

Transportation System Needs for the 1990s and Beyond

Historically, Federal funding has focused on new construction to increase urban and rural highway and transit access and capacity and, to a lesser extent, on system preservation. Analyzing Federal spending by project types, new construction and capital replacement have absorbed about 75 percent of Federal spending during the last decade.¹ Project improvements more closely associated with maintenance and system preservation (restoration, rehabilitation, and resurfacing) have rarely claimed 25 percent of Federal spending and are now around 20 percent (see figure 1-1).² State spending, which accounts for about 50 percent of all highway expenditures, also favors new construction and reconstruction.³

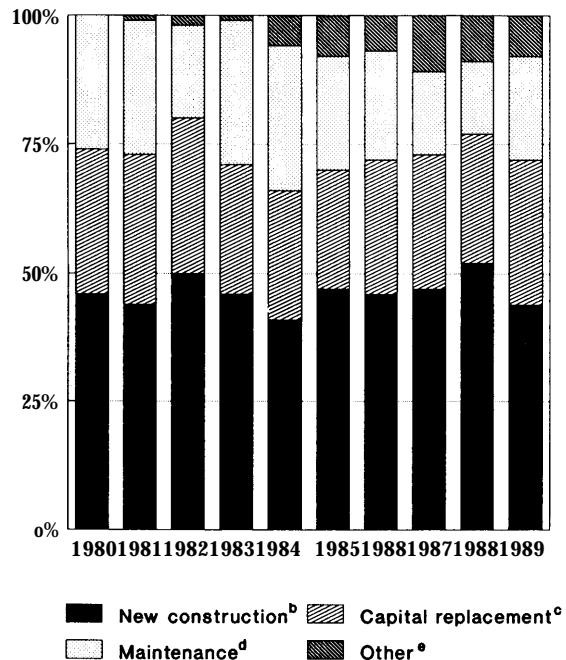
¹ In addition to classifying spending by grant program such as Interstate and primary, the Federal Highway Administration categorizes obligations by project improvement types: new construction, relocation, reconstruction, widening, resurfacing, restoration and rehabilitation, bridge replacement, and bridge rehabilitation. To simplify, these are grouped into four broad categories: new construction, capital replacement, maintenance, and other. New construction includes all first-time construction, construction of a new route to replace an old one, major and minor widening, and new bridges. Capital replacement covers full or near full replacement of a bridge or highway system and includes bridge replacement, major bridge rehabilitation, and highway reconstruction. Maintenance covers projects for rehabilitation or repairing existing structures to prolong life and to avoid total capital replacement. This group includes project improvement categories for restoration and rehabilitation, resurfacing, and minor bridge rehabilitation. The other category captures all nonconstruction spending.

² J.F. Hornbeck, *Maintaining Highway and Bridge Investments: What Role for Federal Grant Programs?* (Washington, DC: Congressional Research Service, May 31, 1990), pp. 6-7.

³ U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 1989* (Washington, DC: 1990), p. 72.

During the 1960s and 1970s, construction of new roadways and more lanes was the typical prescription for resolving congestion problems. Most major urban areas built Interstate beltways to carry through traffic around congested downtowns. But building roads in metropolitan regions encouraged vastly increased vehicle ownership and travel demand, particularly in the low-density suburbs, and beltways now carry predominantly local traffic, despite their designation as part of the Federal Interstate system. By 1991, land scarcity, air quality mandates, intergovernmental rivalries, and competition for public

Figure 1-1—Types of Highway Improvement Financed by Federal Aid^a



^a Includes obligations for Interstate construction, Interstate 4R (restoration, resurfacing, rehabilitation, and reconstruction), Primary, Secondary, Urban, and Bridge programs.

^b Includes all first-time bridge and highway construction.

^c Includes full or near full replacement of a bridge or highway section.

^d Includes expenditures for rehabilitating and repairing existing structures to prolong useful life.

^e Includes nonconstruction spending, such as safety.

SOURCE: Office of Technology Assessment based on material compiled by Congressional Research Service and reported in J.F. Hornbeck, *Maintaining Highway and Bridge Investments: What Role for Federal Grant Programs?* (Washington, DC: Congressional Research Service, May 31, 1990), p. 7.

capital have made relying on new construction in urban areas an expensive and obsolete policy. Rural States must be assured of the ability to maintain the roads they have--an assurance they now lack. New approaches and different programs are clearly a must.

Based on findings in *Delivering the Goods*,⁴ OTA's recently released comprehensive study of public works infrastructure, the major system problems facing surface transportation in the 1990s and beyond are:

- . rehabilitation and maintenance of existing facilities,
- . urban mobility and congestion relief,
- . rural accessibility,
- transportation system efficiency,
- . compatibility with a healthy environment, and
- . technological preparedness for the future.

As important, *Federal financing and institution/policies* need rethinking, including Federal investment levels and apportionment formulas, program priorities and design, needs and expectations of State and local governments and the private sector, and clarification of Federal responsibilities.

SYSTEM REHABILITATION AND MAINTENANCE

Across the country, highways, bridges, and transit facilities require major repair or reconstruction to maintain acceptable service levels. Because the rewards for regular maintenance are minimal compared to those for other more visible types of spending, investment in rehabilitation and maintenance has lagged seriously behind the need for decades. Currently, about one-third of the Nation's non-interstate arterials are deteriorated or deteriorating. Almost one-half of all bridges are structurally deficient or functionally obsolete. The maintenance backlog of large city transit systems includes rehabilitation of 2,800 miles of track, 11 million square feet of bridge structures, and 214 bus maintenance and storage facilities.⁵

⁴U.S. Congress, Office of Technology Assessment, *Delivering the Goods: Public Works Technologies, Management, and Financing*, OTA-SET-477 (Washington, DC: U.S. Government Printing Office, April 1991).

To a large extent, today's need for massive reconstruction and capital replacement was predictable. The 1980s marked the end of the design life of millions of miles of roadways built in the 1950s and 1960s and of bridges and mass transit facilities constructed in the early part of the century. Moreover, the expected functional life of many highways and bridges has been shortened by heavier than anticipated use (including much greater use of heavy trucks) and the neglect of regular maintenance. Local governments have often diverted funding originally slated for pothole repair, bridge painting and resurfacing, and bus maintenance to match Federal and State construction grants or to address other priorities. Small, rural communities and States with low per-capita incomes are under particular revenue stress.⁶ In Alaska, for example, communities depend on the Al-Can Highway for connections between Southeast Alaska and the panhandle and between the State and the lower 48. They are threatened with imposition of a 35-mile-per-hour speed limit and shutdown of sections of the road by the Canadian Government, because portions of the State's road are in such poor condition. Estimates for repair costs exceed the State's total annual highway budget. Addressing system rehabilitation and maintenance problems is the top priority for new highway legislation.

