# U.S. Highway Financing: Historical Perspective and National Priorities

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Investment in roads in the United States has had a convoluted history, but has always had a connection to the nation's growth and development. In this article we examine the history of U.S. highway investment and its relationship to the broader national agenda for economic growth and prosperity.

## History of Highway Finance

Until the 20th century, road building in America was for the most part a local responsibility, funded by local taxes. The colonies of America first opened roadways for military purposes, to link the widespread frontier settlements to each other and to the more thickly settled areas of the East, providing for transportation of troops, arms, and ammunition to resist enemy attacks. Subsequently, the growing commerce of the colonies resulted in a demand for better transportation facilities. The colonial governments responded with various laws requiring roads. Because the colonial governments had limited means, however, road affairs were administered by localized systems. Moreover, the roads were funded with local revenues—primarily labor taxes, which consisted of compulsory road service, or the equivalent value in cash.[a] Resources other than this "statute labor" were occasionally available and included donations, assessments on property, and proceeds of lotteries.

After the American Revolution, the nation moved westward. As settlements pushed past the Allegheny Mountains, roads were needed to improve communications between the East and the West and to serve the developing commerce among states. Local governments soon realized that they alone could not meet these burgeoning needs and appealed to the states for help. Many states turned to the private sector for money, chartering private turnpike companies to build roads and canals and charge tolls to the public for their use. After 1800 most of the states adopted toll financing for main roads and canals. The turnpike system, while beneficial in providing many miles of roads, was eventually abandoned because it was not profitable and could not compete against the railroads, which could carry larger loads at faster speeds.

The federal government ventured into road building during the early years of the republic. In 1808 Secretary of the Treasury Albert Gallatin issued a Senate-requested report that inventoried the nation's transportation system. He argued that only the national government could provide for the financing of transportation systems needed in underdeveloped countries of vast size, such as the United States. He pointed out the strong connection between transportation improvements and the wealth of nations. Gallatin was the driving force behind the construction of the National Road (from Cumberland, Maryland, to Vandalia, Illinois), which was built by the federal government with a portion of the revenues from the sale of public lands to settlers in a territory that would be served by the road.

In 1816 John Calhoun of South Carolina echoed Gallatin's view in defending a bill to have

[a] Compulsory labor requirements varied by colony. Typically, residents could be compelled by an agency of the colony's government to perform work on the roads or to provide money in lieu of such service. For example, in Virginia the county court could direct that necessary road work be performed gratis by "tithable males" (all local male residents over 16 years of age).

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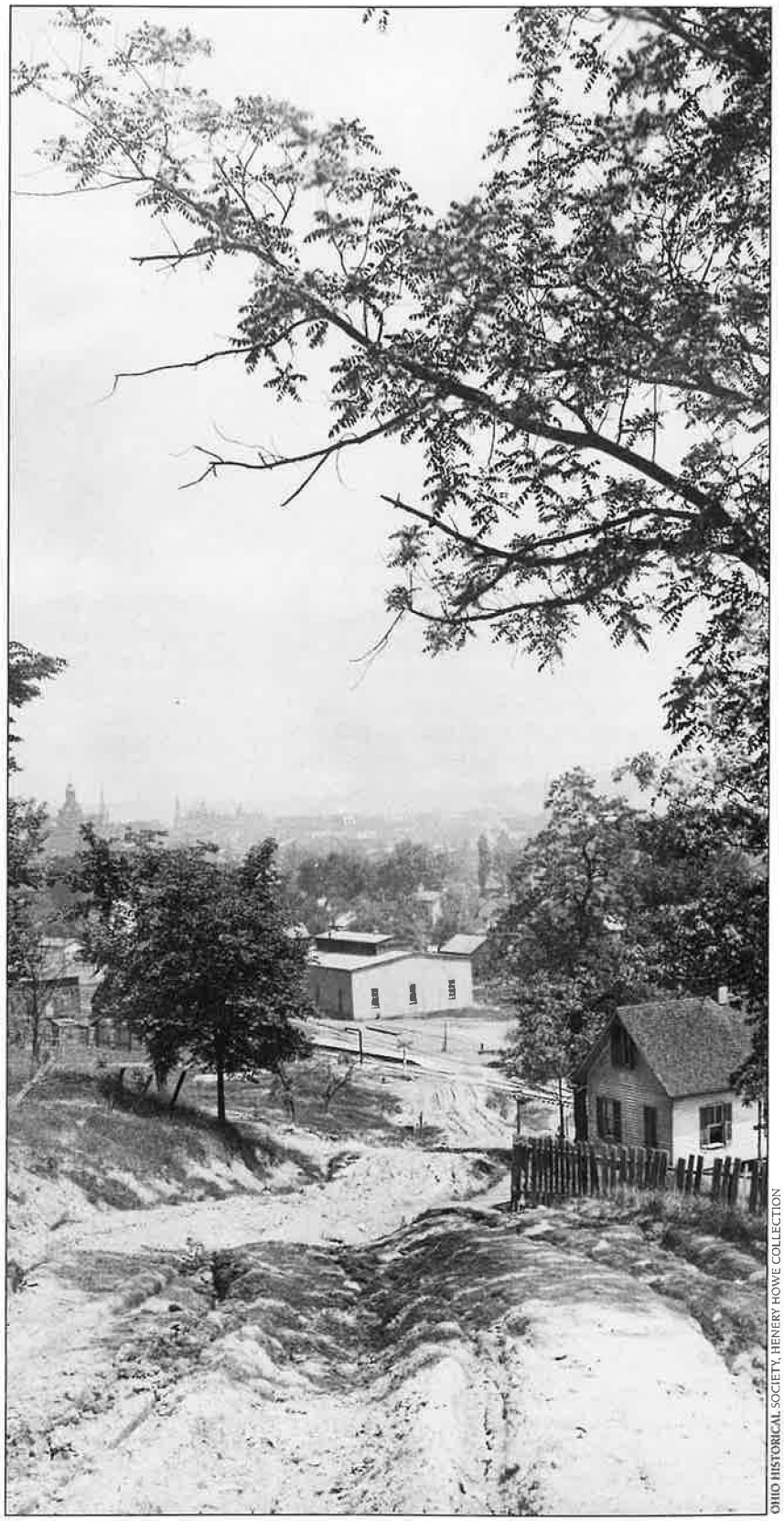

