NCHRP Web Document 39 (Project SP20-24[14]): Contractor's Final Report

Managing Change in State Departments of Transportation

Scan 8 of 8: Innovations in Project Financing

Prepared for:

National Cooperative Highway Research Program
Transportation Research Board
National Research Council

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Washington, D.C.

May 2001

ACKNOWLEDGMENT

This work was sponsored by the American Association of State Highway and Transportation Officials (AASHTO), in cooperation with the Federal Highway Administration, and was conducted in the National Cooperative Highway Research Program (NCHRP), which is administered by the Transportation Research Board (TRB) of the National Research Council.

FOREWORD

Change Management in State DOTs

State departments of transportation are operating in an environment of unprecedented change. Evolving demands for transportation services, new technologies, workforce composition, stakeholders' concerns, and a constantly changing political environment create continuing demands for institutional change. To address these challenges, many state DOTs are undertaking a range of initiatives such as strategic planning, organizational restructuring, performance measurement, process engineering, and outsourcing.

Both anecdote and survey suggest that change management is now the major preoccupation of senior management. However, the rate of change is very uneven and not well-understood. Indeed, there appears to be more *innovation* than *imitation* -- since the creative approaches being introduced are not documented or widely discussed. Little "literature" on state DOT change management has been developed -- either case studies or "how to" material.

AASHTO's Strategic Interest

A 1998 AASHTO report on "The Changing State DOT" identified drivers of change and approaches being taken by state DOTs in change management. AASHTO's Year 2000 Strategic Plan activities then introduced an element concerned with facilitating institutional change. Meanwhile, a newly reorganized TRB Committee on Strategic Management, through calls for papers and annual meeting sessions, focused on studying the range of changes occurring in transportation organizations. This led to the formation of a committee to plan a special workshop on strategic management under the joint sponsorship of the Transportation Research Board Committee on Strategic Management, AASHTO Standing Committee on Quality, and the Federal Highway Administration (FHWA).

The Strategic Management Workshop

The two-day workshop (June 25-27, 2000) in Minneapolis was organized to facilitate peer-to-peer discussions among the CEOs and senior staff of the state DOTs about their experiences in managing internal and external change. This workshop focused on sharing recent experiences with managing internal and external change and lessons learned. Twenty state DOT CEOs participated in the workshop, and 35 state DOTs were represented by CEOs or senior staff. Conference dialogue dealt with three principal management challenges:

1. Strategic planning-related initiatives
2. Workforce and reorganization-related initiatives
3. Process and program delivery-related initiatives

The discussions identified a wide range of specific issues within each area that attendees felt deserve organized review via case studies, assessment of the state of the practice, and identification of promising concepts, approaches, and tools. Workshop participants used the results of these discussions to identify research that would help state DOTs lead and manage their changing organizations. Twenty-two research problem statements were crafted around the three subject areas.

TRB, at the urging of AASHTO and participating CEOs, immediately set up an NCHRP panel, chaired by Mary Peters of Arizona DOT, to develop a multiyear NCHRP research program under the 20-24 program established for special AASHTO research related to DOT administration. The panel combined and prioritized problem statements into eight strategic management issues for priority research. In view

of the lack of written material on these subjects, the panel decided to start with broad "scans" of the state of the practice in each area to provide guidance for a substantive multiyear research program. Each scan would summarize the challenges, document examples of current innovations, and recommend the appropriate initial components of a research program. The eight-month scan program -- including presentations at AASHTO Board meeting roundtables -- represented a highly unusual rapid-response approach to the priority placed on these issues by AASHTO and TRB.

Cross-Cutting Findings from the Initial Eight Scans

The eight scans produced considerable evidence of the number and breadth of change management initiatives within state DOTs. In general, these initiatives are concerned with the agencies as institutions, their mission and leadership, organization and workforce, process, and resources. The principal, common forces of change include:

1. Deliberate reorientation of strategic objectives in response to program limitations (Scan 3, operations), new technology (Scan 6, information technology), or funding (Scan 8, innovative finance)
2. Evolution of new forms of cooperation for improved service delivery with other public agencies (Scan 7, partnerships) and the private sector (Scan 2, outsourcing)
3. Workforce strategies (Scan 5) in response to downsizing, retirements, competition, and the need for new capabilities
4. The need to institutionalize and measure change management (Scan 1, strategic leadership) and improve agency image in the overall constituent context (Scan 4, positioning)

Overall, state DOTs today appear to be evolving away from single-purpose entities with standard approaches to producing a limited number of well-understood products and services. Instead, they are moving toward more flexible organizations designed to respond to constantly changing missions with ever-increasing efficiency through a shifting coalition of partners and stakeholders. Managers of these changes can clearly benefit from access to collective experience, including a better sense of the state of the practice and specific resources based on the more promising approaches. The scans identify some of the most valuable experience and provide important pointers to key issues for further dialogue and research.

Individual Scan Highlights

Scan 1 -- Innovations in Strategic Leadership and Measurement for State DOTs: Strategic planning itself is increasingly widespread in state DOTs. However, many CEOs find that the process often breaks down in the implementation stage -- creating buy-in and "institutionalization" of key change vectors. Yet some promising solutions are being found, including widespread participation of a variety of stakeholders in the process, a customer focus in terms of strategy and priorities, top management commitment to implementing the strategic agenda, ongoing communication to promote it, and "omni-directional alignment" among goals, performance measures, and budgets. Further research in each of these areas is needed to strengthen and integrate strategic management practices. *(Scan by T.H. Poister and D.M. Van Slyke of Georgia State University)*

Scan 2 -- Innovations in Private Involvement in Project Delivery: Outsourcing -- commonly employed for construction and design services to cope with lumpy demands or staff downsizing -- is spreading to other functions within the project and service delivery functions. It is increasingly important to understand the relative costs and quality of work conducted in-house versus by external private firms. Current evidence is not conclusive, as cost comparisons may not have been systematic. More research and more collaborative efforts are required by transportation organizations to identify best practices and possible standard procedures. *(Scan by Dr. D. Hancher, P.E. and R. Werkmeister, P.E., University of Kentucky)*

Scan 3 -- Innovations in Institutionalization of Operations: Systems operations and management is already considered a mission priority by many state DOTs. However, the several types of operations-related activities -- ranging from ITS to maintenance of traffic -- are stovepiped and decentralized in most state DOTs. In most cases, there appears to be no common department-wide policy framework around which to organize for efficient integration of services and sustainable funding. Some member departments are establishing performance measures by conducting customer surveys, but implementation for program management is still in the very early stages. Further case study research into promising approaches is needed to connect customer interests and performance measures to integrated operations activities. *(Scan by Philip J. Tarnoff)*