Major issues include: What Federal policy and funding changes can ensure systematic investment in rehabilitation and maintenance by all levels of government? What adjusters, if any, should be included in Federal programs to help States with few economic resources and large maintenance and rehabilitation costs?

METROPOLITAN MOBILITY AND CONGESTION RELIEF

Almost 80 percent of the U.S. population lives in one of the Nation's 282 metropolitan areas, and the metropolitan growth trend is expected to continue. Almost all new jobs and population increases are forecast to occur in the suburbs of metropolitan areas, particularly in the larger ones.⁷ Travel on major urban highways increased 30 percent between 1983 and 1987.⁸

⁵U.S. Department of Transportation, *National Transportation Strategic Planning Study* (Washington, DC: March 1990), p. 12-21.

⁶See Office of Technology Assessment, *op. cit.*,

Table 1-1—1989 Congestion Levels in Major Cities^a

Cities	Congestion level ranking ^a	Congestion cost per vehicle ranking ^b	Total congestion cost ranking ^b
Los Angeles, CA	1	4	1
San Francisco/Oakland, CA	2	5	3
Washington, DC	2	1	4
Miami, FL	4	11	15
Chicago, IL	5	16	5
Seattle-Everett, WA	5	8	9
San Diego, CA	7	19	16
Atlanta, GA ^c	8	9	6
Houston, TX ^c	8	12	12
New Orleans, LA	9	28	27
New York, NY	11	3	2
San Jose, CA ^d	11	6	13
Boston, MA	13	6	7
Honolulu, HI ^d	13	19	31
San Bernardino-Riverside, CA ^d	13	2	14
Detroit, MI ^c	16	15	8
Norfolk, VA ^d	16	21	24
Portland, OR	18	18	26
Philadelphia, PA ^c	19	24	11
Phoenix, AZ ^c	20	14	17
Tampa, FL	20	35	38

NOTE: Annual congestion costs per vehicle range from \$1,040 in Washington to \$200 in Tampa. Total costs of congestion range from \$5.8 billion in Los Angeles to \$130 million in Tampa.

^a Congestion level rank is based on the Roadway Congestion Index (RCI) developed by the Texas Transportation Institute. RCI calculates roadway mobility by combining average traffic volume per lane-mile for freeways and principal arterial streets, accounting for total vehicle-miles traveled and the capacity of each type of road.

^b Congestion cost is the estimated cost of travel delay and excess fuel consumed paid by residents of large, congested urban areas. Delay is defined as the total vehicle-hours per day spent by motorists driving on congested roads. A constant monetary value of time is used for all urban areas, making price of fuel and time of delay the most prominent factors in the calculation of cost.

^c These cities reduced congestion levels from 1987. Phoenix experienced the greatest drop, reducing congestion by almost 13 percent.

^d These are preliminary values; some data items are being reviewed.

SOURCE: Office of Technology Assessment, 1991, based on Texas Transportation Institute, "1989 Roadway Congestion," research report 1/31-4, 1991.

Congestion, stalling workers and truck traffic, costs American business billions of dollars every year in lost productivity and adds significantly to air pollution. The total price to the public for delays caused by highway congestion is at least \$30 billion annually, and while some places are beginning to attack traffic congestion, by and large it is a worsening and nationwide problem (see table I-1). A comprehensive Federal policy to deal with metropolitan regional congestion and urban mobility problems is long overdue. Initial components for developing such a policy must include analytic tools, such as reliable data and information collection, and quantifiable performance measures that incorporate incentives or financial rewards for improvements.

Actions that can be taken immediately include a combination of some additional capacity, better

footnote 4, ch. 1.

⁷ U.S. Department of Transportation, op. cit., footnote 5, p. 1-12.

⁸ Ibid., p. 10-18.

maintenance, and making existing roadways and bridges more productive and efficient through available intelligent vehicle/highway systems (IVHS) technologies. However, a program that emphasizes more highway spending alone is not adequate for the 1990s. Improved transportation alternatives--such as commuter rail, mass transit and other high-occupancy options, stronger regional transportation planning linked to land use and growth management goals, and better connections between transit and highways and other modes--must become parts of surface transportation programs.

Growing communities have economic resources they can tap to fund congestion relief measures, and they can direct new development into relatively efficient patterns. This is not the case for older, less affluent central cities and sub-urbs, where congestion problems are exacerbated by aging roadways and bridges and outmoded radial highway and transit patterns (New York and Philadelphia are prime examples).

Such cities need special help, and State governments need to recognize the role their major cities play in the overall economic health of the State and provide assistance, as appropriate.

Major issues include: How to restructure Federal transportation priorities and programs to help States and localities address congestion issues, including its staggering costs. What new technologies (such as planning aids) in addition to IVHS, can assist in managing and reducing congestion?

ACCESS TO RURAL AREAS

Transportation options for rural America are shrinking, while the costs for maintaining rural highways are rising.⁹ To control costs and make their operations more productive, rail, air, and intercity bus transportation have abandoned service to many small towns, especially those in rural, low-density States, leaving cars and trucks as the only transportation alternative. Simultaneously, Federal and State programs, seeking to maximize economic benefit, generally target their subsidies for Interstate system and major highway construction, and capital replacement; county and local government shoulder most responsibility for maintenance. These costs are particularly heavy burdens for sparsely populated States that have extensive road systems, such as Montana and Wyoming, and for poor States like Alabama and Mississippi where per-capita income levels are far below the national average. Their ability to pay is not commensurate with the investment needed to maintain the roadway system on which they are dependent.

Major issues include: Determining the Federal responsibility for assisting rural and poor States in maintaining their road networks.

⁹The number of heavy vehicles operated by farmers and farm supply and marketing firms traveling on rural roads has increased substantially, while revenues to maintain and reconstruct the existing system are declining in real terms. For further information, see C. Phillip Baumel et al., *The Economics of Reducing the County Road System: Three Case Studies in Iowa*, DOT/OST/P 34/86/035 (Washington, DC: U.S. Department of Transportation, January 1986).

TRANSPORTATION SYSTEM EFFICIENCY

As a result of long-term Federal and private sector investment and regulatory policies, U.S. transportation infrastructure and institutions provide for multiple separate modes. To the detriment of shippers and travelers, the country does not have an efficient intermodal system, in fact or as a matter of policy. Trucks compete with railroads for freight market share and with automobiles on the highways. Highway and transit officials compete against each other for public support and limited public funding. U.S. Department of Transportation (DOT) modal administrators and congressional committees compete, too. While competition is an essential ingredient for continuing vigor in a complex transportation system, the trick is to achieve a balance between a healthy level and narrow, parochial feuding that strangles essential growth in productivity.

