Proceedings

Thirty-Third
annual meeting

Transportation Research Forum (TRF)

Halloween In New Orleans

October 31 -
November 2, 1991
New Orleans, LA

Editor:
Louis A. Le Blanc

FEDERAL TOLL HIGHWAY POLICY: REVIEW AND OPTIONS FOR THE 1990s

Kant Rao
The Pennsylvania State University
University Park, PA 16802

Gary Gittings
The Pennsylvania State University
University Park, PA 16802

S. Sriraman
Gokhale Institute of Politics and Economics
Pune, India

Introduction

Historically, federal transport policy discouraged states from building toll highways by not permitting federal aid for such projects. The newly proposed National Transportation Policy, however, would alter this traditional federal stance by allowing state and local governments to mix federal aid with toll financing for highway improvements (U.S. Department of Transportation, 1990). Whether or not the proposed change is accepted by Congress will depend upon many details to be worked out between the federal and state governments and various special interest groups.

The purpose of this paper is to provide a review of the critical elements of federal toll policy in the context of past toll experience. Several key issues and options are examined, including consideration of the views of state departments of transportation (DOTs), the other major player in the federal-state partnership that manages highways in the United States. The paper concludes with a summary of the expected future role for toll financing.

Historical Overview

Approximately 4,700 miles of toll roads (and hundreds of toll tunnels, bridges, and ferries) are in operation in the United States. While constituting only a small percentage of the nation's total road and street mileage, these facilities generally provide a high level of service while carrying large volumes of traffic, either between major population centers or within high-density corridors of large metropolitan areas. As such, they have a far greater influence on the overall quality of highway service than either their absolute

magnitude or proportionate share of total highway mileage would otherwise indicate.

Interest among the states in toll financing as a supplemental revenue source to traditional first and second structure highway taxes and fees (vehicle-related license fees and fuel-related taxes, respectively) has ebbed and flowed over five decades. Changes in the availability of federal funding relative to needs, variations in market parameters affecting the financial attractiveness of toll financing, and periodic deviations in federal toll policy have accounted in large measure for the sometimes keen, but more often scant, interest in the toll-based method of financing highway improvements.

Though toll roads were widely prevalent in America during the 18th and 19th centuries, the custom of constructing private roads upon which a toll was levied had disappeared by the early years of the 20th century. Many of these early ventures had expired through financial insolvency and mismanagement. This initial experience with toll roads undoubtedly had not been forgotten by Congress, when in 1916, the Federal-Aid Road Act was adopted, thus establishing a policy in opposition to the expenditure of federal funds on toll roads (U.S. House of Representatives, 1966).

Ironically, the first of the major U.S. toll roads, the Pennsylvania Turnpike, was financed almost entirely with federal (public works) assistance. Although there were some unique factors that led to the construction and financing of this highway with federal funds, Owen and Dearing argue that conditions underlying the demand for such roads were not unique (1951). A common underlying factor was the phenomenal upsurge in traffic volumes. For instance, between 1940 and 1950, the number of highway vehicles doubled, while vehicle miles of travel went up by 150 percent. Equally significant from the point of view of demand was the change in the composition of traffic whereby heavy duty vehicles were using an increasing share of highway capacity. On the other hand, adequate resources were not forthcoming for expansion and maintenance of the highway network to keep pace with demands--at least not on those segments where they were required most.

Dearing pointed out that the most important single factor leading to such a situation was the failure to follow consistently the logic of the benefit theory of pricing (1957). "If special charges are justified where the government provides special benefits, it follows that proceeds from user fees should have been spent on roads which carried the greatest volume of traffic. Instead, user revenues were employed to support a large mileage of local roads. Thus, too small a portion of available user funds was allocated to improve high-density routes which should have had high priority in highway programming (Dearing, 1957). It is interesting to note a similar argument made by Friedlander, though in the context of the Interstate system, that the enormous pressure on certain segments was a result of the overbuilding of the rural segment, the waste not

being merely on the negative side but also on the positive side in the failure to build more urban capacity (Friedlander, 1965; Walters, 1987).

