For many years, if average citizens knew the name of any of their legislators, it was their senator or U.S. representative. City council members and elected county officials labored under virtual anonymity. Recently, we have seen evidence of a reversal in this situation. The Americus bridge project and the local-option tax examples should serve as warnings to state and local officials about the possible not-so-distant future of highway funding. It is appropriate and expected that local citizens have a keen interest in how local funds are spent and in how local projects are selected. But as major projects become even more expensive, a new mechanism for funding large local projects must be developed. Most of Indiana's localities have populations and tax bases that cannot measure up to an individual large road or bridge project, let alone a number of them over a period of a few years.

It is with these large projects that new fund-allocation procedures and renewed efforts at inter-jurisdictional cooperation are critical. Among the measures that demand sober, unselfish evaluation are

1. The feasibility of levying special-assessment fees for highway improvement and maintenance for property owners adjacent to the rights-of-way (this option is particularly relevant for county roads, most of which are farm-to-market roads); special assessment will thus reflect direct-user fees;
2. A practical mechanism for localities to accumulate funds for planned or emergency future projects;
3. The establishment of a state-level capital fund for large projects on local roads; grants could be made on project merit, a rotational basis, or other criteria;
4. A streamlined and equitable method for reevaluating the appropriate jurisdiction for a given road together with appropriate standards for its design and upkeep; and
5. The removal of obstacles to the cooperation of different jurisdictions in undertaking a mutually beneficial project.

If any significant portions of the New Federalism proposals survive the political battlefield, an era of opportunity and hard choices lies ahead. No longer will the major concern be effective grantsmanship at the federal level. Instead, we will have a clearer recognition that it is our money being spent. Citizen input will be more direct and intense, both to spend and not to spend. Local officials will be pressed to offer solid justification for their use of tax revenues. And local taxes may rise, even significantly. But if local tax increases occur in response to public demand for services, if measures such as the five listed in the previous paragraph can be implemented, and if at the same time the federal and state tax burdens can be eased, progress will have been made. If we can achieve progress in the category of postponable highway maintenance, we will surely see improvements in other areas.

ACKNOWLEDGMENT

I would like to extend my gratitude to Kumares C. Sinha for reviewing drafts of this paper, the contents of which nevertheless remain my responsibility. Special thanks are also due Marian Sipes for typing so well the various versions of the manuscript as it developed.

REFERENCES

1. ATAC II: Total Transportation Financial Needs During the Next Decade. American Transportation Advisory Council, Washington, DC, April 1981.
2. State Highway Funding Methods--An Analysis and Update. The Road Information Program, Inc., Washington, DC, Sept. 1982.
3. Highway Funds Down. Lafayette Journal and Courier, Lafayette, IN, May 17, 1982.
4. Highway Finance--1981 Updates. School of Civil Engineering, Purdue Univ., West Lafayette, IN, Dec. 1981.
5. K. Moyars. Wheel Tax: No Warren Quorum. Lafayette Journal and Courier, Lafayette, IN, June 22, 1982, p. B-4.
6. Wheel Tax Can't Smooth All Paving Woes. Lafayette Journal and Courier, Lafayette, IN, June 27, 1982, p. B-2.
7. Residents Raise Road Work Funds. Lafayette Journal and Courier, Lafayette, IN, May 23, 1982.

Publication of this paper sponsored by Committee on Local Transportation Finance.

Current Trends in Toll Financing

WILBUR S. SMITH AND NORMAN H. WUESTEFELD

User fees for the consumption of services provided by transportation facilities have been accepted for centuries and are receiving wider support today for future application. Currently in the United States, 28 states operate 36 toll roads and 43 toll bridges. In addition, 29 county and 27 municipal toll facilities, primarily bridges, are now in operation across the country. Despite the effects of the 1956 Federal-Aid Highway Act, which discouraged the user-fee concept for highways, 20 new toll roads totaling 770 miles and 13 new toll bridges have become operational in the United States during the last 15 years. The toll concept has also become accepted internationally; France, Spain, Italy, Japan, and Britain are among the many nations operating successful toll facilities. Toll projects, especially toll roads, are gaining approval for several reasons. First, user fees can partly relieve the state governments of the financial burden of providing adequate and efficient highways. Second, toll facilities often provide better emergency and patrol services and a greater degree of safety than their nontoll counterparts. Last, through rate differentials, toll roads can encourage carpooling, thereby maximizing energy efficiency, or can offer special commuter rates for frequent users. Creative financing has become the key to expansion of the present toll-facilities system. Traditionally, financing has been accomplished with the use of revenue bonds when costs incurred in the construction and operation of toll facilities are covered completely by toll revenues. In 1965, the Dallas North Tollway was the last major new toll road to be financed with revenue bonds; the financing since then has been extensions of existing systems or included subsidies and/or pledges of other than toll income. The Ambassador Bridge in Detroit, privately financed and operated by the Detroit International Bridge Company, is one of the few major toll facilities still in private ownership. Future expansion of the toll concept depends heavily on actions of the federal and state governments as to possible use of federal funds to partly defray the construction cost of new toll facilities as well as on the extent to which federal contributions can be made to annual maintenance and rehabilitation costs. It is expected, too, that greater public-

and private-sector cooperation will play a vital role in the future of toll-facility financing.