Scan 4 -- Innovations in DOT Communications, Image, and Positioning: The scan focused on states known to be addressing issues of communications, image, and positioning. Those that were most advanced focused on improving both internal communications with staff and external communications with the public, elected officials, and the media. Some innovative states are assessing their image and identifying ways in which to clarify and improve it with the public, recognizing that image enhancement and improved constituent communications may lead to an improved position for the agency, to new resources, and to a more supportive audience for the agency's work. Increasingly, states report that proactive efforts to better communicate and to position the agency positively with decision makers have led to increased public support and legislative funding for the DOTs. Additional research in communications, positioning, and marketing to various constituencies was felt to be needed. *(Scan by K. Stein and R. Sloane of Howard/Stein-Hudson Associates)*

Scan 5 -- Innovations in Work Force Strategies: State departments of transportation face severe challenges in recruiting and maintaining their workforces. Innovative approaches are being taken to recruitment of core competencies such as IT and senior civil engineering. Retention and succession approaches were also investigated, including mentoring and reverse mentoring. However, more case study and research are needed in defining, recruiting, and retaining the necessary workforce. *(Scan by C. Gilliland of the Texas Transportation Institute)*

Scan 6 -- Innovations in Organization Development as a Result of Information Technology: The rapidly changing environment of IT is challenging DOTs to deal with emerging opportunities and problems. This scan identified the range and types of new opportunities related to IT itself as well as related organizational development implications. Key issues include organization of the IT function, the cost-effective degree of outsourcing, and a range of management issues such as handling information overload, funding, procurement, and training. These areas suggest future research directions. *(Scan by C. Cluett and K. Baker of Battelle Seattle Research Center)*

Scan 7 -- Innovations in Public-Public Partnering and Relationship Building in State DOTs: A wide variety of partnerships among state DOTs; other state, local, and federal agencies; and public stakeholders are improving project and program delivery and increasing efficiency across agency or jurisdictional lines. Promising areas for partnering include achieving environmental streamlining, rationalizing state-local maintenance responsibilities, and joint community problem solving. Examination of successful partnerships and relationships identifies common elements of success and provides a starting point for the development of new partnering tools more applicable to longer-term, peer-to-peer relationships among DOTs; other state, local, and federal agencies; and non-governmental stakeholders. *(Scan by Mark Ford of HDR-Portland)*

Scan 8 -- Innovations in Project Financing: There is now a very rich menu of innovative revenue sources and finance techniques. New revenues are available from toll facilities, HOT lanes, value or congestion pricing, special assessments and fees, shared resource projects, and/or joint development. These revenues can be combined to leverage scarce federal aid through both debt and equity approaches, capitalizing on the new flexibility within the federal aid and some state programs. Such new approaches to project financing can also benefit from innovative project development approaches. Research is needed on promising approaches to mainstream these approaches within transportation agencies. *(Scan by A. Reno and L. Hussey of Cambridge Systematics, Inc.)* **This scan is the topic of this file.**

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Executive Summary

This report presents the results of an initial scan of the topic of innovations in project financing under NCHRP Project 20-24(14). The scope of the initial scan is to outline innovations that augment traditional finance sources and to identify approaches that are less dependent on federal and state tax funds. There are a wide range of available techniques and approaches to improve the financing of state and regional transportation. But confusion has occurred about the role of innovative finance, stemming from the difference between "new revenue sources" and "other finance techniques", such as innovative contracting, innovative management, loans, and bonding, A revenue source is a stream of revenues generated that can be used for payment of project or program costs. Revenues can pay directly for construction or can be used to pay off borrowed funds. Borrowed funds must be paid back from a revenue source.

Within the range of innovative finance initiatives, those involving the generation of new revenues are an important category. New revenues can be generated from toll facilities and from innovative approaches to pricing including high-occupancy and toll (HOT) lanes, value or congestion pricing, or new types of fees, such as fees based on vehicle miles of travel. New revenues can also be generated from other sources such as development impact fees, special assessments, tax increment financing, shared resource projects, or joint development.

With any given revenue stream, "pay as you go" purchases more projects over time. Borrowing money requires the payment of interest, which decreases the future revenues available for new projects in future periods. The tradeoffs that determine when borrowing is better are due to whether advancing the benefits of the project, avoiding inflation, and advancing the revenues being generated more than offset the additional costs of borrowing.

Innovative contracting can serve revenue-related needs, project cost control needs, and needs for managing financial resources. Contractors can provide warranties that guarantee the condition of assets. Innovative contracting can be used to speed implementation and reduce costs, even in instances where the agency maintains all financing responsibilities. Cash management is another important area in which innovative finance tools provide benefits to states. The ability to utilize federal funds flexibly improves the delivery of transportation programs.

The important general findings and conclusions of this initial scan are:

- There is now a very rich menu of innovative revenue sources and finance techniques.
- Innovations which provide for new revenue sources (tolls, value pricing or congestion pricing, vehicle miles of travel fees, development fees, etc.) are important not only for what they can provide in terms of immediate revenues to meet present needs, but also for their role in demonstrating new sources which can augment or replace fuel taxes and other current sources.
- Innovative contracting can provide not only new investment sources, but also cost savings and implementation benefits. Warranties are very promising approaches to help in achieving efficient life-cycle costs.
- Borrowing has a valid role to play in the finance of transportation capital programs. The many new federal and other programs facilitate borrowing and make terms more favorable.
- Funds management techniques are highly useful to states in allowing investment programs to proceed expeditiously. Flexibility in federal programs allows states substantial latitude.

- States and other agencies must make best use of the techniques appropriate to them, given resource shortfalls and financial management challenges. Innovative finance web sites at FHWA, and soon at TRB, can provide timely information about opportunities.
- There is no best new innovative revenue source for project financing; rather, any new source that can be tied to a project will augment current revenues.
- Innovative revenue sources will need to be associated with a specific project or program, and those who pay must see clear benefits to themselves. A public interaction process will be needed to generate support and consensus.
- Advancing innovative tolling or pricing somewhere in the United States will have enormous payoff in terms of establishing a future revenue source that can be emulated.
- While innovative finance might now constitute only a small portion of current overall revenues, the proportion may grow dramatically and quickly due to pressing needs.

