALIFORNIA Orange Co.TCA	MINNESOTA CH.160 Minnesota Statutes	VIRGINIA Public/ Private Act Of 1995	WASHINGTON Title 47
INSTITUTIONAL FRAMEWORK- Roles and Authority	Arizona DOT administers unlimited (solicited or unsolicited)	CALTRANS administers Up to 4 projects	Joint Powers Agreement of local agencies	State road authority and agreement with private operator Final approval DOT Commissioner	Qualified local agencies can contract	Washington DOT administers Up to 6 demonstration projects
FACILITY OWNER/DEVELOPER/ OPERATOR	Public owner private developer/operator	Public owner, private developer/ operator	Public owner/ developer, private operator	Public owner/private developer, operator	Private owner/ developer/ operator	Public owner, private developer/ operator
ROLE OF PRIVATE SECTOR	BTO-Lease term negotiable	Leasehold interest-13 to 35 year lease term	Construction/ Management/ Operations	BOT or BTO or BOO	No predetermined model	BTO preferred BOT possible-lease term up to 50 years
INNOVATIVE USE OF FEDERAL FUNDS	yes	No	No	Yes	Yes	Yes
EMINENT DOMAIN	DOT can exercise on behalf of developer	CALTRANS can exercise on behalf of developer	TCA has power	Available to "road authority"	Any public entity can exercise on behalf of project developer	DOT can exercise on behalf of developer
TOLL RATE SETTING	By transportation board-if solicited May utilize HOV lanes	Negotiated in agreement ("reasonable returns")	By TCA	In development agreement-may utilize time of day pricing	Negotiated with responsible public authority	Negotiated in agreement with DOT Secretary-
ALLOWABLE RETURNS	Reasonable	Reasonable, Incentives available	Only to pay for construction and toll collection	"Reasonable rate of return"	Reasonable, costs subject to review for reasonableness	Reasonable rate of return-maximum established. Incentive with sharing possible
DEBT ISSUANCE	Taxable	Taxable	Tax exempt	Either	Taxable	Taxable or tax-exempt
COMMINGLING OF FUNDS	No	No	Yes (through special legislation)	Yes	Yes-established toll revolving loan fund	Yes - Revolving loan fund possible grants & other innovative financing arrangements
ROAD ALIGNMENT	Reasonable-"At least direct as alternative route"	"Offer alternative route selection"	Parallel to other public thoroughfares and highways"	Can be vetoed by local jurisdiction	Can be rejected by any local jurisdiction	Affected jurisdiction involved and consulted
ORIGINATION	Solicit Proposals	Solicit proposals to "take advantage of private efficiencies"	Local Agency	Local Road Authority Solicits proposals	Application to State commission-no limit on number of projects-unsolicited proposals accepted	Solicitation
PROCUREMENT PROCESS	Negotiated	Negotiated	Does not apply.	Negotiated	Public procurement act shall not apply	Negotiation

Exhibit 4. Sample Strategies For Risk Mitigation For Both The Public And Private Partner

Public Sector Risk Mitigation Strategies	Private Sector Risk Mitigation Strategies
• clear legislative authority	• cost-sharing and other forms of financial economic support
• avoidance of liens	• resource sharing (use of real public resources such as property)
• avoidance of joint liability	• loss sharing
• avoidance of legal partnership	• reduced cost procurement and project development processes
• competitive procurements	• relief from regulatory burdens and standards (economic, environmental, etc.)
• rights to inspection and audit	• access to state police powers (eminent domain)
• reimbursement for state services	• use of good offices in other negotiations
• retention of ownership	• liability insurance and bonding
• insurance and bonding requirements	• exclusive access to resources (information, ROW)
• rights to inspection and approval	• exclusive right to conduct activity (franchise, concession, lease)
• use of state standards and procedures	• clear legal remedies for default or contract violation
• cost-sharing and other forms of financial support	
• resource sharing (use of real public resource)	
• loss sharing	
• reversion procedures	
• clear legal remedies for default or contract violation	

FINANCING INNOVATIONS IN TRANSIT: METHODS AND ISSUES

BY

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INTRODUCTION

Our transit systems vary greatly in size and complexity. The largest, in New York, includes buses, subways, vans, commuter rail, and ferries and accounts for about 40 percent of all transit trips each year. The smallest may be a single van serving an area larger than all the New York boroughs combined. Thus, to seek to identify "emerging financing innovations" for our transit systems is to overstate our capability. The largest transit systems have the personnel and financial means to test increasingly complex financial structures relevant only to themselves. Financing innovation for the smallest systems may mean meeting the payroll from month to month.

