
CHAPTER I. CONSIDERING PUBLIC WORKS INVESTMENT --FRAMEWORK AND OVERVIEW

The nation's public works infrastructure--defined here as including highways, public transit systems, wastewater treatment works, water resources, air traffic control, airports, and municipal water supply--is suffering from growing problems of deterioration, technological obsolescence, and insufficient capacity to serve future growth. 1/ The nature, extent, and severity of these problems vary widely among the systems considered. But attention on them has converged at a time when tight budgetary constraints are forcing the federal government, the states, and the localities to review spending priorities and to make difficult decisions about what they can and cannot undertake.

At the federal level, capital spending for public works is projected to average more than \$24 billion a year between 1983 and 1990 (see Table I-1). 2/ If current programs are maintained without change, these outlays would fall somewhat short of meeting needs as they are defined by the agencies with a role in providing these services. 3/ Meeting needs under federal programs as they are now structured would raise annual federal spending to about \$28 billion--or more, if needs are interpreted as reflecting a broader federal responsibility. At the same time, however, federal policies could be altered in a way that could bring the total federal costs to a lower level than under current programs--albeit with important

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1. The concept of infrastructure can be applied broadly to include such social facilities as schools, hospitals, and prisons, and it often includes industrial capacity as well. The seven systems considered in this study share the common characteristics of capital intensiveness and high public investment at all levels of government. They are, moreover, directly critical to activity in the nation's economy.
 2. Unless otherwise noted, all dollar figures cited in this study are expressed in 1982 dollars.
 3. Needs are inherently difficult to quantify. They can depend on levels and quality of services, valuations of time, health, and safety, and other concerns. The composition of needs estimates is described in each chapter.

TABLE I-1. FEDERAL SHARE OF ANNUAL CAPITAL INFRASTRUCTURE COSTS UNDER CURRENT AND REVISED POLICIES, 1983-1990 (In billions of dollars)

Infrastructure System	Current Spending Level	Annual Spending to Meet Alternative Measures of Need	
		Under Current Program Structure	Under Revised Programs
Highways	12.7	13.1	9.3
Public Transit	3.7	4.1	2.2
Wastewater Treatment	3.2	4.2	3.7
Water Resources	2.3	3.7	3.1
Air Traffic Control	0.8	0.8	0.7
Airports	0.8	0.9	0.3
Municipal Water Supply	<u>0.9</u>	<u>1.4</u>	<u>1.0</u>
Total	24.4	28.2	20.3

SOURCE: Congressional Budget Office.

implications for the states and localities that participate in providing public works and for the private-sector beneficiaries of infrastructure services.

The structure of many current federal programs tends not to encourage selection of the most efficient projects. Many also channel federal money toward projects that are of greater local interest than of overall nationwide benefit. Further, many federal programs were designed for important goals that have now been met--building a national network of highways, for example, or fostering regional development of agriculture, or constructing a system of locks and dams. Today, however, the more pressing needs are maintenance and repair.

Revised programs that emphasized investments with clear national significance and that reduced the current bias toward capital-intensive undertakings could improve the cost effectiveness of federal spending. One mechanism to help guide cost-effective investment is increased use of user fees, which can either raise money for needed projects or dampen demand, in turn diminishing needs. Under policies redesigned to reflect these considerations, federal costs to meet the nation's infrastructure needs could in fact be reduced to about \$20 billion a year--\$4 billion less than current spending.

Though such changes could bring about more cost-effective investments and with them, reduced federal spending, they might have to be coupled with other major nonfederal changes. State and local commitments to public works spending might have to rise. Users of services might have to pay more than they do now. And the levels of service now available might have to be diminished.