Charging a fee for the use of a highway, bridge, tunnel, or ferry is not a new idea. There is historical evidence that such facilities existed before the birth of Christ, for example, the toll road from Syria to Babylon. In England, toll concepts date back to the 12th century. By 1281, tolls were applied to the old London Bridge and, interestingly, also to ships passing underneath the structure. By 1820, Britain had 20 000 miles of toll roads in operation.

Many of the earliest rural roads in the United States and early crossings of major rivers were tolled. At that time, funds for the construction and maintenance of roads from public tax sources were almost nil. In 1785, the Legislature of Virginia enacted a law providing for the erection of turnpikes on roads. Most highway professionals are familiar with the 62-mile Lancaster Pike, completed in Pennsylvania in 1794. It contained 13 toll gates and was the first of its type to have a variable toll schedule related to the number of axles on vehicles and the number of horses used.

As one looks at the history of toll roads, it appears that these roads have had cyclic patterns, especially in the United States. Some of the first roads along the Eastern seaboard were constructed as toll facilities. This trend continued into the first two decades of this century. Early county and state road systems often contained toll bridges or ferries, which were in some cases privately owned and operated. Then, when road building was more formally organized and administered, by the formation of state highway organizations and the creation of the U.S. Bureau of Public Roads, an antitoll attitude developed, and most of the existing toll facilities were made free facilities. In some cases, this was done by adding a county road on which the facility was located to the state highway system; in other cases, the county or state purchased all rights to private toll facilities.

The modern era of U.S. tollways began in the 1930s, engendered largely by the rapid increases in vehicular traffic in major corridors. With the passage of the Federal-Aid Highway Act of 1956, which accelerated authorization of funds for the Interstate system, a decline began in the toll roads.

Now, for almost a decade, the country has witnessed an upturn in popularity of toll highway facilities. Since 1968, 20 new toll roads totaling 769.76 miles and 13 new toll bridges have become operational in the United States (1,2). For many years, study results have been available that indicate that on some toll facilities up to 15 percent of the users might be driving farther, taking more time, and paying more tolls than would be required to make the same trip on free facilities. Current interest in toll roads likely relates to the energy crisis, environmental and other regulations that substantially increased the costs of facilities, reductions in travel, fuel-efficient vehicles, and inflation as related to capital maintenance and operating costs of highway systems; in short, the same amount of money today buys less than it did in the past. There is no evidence that the trend is diminishing; there is more intense interest now in toll financing than 10 years ago.

In a brief overview of past and current sources of revenues to fund highway transit improvements and innovations being considered, it is important to place the trend in toll financing in proper perspective. Certainly much is known and has been said about the deterioration of the nation's highway and bridge system. According to a study by The Road Information Program (TRIP), 60 percent of the country's 2 million miles of paved roadway needs resurfacing or rebuilding (3). The estimated cost of repairing these roadways is $270 billion. In comparison, both federal and state spending last year totaled $19.2 billion.

On January 6, 1983, President Reagan signed a measure to raise the current 4-cent federal motor fuel tax by 5 cents; 80 percent of the funds, or approximately $52 billion per year, was earmarked for highway purposes and the remainder for mass transit. Under this Surface Transportation Assistance Act of 1982, more than half of the highway funds will be allocated for Interstate construction, Interstate 4R work, and bridge replacement-rehabilitation.

Under the new measure, there are emergency provisions whereby state matching funds can be deferred in 1983 and 1984. The means by which to generate these matching funds are of concern to a number of states.

THE FISCAL DILEMMA

Across the country, the average gasoline tax per gallon has risen 10 cents, with differentials on diesel fuel, as motor fuel sales have stabilized (3,4). In some states such as Iowa, gasohol is exempt from state tax. Most state departments of transportation have made severe budget cuts, forcing cutbacks in expenditures and services.

In April 1982, nine states were considering increases in gasoline taxes (4). Twelve states, including the District of Columbia, Indiana, Kentucky, Massachusetts, Michigan, Nebraska, New Mexico, Ohio, Pennsylvania, Rhode Island, Virginia, and Washington, have introduced variable motor fuel taxes--the tax is a percentage of the sale rather than a fixed rate per gallon. Of the nine states that now collect a sales tax on motor fuel, only two dedicate the funds received to transportation improvements. Other states are considering adding motor fuel to the list of items covered by sales tax, including Connecticut, which would impose a 7.5 percent sales tax on motor fuel. Another bill in the Connecticut legislature would introduce a special sales tax on gasoline equal to 12 percent of the sales price (4).