Nevertheless, there are financing innovations that will have some relevance to the small and mid-size transit systems of today. They include cross-border leasing, lease/leaseback, turnkey procurement, and State Infrastructure Banks. These are some of the innovations that will be addressed in the Innovative Financing Workshop.

This paper is intended to provide an overview of recent financing innovations that FTA has either reviewed or heard about, and to present some issues with regard to each innovation for readers' consideration and further discussion. A possible context for such a discussion could be an apparent departure from "pay-as-you-go" procurement to leasing and installment purchasing, to more smoothly match capital needs with revenue flows. Another context could be the switch from predominantly federal investment in transit infrastructure, to predominantly state and local investment (this happened in 1993). Yet another context could be the rising role of private capital markets in supporting municipal infrastructure needs.

Regardless of the context, these innovative financing methods present new risks and new opportunities for transit systems and private sector firms who wish to forge new partnerships for infrastructure investment. The most successful of these new partnerships will be based on a solid understanding of where the market and its financing methods are going.

THE TRANSIT FINANCE CORPORATION

Three States now have established a centralized entity to purchase rolling stock in quantity, and provide the vehicles to multiple transit providers.

- The California Transit Finance Corporation (CTFC) has issued Certificates of Participation (COPs), tax-exempt securities, to buy buses on behalf of

multiple transit systems. The Certificates were backed in large part by leases with the several transit systems.

- **The Arkansas DOT has established a revolving loan fund to buy lift-equipped vans for specialized rural transportation service in that state. The vans are leased at no interest to the human services transportation providers.**

- **The Florida Transit Association Finance Corporation (FTAFC) is preparing its first pooled bus procurement on behalf of several smaller transit systems in that state. Once purchased, the vehicles may also be offered for a cross-border lease.**

CTFC

What makes these states undertake such complex organizations? In a word, money. The CTFC was able to accelerate fleet replacement schedules for a dozen transit systems, while reducing their unit cost of buses. While each transit system might only have bought six, eight, or ten buses, these vehicles were priced as though purchased 100 at a time. On a ten-bus purchase, that would be equivalent to getting the tenth bus free. The Certificates of Participation financing provided significant cost savings as well.

By issuing the certificates with progressive maturities, the CTFC reduced the overall cost of the financing. For example, for one purchase the CTFC issued 12 series of certificates, one series maturing every year. The certificates maturing the first year carried an interest rate of just 2.58 percent. Those maturing in 12 years had an interest rate of more than 7 percent. The average interest cost was just over 5.5 percent.

as Translease

Arkans

In Arkansas, the issue was still money, but in this case it was the lack of it. Many of the vans purchased under this initiative would not have been acquired because individual transportation providers could never accumulate the funding necessary at one time.

The State DOT established a revolving fund with a combination of FHWA and FTA grant funding totaling about $687,000 including their local matching funds. It purchased ADA accessible vans by competitive procurement, then offered these by lease to public transit and human services transportation providers in the state. The lease would cover the useful lives of the vans (4 or 5 years), and would be made without interest charges. At the end of the lease, the transportation provider would

own the van outright. Thus, the highest cost van was just $600 per month, and the average was around $350 per month a much more manageable figure than $35,000 all at once. The program has been so successful in its first iteration, that Arkansas DOT intends to expand the program with State funding.

Florida Transit Association Finance Corporation

In Florida, the situation is much like the CTFC, only with the potential of the added benefit of cross-border leases and other financing mechanisms that depend on private capital. FTAFC has made its first pooled procurement of buses on behalf of several transit operators in Florida. It is now exploring a possible Japanese leveraged lease of these buses. The cross-border lease faces significant uncertainties due to the current economic climate in Japan. Interest rate differentials between the U.S. and Japan are shrinking, and market restructuring in Japan is reducing the amount of capital available for overseas investment. Nevertheless, there may be some benefit to the FTAFC and the Florida transit authorities from undertaking this transaction.

Issues

- **Does it require a state-established organization to provide these fleet leasing benefits, or could they be provided by the private sector?**

  There are many specialty leasing operations today, providing construction equipment, aircraft, and even specialized manufacturing facilities. The transit market is served by contract transportation firms that, in effect, provide vehicles under a service contract rather than a lease. Some $500 million per year is expended for purchased paratransit service in the U.S., for example. But in terms of bus capital leases there is no large scale market. This may be due to the general acceptance that bus purchases are grant funded. Or it may reflect a perception that such leases would be unduly subject to appropriation risk every year. It can be said that no leasing company would willingly undertake leases in the Arkansas DOT model, however.