In any case, the success of the Pennsylvania Turnpike demonstrated that there was another solution when there existed significant unmet demand. This lesson paved the way for a "boom" in toll road construction. By 1959, nearly 3,000 miles of toll roads had been built. Toll road financing slowed down sharply after passage of the 1956 Federal-Aid Highway Act with investment declining to $571 million between 1960 and 1965 from a figure of $4.8 billion during 1950-1958 (Rusch, 1984).

Much of the toll road construction initiated prior to the 1956 Act was located in the heavily travelled corridors and general locations to be designated as part of the Interstate system. In order to avoid a wasteful duplication of facilities, and in order not to endanger their financial viability, toll roads and systems of such roads located within the corridors and providing the intended service of the planned Interstate system were designated as official parts of the system. The use of federal funds for connections and interchanges between toll roads and other roads was permitted provided the toll road in question would become toll free when all outstanding debt was retired. However, only six states signed agreements under this provision, suggesting that the federal policy being promulgated (that is, its inflexibility with regard to toll highways) was perhaps unduly restrictive. Indeed, by subsequent special legislation, several of the six states managed to exclude themselves from implementing this provision.

The 1960s and early 1970s saw the continued progress in the building of Interstate highways under a relatively stable revenue situation. With the oil crisis in 1973 and 1979, however, revenues declined due to a fall in fuel consumption and subsequent introduction of fuel-efficient vehicles, while inflation and deferred maintenance practices led to higher costs. Although the Surface Transportation Assistance Act (STAA) of 1982 provided a much-needed infusion of funds, states continued to fall behind in infrastructure investment. During this decade, interest again rose in a host of innovative, supplemental highway revenue sources, such as benefit assessment, public-private partnerships, and toll financing. In order to fully integrate these new funding practices with the conventional funding sources, and in particular with federally apportioned funds, changes in federal policies were clearly needed.

Changing Federal Policy

While current federal highway law generally prohibits the use of federal aid to construct, reconstruct, operate, or maintain toll roads, federal policy regarding the mixing of federal aid and toll financing to enable new or improved highway infrastructure has clearly been in transition. Beginning in the late 1970s and

throughout the 1980s, many proposals from a wide spectrum of highway interests supported relaxation of the strict federal prohibition.

The primary motivation for these proposals revolved around the growing inadequacy of public investment in the highway infrastructure and the consequences thereof. Both the driving public and businesses relying on timely deliveries directly experienced the effects of rising levels of metropolitan traffic congestion as motor vehicle usage growth rates outpaced new capacity additions (Rao et al., 1991). Congestion has become so pervasive that it has been reported that "congestion is replacing crime, housing and unemployment as the number one concern of suburban voters" (Orski, 1987). While some dire predictions may be exaggerated, they nonetheless indicate that congestion is imposing significant economic costs that are likely to rise rapidly in coming years (Koepp, 1988; Maremont, 1988).

In addition, there has been mounting evidence of a deteriorating physical infrastructure and its detrimental impact on economic productivity. Rising maintenance and rehabilitation requirements in most states are consuming the majority of user revenues available from traditional sources, leaving little funding available for new capacity additions or for technological innovations (such as ramp metering) that might improve utilization of existing capacity (Rao, 1986).

Given this impetus for change, early indications of a shift in federal policy towards toll roads came during the first term of the Reagan administration. A Federal Highway Administration (FHWA) legislative proposal for the STAA of 1982 included provisions permitting the use of federal aid to construct new toll roads, including roadways that are in various phases of the engineering-design-construction process but not as yet open to traffic (Robertson, 1983). The proposal would, however, have required states to pledge the removal of tolls once the debt incurred for the original construction was retired. (This was the same type of provision rejected by many states two decades earlier.) In addition, as long as the facility remained a toll road, it would not be eligible for 4R funding. FHWA also did not believe that federal law should be changed to permit tolls on roads originally constructed as toll-free facilities.