Many other forms of increased taxation are being considered by the various states, all of which would raise the cost to the user. They include a variety of levies--vehicle registration fees; excise taxes on automobile sales, parts, accessories, and repairs; special truck taxes such as gross receipts, fuel surcharge, axle-mile, ton-mile, mileage, and weight-distance; fees for driver's license and certificate of title; tax on lubricating oils; and increases in current allocations of funds for transportation improvements from such sources as expansion of the base for sales tax and various other forms of taxes such as liquor, tobacco, and income. In Kentucky and Utah, income is derived from state energy road taxes and in Pennsylvania, Virginia, and Rhode Island from oil franchise taxes (4).

While a substantial part of the funds for highway-bridge system maintenance and improvements is derived from federal and state taxes, county and regional-based taxes also contribute. At the county and municipal levels, ad valorem taxes in large measure fund maintenance of the local road systems, with support from the state. The cost of constructing new residential streets is often the responsibility of the developer, an important example of the role of private industry in development of the local infrastructure.

The use of the private sector and end user to meet maintenance and improvement needs rather than reliance on government subsidies is becoming increasingly popular in other transportation modes. General aviation's fuel tax and scheduled airlines waybill and passenger taxes are good examples. Many airports are also considering introduction of an access tax such as that now assessed at Dallas-Ft. Worth Airport as a means of increasing revenues. Lock fees coupled with fuel taxes are under serious scrutiny as a means to reduce government subsidy of waterborne commerce. Gross volume taxes were imposed at one time on pipelines, and ton-mile taxes on highway-transported commerce have long been debated.

Creative financing and identity of funding sources is the central theme today; all levels of government realize that fewer federal dollars are available and less will be provided in the future. Although the provisions of the Surface Transportation Assistance Act of 1982 seem to fly in the face of this statement, it should be remembered that the billions in federal funds to be allocated over the next four fiscal years is only a small portion of the total needed to bring the highway system up to acceptable condition. Even if the states were to somehow come together and all increase state motor fuel taxes by the same 5 cents and, as important, dedicate all such income to highway improvements, the impact would still be far below the revenue level needed.

MASS TRANSIT FINANCING INITIATIVES

Mass transit, which will also benefit under the Surface Transportation Assistance Act of 1982, has been far more innovative in seeking to obtain funds from other than traditional sources. Such sources have ranged from a state lottery in Arizona to revenue bond issues in New York City and San Francisco, California, backed not only by transit patron fares but also by vehicle tolls collected on bridges and tunnels. The bonding by the Metropolitan Transportation Authority (MTA) in New York City has local government backing and the $250 million bond series sold in October will go toward the purchase of new railcars; no federal funds will be involved in the purchase (5).

Using vehicle tolls to support mass transit is not a new concept. The Golden Gate Bridge Authority has subsidized not only a rubber-tired transit system but also a commuter ferry service for several years. A significant portion of the Bay Area Rapid Transit (BART) connection under Oakland Bay was financed by vehicle tolls collected on the Oakland Bay bridges together with a special property tax in the three counties it serves plus federal and state funds (6).

In addition to transit patron fares, the BART system in San Francisco receives operating funds from a special sales tax in San Francisco, Alameda, and Contra Costa Counties and a percentage of the statewide sales tax revenues collected. BART recently issued $65 million in bonds for capital needs, backed by patron fares and the annual income derived from the sales taxes dedicated to transit.

In Houston, Texas, a 1 percent regional sales tax is programmed to provide the main support for an 18-mile heavy commuter rail system; currently implementation will not involve any use of federal funds. The Metropolitan Transit Authority of Harris County receives the 1 percent sales tax collected on sales in the City of Houston and part of Harris and Montgomery Counties. Sales tax proceeds accounted for 67 percent of Harris County transit authority's 1981 total revenue.

The Metropolitan Atlanta Rapid Transit Authority (MARTA) system is also partly funded by a regional sales tax. A 1 percent sales tax is levied in Fulton and DeKalb Counties of which 99 percent is dedicated to MARTA. The remaining 1 percent goes to the state of Georgia.

Los Angeles County has a 1/2-cent sales tax projected to raise $290 million per year in support of mass transit. In addition, 25 percent of the 6 percent state sales tax collected in the county is returned and dedicated to transit. Of this amount, the Southern California Rapid Transit District receives 87 percent (6, p. C-3).