- **How is the individual transit system's risk level affected by these transactions?**

  The leases that support these pooled transactions represent a long-term debt for the transit system. The lease payment must be balanced against expected revenues, in conjunction with other fixed payments such as building leases and loans. Ideally, the lease payment should be structured so that delayed appropriation risk is minimized. In a COPS-based transaction, the bondholders must be paid on time. There is some risk that the transit

system (especially a small system) will face a choice between meeting current payroll or making its required lease payment.

- What if the transit system defaults on its lease obligation?

  These transactions have grown in quantity in part because the default rate has been negligible. Most of the transactions have involved state government backing, either implicitly or explicitly. Thus, if a transit system did default on its obligation, the greatest likelihood is that the state would satisfy the requirements of the lease on the transit system's behalf. However, one such default, even if it resulted in no financial loss to the lessor of bondholders, could increase the risk perception in these transactions.

- What does the transit system do (what is it allowed to do) with the funding provided by these transactions?

  FTA regards the proceeds, if any, from these pooled transactions to be program income. Under the Common Grant rule, such income may be used for any eligible transit purpose. Some transit systems have used such funding to pay for operating costs, while others have used their proceeds to support long-term capital programs. How these funds are used depends to a great extent on local circumstances, including economics, the transit system's relationship with its community, and the relative strength of the transit board.

LEASE/LEASEBACK TRANSACTIONS

In March of 1996, the San Diego transit system undertook the first transit lease/leaseback. This type of lease, also known as a "467 Lease" after the section of the IRS code that governs it, is based on the lease of intangible assets such as movie rights. Under this structure, an investor leases rolling stock or a facility from the owner, which creates an "intangible asset" - the lease. The investor then leases this lease (actually the rights under the lease) back to the transit system. The first or "head" lease must be for at least 80 percent of the assets' useful life. The secondary lease must be for no more than 80 percent of the head lease period.

The investors use a combination of equity and borrowed funds to initiate this transaction, and the payments under both leases and loans are calculated to completely defease the transaction. That is, at the end of the lease term, remaining cash balances are sufficient to satisfy all loan and lease payment requirements. These transactions may return as much as eight percent of the transaction value to the transit system. In a recent transaction, New Jersey Transit actually realized

significantly more than this on the lease/leaseback of its Meadowlands Maintenance Facility.

The benefits from such a transaction come from their long term, the stability of cash flows, and (mostly) from the amortization of the sub-lease. In its notice of preliminary rulemaking of August, 1996, the IRS required that the lease payments and depreciation be level through the term of the lease.

To be economically attractive to investors, this transaction requires substantial volume. FTA has reviewed such transactions in the $200 million range and above, inferring that this technique may be useful only for the larger transit systems.

Issues

- Could multiple transit systems pool assets in such a transaction?

  It would appear that this leasing structure would be difficult to arrange with more than one participant at a time. However, for the same reason that the FTAFC is able to arrange a cross-border lease involving multiple transit systems' new buses, a single organization could represent multiple asset owners. Such transactions currently involve two or three single-purpose trusts, established to limit investor liability and lessor risk. To establish a "lessee trust" to act on behalf of multiple transit systems would require legal advice, but should not be impossible.

- The transaction requires the transit system to maintain accounts and contractual relationships for 15 years or more. Does this present a barrier for transit boards or certain kinds of transit organizations?

  There are transit authorities that will not be able to take advantage of these lease transactions, because they may not retain cash accounts beyond the end of their fiscal year. "Defeasance" makes these transactions useful, in that the transit system must receive the entire value of the asset to be leased, then must deposit most of that in an interest-bearing account from which lease and loan payments will be made. Having to close all cash accounts at the end of the fiscal year makes this mechanism unworkable.

- How is the transit system's risk profile affected by these transactions? Do they affect the system's ability to acquire credit in the short term, or long term?

  These leases represent a long-term draw on the transit system's resources.

However, they are based upon a fully defeased structure, so that the funds needed to make payments remain on deposit until all requirements are satisfied. The net impact on agency cash flows should be minimal. Also, to the degree that the trustee banks and other entities remain viable, there is no significant risk to the transit system. However, a transit agency should always assess these transactions in light of a possibility of unwind, or default, at some time in the future. Could the transit system absorb a one-time "hit" on its operating budget of between five percent and eight percent of the assets' value? (That amount is the usual unwind, or stipulated loss value in these transactions).