While FHWA's proposals were not included in the STAA of 1982, the twin factors of continued shortfalls in infrastructure spending and lack of any imminent relief from congestion continued their inexorable pressure for finding new financing mechanisms. In 1987, Congress created a pilot toll financing program in the Surface Transportation and Uniform Relocation Assistance Act (P.L. 100-17). The act permits federal financial participation, up to 35 percent of cost, on pilot projects in nine states to test the use of tolls as a supplementary revenue source. The act limits the projects to non-Interstate roads and to new construction or reconstruction activities to increase capacity and requires that, after repayment of debt that may have been underwritten by toll revenues, tolls must be set at a

level only to cover maintenance and operating costs (in other words, excess revenues cannot be directed to other transportation investments). Note that this latter provision somewhat relaxes the earlier version in FHWA's 1982 draft legislation. The 1987 Act provided no additional federal funds to the nine states but permitted them to use a portion of the existing federal allocations.

The recently issued statement of national transportation policy by Secretary Skinner and the U.S. Department of Transportation makes several marked departures from past federal transportation policy. Noteworthy among them is the recognition that the market pricing system and greater private sector participation can significantly improve both the utilization of and investments in our highway system. Recognition of both supply-side (to increase long-term investments) and demand-side (to improve existing utilization) changes is evident in the policy statement (U.S. Department of Transportation, 1990).

Depending on how the policy is implemented, there could be a significant change in the federal-state cooperative partnership for managing the nation's highways. What are the key policy issues that must be debated and resolved in setting the course for this change? There are several, and examination of states' views on the subject reveals both the issues and the options with regard to the role of toll financing.

Policy Issues and Options

Starting from the premise that the new federal policy will allow federally apportioned funds to be used on federal-aid roads financed and operated as toll highways and bridges, several other issues emerge. To improve states' fiscal flexibility, for example, the American Association of State Highway and Transportation Officials (AASHTO) suggested in 1985 that states be allowed to mix toll financing and federal aid for the purpose of constructing new highways, and that, with the approval of the U.S. Secretary of Transportation, states be allowed to establish tolls on existing highways and bridges with uniquely high maintenance, construction, or reconstruction costs without requiring payback of any federal funds previously expended on the facility (AASHTO, 1985).

The Transportation Infrastructure Advisory Group (TIAG), a private sector coalition concerned with infrastructure financing, proposed in the mid-1980s that the federal government permit the use of federal aid for building new toll roads and allow the tolls to be continued as long as receipts are used on federal-aid eligible projects (Greenbaum, 1985). In addition, TIAG also called for eliminating any prior agreements between states and the federal government requiring removal of tolls once bonded indebtedness has been retired (Section 129 agreements). In perhaps its most controversial recommendations, TIAG also requested that states be permitted to place tolls on existing toll-free interstate highways where the rehabilitation costs (so-called 4R costs) are high.

The National Conference of State Legislatures declared toll financing to be one of the best means for supplementing federal highway trust fund revenues. It reiterated positions similar to the TIAG and the AASHTO recommendations and suggested that if states desired to impose tolls on existing federal-aid routes, then there should not be a requirement for payback of federal aid that may have been used in the highway's initial construction (Transportation Infrastructure Advisory Group, 1986).

State DOT Views

As this description suggests, there are several major policy elements; these are summarized in Table 1. What are the state DOTs' views on these toll policy issues? Although some of these views are evident from the earlier description of AASHTO and TIAG recommendations, a more detailed examination was necessary. Therefore, the authors undertook a survey during 1990 of the 50 state DOTs. The methodology involved test instrument development, pilot testing, and full-scale implementation. The survey was mailed to the chief administrative officers (CAOs) of the 50 DOTs. Forty-eight were returned, for a response rate of 96 percent.

The survey probed financial, operational, and organizational aspects of toll systems, but only the financial aspects are presented in this paper. In presenting these results, three clusters of states are employed, using the following variable as the criterion for grouping: the percentage of total highway revenues (including federal aid and bond proceeds) derived in a state from toll revenues. Referring to this variable as TOLLREV, the three clusters were formed based on whether TOLLREV was zero, between zero and 5 percent, or more than 5 percent. Twenty-two states formed the first cluster, 14 the second, and 12 fell into the third cluster.

Two key sets of findings are pertinent to the policy discussion here. The first relates to the role that state DOTs assign to toll financing in their overall highway planning framework. Obviously, one would expect states that have used toll financing relatively heavily (i.e., cluster 3) in the past to indicate greater importance to toll financing today, and one might suspect that they might also give it a greater role in the future given the general success of most toll operations. To probe this question, states were asked to indicate the importance of toll financing on a 10-point scale, both the current status and their forecast or expectation two years after Congressional enactment of legislation broadening federal toll policy.