Elsewhere, Birmingham, Alabama, plans to use a tax on beer to raise $2 million annually to support mass transit. Since January 1981, 24 transit systems now operate with some form of dedicated tax.

ALTERNATIVE METHODS OF HIGHWAY FINANCING

Certainly it is expected that the traditional methods of raising funds for highway maintenance and improvements will remain viable, but there is also no doubt that these sources will have to be bolstered by other means to maintain the integrity of the nation's highway-bridge infrastructure. Recently, the concept of leveraging annual state income derived from these traditional revenue sources through issuance of revenue bonds has become more pronounced.

Today, 28 states operate 36 toll road systems and 43 toll bridge systems. In addition, 29 county and 27 municipal toll facilities, primarily bridges, are now in operation across the country (7, Table SF-3B). Summarized by intrastate versus interstate facilities and including toll ferry services, there are 68 intrastate toll roads, 83 bridges, 76 ferries, and 7 tunnels. In addition, there are 58 interstate toll bridges, 29 ferries, and 2 tunnels (8).

The Federal-Aid Road Act of 1916 for the first time in history made federal funds available to the states as assistance in providing roads. A major stipulation of the act was the prohibition of tolls of any kind. The Federal Highway Act of 1921 reemphasized this point. Interestingly, however, the Pennsylvania Turnpike, the first modern toll road, was built with federal assistance in 1940. Between 1940 and 1956, toll roads in the United States proliferated. The sudden expansion of toll roads largely ended, however, with the 1956 Federal-Aid Highway Act. That act provided for 90 percent federal financing of the Interstate system; a substantial increase in federal funds available for highway networks; inclusion of toll roads, bridges, and tunnels in the Interstate system where the facilities met Interstate standards; and the use of federal funds for approaches to toll roads.

There have been, however, several enforcement problems that have prevented complete implementation of the 1956 highway act. One hindrance to the act concerns the ability of the states to repay federal-aid funds in order to make the road, bridge, or tunnel into a toll facility. For example, the 1954 Federal-Aid Highway Act allowed Connecticut to repay federal funds in order to build part of the Connecticut Turnpike as a toll facility. Again, in 1960, the Federal-Aid Highway Act permitted Delaware and Maryland to repay federal funds used to construct I-95; each state tolled their portion of I-95. New Jersey has also repaid federal funds in order to toll portions of the Garden State Parkway.

There is a further hindrance to the federal government's efforts to have totally toll-free Interstate and primary systems. The Oldfield Act of 1927 permitted federal-aid funds to be used in the

construction of toll bridges and approaches. Adopted as Section 129 of Title 23 of the United States Code, the law (9, p. 6)

> permits federal participation in toll bridges, toll tunnels, and approaches thereto; toll road approaches to the Interstate System; and upgrading of two-lane toll roads to Interstate System standards. To receive federal funds, the states must agree to make the toll facilities free to public travel upon collection of tolls sufficient to retire the indebtedness of these facilities.

The effort made by Section 129 to make all roads toll free has been thwarted. Both Maine and Indiana, states that once had Section 129 agreements, have attained congressional relief and have paid back federal-aid funds in order to retain revenue-producing tolls on their respective facilities.

A major roadblock in the way of converting toll facilities to tax-supported facilities is the current lack of a federal plan to reimburse the states' costs of building toll facilities or to cover the states' current indebtedness to the respective bond holders.

The benefits of toll facilities are many. Not only do toll facilities provide fiscal relief to the state from the burden of maintaining, operating, and reconstructing highway facilities, but they serve the motoring public and taxpayer in general. Toll facilities have the ability to match the cost of using such a facility with the benefits derived by each class of user. Separate toll classes are maintained for each vehicle class.

Also, users pay for the facility, which lessens the financial burden on the taxpayer. Furthermore, toll rates can be charged to affect traffic flow, thereby smoothing movements during peak periods, and to encourage energy conservation by charging a separate ridesharing trip toll. In addition, toll facilities normally offer a greater degree of highway policing; a higher level of safety; on-the-road facilities, such as motor fuel stations and restaurants; and emergency highway services. Last, in the event that sufficient federal funds are not available for the construction of a travel facility in an area with a growing travel need, the toll-facility concept offers an effective alternative.

The three basic approaches to toll financing used to date are revenue bonds, revenue bonds supplemented by income other than that paid by users, and private financing. The first two are variations of public or quasi-public operations and the last of entrepreneurial operations.

The Ambassador Bridge in Detroit, Michigan, privately financed and operated by the Detroit International Bridge Company, is one of the few major toll facilities still in private ownership. Beginning with the Connecticut Department of Transportation's financing of the Merritt Parkway, several state highway departments have issued bonds supported by tolls generated by proposed toll facilities but, importantly, also backed by income generated by state highway taxes, total state income, or combinations thereof.