THE DIVERGENCE OF NEEDS AND POLICIES

Policies of planned governmental subsidization evolved out of concerns for regional development and fairness dating back to the early days of the nation's expansion and settlement. The aim of accelerated development of the West at the turn of the century, for example, prompted the federal government to foster western agriculture by subsidizing irrigation systems. Assistance to needy regions and groups of people has been another motive underlying federal subsidies to infrastructure services. Examples include the Appalachian highway program and much of federal aid to urban mass transit systems. Most federal infrastructure programs, having evolved without a single direction and having been shaped over time by the need to establish an infrastructure foundation, fail to recognize today's highest priorities--repair, rehabilitation, and replacement. Thus, the orientation of current federal infrastructure policies can promote inefficient spending.

Many of the concerns that once motivated subsidies for infrastructure facilities may now no longer apply. And in some instances, continuation of these policies can distort economic choices. Freight shipping on inland waterways, for example, has become a mature business, suggesting that the need for nurturing, in the form of federal subsidies, may long since have been met. In fact, these subsidies now cover more than one-fourth of the costs of the barge industry, many times the share of federal subsidies for other modes of transport. As an example of economic distortion, federally subsidized water transport encourages the use of barges rather than railroads, and this in turn stimulates demand to build more locks and dams with federal dollars.

ISSUES BEFORE THE CONGRESS

The Congress faces difficult choices about how to solve the nation's infrastructure problems: whether simply to change funding levels while keeping the present structure of federal programs intact, or to make more fundamental changes in the process by which these investments are made. In this context, the Congress confronts three fundamental questions:

- o **How should the costs of future infrastructure spending be divided among the various participants--the federal, state, and local governments and the users of infrastructure services?**
- o **What areas of infrastructure spending are the federal government's province, as defined by the interests of the nation as a whole? and**
- o **How can federal policies encourage the selection of cost-effective projects in general, including an appropriate balance in investments between new construction and maintenance?**

PLAN OF THE STUDY

The remainder of this chapter gives an overview of the nation's present infrastructure problems and of the federal role in dealing with them. It begins with a review of the economic purpose of public works investment. Then, drawing on the analysis in the remainder of the paper, it assesses the extent and nature of infrastructure problems, the potential costs to the nation of neglecting these problems, and the potential effects of relying on the federal programs now in place for remedies. This overview closes by outlining three possible strategic approaches that, applied in varying combinations, could help promote effective public works investment.

Although the seven infrastructure systems considered here share some basic characteristics, the diversity among them limits generalization. Therefore, each chapter examines one system only, briefly recapitulating the current problems of that system and estimating the costs of correcting those problems. Then, in an attempt to define means for achieving more cost-effective investments, each chapter explores various funding and spending strategies. Chapter II deals with highways, Chapter III with public transit. Chapter IV concerns wastewater treatment; water resource investments--dams, ports, inland waterways, and the like--are addressed in Chapter V. Chapter VI deals with air traffic control, Chapter VII with airports, and finally, Chapter VIII addresses municipal water supply. The sequence of chapters roughly reflects the size, in descending order, of the current federal role in financing these diverse infrastructure services.

THE ECONOMIC OBJECTIVE OF INFRASTRUCTURE INVESTMENT

Federal, state, and local governments participate in providing public works primarily for two purposes: to achieve an efficient use of resources, and to assure an equitable distribution of services. These goals might not always be met if provision of services were left solely to the marketplace. In evaluating the economic consequences of contemplated road construction, for example, a governmental body considers potential time savings, productivity improvements, industrial development, and safety; a private firm, in contrast, might give highest priority to the direct revenues that would accrue from road users. Thus, private enterprise would find fewer instances in which the benefits of road construction outweighed the costs, and as a result, fewer roads would be built than might actually be desirable for the well-being of the economy as a whole.

The Federal Role

In making infrastructure investments, each level of government has its own unique role to play. State or local governments subsidize facilities that serve their own residents, but they do not always have incentives to make investments that also serve the best interests of the economy at large. The federal government is in the best position to ensure that infrastructure investments simultaneously advance national goals of efficiency and fairness. Over the years, federal involvement in the provision of public works has grown in response to several specific concerns:

- o **Underdeveloped regions.** States in less developed regions may lack the resources to finance the construction of infrastructure projects needed for regional development.
- o **External costs and benefits.** Individual states may lack the incentives to supply certain facilities and services in sufficient quantity, since the costs and benefits of some public works cross state borders.
- o **Centralized planning.** Some infrastructure services are provided most effectively when coordinated by central administrative bodies.
- o **Inequities and hardship.** Some population groups, such as the poor and the handicapped, may need federal intervention to assure their access to certain public services.