Regarding the current role, the responses are quite consistent with prior expectation. States that are less dependent on toll financing today give a lower importance to toll financing in their current highway planning framework than more toll-dependent states. Regarding the future role, all three clusters of states assign a greater role to toll financing in the future compared to the present. In other words, states want and expect Congress to broaden federal

Table 1. Toll Issues and Current Policies

POLICY ISSUE	CURRENT POLICY	PILOT TOLL PROGRAM
1. Use Toll Revenue as Non-Federal Match on any New Roads	No	Yes
2. Allow Tolls on New Roads Only If Parallel Toll-free Road Exists	N/A	No Restriction
3. Allow Tolls on Existing FA Roads for 4R	No	No
4. Allow Tolls on Existing Interstate Roads for Capacity Expansion	No	No
5. Allow Tolls on Existing Non-Interstate Roads for Capacity Expansion	No	Yes
6. Allow Toll Revenue to be Commingled with Other Statewide Highway Revenues	No	No
7. Maximum Federal Share as % of Cost	0	35%
8. Tolls Must Be Removed After Debt Retirement	Yes	No
9. Private Sector Can Own and/or Operate FA Toll Road	No	No

toll flexibility and indicate that they will make use of that greater flexibility. In addition, the future role assigned to toll financing also varies according to toll-dependency--cluster 3 rankings are higher than cluster 2, which in turn are higher than those of cluster 1.

There are three likely explanations for why toll-dependency is a factor in rankings of future toll financing importance. The first is that low-dependency states (cluster 1) may have several obstacles, such as a constitutional prohibition on the issuance of debt to finance highway projects, which prevent them from utilizing toll financing. A second factor is that because of lower-than-average population densities, many low toll-dependency states may not experience the extent of congestion severity found in higher density areas. Also, these states may not have adequate traffic volumes to support toll operations on a self-sustaining basis unless the federal aid match is set at unlikely high levels. Even these states, however, recognize the need to broaden their fiscal strategies, and this is reflected in their views regarding the role of toll financing in the future.

Finally, a third factor is that cluster 3 states (and to a lesser extent cluster 2) have toll commissions or authorities and other quasi-public organizations in place with the appropriate structure and statutory backing to undertake complex, debt-financed investments as well as the operational muscle to manage them during the life of the debt instruments. These states might find it easier to extend their toll financing role to additional projects in the future under a broadened federal policy.

The second set of findings from the state DOTs survey relates to the type of broadened flexibility they desire in federal policy. In order to probe this issue, states were given a menu of options and asked to indicate their preferences in terms of utility within their state. The options included:

- New Roads & Bridges--allow federal funds to be used along with toll revenues on new roads and bridges built as toll operations.

- Existing Roads & Bridges, New Improvements--allow federal funds to be used along with toll revenues on existing roads and bridges that are to undergo improvements; examples might be modernization, expansion of capacity, and replacement.

- Revenue Commingling--allow excess toll revenues to be commingled with general highway funds for improvements on other transportation facilities within the area or state.

- Federal Match--Congress should not change or substantially lower the federal match on toll-funded projects compared to toll-free projects.

- Toll Continuation a Local Decision--Congress should not impose the traditional restriction that tolls be removed upon retirement of debt service; this decision should be left to state and local policy.

The state's responses, once again grouped by cluster, showed that a majority of states in all three clusters desire all of the above types of flexibility in toll financing. The responses of clusters 2 and 3 are stronger than that of cluster 1, for probably the same reasons described earlier. In addition, states showed a higher ranking for option 2 (Existing Roads & Bridges, New Improvements) than for option 1 (New Roads & Bridges). For instance, 90 percent of the states preferred option 2, compared to 70 percent for option 1. This view may be due to the fact that there would be many more projects that could be undertaken if new improvements on existing segments could be financed as toll investments.