The resiliency and long-term growth of the economy depends on an efficient and balanced transportation system; intermodal cooperation and the linkages between the modes will be the keys. Without substantial improvement, inefficient freight transfers will cost industry dearly, and time-consuming commutes will reduce worker productivity. A political and institutional framework must be developed to address these issues. At present, for example, the groundside transportation needs of air and seaports--major traffic generators--are frequently left out of local transportation decision making.

Major issues include: What Federal institutional and funding changes can most effectively encourage an efficient intermodal transportation system? What are the best ways to maintain the benefits of competition and still improve intermodal performance?

COMPATIBILITY WITH ENVIRONMENTAL GOALS

Transportation and the environment (air, water, and land) are closely linked in the physical world and in legislation since the passage of recent environmental laws. Unless transportation plans are compatible with environmental goals and mandates, Federal transportation funding will be cut off or projects will be ensnared in lengthy, even irreconcilable intergovernmental or citizen disputes. As a result, environmental inter-

ests are emerging as full-fledged players in transportation decisionmaking.

The specific impacts of the 1990 Clean Air Act are just beginning to be understood by Federal, State, and metropolitan transportation policy makers and administrators. To achieve mandated decreases in car and truck generated pollutants, major changes are unavoidable in business operations, commuting and other travel patterns, land development, as well as, how decisions are made about transportation planning and investment. Linkages between highways and other environmental issues, such as noise pollution and wetlands functions and values, must also be better understood and processes improved for eliminating conflicts. New surface transportation legislation needs to establish processes that incorporate environmental issues as well as engineering and economic factors. Environmental considerations must be included in the early stages of policy and project planning.

Major issues include: How best to clarify lines of communication and authority between transportation and environmental officials and decisionmaking processes at the Federal, State, and local levels.

TECHNOLOGY FOR THE FUTURE

The Federal Highway Administration (FHWA) supports the vast majority of research and development (R&D) on highway technologies and has traditionally focused on research to underpin construction standards and regulations for operating safety. The Strategic Highway Research Program (SHRP) was established outside FHWA to promote a more far-reaching research agenda.

While FHWA'S 1991 and 1992 budget requests reflect some increases in the resources devoted to R&D, the time is right to expand FHWA'S research agenda and related surface transportation research programs still further. Priorities include technologies addressing highway capacity and congestion relief, structural preservation and rehabilitation, and integration of highways with other modes. For example, pavement durability research, such as that being conducted by SHRP, needs a permanent home in

FHWA, since SHRP is slated to go out of existence within a few years. Automatic vehicle identification technologies that speed toll collection and other advanced traffic management technologies in IVHS offer significant potential for congestion relief and for cutting down on highway delays. High-speed rail and magnetic levitation systems need further work to determine their place in the intermodal intercity systems of the future. Many of these technologies are ready to implement, but additional evaluation or demonstration under FHWA sponsorship would help bring them into widespread use.

Bolstering the surface transportation research agenda raises questions about the effectiveness of the current research structure and funding arrangements. The informal cooperative arrangements now used between the Urban Mass Transportation Administration, the National Highway Traffic Safety Administration, and FHWA are better than nothing, but a strategic DOT plan for surface transportation is long overdue. Only when such a plan has been developed, with milestones and technology transfer mechanisms included, can a steady funding stream be contemplated. In addition, OTA's research points to the difficulties facing State and local officials in using new, advanced technologies. FHWA has mounted a substantial effort to re-establish technology transfer programs that were cut back a decade ago, but additional techniques for improving Federal technology transfer and ways to overcome institutional obstacles must be identified and implemented.

Major issues include: What institutional changes are needed to ensure rapid development and implementation of existing new technologies? What R&D programs are needed to evaluate next generation surface transportation technologies?

INVESTMENT AND INSTITUTIONAL ISSUES

Acknowledging an increased backlog of transportation projects, Congress raised the 1991 obligation ceiling for highways and mass transit to \$17.8 billion, 17 percent over the 1990 level of \$15.2 billion. However, budget constraints make it critically important that spending is strategically targeted and that its long-term implications are thoroughly considered.

Table 1-2—Proposed Federal Authorizations for Highway and Mass Transit, 1991-96
(in billions of unadjusted dollars)

	1991 ^a	1992	1993	1994	1995	1996
Highways	\$14.0	\$15.8	\$16.1	\$16.6	\$18.1	\$20.1
Transit	3.3	3.3	3.3	3.3	3.3	3.3

^aEstimated.

SOURCE: U.S. Department of Transportation, Federal Highway Administration, *Summary of Highway Provisions of 1991 Surface Transportation Assistance Act* (Washington, DC: 1991).

Federal-Aid Levels

Compared to investment needs identified by government and industry groups, which range from \$90 and \$150 billion annually, the 1991 Federal appropriations and those projected by the Administration for 1992 to 1996 fall far short of levels necessary to recoup a decade of disinvestment and to leverage large increases in State, local and private investment. The proposed Administration 5-year highway spending plan barely keeps up with inflation through 1994 (see table 1-2); significant increases are not scheduled until 1995 and 1996. Transit funding would be maintained for the authorization period at \$3.3 billion annually, which represents only a 1 percent increase over the past 5 years and a decrease in purchasing power as the result of inflation.¹⁰

While local and State officials and industry advocates are pleased by the increase in 1991 spending, they would like to see more spending drawing down the large trust fund balances maintained for highways and mass transit (\$1.1 billion and \$8.5 billion, respectively, in 1991). Under the Administration proposal, these are estimated to reach \$16 and \$9 billion, respectively, by 1996. "The balances would fall between 1995 and 1996 because current legislation reduces motor fuels taxes in October 1995 back to November 31, 1990 levels—a move that would

¹⁰ Kenneth M. Mead, director, Transportation Issues, Resources, Community and Economic Development Division, U.S. General Accounting Office, testimony at hearings before the House Subcommittee on Investigations and Oversight, Committee on Public Works and Transportation, Mar. 5, 1991, p. 2.

¹¹ James L. Blum, assistant director, Budget Analysis Division, Congressional Budget Office, testimony at hearings before the Senate Committee on Environment and Public Works, Mar. 5, 1991,

eliminate the recent 2-cent per-gallon increase in the highway trust fund and the 0.5-cent per-gallon increase in the transit account and significantly reduce earmarked revenues.