There is a great need for research and dissemination of information about innovative finance, and for demonstrating how to succeed. These three projects are recommended as immediate research to help advance the understanding and use of innovations in finance:

New Revenue Paradigms for Transportation Agencies – This project would build upon the highly successful "New Paradigms" organizational project now being conducted for TCRP. The focus of this complementary effort will be on advancing new paradigms for revenues and institutional partnerships. Interaction will be conducted with institutions in selected areas ripe for new initiatives, to assist in bringing about a new example of how to generate new revenues and how to manage projects and programs. A budget of $150,000 is suggested as an add-on.

Revenue Threats, Opportunities, and Responses – This research would identify the threats and opportunities facing transportation agencies in the finance area. With hybrid vehicles actually entering the market, and with prospects of a doubling of the fuel efficiency of new autos, SUVs, and light trucks, the threatened future is about to arrive. A blueprint needs to be created of successful approaches to achieve new revenues. This research should compile in depth information on successes and draw and synthesize lessons about what approaches are needed to successfully implement revenue innovations. A budget of $75,000 is suggested for a case study and synthesis effort, building upon a $50,000 effort under for project 8-36.

Tools Series: New Revenue Tools, Bonding Tools, Funds Management Tools – This suggested effort would not entail much additional research, but would organize information including that generated from the research above into helpful products for selected audiences. Those who work to generate and implement new revenues are in the top executive levels. Bonding and funds management will be undertaken by financial managers. Breaking out these topics, and providing more details on successful approaches, will provide usable "how-to" information to those most concerned. This effort is estimated to require a budget of $125,000.

1.0 Introduction

This report presents the results of an initial scan of the topic of innovations in project financing. It has been prepared as one part of a series of eight initial scans of important topics selected for NCHRP Project 20-24(14). The scope of the initial scan is to outline innovations that augment traditional finance sources and to identify approaches that are less dependent on federal and state tax funds. While traditional state and federal transportation finance sources are likely to continue to provide the substantial majority of transportation project funds, the innovative sources are becoming more important as a means to help fill the gap between available resources and the huge and growing list of justified but unfunded needs.

Previous concerns with the conditions of our highways and transit systems are now being overtaken with concerns that relate more to the experience of users: congestion is increasing on highways, crowding is increasing on transit services, and declining reliability is impacting both passengers and freight shippers. All these negative trends result directly from the increasing gap between available revenues and needs.

Leaders of transportation agencies do not any longer believe that our existing revenue streams will be adequate. It is difficult to raise fuel taxes. Some states and localities with progressive taxes on the value of motor vehicles have seen attacks destroy those important supplementary sources.

Clearly, revenues must be generated from user sources in new ways. Yet, tolls and congestion fees have not been gaining in acceptance, despite the obvious need for fees that are better related to usage. Revenue sources that are incorporated into normal activities in the same manner as fuel taxes may be perceived to be less onerous. The types of fees that might be desirable – value pricing, VMT fees, electronic tolls – are available. What is needed is a painless way to pay innovative user fees, such as incorporating pricing charges in regular credit card invoices.

Innovative finance techniques span a range of purposes from the generation of new revenues, to better use of bonding and borrowing, to cash management. Methods that result in new revenues are given prominence in this scan. However, techniques to reduce the costs of borrowing or of cash management, techniques which broaden available sources of capital funds, and techniques which increase flexibility have substantial benefits to states and their stakeholders. Recent innovative techniques that serve these purposes are also reviewed briefly here.

The initial scan has utilized a range of available resources including other ongoing research into innovative finance approaches which is being conducted on behalf of the Federal Highway Administration, and interviews with a wide range of those involved in projects. The results of the initial scan of innovative finance are reported in terms of findings, interpretations and conclusions, and suggested research. The innovative finance techniques are grouped into classifications as indicated in Table 1.1.

Table 1.1 Innovations in Finance Techniques Matrix

Technique Classification	Techniques Available
New Revenues: Toll Highways and New Tolling or Pricing Approaches	Traditional Toll Highways, High-Occupancy Toll (HOT) Lanes, Interstate Reconstruction and Rehabilitation Program, Value Pricing Pilot Program, and Innovative Pricing Approaches
New Revenues: Development-Related Fees and Taxes	Development Impact Fees and Developer Exactions, Special Assessments
New Revenues:Value Capture Techniques	Tax Increment Financing, Shared Resource Projects
New Revenues: Joint Development	Joint Development
Innovative Contracting	Turnkey Management, Warranties, Shadow Tolling
Innovative Management	Advance Construction, Partial Conversion of Advance Construction, Tapered Match, Flexible Match, Toll Credits
Loans and Credit Enhancements	Section 129 Loans, Transportation Infrastructure Finance and Innovation Act, State Infrastructure Banks and Revolving Funds, Railroad Rehabilitation Improvement Financing Program
Bonding/Financing Instruments	Grant Anticipation Revenue Vehicle Bonds, Certificates of Participation, 63-20 Corporations

2.0 Findings

There are a wide range of available techniques and approaches to improve the financing of state and regional transportation. But some confusion has occurred about the role of innovative finance. That confusion stems from the difference between "revenue sources" and "finance techniques." A revenue source is a stream of revenues generated that can be used for payment of project costs. Revenues can pay directly for construction or can be used to pay off borrowed funds. Borrowed funds are not revenue sources, but rather are a debt that must be paid back – from a revenue source. Bonding, cash management, and other approaches or techniques do not generate new revenues. Instead, they may decrease costs and they may help to organize the ways in which revenues are applied, in order to speed implementation or enhance overall management of transportation investments.

Within the range of innovative finance initiatives, those involving the generation of new revenues are an important minority. New revenues can be generated from toll facilities and from innovative approaches to pricing including high-occupancy and toll (HOT) lanes, value or congestion pricing, or new types of fees, such as fees based on vehicle miles of travel. New revenues can also be generated from sources which allocate costs to additional

special beneficiaries other than the general highway user (development impact fees, special assessments, tax increment financing, and shared resource projects), or which tap associated investments (joint development).

With any given revenue stream, "pay as you go" purchases more projects over time. Borrowing money requires the payment of interest, which decreases the future revenues available for new projects in future periods. The tradeoff that determines when borrowing is better is due to when projects can be implemented. Borrowing allows faster implementation of current projects, and the benefits of those projects accrue to users for many more years.

Innovative contracting can serve revenue-related needs, project cost control needs, and needs for managing financial resources. Contractors can provide up-front financing for some or all of project costs, and can finance warranties that guarantee the condition of assets. Innovative contracting can be used to speed implementation and reduce costs, even in instances where the agency maintains all financing responsibilities.

Cash management or finance management is the other important area in which innovative finance tools provide benefits to states. The ability to utilize federal funds flexibly and when and where needed improves the delivery of transportation programs.