In some instances, the tax monies served simply as a pledge and were never drawn on. Most of the trust instruments call for repayment of any tax funds advanced prior to removal of tolls. Among the states employing this general concept, in addition to Connecticut, are New Hampshire, Virginia, Iowa, Louisiana, Maryland, Alaska, Delaware, Oregon, Florida, Indiana, and Kentucky (7).

Variations of state involvement are also in place in other states. The Kentucky arrangement calls for the turnpike authority to issue sufficient bonds for project construction; the authority then enters into a two-year, renewable lease agreement with the Kentucky Department of Transportation to maintain, operate, and provide all project debt service.

In Oklahoma, the turnpike authority operates the Will Rogers Turnpike and the Oklahoma Turnpike System; the latter is made up of five different projects. Shortly, the original debt on the Will Rogers Turnpike will be retired, and it too will become a part of the system. Based on a miles-per-gallon formula for various types of vehicles, the state motor fuel tax represented by the vehicle miles of travel on the turnpike system is credited annually to an account managed by the authority from which funds can be drawn to meet project debt service requirements.

In Florida, the turnpike was financed through issuance of revenue bonds and most all other toll facilities through bonds marketed by the state department of transportation that carried the pledge of the uncommitted portion of annual state motor fuel tax receipts allocated to the county in which the facility is located. In addition, the department of transportation agrees to maintain and operate each such project and to reimburse these expenses after all initial bonded indebtedness is retired and prior to the project's becoming toll-free and thereafter maintained by tax resources. At least one such project has reached this goal.

At present, federal law envisions the removal of tolls through defeasance of outstanding bonds for projects carrying Interstate highway system designation. It is not too difficult to imagine the reaction of some of these state transportation agencies to the prospect of suddenly inheriting many miles of limited-access highways, much of which were approaching the initial design-year age, and the potential downstream maintenance-rehabilitation burden. Immediately, most began negotiations with the various toll agencies involved to ensure that sufficient rehabilitation work would be accomplished prior to complete debt retirement so that the facilities would be turned over to the states in good operating condition. In the case of Ohio, this will require close to a $1 billion improvement program, which will delay transfer of the Ohio Turnpike to the state by several years.

A similar situation exists with the Pennsylvania Turnpike; well over $1 billion in upgrading would be required to bring that facility close to current Interstate highway system design standards. A considerably smaller expenditure was estimated back in 1974 to bring the Dallas-Ft. Worth Turnpike closer to such standards; this included the addition of several new interchanges. However, the turnpike debt was subsequently fully retired and the facility was transferred to the Texas Department of Public Transportation and Highways at the end of 1975. Since then, because of lack of adequate tax funds, maintenance of the project has suffered and none of the interchanges planned for construction, if tolls had been continued, have been implemented nor are there prospects that any will be in the near future.

In 1979, the Indiana Toll Road Commission was rapidly retiring its original bonded indebtedness, and under the terms of a tripartite agreement executed between the Commission and state and federal government, the toll road would soon become a part of the state's limited-access highway system. The tripartite agreement was reached many years ago when federal 90-10 funds were received for part of the construction of three Interstate highway connections to the toll road. With the active support of the state department of highways, which was concerned about accepting the facility without certain improvements, including the addition of several new

interchanges, and the almost $10 million/year in maintenance cost, the Toll Road Commission embarked on a program that culminated successfully on October 1, 1980, with the marketing of a $259.5 million bond issue (10).

In the process, legislative and congressional action was obtained to abrogate the tripartite agreement calling for the toll road to become toll-free on retirement of the initial debt, that debt was refunded, and design was initiated and funds established to defray the entire cost of the improvement program. In addition, through continuation of tolls for the new 30-year bond term, the anticipated annual maintenance burden on the department of highways was eliminated.

Coincidentally, as part of the legislative process, the Indiana Toll Road Commission was abolished and effective July 1, 1982, operation of the toll road became the responsibility of the Indiana Department of Highways. The facility continues to operate under a trust agreement by which all income derived from tolls and other sources must be used for operating-maintenance expenses and to meet debt requirements, including bond amortization.

During the course of the work leading to the bond sale, two Indiana legislators located in the toll road corridor sponsored separate public opinion polls on the desirability of retaining tolls on the facility. Faced with the prospect of insufficient tax dollars to fund the improvement program, citizens in both polls indicated overwhelming support for continuation of tolls to accomplish this objective.

In Connecticut, during 1982, almost the opposite occurred when opponents of a continuation of tolls on the Connecticut Turnpike were narrowly defeated. Their argument was that users of the turnpike, much of which is designated I-95, were being unfairly discriminated against in relation to users of toll-free I-91. Two factors were said to heavily influence the outcome: (a) the existence of the turnpike trust agreement with bondholders and (b) the approximately $16 million in excess toll revenues that annually flows into the state general fund (11). Interestingly, the last of the bonded indebtedness on the Merritt and Wilbur Cross Parkways in Connecticut was retired several years ago, and tolls remain in place; the income from tolls continues to flow to the general fund each year.