Unlike mandatory entitlement trust funds, such as social security, highway and transit fund balances cannot be spent without being budgeted and appropriated. Thus, the annual surface transportation agenda must compete with other Federal priorities that are funded under the domestic spending ceilings imposed in the 1990 deficit reduction package.

Congress could consider whether the long-term economic and environmental benefits of a structurally sound and efficient transportation system are so compelling that they warrant recalculating Federal budget priorities (or strategies). A growing body of economic research shows a strongly positive relationship between public investment in infrastructure and economic growth.¹² If the Federal gas tax were raised gradually and continuously, the flow of earmarked transportation funds would increase, adding to the amounts available for improvements, and reducing the energy consumed during traffic delays and travel over bumpy roads.

Major issues include: Is a substantially larger Federal investment warranted to address transportation system needs and avoid detrimental economic consequences? And if yes, how can it be financed?

p. 13.

¹² Alicia Munnell, senior vice president and director of research, Federal Reserve Bank of Boston, testimony at hearings before the House Committee on Public Works and Transportation, Feb. 20, 1991.

Table 1-3—Current Federal Highway and Mass Transit Program Authorization

Program	1991 authorizations (in billions of dollars)	Percent
Highways:		
Interstate construction	\$3.2	23%
Interstate 4-R ^a	2.8	20
Primary	2.3	16
Secondary	.6	4
Urban	.8	6
Bridge	1.6	12
Other	2.7	19
Subtotal	14.0	100
Highway and motor carrier safety:		
Subtotal	0.4	
Mass transit:		
Discretionary programs (new rail lines, modernization, and bus projects)	1.2	36
Formula (capital projects, planning, and operations)	2.1	64
Subtotal	3.3	100
Total	\$17.7	

^aResurfacing, restoring, rehabilitating, and reconstruction. Reconstruction that includes lane additions and new interchanges is currently the largest program component.

SOURCE: Congressional Research Service, *Surface Transportation Reauthorization 1991: A Comparison of Current Law With the Bush Administration Bill* (Washington, DC: Mar. 25, 1991), pp. 6, 30.

Table 1-4--Administration Proposed Surface Transportation Act Authorization for 1992-96

Program	Authorizations (in billions of dollars)	Percent
Highway:		
Interstate completion	\$7.2	8%
National highway system	43.5	50
Urban/rural	22.2	26
Bridge	10.7	12
Other	3.2	4
Subtotal	86.8	100
Highway and motor carrier safety:		
Subtotal	2.3	
Mass transit:		
Discretionary programs (primarily new starts)	2.0	12
Formula (capital projects, planning, and operations)	14.3	88
Subtotal	16.3	100
Total	\$105.4	

SOURCE: Federal Highway Administration, *Moving America Into the 21st Century* (Washington, DC: 1991), p. 16.

Program Priorities

Along with Federal-aid levels, the biggest issue facing Congress is how the money is to be spent. (See table 1-3 for current authorizations and table 1-4 for 1992 to 1996 proposed program authorizations.) Two issues are at the heart of the priorities debate: 1) the importance of system preservation and efficiency relative to construction and capacity expansion, and 2) the wisdom of concentrating Federal spending on a national highway network as opposed to supporting a balanced intermodal transportation system that

serves both rural and urban areas efficiently.

Construction or System Preservation?

Despite a tradition of favoring construction as answers to transportation needs, the building bias is moderating. DOT, most State and local officials, and many highway and transit groups advocate targeting funding at system preservation and improvement to protect existing investment, improve safety, and reduce long-term maintenance and environmental costs.

Some interest groups recommend denying Federal funding of new highway construction, unless it is part of a State or rural government-approved program, and focusing Federal spending on system rehabilitation and performance enhancement. Others contend that adequate funding for construction is essential to provide access to underserved areas.

Highways or Intermodal Systems?

Federal policy and funding has generously supported construction of an excellent Interstate highway system, but this focus has helped create sprawling metropolitan areas, and is not well suited to the complexities of the 1990s, much less the 21st century. The Nation needs a robust and balanced intercity transportation system to compete effectively in the international economy. Investment in highways is, of course, an important part of such a balanced system. However, in a time of very tight budgets, too much emphasis on highways may divert resources from metropolitan transportation problems that have enormous consequences, and affect intercity passenger and freight travel and much of the Nation's population, its economy, and the environment. Furthermore, overemphasis on highway construction and capital improvements burdens rural areas with demands for rehabilitation and maintenance that they have difficulty meeting.

Federal policy could promote an intermodal model that integrates Interstate, other arterials, rural highways, waterways, freight and passenger rail lines and air corridors into a national transportation system. This concept includes metropolitan networks--made up of modern urban highways; high-occupancy, high-volume corridors; transit, commuter, and intercity rail routes; and intermodal transfer centers--all integrated and linked to air and seaports.

Major issues include: To promote the long-term national interest, should Federal spending priorities focus on expanding the national highway system or on developing a balanced transportation system that includes highways as one component of a surface transport network?

APPORTIONING FEDERAL AID

Because all States contribute to the Federal Highway Trust Fund, maintain backlogs of trans-