The findings about each of the techniques are summarized under the headings below. The important general findings of this initial scan include:

- There is now a very rich menu of available innovative finance techniques that can not only provide for new additional revenues but also for much greater flexibility in approaches to investment and financial management.
- Innovations which provide for new revenue sources (tolls, pricing approaches, development fees, etc.) are important not only for what they can provide in terms of immediate revenues to meet present needs, but also for their role in demonstrating new sources which can augment or replace fuel taxes and other current sources.
- While innovative finance might now constitute only a small portion of overall revenues, the proportion may grow dramatically and quickly, particularly as fuel taxes become less effective due to new technologies such as hybrid vehicles.
- Innovative contracting can provide not only new investment sources, but also cost savings and implementation benefits. Warranties are very promising approaches to help in achieving efficient life-cycle costs.
- Borrowing has a valid role to play in the finance of transportation capital programs. The many new federal and other programs facilitate borrowing and make terms more favorable. The benefits of many investments can accrue earlier through borrowing. The decisions on borrowing versus pay-as-you-go must be made on an individual basis.
- Funds management techniques are highly useful to states in allowing investment programs to proceed expeditiously. Flexibility in federal programs allows states substantial latitude to target currently available resources most effectively.

The techniques are summarized individually below.

New Revenues – Toll Highways and Innovative Tolling and Pricing Approaches: *Toll facilities are a centuries old concept, but there are many exciting and important opportunities to utilize tolls today in both traditional and innovative ways. Toll highways represent desirable opportunities to generate new revenues to support investments in the toll facility itself or in related facilities. New pricing approaches could pay off now and point the way for the evolution of revenue streams to support transportation.*

Traditionally, toll roads have been purely supported by tolls. However, there is much interest today in using tolls as partial sources of revenue to support new highway investments, even if tolls cannot pay for the entire investment. New innovative finance strategies are also being used within the broader context of toll highways. Toll facilities are usually financed with non-recourse revenue bonds, meaning that the risk of traffic and toll revenue being adequate to meet expectations is shouldered by the bond holders. In some cases, projects have been funded with general obligation debt, whereby a government entity pledges its full faith and credit to pay off the bonds.

With the extensive free road system that is in place, new "start up" toll facilities may have a difficult time generating enough revenue to pay back the cost of an entire project. In response, the mature or older toll systems have successfully used the excess revenue stream from the mature parts of their systems to build extensions, spurs, and other new toll facilities. Some have funded related transit systems. The revenue streams from toll roads are restricted as to their use by a trust indenture, which ensures that funds are first targeted to assuring that bond holders are paid back on schedule, and that adequate reserve funds are maintained. Only funds in excess of these requirements are available for other purposes.

States may now place tolls on reconstructed bridges and tunnels on the Interstate system. TEA-21 allows the Secretary of the U.S. DOT to select three pilot projects under which states will be permitted to convert reconstructed or rehabilitated free Interstate highway segments into tollways. There is also a FHWA Pilot Program through which new applications of pricing are being explored.

Innovations in tolling have come in the arena of project type, as well as in attributes of the finance/ownership structure. New project types and new approaches that have emerged include:

Electronic Toll Collection. Most existing toll facilities now have electronic toll collection, whereby customers do not have to stop at the toll plaza to pay a toll. This removes one of the foremost previous drawbacks to tolls, which is having to stop to pay, often in congested conditions. At very low toll rates, the travel time and operating costs of slowing, stopping, and returning to speed have been higher than the cost of the toll itself, even without toll booth backups.

High-Occupancy Toll (HOT) Lanes. These are lanes whereby single-occupancy vehicles buy the right to use excess capacity in lanes that are otherwise reserved for high-occupancy vehicles (HOVs) which pay no tolls.

Express Electronic Toll Lanes or FAIR Lanes. Similar to HOT lanes, express toll lanes would also parallel existing freeways, but may not provide special treatment for HOVs. None have yet been built without HOV provisions.

Variable, Value, and Congestion Pricing. These are promising pricing methods in which tolls or congestion fees are varied by time of day, day of week, or market segment, potentially to maximize vehicle throughput and generate revenues.

Interstate Reconstruction and Rehabilitation Program

This FHWA program allows up to three pilot projects to convert reconstructed or rehabilitated free Interstate segments or bridges into toll facilities. This program has not yet been used, despite the opportunities it presents for augmenting funding.

The Interstate Reconstruction and Rehabilitation Program in TEA-21 allows the U.S. Secretary of Transportation to select up to three pilot projects under which states will be permitted to convert reconstructed or rehabilitated free Interstate segments into tollways. No federal funding has been authorized for this program. The state in which the toll project operates also must enter into an agreement with FHWA covering the use of toll revenues for the pilot project. During the term of the toll pilot project, the state cannot use Interstate Maintenance funds on the portion of the Interstate route where tolls are collected. The term of the toll pilot project must be at least 10 years.

Value Pricing Pilot Program

The intent of the FHWA Value Pricing Pilot Program is to demonstrate and evaluate road and parking pricing concepts that achieve significant and lasting reductions in highway congestion. New approaches such as pricing innovations will be an important source of future revenue streams.

TEA-21 authorizes the U.S. Secretary of Transportation to provide up to $51 million in FY 1999 through FY 2003 to support the implementation of up to 15 value pricing projects. The program supports the costs associated with pre-implementation, public participation, and pre-project planning for up to three years. Additionally, the program supports implementation projects for three years from the time the project is implemented.

Value pricing entails fees or tolls for road use, which vary with the level of congestion. This concept of assessing relatively higher prices for travel during peak periods is the same as that used in many other sectors of the economy to respond to peak-use demands. Road-use charges that vary with the level of congestion provide incentives to shift some trips to off-peak times, less-congested routes, or alternative modes, or to cause some lower-valued trips to be combined with other trips, or to be eliminated. A shift in a relatively small proportion of peak-period trips can lead to substantial reductions in overall congestion. Fees also generate revenues that can be used to further enhance urban mobility.

The Value Pricing Pilot Program is an extension of the Congestion Pricing Pilot Program authorized under ISTEA. Three projects were undertaken in the original program:

I-15 HOT Lanes (San Diego, California). Two existing reversible HOV lanes in the median of the congested I-15 Freeway were opened to single-occupant vehicles that paid a toll.

Midpoint and Cape Coral Bridge Variable Pricing Project (Lee County, Florida). The toll schedules for two existing bridges were modified to provide discounts to customers who chose to travel in the period before and after the commute peaks.