Summary and Future Research

Since the passage of the act establishing a federal-aid highway system in 1916, and in particular with the inception of the Interstate Highway Program in 1956, federal policy has discouraged toll financing by states. However, there is now recognition at all levels of government that states need a broad arsenal of tools to attack infrastructure underinvestment and to relieve congestion and that federal policy with respect to toll financing and its variations as manifest in various forms of public-private partnerships must undergo change. This paper has described the context for such change with a historical overview followed by a prospective analysis based on a survey of state DOT administrators.

The findings suggest that state DOTs strongly favor broadened flexibility in federal policy. States that have relatively high population densities and have utilized toll financing in the past are more likely to experiment with alternative forms of financing innovations under a more relaxed federal policy. States favor federal relaxation not only with respect to new highways and bridges but also with respect to improvements on existing segments of the highway network.

It is, of course, important to place the role of toll financing in perspective. Toll roads today account for about 4,700 miles or about one-tenth of 1 percent of all roads in the United States. Even if the toll mileage were to double over the next 10 years, which is unlikely, the increase would be modest. However, toll-financed projects are likely to have impact beyond what this number comparison suggests because such projects are undertaken where demand is highest and where their implementation would relieve congestion and add value for which users would be willing to pay a toll premium. Toll projects are also likely to have some salutary effect in improving utilization of capacity by encouraging some users to switch to carpooling and transit use. Federal policy can encourage and facilitate these trends by permitting states to determine the best

mix of fiscal and operational tactics to employ in solving their infrastructure and congestion problem.

There are a number of areas for further research that can illuminate various aspects of these issues. How does alternative federal matching shares for toll roads influence state allocation of funds between toll and toll-free projects? What specific types of projects are most suitable for toll financing and for public-private partnerships? How much would state infrastructure investment increase if federal policy permitted toll financing on existing high-volume segments that require major modernization and/or 4R work? Finally, what are the distribution effects of greater toll financing among users, both between and among passenger and commercial traffic? Understanding these distribution effects may assist in determining the appropriate role for toll financing and public-private partnerships in the years ahead.

REFERENCES

American Association of State Highway and Transportation Officials, A New Focus for America's Highways: Recommendations on the Federal-Aid Highway Program, Washington, DC, 1985, pp. 34-35.

Dearing, C. "Toll Rates and Highway Pricing," Proceedings, American Economic Association, 1957, pp. 441-453.

Friedlander, A. F., The Interstate Highway System, North Holland, Amsterdam, 1965, p. 139.

Greenbaum, D., Prepared statement before the U.S. Senate Subcommittee on Transportation of the Committee on Environment and Public Works, as member of the Transportation Infrastructure Advisory Group, Washington, DC, July 1985, pp. 312-313.

Koepp, S., "Gridlock!" Time, Sept. 12, 1988, pp. 52-60, 55.

Maremont, M., "The race is on to make streets smart, too," Business Week, June 13, 1988, pp. 76-78.

Orski, C. K., "Managing Suburban Traffic Congestion: A Strategy for Suburban Mobility," Transportation Quarterly, Volume 41, Number 4, 1987, pp. 457-476, 475.

Owen, W., and Dearing, C., Toll Roads and the Problem of Highway Modernization, Brookings Institution, Washington, DC, 1951, p. 10.

Rao, K., "Policy Issues in Financing Future Highway Investment," Transportation Journal, Volume 26, Number 1, 1986, pp. 45-54.

Rao, K., Grenoble, W., and Young, R., "Traffic Congestion and JIT," Journal of Business Logistics, Volume 12, Number 1, 1991, pp. 105-122.

Robertson, R. B., Testimony of the Associate Administrator, Federal Highway Administrator, Senate Committee on Environment and Public Works, Subcommittee on Transportation, July 1983.

Rusch, W., Toll Highway Financing, NCHRP Report 117, 1984.

Transportation Infrastructure Advisory Group, Toll Road Financing in the Past and the Prospects for the Future, May 1986, 16 pp.

U.S. Department of Transportation, Moving America, A Statement of National Transportation Policy, Washington, DC, 1990, pp. 5, 49, 57.

U.S. House of Representatives, Hearings Before the Special Subcommittee on the Federal-Aid Highway Program, 89-39, Government Printing Office, 1966, p. 915.

Walters, A. A., "Role of the Private Sector and Market Processes in the Financing and Provision of Roads," Transportation Research Record 1107, 1987, p. 2.