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National Road leading into Zanesville, Ohio, 1887. Federal participation in road building had ceased before the start of the Civil War. By the 1880s, piecemeal maintenance efforts had left parts of the National Road in poor condition.

the federal government permanently set aside funds for "internal improvements." He argued:

> If we look into the nature of wealth, we find that nothing can be more favorable to its growth than good roads and canals. . . . Many of the improvements contemplated are on too great a scale for the resources of the States or individuals; and many of such nature that the rival jealousy of the States, if left alone, might prevent. Let us then bind the Republic together with a perfect system of roads and canals. (*1*)

President Madison vetoed the bill on the grounds that the proposed program was an improper interpretation of the constitutional power to regulate commerce and provide for the national defense. While Congress appropriated $14 million for national roads on a project-by-project basis in the first half of the 19th century, controversy continued over whether the federal government should be involved in road building.

Federal government participation in road building had ceased by the time of the Civil War. At that point the turnpike companies were nonexistent, and the states were giving little attention or aid to the matter of road building, which once again was the full responsibility of the local governments.

Until the early 1900s, the main source of funds for financing city roads and streets was real estate taxes. Rural roads also were financed by property taxes, but some revenue for these roads came from per capita and labor taxes. Actual labor contributions remained important in a few states. Borrowing to finance large construction projects became a common practice in the cities, but was seldom done in rural areas. It has been estimated that in 1906, when annual expenditures on rural roads were at the $75 million level, expenditures on city and village streets were averaging about $300 million per year (2). Streets in urban areas were vastly superior to roads in rural areas, a discrepancy that concerned few city dwellers until it became apparent that the economic burden of bad roads was falling on city residents and farmers alike.

### *State Involvement*

Awareness of the negative economic impact of bad roads on the economy in general and a movement for good roads in rural areas combined to spur state involvement in road building toward the end of the 19th century. The first state to participate in road building on a statewide basis was New Jersey, which in 1891 formulated a systematic plan for im-

proving roads in the state's townships. This initiative included the commitment of the state to pay for one-third of the cost of needed road improvements. The New Jersey State-Aid Act was landmark legislation in establishing the principle that highway improvement for the general good is an obligation of the state and county.

By the end of 1917, all 48 states had enacted some form of state aid to road building. Emerging during the same period were state highway systems, over which state laws granted the states varying degrees of control. At this time, highway-user taxes had not emerged as a source for highway funding. In 1919 Oregon adopted a 1-cent-per-gallon gasoline tax and dedicated the revenue to roads. Within 11 years, all 48 states and the District of Columbia had adopted a gasoline tax. While gasoline and other highway-user taxes were imposed primarily to raise funds for the construction and maintenance of state highways, the revenue was devoted to other uses as well, including aid to local roads and nonhighway purposes.