- Do local procurement laws or practices interfere with such transactions?

To date, the primary concerns FTA has encountered at the local level involve state tax laws and laws governing local utilities. In one instance, the entity engaging in a sale/ leaseback transaction had to be a resident corporation in the state, or the state would levy a transaction tax on funds leaving the state. This would have made the transaction uneconomic.

In another instance, the local gas utility was forestalled by local utilities laws from participating as a financial partner in a natural gas facility lease. So it formed a non-utility subsidiary to undertake the partnership. This appears to be a successful mechanism for addressing local laws as well as transaction risks of many kinds.

- Could this technique be applied to other fixed facilities, such as a highway, a toll bridge, or an airport terminal?

It seems very likely that this type of transaction could apply to a wide variety of fixed assets. To date, bus and rail maintenance facilities have been brought into lease/ leaseback transactions. The form of the transaction originated in the movie industry, but there are equally risky ventures in other industries that could benefit from this type of lease. One example might be the establishment of a toll highway or bridge, the economics of which are not known with certainty. The state or municipality wishes to have the facility operated privately, but no private partner can accept the level of risk that it represents. The state then undertakes a lease/leaseback of the finished facility, which was probably built by the eventual partner, either retaining the facility at the end of the lease if it chooses, or allowing the private partner to "buy out" its state partner for a pre-determined price. [An actual transaction would be much more complex than is described here.1

JOINT DEVFLOPMENT

FTA is promulgating its revised Joint Development policy to remove some of the apparent federal obstacles to partnerships between transit systems and private developers. The policy was revised to clarify the basis upon which transit systems could retain the proceeds of sales of land and air rights, when such a sale supported transit-oriented development on or near the transit station. One reason for the revision was to respond to an increasing awareness of local transportation / land use / and air quality links, and to allow as many transit systems as possible to capitalize on these links.

Some of the largest transit systems have a long history of transit-oriented development, including Washington D.C.'s Metro and Atlanta's MARTA. However, the developments have tended to be haphazard and the returns to the transit systems have been limited. This is due in part to the difference in time between the developability of land and the presence of transit on or near it. It is also due to fluctuations in land use patterns and land values at the time the property is available for development. Nevertheless, major developments have arisen as a result of joint development arrangements, such as the Air Rights building in Bethesda, Maryland, and Pentagon City (a major shopping center), in Virginia.

When the FTA joint development policy was first developed, it was hoped that transit development would be linked with the community served, which would provide a long-term revenue for the transit system through Benefit Assessment Districts, Tax Increment Financing districts, and similar mechanisms. In most cities there has been significant resistance to these methods of raising revenue.

Issues

- Why are more transit systems not able to take advantage of joint development opportunities?

  The most influential reason is a difference in perspective between transit systems and developers. A transit system wants to increase its ridership, and to serve the greatest number of people possible with the assets that it has. The developer wants to build something with a reasonable prospect of a financial return. The transit system plans three to five years out, and may take that long to make a financial commitment. The developer may plan three years out, but it must make a financial decision within a few months. Because the developer is looking for the best return available at the moment, a competitive site may become available while negotiations are under way with the transit system. There are few incentives that the transit system can

offer to keep the developer's interest in this case.

- How can transit systems develop new partnerships with private developers? What are the obstacles?

  The basic mechanism for initiating partnerships with developers seems to be to include developers in the planning process, when transit facility location decisions are first being made. The transit system consults with the local community whenever it considers service changes, route additions or modifications, or major infrastructure projects. Welcoming the input of developers in this process could enhance future developments around these projects.

  The biggest obstacle to such cooperation arises from procurement requirements. Transit systems may fear prejudicing their competitive procurement processes for joint development activities by involving potential partners too soon in the process.

- Should transit operators be part of the "land use" equation, or are they already?

  The answer to this question depends on one's perspective. Transit systems have land use impacts, whether they wish to or not. These impacts are being analyzed in the public and private sectors, but they seem to indicate that transit contributes to the formation of integrated, multi-use communities, and that it helps to increase the average value of residential and commercial property in its vicinity. However, there is much argument about whether transit authorities should have a role in land use decisions near their facilities, or even whether transit operators should be activists in developing land use policies that increase ridership on their systems.