Early in 1982, in Maine, the turnpike authority and department of transportation reached a milestone agreement. With defeasance of the original turnpike bonds scheduled for mid-1982, the Maine legislature enacted provisions calling for repayment from turnpike income of the federal 90-10 contributions received many years ago toward construction of several Interstate highway connections to the turnpike, continuations of tolls during this period of repayment, and an annual contribution to the department of transportation of no less than $4.7 million annually from turnpike revenues.

The turnpike authority subsequently obtained congressional approval to repay the Federal Highway Administration (FHWA) and to continue tolls until such repayment was accomplished, which effectively terminated the original tripartite agreement. Short-term revenue bonds in the principal amount of $7.5 million were issued. In this manner, the Maine Turnpike Authority will remain in existence until the new debt is retired, tolls will remain in effect during this period, and the authority will contribute a minimum of $4.7 million annually to the department of transportation for funding of highway improvements in the turnpike corridor.

In July 1982, the New York State Thruway Authority, New York State Department of Transportation (NYSDOT), and FHWA entered into a tripartite agreement that appears to have brought FHWA close to greater recognition of the value, as a supplemental resource, of the toll concept. In the agreement, NYSDOT will begin to receive 100 percent of the annual federal funding now flowing to the state for Interstate highway system maintenance; previously, this percentage had been adjusted downward by the ratio of New York State Thruway mileage to total Interstate highway system miles in the state.

NYSDOT would act as a conduit only and pass these funds on to the Thruway authority for maintenance purposes. On its part, the authority agreed to remove tolls on the Thruway on retirement of the last of the currently outstanding bonded indebtedness, issue no new bonds except under a restrictive emergency covenant, and turn the Thruway over to NYSDOT after elimination of tolls.

This position of the agreement, particularly as it relates to the toll-free transition, is not unique and is common to numerous other agreements consummated with toll agencies since inception of the Interstate highway system. The unique section pertains to remedial measures of the authority and does not eliminate tolls. After repayment of the last of the outstanding bonds, the authority will have 90 days to convert the project to toll-free status. If this does not occur, the authority must immediately begin paying interest, with no provision for principal amortization, on the sum of all federal funds received since 1982. In some quarters, this arrangement has been viewed as simply providing an interest-free loan for many years, after which interest only will be required to service the debt in the future should the authority or state default in making the project toll-free.

Looking back, there have been numerous other examples of federal participation in toll facilities, all mandated through congressional action. These have included payment of 90-10 Interstate highway system program funds to widen two-lane sections of the West Virginia Turnpike to four lanes, similar funding of extensive rehabilitation of the Richmond-Petersburg Turnpike in Virginia, and reconstruction of the two-lane Alligator Alley toll road in Florida to four lanes in conjunction with I-75 designation. In each such instance, the original toll agency involved, the state (if it did not serve as the toll agency, as in the case of Alligator Alley), and FHWA executed a tripartite agreement requiring that complete retirement of all initial bonded indebtedness plus all newly issued debt be accomplished within the originally programmed debt-amortization schedule, after which time the project would become toll-free and thereafter maintained by the state with tax resources.

The last major new toll road successfully financed with revenue bonds was built in 1965--the Dallas North Tollway. At that time, $33 650 000 in bonds were sold, based solely on the anticipated toll income to be generated by the approximately 10-mile-long facility (12). As an indication of the change in economics of toll-road financing, in August 1982, the Texas Turnpike Authority issued $168 090 000 in revenue bonds to finance a less than 5-mile extension of the original project and to refund the $7 710 000 of the original issue still outstanding (13). Similarly, very few self-sustaining major new toll bridges have been constructed over the past decade; the last was the Houston Ship Channel Bridge, for which a revenue bond issue of $102 million was sold in July 1978.

Since 1965, such projects as the Phase II portion of the Tampa South Crosstown Expressway in Florida were constructed and opened to traffic and the Ft. McHenry Tunnel in Baltimore, Maryland, is scheduled

to open in June 1985. However, the Tampa project has a pledge on Hillsborough County's portion of the state motor fuel tax, and the tunnel in Baltimore is being constructed as a part of a toll facilities system, financed through the toll resources of all system projects.

In New York City, the Triborough Bridge and Tunnel Authority has issued more than $800 million in new revenue bonds since 1980; the bulk of these funds was used to support mass transit. During the past several years, tolls on the authority's several facilities have been steadily raised to a current level of twice the earlier rates. Recently, the authority also provided financial guarantees to construction and operation of the new Convention Center, although this backing would come into play only if the state of New York declared bankruptcy.