IH-10 HOT Lanes (Houston, Texas). Under the Value Pricing Pilot Program project, HOVs with two occupants were allowed to buy the right to use the HOV lanes, which were for three occupant vehicles.

New Revenues – Developer Exactions, Impact Fees, and Special Assessments: *Developer exactions and impact fees and special assessments are designed to assess the costs of projects needed to maintain a reasonable level of service after a development is implemented and thus to mitigate the impacts of development on the local transportation infrastructure These are primarily local government tools.*

The basic concept behind exactions and impact fees is to assign cost responsibility for new facilities or enhancements to the new development it is needed to serve. Examples of development impact fees include traffic mitigation fees, infrastructure improvement fees, and fees for improving sewer and water systems to accommodate new development. Exaction is a broader term for impact fees, dedications of private property, and other in-lieu fees imposed to fund public improvements required to support proposed development. Examples of exactions include road dedications and improvements.

Impact fees and exactions are widely used in the U.S. In response to more widespread use and increasing impact fee amounts, the development industry in California began lobbying the California State Legislature to regulate the amount and application of impact fee programs. Their efforts culminated in the passage of Assembly Bill (AB) 1600, which has become enabling legislation and was used as a model for legislation elsewhere in the country. The U.S. Supreme Court decided in *Nollan v. The California State Coastal Commission* (1987) that a relationship must exist between the development's impact and the particular public facilities required to mitigate the impact, and that the amount of the fees must correspond to the cost of the public facilities

Special assessments finance highway and transit infrastructure by levying a fee for the value that the transportation improvement adds to an affected property. The fees collected through special assessments are a one-time charge, and are therefore different than property taxes. The assessment amount is derived from a formula applied to properties in an assessment district.

New Revenues – Value Capture -Tax Increment Financing: *Tax increment financing captures the additional tax revenue that is estimated to be derived from the increase in property values resulting from a transportation improvement. These are not state finance opportunities, but should be considered locally.*

Tax increment financing (TIF) uses a community's standard property tax program to generate revenue for public (including transportation) facilities. Such financing is predicated on the assumption that improved public services raise the values of the property surrounding newly constructed infrastructure. With TIF, a portion of those additional revenues is earmarked for the costs of transportation investment. Communities and local public agencies may be fearful that it would lower the amount of taxes available for other community programs funded by tax revenue, even though TIF only applies to the incremental value added by an improvement to the transportation system.

New Revenues (Trades) – Shared Resources: *Shared resource projects allow state and local governments to receive utility services at no cost in exchange for private use of right-of-way. Shared resources can make limited but important contributions to state transportation.*

Shared resource projects entail public entities working with cable and television companies, telephone service providers, electric utilities, and other telecommunications companies to offer the right to install communications infrastructure on public rights-of-way in exchange for providing valuable telecommunications services at no charge. The benefits to both the public and private sectors are significant.

For the private sector, access to public rights-of-way means that necessary communications networks and other related infrastructure can be constructed less expensively. For the public sector, the most obvious benefit is the provision of telecommunications infrastructure. A state can receive credit towards its matching share for a transportation project that requires the use of the shared resource.

New Revenues – Joint Development: *Joint development refers to direct private contribution to the construction or maintenance of transit assets or related investments. Joint development can make an important contribution but likely only with regard to major new facilities.*

Joint development as a revenue raising technique is flexible and may take a number of forms. Transit agencies rent space inside stations, or lease or sell air rights over, under, or adjacent to their facilities. However, joint development is not limited to property owned by the transit agency. Private companies, recognizing the benefits of the provision of public transportation access to their land, may choose to incorporate transit infrastructure into their own projects. Joint development provides local match for federal grants in two ways. First, revenues from the leasing and sales of property rights are counted as locally generated funds. Second, the value of the transit infrastructure erected or maintained by private developers (i.e., the costs saved by the public transit authority) also may be included in the local match.

Innovative Contracting – Turnkey Management: *Turnkey management refers to an innovative procurement technique in which a public authority consolidates the various aspects of a new facility in a single private contract. Turnkey contracting can impact revenues, costs, and performance.*

Turnkey projects are designed to save money and speed implementation. With the consolidated type of contract used in turnkey management, the public agency can share risk with the private sector while streamlining the development process. The private contractor becomes a turnkey manager, who, after fulfilling the terms of the contract, "turns the keys" over to the public agency. This procurement method may be applied to the construction of an entire system or a single aspect of a system, such as a maintenance facility. In general, the private operator is paid by the public agency, unless the project has a sufficient revenue stream. Turnkey projects may also be particularly valuable in the context of warranties, which limit the public agency exposure to future costs.

There are many different types of turnkey contracts, several of which are: Design-Build Turnkey, Build-Operate-Transfer (BOT) Turnkey, Design-Build-Operate-Maintain

(DBOM) Turnkey, Design-Build-Operate-Transfer (DBOT) Turnkey, Design-Build-Transfer-Operate (DBTO) Turnkey, Super Turnkey.

Turnkey projects have been very common around the world, but less so in the United States. Over the last decade, however, FTA has led the way with a Turnkey Demonstration Program that was established by ISTEA and modified by TEA-21. Five projects participated in that demonstration: Baltimore Central Light Rail Extensions, Los Angeles Union Station Gateway, San Francisco BART Extension to San Francisco International Airport, New Jersey Hudson-Bergen Light Rail, and Tren Urbano in San Juan, Puerto Rico.

In addition, many states have begun experimenting with turnkey techniques, especially design-build. California used the DBTO technique to bring about the SR 91 Express Lanes project, in which four HOV lanes were built in the median of an existing freeway, and single-occupancy vehicles were allowed to use the lanes for a toll. South Carolina also used that technique in bringing about the Greenville Southern Connector project, a 17.5-mile toll road.

Innovative Contracting – Shadow Tolls: *Shadow tolls are per vehicle or per vehicle mile of travel amounts paid to a facility operator by a third party, such as a sponsoring governmental entity, and not by facility users.*

Shadow tolls would involve payments to private facility operators from public agencies based upon vehicle miles of travel on privately designed, built, and operated facilities. Shadow toll payments come from other pledged revenue sources. Shadow tolls could allow a private facility operator to construct a facility that could not be supported from traditional tolls. Shadow tolls encumber future revenues in a manner similar to bonding, but through a different type of financial structure. Eight shadow toll contracts have been signed with private consortia in the United Kingdom, and one in Finland, though thus far no projects with shadow tolls have actually begun operation. There is no history of shadow tolling in the U.S.