***Federal Involvement***

In 1893 the federal government once again became involved in roads with the creation of the Department of Agriculture's Office of Road Inquiry. The role of this office was expressly limited to investigating and disseminating information about building good roads. Indeed, an early director of the Office of Road Inquiry had to convince lawmakers that "it was not the intention to shift the burden and responsibility of constructing improved roads from the states and counties to the General Government" in seeking increased funding for his office.

The pressure for good roads mounted as bicyclists and the rapidly growing number of automobile owners demanded more and better roadways. This pressure culminated in the introduction of Rural Free Delivery (RFD), which depended on the existence of passable roads for home delivery of mail. In 1903 Members of Congress began introducing legislation that provided national aid for the construction and improvement of RFD routes. No such legislation was enacted, however, until 1912, when an experimental program was added to the Post Office Appropriation Act to improve the condition of selected post roads. The same act called for a joint committee to report on the issues involved in providing federal aid to highways.

The post road program laid the groundwork for federal involvement in the financing of highways. The joint committee considered a wide range of concerns in examining the federal-aid issue, including the effects of highways on the quality of rural life and on the performance of the economy. The committee calculated that bad roads were costing the country $504 million annually. In 1915 the committee concluded unanimously that there was a need for federal road aid and that such aid would accomplish several objectives of the Constitution: to establish post roads, to regulate commerce, to provide for the common defense, and to promote the general welfare.

In 1916 Congress passed the first Federal Road Act, providing $75 million over 5 years to "aid the states in the construction and maintenance of rural post roads." Early efforts toward a system of federal highways, constructed and maintained by the federal government, had not prevailed. Rather, there developed an underlying concept of state ownership, state responsibility, and state program initiation, with the federal government providing advice and consultation, as well as financial assistance. This partnership concept endures today.

The 1921 Federal Highway Act, together with the Post Office Appropriation Act of 1922, broadened the concept of the federal-aid program. The 1921 act represented a compromise between advocates of long-distance roads and advocates of farm-to-market roads, toward which the 1916 act had primarily been targeted. The act limited federal assistance to a system of federal-aid highways, not to exceed 7 percent of all roads in the state. Three-sevenths of this system was to "consist of roads that are interstate in character." Up to 60 percent of federal-aid funds could be used on the interstate routes. Thus the principle of focusing federal assistance on limited mileage, nearly half of which comprised roads important to interstate travel, was established.

Other financial provisions of the 1921 act completed the foundation for the federal-aid program. Federal highway funds were to be matched with state funds, and were made available on a reimbursable basis; that is, states paid the full cost of each highway project and then were reimbursed for the federal share of the project costs. The federal highway program operated with contract authority, which required an authorization act, but no appropriation, before funds were distributed.

Although the federal-aid highway program has changed over the years, the role of the federal government in building highways and the principles of the program as defined in the early legislation have remained essentially intact. Since 1921, however, the federal government's contribution to total highway expenditures has grown dramatically (see Table 1).

TABLE 1 Growth in Federal Contribution to Highway Spending, 1921–1998

| Year | Total Estimated Highway Expenditures[a] | Federal Contribution | State Contribution | Local Contribution |
|---|---|---|---|---|
| 1921 | $1.385 billion | $92 million (6.6%) | $309 million (22.3%) | $984 million (71.1%) |
| 1998[b] | $106.1 billion | $21.8 billion (20.6%) | $56.0 billion (52.8%) | $28.3 billion (26.6%) |

[a]All units of government.

[b]Sources of 1998 funds are as follows: highway-user revenues (62.6%), property taxes imposed by local governments (4.7%), General Fund appropriations (12.6%), other taxes and fees (3.4%), investment income (7.4%), and bond issue proceeds (9.3%).

The General Fund of the Treasury supported the federal-aid highway program for the first 40 years of the program. Congress had clearly favored a tax-supported highway system when it added a provision to the 1916 act that "all roads constructed under the provision of this Act shall be free from all tolls." The first federal highway-user tax was imposed in 1917 and the first federal motor vehicle fuel tax—1 cent per gallon of gasoline—in 1932, but those funds were deposited in the General Fund of the Treasury and were not associated with the federal-aid highway program.

By the late 1930s, pressure was mounting for construction of a superhighway extending from coast to coast. This system began to be mapped out in the 1940s, and by 1952 $25 million had been authorized for the new system of Interstate highways. But it was not until the 1956 Highway Act, which authorized substantial funds for completion of the Interstate system, that work got seriously under way. President Eisenhower, who played a pivotal role in establishing the system, stated that a modern network of roads is "as necessary to defense as it is to our national economy and personal safety." Federal interest in the Interstate system was high, as reflected by the level of funding and the 90 percent federal share in construction. Still, the partnership concept was upheld: the states owned and operated the Interstates, with the federal government providing financial assistance and oversight.