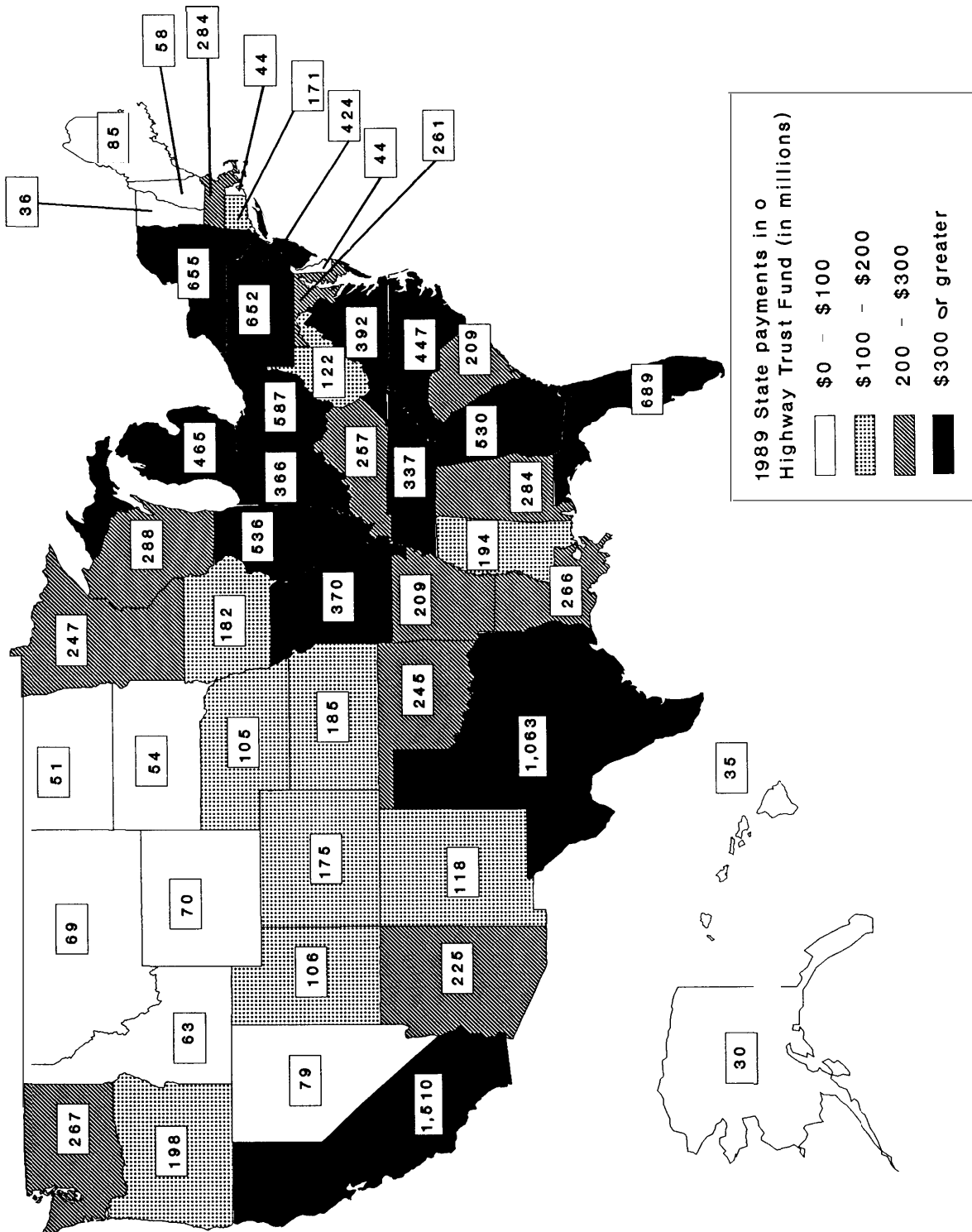
portation projects, and count heavily on Federal aid, Federal apportionment formulas are important and controversial policies. The result of numerous political compromises made over many years, Federal-aid apportionment formulas are complex and hard to evaluate in respect to current national goals. Key formula factors are outmoded and hard to quantify accurately. (See table 1-5 for a summary of current apportionment factors.) Urban States protest that allocation formulas are weighted unfairly in favor of rural States, ignoring the heavy use of urban roads, and large rural States claim their Federal share is minimal compared to their needs and their key role in national highway networks. Rapidly growing States and metropolitan areas object to highway and transit apportionments based on decennial census counts, because they receive no credit for their above-average growth except at 10-year intervals. All States want to maximize their share of the Federal outlays and, at least, get back close to what they pay in through fuel taxes. (See figure 1-2 for a map showing State contributions to the Highway Trust Fund and figure 1-3 for current State Federal-aid apportionments.)

Table 1-5-Apportionment Factors for Federal Surface Transportation Aid, 1991

Program	Factors determining each State's apportionment
<i>Highways:</i>	
Interstate construction	State's share of the cost to complete the planned Interstate system
Interstate 4-R	Number of Interstate lane-miles Number of vehicle-miles traveled
Primary	State land area State rural population State rural delivery routes and city mail route mileage
Secondary	State land area State rural population State rural delivery route mileage
Urban	State urban area population
Bridge	State's share of the cost to replace or rehabilitate deficient bridges
<i>Mass transit:</i>	
Discretionary	Urbanized area population
Formula	Population density within urbanized areas Transit system service and ridership

SOURCE: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 1989* (Washington, DC: 1990); and Congressional Research Service, *Understanding U.S. Transportation Program Finances* (Washington, DC: 1990).

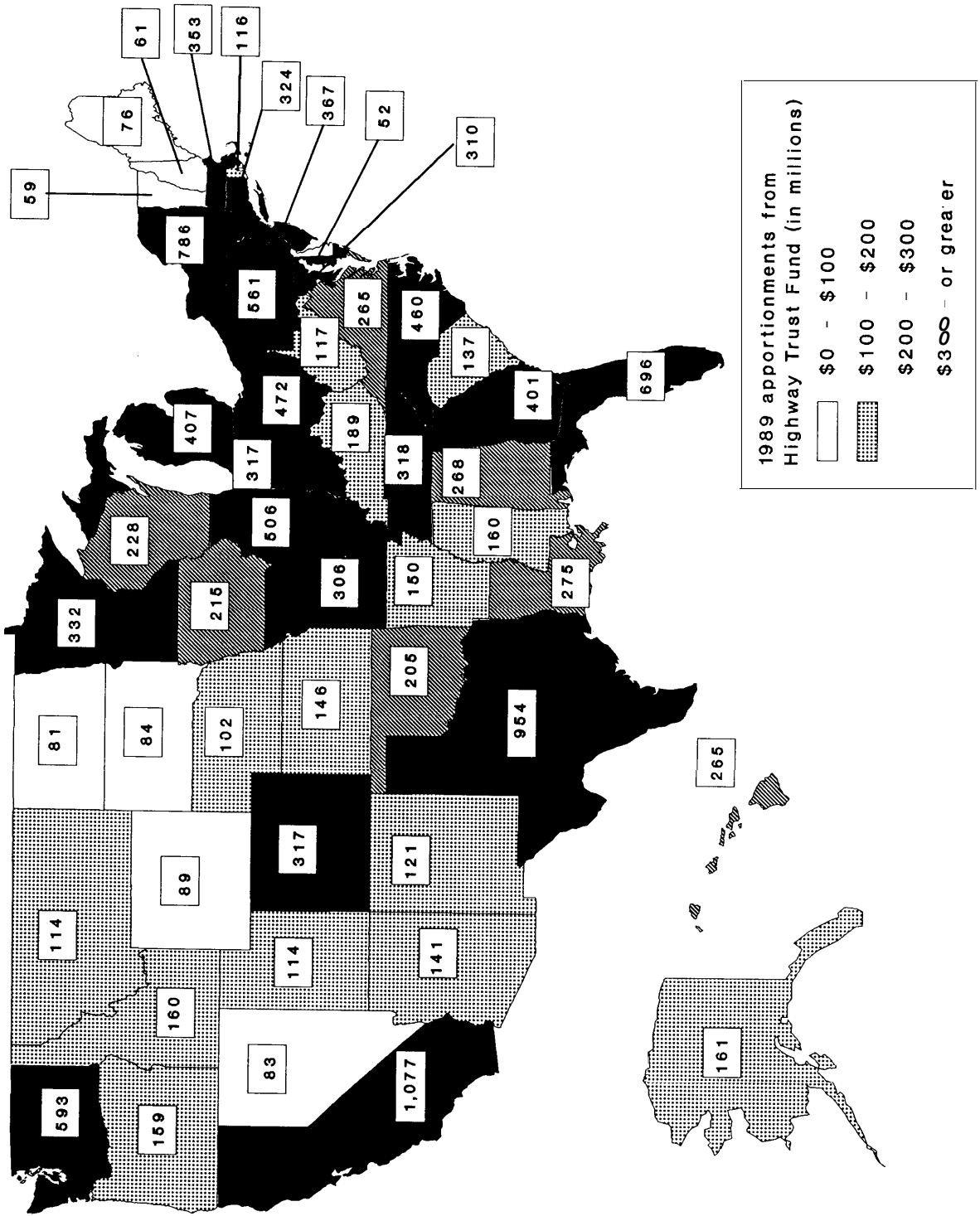
Figure 1-2—State Payments Into Highway Trust Fund, 1989