Innovative Contracting – Warranties: *Highway warranties are an important opportunity to help improve performance and achieve lower life-cycle costs. Highway warranties provide a guarantee on the part of the private contractor of the performance of a roadway or other asset for a specified period of time.*

Warranties have been used by many states on transportation projects to protect investments. The warranty is a means to capture the long-term life-cycle cost of highway infrastructure. The states and industry need to work cooperatively in developing warranty provisions.

Table 2.1 summarizes the use of warranties on U.S. highways. Most warranties relate to specific products and structures; however, the New Mexico State Highway and Transportation Department signed the nation's first long-term comprehensive warranty on a highway in 1998. For a one-time cost of $62 million, the private contractor guaranteed the overall performance of the highway for 20 years from the date of completion and all structure and drainage and erosion features for 10 years.

Table 2.1 Warranties on U.S. Highways

Product	Range of Warranties	States
Asphaltic Concrete/Rubberized Asphalt	3 to 8 years	AL, CA, CO, FL, IN, ME, MI, MO, OH, NW, WI
Asphaltic Crack Treatment	2 years	MI
Portland Cement Concrete Pavement	5 years	WI, MI
Bridge Components	5 to 10 years	WA, ME
Bridge Painting	2 to 10 years	IN, MA, ME, MI, NH
Chip Sealing	1 to 2 years	CA, MI
Comprehensive	20 Years	NM
ITS Buildings	2 to 3 years	VA, NC
Landscaping, Irrigation	1 year	WY
Microsurfacing	2 years	CO, MI, NV, OH
Pavement Marking	2 to 6 years	FL, MT, OR, PA, UT, WV
Roofing	10 years	HI

Sources: Federal Highway Administration and New Mexico State Highway and Transportation Department.

Innovative Management – Advance Construction/Partial Conversion of Advance Construction: *Advance construction is a very popular technique. Advance construction and partial conversion of advance construction are cash-flow management tools that allow a state to begin an eligible project even if the state does not currently have sufficient federal-aid obligation authority for the federal share of project costs. Partial conversion of advance construction is an innovation that allows states to convert, obligate, and receive reimbursement for only a portion of the federal share of project costs, which removes any requirement to wait until the full amount of obligation authority is available.*

Advance construction is a very popular and proven state DOT financial management tool. Florida has very extensive use of advance construction. Under advance construction, a state may use non-federal funds to advance a federal-aid project while preserving its eligibility to receive federal-aid reimbursements in the future. At some future date when the state has sufficient obligation authority, it may convert the advance-constructed project to a federal-aid project by obligating the permissible share of its federal-aid funds and receiving subsequent reimbursements. Partial conversion of advance construction enables states to convert an advance-constructed project to a federal-aid project in stages rather than all at once on a single future date. For transit facilities, a letter of no prejudice (LONP) follows similar procedures to advance construction but also applies to non-construction-related activities (e.g., vehicle purchases). As of September 30, 2000, 47 states had $19.6 billion in advance construction projects under agreement with FHWA.

Innovative Management – Tapered Match: *With a tapered match, the non-federal share may vary over time to match availability of funds.*

When a tapered match is authorized, the non-federal matching ratio is permitted to vary over time. Thus, federal reimbursement of state expenditure can be as high as 100 percent in the early phases of a project provided that by the time the project is complete, the overall federal contribution does not exceed the statutory federal-aid limit (typically 80 percent of project costs). For transit facilities, delayed local match follows similar procedures to tapered match. Under the TE-045 program, 11 projects with total costs of $193 million have tapered the non-federal matching ratio.

Innovative Management – Flexible Match: *Flexible match allows a wide variety of contributions to be counted towards the match for federal projects.*

The value of private and certain state and local contributions – including publicly owned property – may be used to satisfy the non-federal matching requirement for federal-aid funding. The fair market value of non-monetary contributions (e.g., land, materials, services, equipment, or facilities) must be determined and documented in order for the credit to be applied as non-federal match. The value of the public or private contribution must be included in the total project cost. Funds from other federal agencies may count toward the non-federal share of recreational trails and transportation enhancement projects. Under the TE-045 program, 22 states were approved to advance projects with various forms of the flexible match technique. Flexible match has been very popular with the states, and has been used on 29 projects to date for project costs totaling just more than $1 billion.

Innovative Management – Toll Credits: *States may use excess revenue from toll facilities as a credit toward the non-federal matching share of certain transportation projects. This has been very helpful for states with toll facilities.*

Under the toll credit technique (codified by Section 1111© of TEA-21), a state is permitted to use certain toll revenues as a credit toward the non-federal matching share of programs authorized under Title 23 U.S.C. (except for the emergency relief program) and for transit programs authorized by Chapter 53 of Title 49.

The amount of the credit earned is based on revenues generated by the toll authority. Eligible expenditure categories include preliminary engineering, right-of-way acquisition, initial construction of a toll authority's own facility provided the construction costs are repaid with toll revenues, and capital improvements to new or existing non-tolled state highways. Routine maintenance work (such as snow removal or mowing), debt service, costs of collecting tolls, or pass-through expenditures of state revenue may not be used to establish toll credits.

Loans and Credit – Section 129 Loans: *States may use federal aid to fund loans to projects with dedicated revenue streams.*

Section 129 of Title 23 of the U.S. Code (23 U.S.C.) allows states to use federal aid to fund loans to projects with dedicated revenue streams. Section 129 allows a state to make loans to a public or private entity which is constructing, or proposes to construct, a toll project that is eligible for federal-aid funding or a non-toll highway project with a revenue source specifically dedicated to support the project. The amount loaned by the state is considered an eligible federal-aid project cost.

Loans must be repaid to the state. The repayment must begin within five years after the project is completed and opened to traffic and must be completed within 30 years after the date federal funds are authorized for the loan or first increment of the loan.

Loans and Credit – State Infrastructure Banks (SIBs): *A SIB is a state (or multistate) revolving fund that can offer loans and non-grant forms of credit assistance to public and private sponsors of Title 23 highway construction projects or Title 49 transit capital projects. SIBs have been important sources of credit for smaller projects.*

SIBs have been a useful method to advance selected projects. Some states are expanding their SIBs with state funds, and other states are using their SIBs as a credit enhancement or a reserve account.

SIBs allow states to leverage additional transportation resources, accelerate construction timelines for projects with dedicated revenue sources, and recycle assistance to traditional non-revenue-generating projects. A SIB can offer non-grant forms of credit assistance to public and private sponsors of Title 23 highway construction projects or Title 49 transit capital projects. SIBs provide financial support to public and private sponsors of eligible surface transportation projects during all project stages. The types of assistance that may be provided by SIBs include loans, guarantees, interest rate subsidies, letters of credit, purchase and lease agreements, and other forms of non-grant assistance. As of October 2000, 32 states have entered into 172 loan agreements with a dollar value of nearly $2.3 billion.