- Where should transit systems generate their revenue - from the farebox alone, from local dedicated taxes, from joint development revenues, or elsewhere?

  One goal of FTA's joint development policy is to help transit systems to generate revenues from the use of their available assets, including land. This goal is based on the realization that transit operators need regular, dependable sources of revenue to maintain and improve their transit service. It has been very difficult, politically, for transit systems to secure independent taxing authority, or to share in other local revenues such as cigarette or sales taxes. The average farebox recovery rate is less than 44

percent of operating costs. Thus, it would seem that if a revenue source can be generated without taking away from the transit system, it should be pursued.

- How big a part should joint development opportunities play in the planning and siting of transit stations and facilities?

  Transit agency governing boards have shown significant reluctance to engage in joint development activities. Part of this reluctance reflects past Federal policy, but some also comes from a desire to "do what we're paid to do" - i.e., to provide transit service. It would be inappropriate for a transit system to plan a major land purchase for joint development, then add a transit facility as an afterthought. But the local public benefits of the transit facility will be enhanced if joint development in the area is planned for in the design and engineering of the transit project.

STATE INFRASTRUCTURE BANKS

The National Highway System designation act created a new, state-level entity called the State Infrastructure Bank (SIB). The Appropriations Act of 1997 allowed all 50 states to apply for the designation. This new entity is authorized to receive grant funds from the federal highway and transit programs and to use this money to make loans and credit enhancements in support of public or private highway and transit projects. To date, DOT has approved the formation of ten SIBs, and it expects to approve some additional SIBs shortly. The Administration has proposed that SIBs be capitalized through the next reauthorization at $150 million each year.

The SIBs' basic function is to support transportation projects that have the ability to repay loans eventually through user fees, tolls, or dedicated revenues. Projects that might benefit from such a structure include toll roads and bridges, multimodal facilities, and transit oriented joint developments. Due to the requirements of the highway and transit programs, the initial rate of capitalization for the SIBs will be low, resulting in a gradual ramping up of lending activity. Of the first ten designated SIBs, only four have expressed any intention of using credit enhancement to leverage their initial capitalization. Only one has indicated that it might issue bonds to expand its initial lending and loan guarantee capabilities.

Issues

- Is there a need for a lending institution such as a SIB in infrastructure investment?

The argument has been made that establishing the SIB program will merely insert yet another layer of bureaucracy into the transportation infrastructure hierarchy. This argument is extended to an assertion that projects that would otherwise have been supported with local public capital will instead be supported with local public debt - not a good thing. The counter-argument is that there are infrastructure projects of sufficient public and private benefit to advance on their merits, but that inherent risk in the projects makes them unable to compete for limited private capital. They can only advance with some mix of public and private capital. The SIB would assist such projects.

- Will the SIB accelerate projects that would have been built anyway, or will it help to complete a greater number of projects?

The hope of legislators is that SIBs will help to complete a greater number of projects. The hope of some local DOTs is that the SIBs will, in fact, accelerate some projects. By building them earlier (particularly toll roads and bridges), the states hope to generate revenues sooner, allowing them to undertake more projects. Is one outcome preferable to the other?

- Will the SIB add sufficient "value" to the infrastructure financing process if it only provides loans? Or is it necessary for at least some SIBs to leverage?

The stated goal of the SIB program is for states to leverage their public and private transportation dollars, and thus to increase their available funding for infrastructure maintenance and improvement. This will happen optimally if the SIB can leverage by issuing its own debt or by providing credit enhancements. However, even if most of the SIBs only provided loans, they could still double their total level of infrastructure investment over a five- to ten-year period.

- What will be the likely impacts on state DOT budgets and infrastructure projects of relying more on debt and locally based revenue sources, as opposed to the current system that depends on grant funding?

On one extreme, there may be an outright revolt, as states that had formed a dependence on grant funds for their infrastructure programs realize that grant funds will decline. On the other extreme, states may depend increasingly on locally generated sources of revenue, such as user fees, tolls, dedicated taxes, or benefit assessment districts. In reality, neither extreme is likely, but the impact in individual states is likely to result from the balance between reduced levels of federal grant funding and increased control and dependability of locally generated revenues,

- **How will the SIBs affect (be part of) the tax-exempt debt market? If they leverage their federal capitalization through debt issuance? If they provide loan guarantees or other credit enhancement?**

  This depends in large part on the organizational structure of the SIBs. If they are part of the transportation organization in a state, they are likely to be limited in their debt issuance, but they may have significant flexibility in providing loan guarantees or standby lines of credit. If the SIBs are independent state authorities, they may also be authorized to issue tax-exempt debt. However, this capability is likely to be limited by national and state tax-exempt bond caps.