Federal Highway Statistics 1989 (Washington, DC: 1990), p. 47.

SOURCE: Federal Highway

Figure 1-3—Apportionment of Highway Trust Fund to States, 1989



Box I-B-Fiscal Issues Differ Widely Depending on State Conditions

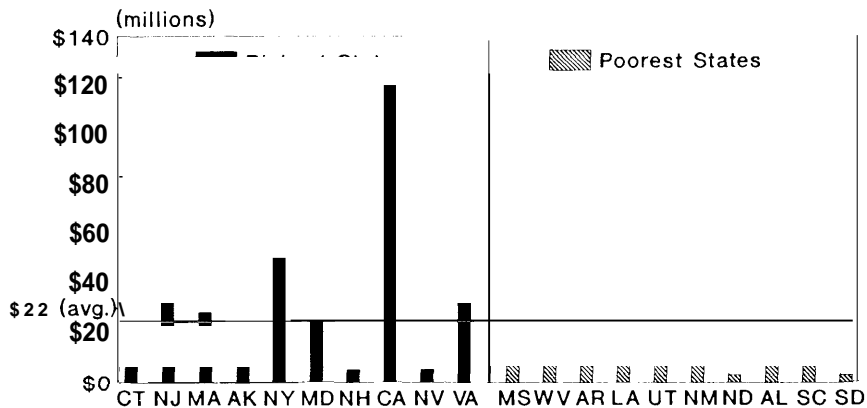
As Congress considers how to allocate Federal aid to States, two special problem types are of concern—areas with serious but short-term capital needs and those with large, long-term capital deficits. In many high growth areas, demand for transportation facilities and services exceeds immediate resources. Population increases have pushed demand for more capacity and investment to the South, Southwest, and west coast and to outlying metropolitan suburbs. State and local tax revenues are likely to grow as the economy prospers, but not fast enough to keep current with demand. (Figure I-B-1 shows the different revenue raising capacity of State gas taxes in rich and poor States.) In addition to traditional grant aid, these places could benefit from strategies such as growth management, stronger State and regional planning, and stimulation of private investment. Federal incentives, such as seed money for capitalized revolving loan funds with repayment based on tolls or value-capture taxes maybe appropriate to fill the short-term capital gap.

On the other hand, in many rural States and older, central cities, investment needs for upgrading and rehabilitating transportation infrastructure are climbing, outpacing growth in State and local tax bases. The problem is particularly acute for low-density States like Alaska, Montana, and North Dakota where planned highways are left incomplete, and major roads remain unrepaired because of inadequate resources. In New York City and Philadelphia, which are extreme examples, massive investment is needed just to maintain minimal levels of service operation and safety.

Current Federal allocation formulas do not weigh the fiscal status of States or metropolitan areas. Although timely and accurate measures of a State's or region's ability to pay or fiscal capacity or effort are difficult to develop, these are critically important factors to consider if maintenance of structurally sound transportation infrastructure is to be achieved nationally. While primary- and secondary-aid formulas include State land area and system size as factors, these are, at best, indirect measures of need and do not calculate fiscal capacity, ability to pay, or local effort. In 1990, six western States with a total population of 5.6 million (or 2 percent of the Nation) and incomes below the national average were responsible for maintaining almost 10 percent of the Interstate system. Similarly, the urban area-aid formula, based only on population size, does not consider economic factors.

¹Per-capita income is the most current available indicator of fiscal capacity. The Advisory Commission on Intergovernmental Relations has developed comprehensive measures of fiscal capacity and effort, the most recent available data is for 1988. See U.S. Congress, Office of Technology Assessment, *Delivering the Goods: Public Works Technologies, Management, and Financing, OTA-SET-477* (Washington, DC: U.S. Government Printing office, April 1991).

Figure I-B-1—Yield Per Penny of Gas Tax in the Richest and Poorest States, 1989a
(by per-capita income)



KEY TO STATE ABBREVIATIONS: AK—Alaska; AL—Alabama; AR—Arizona; CA—California; CT—Connecticut; LA—Louisiana; MA—Massachusetts; MD—Maryland; MS—Mississippi; ND—North Dakota; NH—New Hampshire; NJ—New Jersey; NM—New Mexico; NV—Nevada; NY—New York; SC—South Carolina; SD—South Dakota; UT—Utah; VA—Virginia; WV—West Virginia.

^aStates listed in order from highest per-capita income to lowest per-capita income.

SOURCE: U.S. Congress, Office of Technology Assessment, *Rebuilding the Foundations: A Special Report on State and Local Public Works Financing and Management, OTA-SET-447* (Washington, DC: U.S. Government Printing Office, March 1990), p. 71.

To reflect current Federal goals and more accurately relate to system needs and fiscal capacity, apportionment formulas need reform. Most in need of change are the formulas for primary and secondary roads, which are outdated and generally do not reflect accurately the most heavily used roads. Bonuses have been proposed for low-density States to compensate them for high per-capita road costs, but Congress may also want to consider modifying apportionment formulas or matching ratios (see next section) to assist States with low fiscal capacity.¹³ (See box 1-B for a discussion of fiscal issues.) The five States with the lowest fiscal capacity and not receiving existing or proposed bonuses would be: Mississippi, West Virginia, Arkansas, Alabama, and South Carolina.