The 1956 legislation also established the Highway Trust Fund to support the federal-aid highway program. Congress rejected the idea of financing the Interstate system with either tolls or bonds issued by a federal corporation. Instead, Congress adopted the pay-as-you-go principle, whereby the system would be financed by federal highway-user fees, and raised the federal motor fuel tax to 3 cents per gallon. For the first time, a link was established between federal excise taxes on highway users and federal aid for highways.

The tax on motor fuels, currently set at 18.4 cents per gallon of gasoline and 24.4 cents per gallon of diesel fuel, represents more than 90 percent of federal highway-user taxes deposited in the Trust Fund. Although the Trust Fund was set up for the main purpose of constructing the Interstate system, it was soon viewed as a legitimate source of funds for the entire highway program. In 1982, the Surface Transportation Assistance Act created the Mass Transit Account within the Highway Trust Fund, expanding the scope of the fund even further. Currently, 2.86 cents per gallon of the gasoline tax is dedicated to the Mass Transit Account.

## Current Issues Related to Highway Finance

During the evolution of the highway program at the federal level, a number of key issues regarding the financing of the program have arisen. As the Interstate system neared completion, the view of the federal-aid program began to shift. The Intermodal Surface Transportation Efficiency Act of 1991 was the first response to a post-Interstate federal-aid program. ISTEA kept federal highway funding on an upward track, and shifted the focus to a National Highway System (NHS) that would comprise 160,000 miles of the most important roads in the nation (including the Interstate system). ISTEA also established several environmentally oriented programs and loosened the strings of the federal purse in other funding categories.

The most difficult issue raised in the ISTEA debate was the formula for distributing federal funds. More states were demanding their "fair share" of highway funds, based on their contributions to the Highway Trust Fund. The federal program no longer was centered on a tangible goal affecting all states, as had been the case with completion of the Interstate system. Although new directions were set, such as emphasis on NHS and on intelligent transportation systems, there was clearly no compelling national goal that would convince taxpayers from more affluent states to subsidize roads in less wealthy states.

Indeed, the 1997–1998 debates surrounding the ISTEA reauthorization focused extensively on the amount of federal funds to be provided and the formulas by which those funds would be divided among the states. Most members of Congress

agreed on the need to spend more on highway infrastructure; the debate was not on the merits of spending, but on how much of the Highway Trust Fund should be spent on highways. This is essentially a federal budgeting issue. The resulting legislation, the Transportation Equity Act for the 21st Century (TEA-21), sets the spending level significantly high to provide a sizable increase for every state. This should mute the formula/fair share debate for the present. Additionally, because the highway funds being collected by all levels of government are falling short of preservation needs, efforts have recently been made to increase the level of investment in this area. Since ISTEA was passed, the federal government has been exploring ways of raising highway funds other than the traditional pay-as-you-go approach. TEA-21 includes innovative finance methods that would involve using federal funds in ways that would better leverage other public and private investments. (See article by Grote and Seltzer in this issue.)

## Benefits of Highway Investment

### *Economic Growth*

Most Americans are well aware that the U.S. highway network is critical in providing personal mobility in daily travel and connectivity to other transportation modes. But what about the highway network's role in the country's economic life? Discussions of the importance of highway infrastructure have tended to overlook this crucial question.

While the Interstate system has linked the nation from "coast-to-coast without a stoplight," it and other highway investments have also had great payoffs in terms of U.S. commerce. Good, dependable highway infrastructure allows businesses to receive inputs to their plants and facilities, and promotes rapid shipment of finished goods to markets here and abroad. The U.S. transportation system enables manufacturers and retailers to deliver goods efficiently and precisely, allowing them to use just-in-time techniques and cut warehousing needs dramatically. Thus an efficient public highway network makes it possible for private companies to reduce transportation costs. This in turn allows companies to lower their overall production costs, thereby enhancing their profits and productivity.

### *Productivity*

Productivity of capital, as well as labor, matters enormously to the United States. The nation's standard of living in the future is tied to its rate of productivity growth. Since the Interstate concept first emerged, highways have yielded significant economic returns and supported productivity growth in almost all sectors of industry. Although the large productivity gains of the 1950s and 1960s associated with the Interstate construction era have disappeared, recent returns on investment in public highway infrastructure remain competitive with returns on private capital.

In recent studies for the Federal Highway Administration, the average rate of return on highway capital investments was calculated for all classes of highways and all levels of government. Between 1980 and 1991, the average annual rate of return on net highway capital investment was 14.6 percent. And this rate of return was for commercial activity only, exclusive of any consumer benefits. Although the return declined during the latter portion of the period to approximately 9.6 percent in 1991, it remains competitive with average rates of return in the private sector.