  To a great extent, the answer to this question depends also on the recipient of the SIB assistance. If the recipient is a public entity, then tax-exempt debt is a likely option in supporting the project. If the recipient is a private entity, then credit enhancement and other mechanisms may be more useful.

SUPER TURNKEY

The term "Super Turnkey" refers here to an infrastructure development process where the state or municipality acquires a transportation facility via a "Finance / Build / Operate / Transfer" (FBOT) process. In such a case, a turnkey manager will undertake to build a facility, such as a light rail line, operate that facility for a time, then transfer it back to the transit operator or municipality. The turnkey manager will also forego a portion of its fee for a time (self-financing), or provide construction period financing from its own resources, or even issue bonds in support of the project, with the bonds being repaid by the eventual owner of the facility.

There are many possible reasons for such an arrangement. The transit system may not have a credit rating in the capital markets. Or, the transit system may not be legally able to maintain the necessary debt coverage ratios. Or the project may be expedited through the use of the turnkey manager's financing capability (it may avoid appropriation risk, for example).

While Turnkey, and even Super Turnkey, has been used extensively for infrastructure projects in other countries, particularly Malaysia, Hong Kong, and the Phillippines, it has only rarely been used for transit projects in the U.S. Two projects which involve turnkey elements are Puerto Rico's Tren Urbano (Design / Build / Operate / Transfer) and New Jersey Transit's Hudson/Bergen rail project, which may be a Finance / Build / Transfer project.

Issues

- **How useful could this technique be for small and mid-size transit projects?**

  FTA has provided some technical assistance funding to support a build / finance / maintain transaction in St. Louis, Missouri. There, the Laclede Natural Gas Company is building a natural gas fueling facility for the transit operator, maintaining and enhancing it over a 12-year period, and leasing it to the transit operator. Without this structure, the transit operator could not have completed the natural gas conversion for its facility.

- **How extensive are state level barriers to negotiated procurements and other techniques needed to make a turnkey project happen?**

  The essence of a super turnkey project is that a single firm controls the design, building, and operation of a major project. Some states require each phase of a project to be competitively bid by the cognizant government agency. Other states forbid the combination of architecture and engineering with construction in a single procurement. Some turnkey managers find it difficult to bid a project unless they can participate in the architecture and engineering. Yet other states forbid negotiated procurements, requiring each stage in the procurement to be competitively bid. These procurement restrictions introduce multiple levels of complexity into the turnkey process, acting as economic disincentives to all but the most sophisticated bidders.

- **How does a transit system or municipality repay the turnkey manager for the financing? Through contracted payments? Through shadow pricing? By securing take-out financing?**

  Any of these mechanisms is valid, and there may be many more. The limitation on the transit system's ability to repay the turnkey manager will come from the transit system's access to funds. If the transit operator has access to specific state or federal grant funds, this is likely to be the source of future repayments. But if the project was undertaken to rely upon locally generated funds, the repayment may take place from shadow pricing (i.e., payments in addition to the farebox, based on meeting ridership goals), or from issuance of local bonds by the transit operator or its municipality, to replace the financing provided by the turnkey manager.

- **What if the turnkey manager fails on its completion bond? Whom does the public entity retain for the "Operate" part of the contract?**

This is a very difficult situation which should be settled by negotiation prior to the event. There are many reasons for the turnkey manager to fail in the timely completion of the project. If the failure occurs at construction, the loss may be covered by a bond acquired for the purpose. The turnkey manager may still be the best qualified to continue with operation of the system. If, however, the turnkey manager fails during the operations phase of the project in a "BOT" project, the reason for the failure must be determined.

If the failure is due to fault on the part of the turnkey manager, a new manager will have to be found. If there is no fault (possibly because ridership or other goals were not met) then a financial adjustment must be made in the turnkey contract. Expenses of such an adjustment will be minimized by negotiations before the contract is signed.

- **If the cost of financing declines over the term of the project, who gets the benefit from refinancing? Is this even at issue?**

The benefits of declining financial costs accrue to the provider of financing. Thus, if the turnkey manager provides financing as well as project management, its profitability will rise as financing costs fall. However, if the transit system intends to "take out" the financing with its own means, it may benefit from the lower financing costs. This should be addressed in advance in the turnkey agreement.