Loans and Credit – Direct Loans, Loan Guarantees, and Standby Lines of Credit under the Transportation Infrastructure Finance and Innovation Act (TIFIA): *TIFIA is a major potential source of credit for very large projects. Under TIFIA, the U.S. DOT may offer credit assistance to project sponsors in one of three ways: direct (secured) loans, loan guarantees, and standby lines of credit. Combining senior lien debt sold in the public market with direct loans provided by the federal government under TIFIA could provide access to affordable capital, demonstrate public acceptance, and improve the coverage ratio on outstanding debt (e.g., annual revenues divided by annual debt service). This can facilitate the completion of projects that may otherwise be postponed until much later, or not completed.*

Total federal credit assistance is limited to $10.6 billion during FY 1998 through FY 2003 and ranges from $1.2 billion in 1998 to $2.3 billion in 2003. Projects are described in Appendix A. Under TIFIA, the U.S. DOT may offer three types of credit assistance to project sponsors.

Direct (Secured) Loans. Direct loans provide flexible long-term, fixed-rate financing for a portion of construction costs. Loans may not exceed 35 years after project completion and payments may be deferred for up to 10 years in the event revenues are insufficient to meet debt service payments. The loan is payable from project-related revenues, such as tolls or user fees.

Loan Guarantees. Loan guarantees promote private investment in highway projects by providing a federal guarantee of debt service payments over the life of the loan. The guarantee program is similar to the direct loan program in flexibility and terms.

Standby Lines of Credit. Standby lines of credit represent a commitment to make one or more direct (secured) loans in the future, if needed due to shortfalls in revenues. The

standby line of credit would fill a gap by providing a secondary source of capital during the ramp-up period after construction. The total line of credit cannot exceed 33 percent of project costs and would be available for only the 10-year period immediately following project completion.

Loans and Credit – Direct Loans and Loan Guarantees through the Railroad Rehabilitation and Improvement Financing (RRIF) Program: *Under RRIF, the U.S. Secretary of Transportation may provide direct loans and loan for the acquisition, development, improvement, or rehabilitation of intermodal or rail equipment facilities.*

Section 7203 of TEA-21 established the Railroad Rehabilitation and Improvement Financing Program (RRIF). RRIF is a federal credit program administered by the Federal Railroad Administration (FRA). Under RRIF, the U.S. Secretary of Transportation may provide direct loans and loan guarantees for terms up to 25 years for the acquisition, development, improvement, or rehabilitation of intermodal or rail equipment facilities, including track, bridges, yards, buildings, and shops.

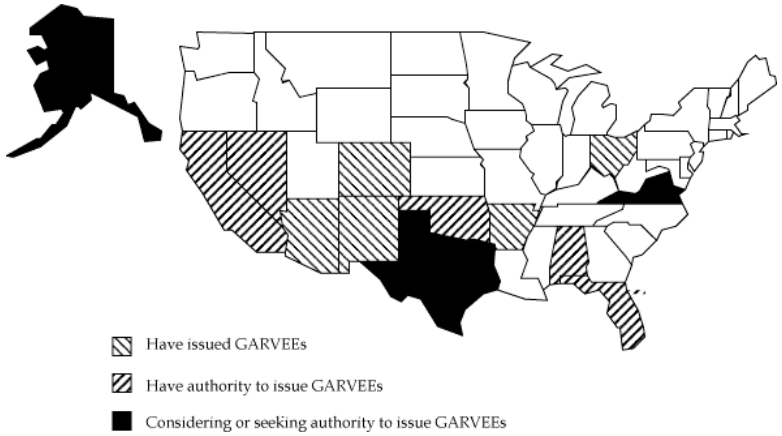
Loans and Credit – Revolving Loan Funds: *States may use federal grants to fund loans to transit projects with dedicated revenue streams, and then reinvest the repaid funds in other transportation projects.*

States may use federal grants to fund loans to transit projects with dedicated revenue streams. States have the flexibility to negotiate interest rates and other terms of these loans. When a loan is repaid, the state must use the funds to make loans or grants to other eligible transportation projects under TEA-21. States also have the ability to establish and operate revolving loan funds. Revolving loan funds allow states to aggregate federal grant funds and to pool purchases of vehicles. In turn, the vehicles may be sold or leased to local transit authorities. The state also may make loans to local transit operators for the acquisition of public transportation vehicles and facilities.

Bonding/Financing – Grant Anticipation Revenue Vehicle (GARVEE) Bonds: *GARVEE bonds allow an agency to finance a project based on the anticipated flow of future grants from regular federal sources. Garvees are increasing in usage among the states, as a means to accelerate projects.*

Grant Anticipation Revenue Vehicle (GARVEE) bonds or grant anticipation notes (GANS) generate up-front capital for major highway projects that a state would be unable to construct as soon by using traditional pay-as-you-go grant resources. Bond-related costs now eligible for federal-aid reimbursement include interest payments and retirement of principal under an eligible bond issue (including capitalized interest); and any other cost incidental to the sale of an eligible bond issue (including issuance costs, insurance or other credit enhancement fees, and other bond-related costs as determined by the U.S. DOT).

Nearly $1 billion in GARVEE bonds have been issued to date in five states (see map). It is anticipated that this amount will double over the next few years, based on state bond issues in the pipeline.



Bonding/Financing – Certificates of Participation: *Certificates of participation (COPs) are tax-exempt bonds that are issued by a public agency and are backed with a very specific source of revenue, such as equipment or facility lease payments.*

Certificates of Participation (COPs) are one mechanism for better matching the flow of revenues and outlays. For example, if a transit agency must replace 50 buses in its fleet, but only has adequate revenue streams to purchase 10 in a year, issuing COPs backed by future flows of federal and local funds could permit the full replacement acquisition to be undertaken at one time.

One of the most recent developments in transit finance is the ability to promise the use of future federal transit formula grants as partial security for the leases underlying COPs. It is now possible for the interest expense associated with lease payments to be reimbursed by federal grants at the 80 percent matching level. All COPs transactions involving FTA grants to date have funded bus acquisitions and have been issued with maturities of up to 12 years. However, long-term, locally funded COPs have also been used to finance an entire segment of a light rail system. For example, in 1985, the city of Sacramento issued $29.4 million of COPs to fund the additional costs required to complete the Sacramento Regional Transit District's light rail system.