Major issues include: How to allocate Federal-aid amounts and balance equity, system need, and fiscal capacity, and also promote the Federal interest.

FEDERAL MATCHING RATIOS

Federally set matching ratios are important determinants of how much money each State gets. They are also pivotal policy issues, since high Federal matches profoundly affect State and local decisionmaking. For example, while a 90-percent Federal match for Interstate construction proved an effective strategy for building a national road system, the policy skewed State and local priorities toward construction and undercut investment in system preservation, maintenance, and transportation alternatives. Similarly, because Interstate receive a 90-percent Federal match, Interstate projects are often given priority over other needed State and local construction projects.

Matching ratios are used to reflect national priorities, and the Administration's interest in limiting Federal assistance for transit in large

¹³ **Fiscal capacity** refers to a State's relative ability to raise revenue from taxes and other sources. Historically, a State's fiscal capabilities have not been considered in apportioning Federal program funds, although States with large Federal land holdings have received special consideration. A State's capacity to raise revenue remains a salient issue, especially if Federal matching shares are reduced. One possible way to assist the five or so States with the lowest fiscal capacities would be to include provi-

cities is seen in proposed new matching ratios, which substantially reduce the Federal match for new transit starts from 75 to 50 percent. The philosophical basis for this is that new projects must be well supported locally to be viable and a cost-effective Federal investment.

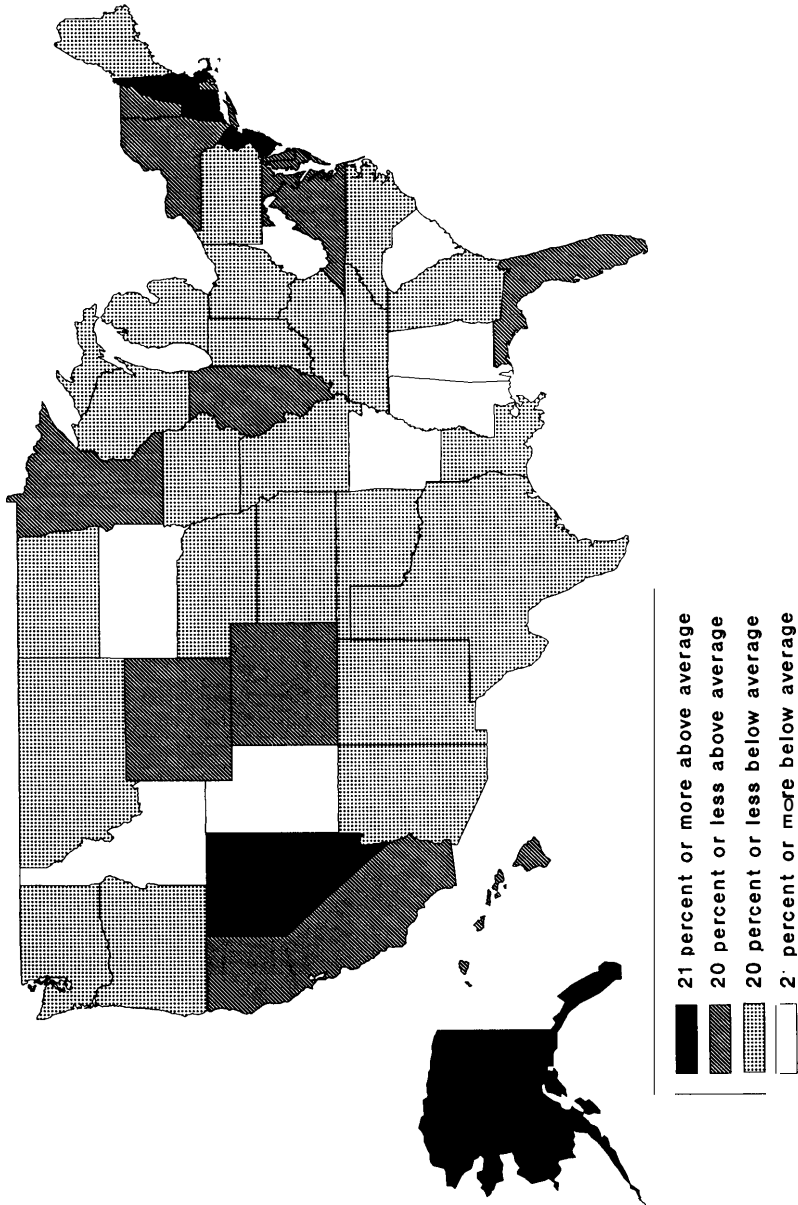
The 90-percent Federal share for Interstate was appropriate in the 1970s and 1980s, given the strong Federal interest in completing Interstate construction, but such a high Federal match for new programs is inconsistent with the notion that States can and should accept a larger financial role. However, if Congress wants to reduce Federal program matches substantially (selectively or for all programs) to leverage more State and local spending, the impact on individual States needs to be assessed. An increase from 10 to 15 percent in State matches may seem modest, but it can have enormous impacts on State budgets. Such a raise for the existing Interstate 4-R program, which provides funds for highway reconstruction and rehabilitation, would require almost \$200 million in additional State investment. (See appendix A, table A-1 for the impact of a change from 20 to 25 percent in the State match for bridges.)

In States where the economy is particularly weak, an increased State matching requirement could severely limit State participation in Federal programs. The local burden of higher matches could be reduced if Federal regulations permitted more flexibility in what qualifies as the State share such as toll revenues, impact fees, and other developer contributions. On the other hand, matching ratios can be manipulated to promote equity. Existing law permits a reduced State match for States where the Federal Government has large land holdings. (See appendix A, table A-2 for those States receiving a match reduction now and those that are candidates for low-density bonuses.) Similarly, reduced matching ratios could be applied to States with low fiscal capacity (see figure 1-4).

Major issues include: How to use Federal subsidies effectively to promote national objectives and leverage more State and local investment without bringing unnecessary hardship.

sions for them in Federal legislation for a reduced matching share.

Figure 1-4—State Fiscal Capacity To Raise Revenue (percent deviation from U.S. average)



SOURCE: Advisory Commission on Intergovernmental Relations, *1988 State Fiscal Capacity and Effort* (Washington, DC: 1990).