### *Employment Opportunities*

In addition to contributing to productivity, highway investment offers an important source of employment for a considerable number of Americans and supports a diverse work force with a broad array of skills. Every billion dollars invested in highways supports approximately 42,000 jobs. Highway spending has a direct impact on employment in the highway construction industry as managers, specialists, and semiskilled and unskilled laborers are called upon to construct new or repair existing roads or make a variety of capital improvements. Highway investment also supports employment in supplying industries, and has a ripple effect throughout the economy as those employed in highway-related jobs spend a portion of their wages on goods and services, thereby inducing greater employment in other sectors of the economy.

## Conclusion

Although the overriding national purpose that characterized the Interstate construction era is in the past, efficient highway networks clearly remain pivotal to the continued economic prosperity of the nation. Productivity growth is enhanced through the ability of the private sector to take advantage of such networks and thereby save in production costs. Highways have thus contributed to enhanced rates of growth in productivity and to a rising standard of living. And in a global context, highway networks promote the competitive posture of the United States worldwide. A

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## Satellite Systems To Track Motor Carriers

In May U.S. Transportation Secretary Rodney E. Slater announced a pilot project permitting motor carriers to use satellite tracking systems and complementary safety management computer systems to record and monitor hours of service by truck drivers. The Federal Highway Administration's motor carrier safety regulations limit truck and bus drivers to 10 hours of driving, after which a rest period of at least 8 hours is required. Secretary Slater stated that this 2-year project "could lead to improved safety by providing an accurate method of monitoring truck and bus driver hours and helping to prevent crashes resulting from fatigue."

During the program, motor carriers can voluntarily enter into an agreement with FHWA to use advanced technology for managing their drivers' compliance with the hours-of-service regulations. Satellite systems replace the usual handwritten records of duty status, commonly called driver logs. Use of these systems is expected to improve compliance, promote safety, and reduce regulatory paperwork.

## PEOPLE IN TRANSPORTATION

**Carol H. Tan Esse**, highway engineer with the Federal Highway Administration, U.S. Department of Transportation, has been named one of the 1997 recipients of The George Washington University's Arthur S. Flemming award in the category of applied science. The Flemming Program, now in its 49th year, honors outstanding men and women in the federal government. Past recipients of the award include U.S. Senator Daniel Patrick Moynihan, former U.S. Secretary of Transportation Elizabeth Dole, and Anthony Fauci, director of the National Institute for Allergies and Infectious Diseases.

Tan Esse was cited for her work in managing FHWA's pedestrian and bicycle safety research program. Her accomplishments include the development of prototype software—the Pedestrian and Bicycle Crash Analysis Tool—and the design of a demonstration CD-ROM for computer visualization of pedestrian and bicycle roadway improvements.

Tan Esse is a member of the Transportation Research Board Committee on Pedestrians. She also serves as liaison representative for the National Cooperative Highway Research Program Project Panel on Superelevation Distribution Methods and Transition Designs.

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sound highway network with good connections to other modal hubs enhances efficiency and reduces costs domestically, which in turn allows U.S. exports to be priced competitively with those of other nations. Highways are truly an integral part of the nation's growth and continued prosperity.

From a federal perspective, the FHWA vision for the future is to create the safest and most efficient and effective highway and intermodal transportation system in the world. This vision is addressed in the agency's 1998 *National Strategic Plan*, with its focus on strategic objectives in the areas of mobility, safety, productivity, the human and natural environment, and national security. The plan reflects a strong, continuing federal role in facilitating the development and maintenance of sound state and local highway systems that will form a key part of the nation's transportation network for the 21st century.

## References

1. *Annals of Congress*, 14th Congress, 2nd session. Gales and Seaton, Washington, D.C., 1984:851–854.
2. *America's Highways 1776–1976, A History of the Federal Aid Program*. Federal Highway Administration, U.S. Department of Transportation, Washington, D.C., 1977:238.

Katona *continued from page 38*

*Journal of Numerical and Analytical Methods in Geomechanics* since 1985.

In recent years Katona's interests have broadened beyond research to include a desire to champion the profession of civil engineering. At Washington State University he directs teaching and research in the areas of environmental engineering, geotechnics, hydraulics, structures, and transportation and oversees a $2 million research budget. Katona never misses an opportunity to share his views on the special rewards of the profession in planning, developing, designing, and maintaining the nation's infrastructure. He often reminds his students that three of the four heroic figures carved on Mount Rushmore had civil engineering-related backgrounds. In his view, that's not bad company.