In 1981, the authority generated $263.2 million in revenues, of which $64.2 million was expended for maintenance-operating expenses and $28.1 million for bond debt service. Of the net available, $170.9 million, the first $24.0 million went to the New York City Transit Authority and the remaining $146.9 million was divided equally between the MTA and the New York City Transit Authority.

In Jacksonville, Florida, a successful group of urban toll bridges has helped meet transportation needs of the city. However, the Jacksonville Transportation Authority maintains two separate operating accounts, one for the toll facilities and the second for mass transit. Despite repeated attempts, the funds are presently not comingled.

Looking back on the success or failure of toll facilities, the conclusion must be drawn that such projects have proven to be viable. Of the great number of projects financed during the modern-day toll era, only three major facilities have defaulted. Only the Chicago Skyway and the Chesapeake Bay Bridge-Tunnel remain in this condition. Only the Series C bonds of the Chesapeake Bay Bridge-Tunnel are in arrears on interest payments, and the project is to become current with interest requirements by 1985, thereby removing the default status (14).

FUTURE PROSPECTS FOR TOLL FINANCING

Even though they realize the difficulty of successfully financing revenue bond toll facilities under current market conditions, why are an increasing number of states considering use of the toll concept? The answer is simply that in combination with available means of tax funding, the use of tolls can be a useful method of constructing an improvement that might otherwise never be built or could take many more years to implement by using conventional tax funds alone.

Among the unique and interesting studies currently under way is one sponsored by Wisconsin's Department of Transportation to determine the financial feasibility of tolling the state's Interstate highway system. Preliminary findings indicate that the capital cost of implementing the toll-collection system could be recaptured in less than two years. Approximately 30 percent of the toll payments would be made by out-of-state motorists (15, p. 3; 16, p. 20; 17, p. 10). However, a critical deterrent to implementation of the toll concept in this instance is the preemption of sections of a long-standing, toll-free, tax-supported system of expressways.

In a companion document to the financial feasibility study report, Wisconsin Department of Transportation is expected to address the policy issues of adopting the toll concept.

In Pennsylvania, a study of several new toll roads, plus tolling of selected sections of the state's Interstate highway system, is being performed under the sponsorship of the Pennsylvania Department of Transportation.

The Illinois Department of Transportation, in concert with the Illinois State Toll Highway Authority, recently commissioned a feasibility study of two urban tollways in the Chicago area, facilities for which tax funds have been sought for many years with increasingly bleaker prospects for success. The study is unique in that innovative means of financing is the primary thrust of the investigations, including options such as transfer of the 90-10 Interstate highway system funds allocated to the proposed Crosstown Expressway and partial financing through the private sector by those business activities that would benefit through implementation (18).

In Houston, the Texas Turnpike Authority just released a preliminary financial feasibility study report indicating that the proposed Hardy Tollway, an urban radial facility extending from the vicinity of I-610 near downtown Houston north to the Montgomery County Line, would be feasible as a revenue-bond-financed facility at a bond interest rate of 9.875 percent but not at the current bond market rate of 11.25 percent. This could be a marginal project for revenue bonds guaranteed by other income sources (19).

From the state to a local governmental level, the regional planning agency in cooperation with the state department of highways and public transportation has commissioned a far-reaching study to examine new revenue sources for highways in Charleston, South Carolina (20). The study is designed to determine what reasonable sources of additional income might be developed to fund long-delayed improvements to the area's transportation system. One option to be examined includes tolling of one or more existing major bridges to produce a revenue pool from which to support rehabilitation of the existing structures and construction of one or more new bridges.

There is an increasing awareness of the need for a greater role by the private sector in financing and constructing transportation improvements. Whereas business interests may well derive direct benefits from a given improvement and be prepared to contribute to its implementation, the greater role may be an increased use of revenue bonds or direct private-sector construction and operation of a project; the challenge is to generate sufficient income to attract such private investment. Current tax programs in which investors can purchase, for example, an equipment system for the inherent tax advantages and lease the system to the operator are being carefully examined.

SUMMARY

The nation is in an "up" cycle in the popularity of toll facilities, from the point of view of both the public and public officials. Several conclusions, or objectives, stand out:

1. If federal legislation and policies can be changed, tolls will be placed on many existing road facilities as a means of raising additional local revenues. Current payback requirements make the tolling of most existing facilities unattractive to state and local governments. A more meaningful approach to meeting funding constraints would be the forgiveness of the original federal contribution with the understanding that the toll part of the system would no longer be permitted to receive federal funding allocations for maintenance or rehabilitation.
2. There is developing a major problem of dis-

continuing tolls on facilities when outstanding debts are liquidated. This can place a very heavy burden on state highway budgets when they have to assume maintenance and rehabilitation costs on roads or structures that have formerly been maintained from toll revenues. In this connection, it should be pointed out that many of the facilities to be converted from tolls to free roads have almost reached their design life, and rehabilitation costs can be enormous. To correct this situation and to recognize the proliferation and widespread acceptance of the toll concept, federal and state laws should be changed so that tolls can continue to be collected but with the specific understanding that the net revenues are to be used for highway purposes.