PROGRAM FLEXIBILITY

Under the current categorical structure, Federal aid is narrowly focused and comes with a myriad of strings and red tape. For reasons of efficiency and because State and local governments are footing a larger share of the bills and have become better informed decisionmakers, they are demanding more autonomy and administrative flexibility. This is especially true for metropolitan and rural programs where conditions and problems may be unique and programs need to be customized. For instance, the ability to transfer or combine program funds would greatly enhance local administrations' capacity to deal with issues such as port access or linkages between mass transit facilities and highways. Greater program flexibility and increased local and State autonomy has wide support, both inside and outside the Federal Government, although definitions of acceptable types of flexibility are likely to differ among interest groups.

Major issues include: Which programs most reflect Federal interests? What are appropriate reasons for Federal collection and redistribution of fuel taxes in flexible grants? Under a flexible program structure, how can States be held accountable for making good use of Federal dollars?

PERFORMANCE MEASURES

The Federal Government currently lacks understandable and reliable system performance measures, a situation that contributes to the general lack of direction evident in current Federal policy. For instance, although congestion is a top national issue, no standard approach is used for measuring congestion.¹⁴ Of particular importance is the development of databases for recording and measuring congestion, intermodal activity, highway and bridge maintenance, and interrelationships of transportation with the environment and land use. Data of this sort are important for understanding transportation problems and their linkages, setting reasonable standards, measuring progress, and refining Federal programs and apportionment formulas. Furthermore, such measures are essential for planning transportation strategies for air quality compliance.

¹⁴ U.S. General Accounting office, *Traffic*

DOT is the most suitable entity to develop performance measures. In establishing an improved assessment system, Congress should be sure that the right questions are asked, that DOT has a mechanism to collect and analyze the appropriate information, and that the department is held accountable for results.

Performance Incentives

The Federal Government offers few rewards for superior performance of transportation systems. Federal dollars are divided up according to formula, project costs and through discretionary programs--all of which have little to do with performance. If reliable performance standards are developed, financial incentives for exemplary achievement can be a positive new tool. Since system maintenance and congestion are such major problems, they are good candidates for incentive programs. (See box 1 -C for sample maintenance and congestion incentive programs developed by OTA.)

REGIONAL PLANNING

Transportation problems are created and solutions stymied by the absence of strong regional and State planning to guide land use and transportation decisions. Because of the number of governmental units that operate (and overlap) in most metropolitan areas, decision-making is fragmented and narrowly focused, making it practically impossible to form a consensus on development goals and, thus, to build a framework for resolving regional transportation issues. Furthermore, State policies frequently thwart meaningful regional planning by limiting local authority, especially for revenue raising, and by failing to maintain a viable State planning process.

Major issues include: How can the Federal Government best promote effective State /and use and transportation planning and budgeting?

Congestion--Trends, Measures and Effects (Washington, DC: November 1989), p. 3.

Box I-C--Sample Maintenance Award and Congestion Relief Bonus Programs

OTA developed these sample complementary programs to demonstrate types of incentives for which all States could compete. The National **Maintenance Award** Program seeks to improve transportation efficiency in States of all sizes and types, and the Congestion Relief Bonus Program is aimed at improving metropolitan transportation system productivity. Rural States are perhaps less likely to be interested in the congestion relief bonus program, but each has at least one city that might be eligible. Peer involvement by State transit, transportation, and planning officials in the award process is key.

National Maintenance Award Program

The purpose of the program is to reward States with cash awards (and appropriate publicity) for raising the largest percentage of highway lane- and bridge-miles to a higher maintenance standard compared to a base year.

Funding: A \$2.5 million set-aside beginning in 1993.

Award criteria: Bonuses would be awarded to State Departments of Transportation (DOTS) that a Peer Review Board determines have made the biggest improvement in the condition of highways and bridges over a previous year's performance. The board, which could be set up by the Secretary of Transportation in conjunction with professional State and industry officials, would establish the evaluation measures or use the current Present Serviceability Rating System.

How it works: Annually or biennially State DOTs may submit applications to compete for the Maintenance award. The Peer Review Board would select winners in two to three divisions; the divisions could be based on size of the system, fiscal capacity, or percent of the system that is rural or urban. The award winners would have their techniques and strategies showcased so that other States could benefit. States may spend awards on any State maintenance-related program.

Congestion Relief Bonus Program

The purpose of the program is to provide a cash award incentive to metropolitan areas to reduce congestion and improve travel time and air quality (or make statutory or programmatic progress toward these goals). Involvement of highway, transit, and Metropolitan Planning Organization (MPO) officials in the program development is key.

Funding: One-half percent would be set aside, beginning in 1993 and increasing to as much as 1 percent by 1996, from the proposed highway or metropolitan program apportionments.

Eligibility: An MPO would be the only eligible recipient of the bonus grants. To qualify for the bonus award competition an MPO must have a Federal, State, and locally approved congestion reduction and management plan including a supporting data collection and analysis program that follows Federal guidelines--to be developed by the Secretary.

Earning bonus points: An MPO earns bonus points for quantifiable reductions in metropolitan area congestion (see possibilities below) and, for some nonquantifiable but supporting accomplishments (see possibilities below.) The details of this step would be worked out by the Secretary between 1992 and 1993 along with congestion management data collection and analysis guidelines.

Quantifiable improvements that earn bonus points

- . increased vehicle occupancy rate (one point per X percent increase);
- Ž decreased travel time (one point per X second decrease on designated arterial);
- decreased hours per month of severe congestion;
- improved air quality;

- increased ridership per capita and in the off-peak and better on-time performance of transit, or other appropriate transit indices; and
- improved level of service for major highways based on adopted standards.

Nonquantifiable achievements that earn bonus points

- approved congestion pricing policy and implementation plan for highways and bridges (note: prohibiting truck travel by time of day is not an effective form of congestion control);
- approved congestion pricing policy and implementation plan for parking;
- approved long-range metropolitan land-use development plan to support congestion relief policies;
- approved 5-year capital improvement program for surface transportation; and
- private sector commitment to participate in congestion relief evidenced by specific agreements for transit allowance if parking is provided free, for example.

How it could work: MPOs would compete for bonus points with other MPOs of comparable size. There could be four categories; the largest would be 3 million and over and the smallest up to 250,000. The value of each bonus point would be determined by the number of points earned in each size category divided by available funds. Once having earned a bonus point, an MPO continues to receive the cash bonus each year throughout the authorization period unless its performance deteriorates. The MPO's objective is to accumulate bonus points over the years as a result of continuous improvement. Therefore, it would be important to increase program finding each year because as more points are awarded each is worth less, unless the base is increased. MPOs could spend the bonus funds on enhancing any congestion relief or mobile source reduction air quality related activities.

SOURCE: Office of Technology Assessment, 1991.