Bonding/Financing – 63-20 Corporations: *Single-purpose, not-for-profit corporations were authorized under Internal Revenue Service ruling 63-20 to develop, finance, and own toll facilities, and to issue tax-exempt debt to construct such facilities.*

A 63-20 corporation issues bonds and then leases the public facility back to a governmental unit while securing any debt issued with the future stream of lease payments. The 63-20 corporation preserves the ability of the project to be financed with tax-exempt bonds, while maintaining the vast majority of the benefits associated with private development. State and local governments typically issue debt through 63-20 corporations in order to avoid statutory debt limitations or other restriction on the governmental unit. Because the government's lease payments are subject to annual appropriations, they are not considered debt under state laws. There have been two projects financed so far through the 63-20 corporation technique: the Southern Connector in Greenville, South Carolina, and the Pocahontas Parkway in Richmond, Virginia. In addition, a 63-20 corporation has been formed by the Massachusetts Highway Department and its developer for the Massachusetts Route 3 North Project.

3.0 Interpretation and Conclusions

There are a very wide range of opportunities in terms of the techniques and approaches that can be used to finance transportation projects and programs. The conclusions resulting from this preliminary initial scan include:

- States must make best use of the available techniques appropriate to them, given resource shortfalls and financial management challenges. Innovative finance web sites at FHWA, and soon at TRB, will provide timely information about opportunities.
- There is no best new innovative revenue source for project financing; rather, any new source which can be tied to a project will augment current revenues and allow more to be achieved.
- Innovative revenue sources will need to be associated with a specific project or program, and those who pay must see clear benefits to themselves. A public interaction process will be needed to generate support and consensus.
- Advancing innovative tolling or pricing somewhere – anywhere – in the United States will have enormous payoff in terms of establishing a future revenue source which can be emulated.
- While innovative finance might now constitute only a small portion of overall revenues, the proportion may grow dramatically and quickly, particularly as fuel taxes become less effective due to new technologies such as hybrid vehicles.
- If states are further into the "learning curve" on implementing and demonstrating new tolling and pricing approaches or other new sources, then the addition of these as major new sources will occur sooner, even though perhaps no timing will be soon enough.

4.0 Suggested Research

There is a pressing need for additional research and dissemination of information about innovative transportation finance. Current and emerging resources are substantial, including FHWA's web sites and a proposed TRB web site. The following are recommended as immediate research to help states to move rapidly up the learning curve on the understanding and use of innovations in finance:

New Revenue Paradigms for Transportation Agencies – This project would build upon the highly successful "New Paradigms" organizational project now being conducted for TCRP. The focus of this complementary effort will be on advancing new paradigms for revenues and institutional partnerships. Interaction will be conducted with institutions in selected areas ripe for new initiatives, to assist in bringing about a new example of how to generate new revenues and manage projects and programs. A budget of $150,000 is suggested as an add-on.

Revenue Threats, Opportunities, and Responses – This research would identify the threats and opportunities facing transportation agencies in the finance area. With hybrid vehicles actually entering the market, and with prospects of a doubling of the fuel efficiency of new autos, SUVs, and light trucks, the threatened future is about to arrive. A blueprint needs to be created of successful approaches to achieve new revenues. This research should compile in depth information on successes and draw and synthesize lessons

about what approaches are needed to successfully implement revenue innovations. A budget of $75,000 is suggested for a case study and synthesis effort, building upon a $50,000 effort under for project 8-36.

Tools Series: New Revenue Tools, Bonding Tools, Funds Management Tools – This suggested effort would not entail much additional research, but would organize information including that generated from the research above into helpful products for selected audiences. Those who work to generate and implement new revenues are in the top executive levels. Bonding and funds management will be undertaken by financial managers. Breaking out these topics, and providing more details on successful approaches, will provide usable "how-to" information to those most concerned. This effort is estimated to require a budget of $125,000.

Appendix A. TIFIA Projects Funded by U.S. DOT

The five projects selected for the initial round of TIFIA assistance were:

State Route (SR) 125 – San Diego, California. The total cost of the project is $400 million. The project was selected to receive a $90 million TIFIA loan guarantee and a $37 million TIFIA standby line of credit.

Metro Capital Program – Washington D.C. The $2.3 billion Metro Capital Program will rehabilitate and replace vehicles, equipment, and facilities and is designated to receive a $600 million TIFIA loan guarantee.

Miami Intermodal Center – Miami, Florida. The $1.4 billion Miami Intermodal Center will receive two TIFIA loans totaling $436 million.

Farley-Pennsylvania Station Redevelopment Project – New York, New York. The project involves the expansion and modernization of the Farley Post Office Building and will receive a $140 million TIFIA loan and a $20 million TIFIA line of credit.

Tren Urbano – San Juan, Puerto Rico. The $1.7 billion 17-kilometer rapid rail system will receive a $300 million TIFIA loan.

In FY 2000 and the early part of FY 2001, five additional projects representing a $5.4 billion investment were selected for TIFIA assistance. To facilitate the financing of this investment, the U.S. DOT will provide $1.52 billion in credit assistance – an amount equal to roughly 28 percent of total project costs – to the five projects at an estimated subsidy (budgetary) cost of $132.3 million to the federal government. Following are descriptions of the five additional TIFIA projects.

Cooper River Bridge (South Carolina). The 2.5-mile bridge structure has been approved to receive a $215 million direct loan under TIFIA, to be financed from truck registration fees and repayments of SCTIB loans.

Staten Island Ferries and Terminals (New York). The $463 million project will receive a direct TIFIA loan to the project in the amount of $152.8 million, secured by revenues from the Tobacco Master Settlement Agreement of 1998.

Tacoma Narrows Bridge (Washington). United Infrastructure Washington, a subsidiary of Bechtel Enterprises, has contracted with the Washington State DOT to finance, develop,

and operate the new bridge. The Tacoma Narrows Bridge Nonprofit Corporation will borrow the TIFIA funds and issue tax-exempt bonds. Project costs are presently estimated at $835 million, and TIFIA assistance will be in the form of a $240 million direct loan and a $30 million line of credit, to be repaid with bridge tolls.

Central Texas Turnpike Project (Texas). This $3.220 billion project will receive TIFIA assistance in the form of direct loan for $800 million. Project debt will be repaid with toll revenues.

Reno Transportation Rail Access Corridor (Nevada). The estimated project cost is $242 million. The city of Reno, plans to finance two-thirds of the project through a bond issue backed with hotel tax and sales tax revenue, and will receive a $79.5 million direct loan from the TIFIA program.