3. Combinations of private- and public-sector funding of major transportation improvements will undoubtedly continue to be more widely accepted. This might include tolling of selected portions of the Interstate highway system, probably mostly urban, where viable alternate toll-free routes exist. Precedent has indicated repayment of the original 90 percent federal funds contributed to construction. The challenge is to achieve a proper and workable blending of public- and private-sector funds to meet rapidly escalating needs of the nation's deteriorating transportation system.

4. The idea that toll facilities must always be self-liquidating could be put aside if public agencies are willing to pledge other highway revenues as a guarantee for debt services. This practice has been followed for some years in many states, and very sizable revenues have been added to the pool of highway funds.

Support for the tolling concept can be drawn from France, Spain, Italy, and Japan; in each country, the Interstate highway systems were designed and constructed as toll facilities, just as the U.S. system was initially conceived in the 1930s as a network of three east-west and three north-south toll roads extending from ocean to ocean and border to border.

There is no factual indication that the popularity of the automobile is diminishing, nor is it likely to diminish in the foreseeable future. It follows that the existing needs for highways can only become greater. Instead of talking about junking the automobile, it seems to make more sense to talk about ways of providing for it.

REFERENCES

1. Bridges in the United States and Canada. International Bridge, Tunnel and Turnpike Association, Washington, DC, March 17, 1982.
2. Toll Roads Opened in the United States. International Bridge, Tunnel and Turnpike Association, Washington, DC, Feb. 18, 1982.
3. R. Dickens. Traditional Funding Not Enough to Patch Old Roads. Consulting Engineer, Nov. 1982, p. 70.
4. Highway Finance Legislation. Highway Users Federation, Washington, DC, Dec. 1982.
5. J. Burgess. Creative Financing Next Station Stop for Mass Transit. Washington Post, Oct. 22, 1982, p. C-15.
6. Survey of Local Mechanisms for Financing Transit Operating Costs. American Public Transit Association, Washington, DC, June 1982.
7. 1980 Highway Statistics. FHWA, 1980.
8. Status of Toll Facilities in the United States. FHWA, Sept. 1982.
9. Bonded Indebtedness Toll Roads Study: Study of Outstanding Indebtedness of Toll Roads on the Interstate System Pursuant to Section 164 of Public Law 95-599. FHWA, Aug. 1980.
10. Official Statement of the Indiana Toll Road Commission Regarding Its $259 500 000 Toll Road Revenue Bonds. Smith Barney, Harris Upham and Co., Inc., Chicago, IL, Sept. 26, 1980.
11. Connecticut Turnpike Financial Report. Connecticut Department of Transportation, Wethersfield, 1981.
12. Official Statement of the Texas Turnpike Authority Relating to Its $33 650 000 Dallas North Tollway Revenue Bonds. Merrill Lynch, Pierce, Fenner and Smith, Inc., New York, June 9, 1965.
13. Traffic and Revenues: Dallas North Tollway and Proposed Extension Phase I. Wilbur Smith and Associates, New Haven, CT, July 1982.
14. Commutation Plan Impact Study: Maryland Toll Facilities System. Wilbur Smith and Associates, New Haven, CT, Jan. 1982.
15. Feasibility of Converting Wisconsin's Interstate to a Toll Road. Wilbur Smith and Associates, New Haven, CT, Draft Tech. Memorandum 8, 1983.
16. Feasibility of Converting Wisconsin's Interstate to a Toll Road. Wilbur Smith and Associates, New Haven, CT, Draft Tech. Memorandum 9, 1983.
17. Feasibility of Converting Wisconsin's Interstate to a Toll Road. Wilbur Smith and Associates, New Haven, CT, Draft Tech. Memorandum 10, 1983.
18. Chicago Tollways Preliminary Feasibility Study. Wilbur Smith and Associates, New Haven, CT, 1983.
19. Preliminary Financial Feasibility Study: Proposed Hardy Tollway. Wilbur Smith and Associates, New Haven, CT, Dec. 1982.
20. Evaluation of Alternate Financing Sources for Highway Improvements: Charleston Area Transportation Study. Wilbur Smith and Associates, New Haven, CT, 1983.

Publication of this paper sponsored by Committee on Taxation, Finance, and Pricing.