Understanding whether current federal programs respond to these concerns in a cost-effective manner requires analysis of the nation's infrastructure needs and how federal investment practices do and do not mesh with them.

THE NATURE OF CURRENT INFRASTRUCTURE PROBLEMS

A hundred years in the making, the United States' public works infrastructure is now largely in place, providing the physical framework for continued expansion, population shifts, and economic growth. The nation's capital spending has not kept pace with increases either in economic activity or population, however. In 1960, estimated capital outlays by all levels of government for the seven infrastructure systems considered in this study were about 2.2 percent of Gross National Product (GNP). By contrast, 1980 capital spending was 1.3 percent of GNP. In terms of population, infrastructure investment fell from \$187 per capita in 1960 to \$174 per capita in 1980.

As a result, physical problems of adequacy have been mounting. Many highways, bridges, water systems, transit systems, and other public works have deteriorated. Other systems have become technologically obsolete. In certain areas, infrastructure capacity is insufficient to serve projected population growth. Though the extent and severity of these problems vary markedly among the seven public works systems examined here, some generalizations can be made.

Deterioration and Obsolescence of Existing Facilities

The most pervasive problem affecting the nation's infrastructure is physical deterioration resulting in mounting needs for repair, rehabilitation, and replacement. Many components of infrastructure systems show the effects of aging, and some are approaching the end of the "design lives" planned by their engineers and builders. Aging problems are compounded by the cumulative effects of inadequate maintenance and repair.

No area of infrastructure has been wholly unaffected by aging and neglect. For example, most of the nation's highway network shows significant signs of deterioration. Approximately 8 percent of Interstate highway mileage is now classified as "poor," indicating that it is badly deteriorated and in need of resurfacing or rebuilding. Another 34 percent is in "fair" condition and may be only barely adequate for high-speed traffic. Similarly, the treatment and distribution components of many urban water supply systems are nearing the end of their useful lives; leakage losses of up to 40 percent are not uncommon in the Northeast, where some water mains

have been in service for a century or longer. In the nation's inland waterway system, some locks are approaching 80 years of service--30 years beyond the generally accepted limit for safe, efficient operation. And in the area of air traffic control, existing equipment has been outmoded by the development of new, more efficient microchip technology.

Insufficient Capacity for Growth

Though less widespread than deterioration, insufficient capacity to serve projected growth is a problem in some areas. In Houston, for example, economic development and a rapidly expanding population have brought increased vehicular traffic, which clogs local roads not designed to handle such volume. Similarly, communities in which existing wastewater treatment plants operate at full capacity will not be able to support new industrial or residential development without expanding their sewage treatment capacities. In addition, deepening several of the nation's major ports may be necessary in coming years to accommodate the larger "world class" coal-carrying vessels to permit continued growth of U.S. coal exports. Finally, substantial future increases in aviation activity could create a need to expand existing airports if severe congestion is to be avoided.

POTENTIAL COSTS OF NEGLECT

The costs of neglecting these infrastructure problems can be substantial, although comprehensive and precise estimates cannot be made. These include higher long-term construction and repair costs for facilities that are not properly maintained, higher costs borne by users of inadequate facilities, and potential constraints on economic development.

Unchecked deterioration of infrastructure facilities can cause total construction and repair costs to rise over the lifespan of a facility. For example, in regions where salt is used to melt snow, failure to keep bridge deck pavement in good condition can have serious--and very expensive--consequences, as worn pavement allows salt to leak through and corrode the bridges' steel underpinnings. Deferred maintenance on water delivery pipes can lead to buildups of deposits inside pipes, and eventually, flow can become so restricted that the pipes must be replaced.

Users of inadequate infrastructure facilities also bear significant costs. Every time a bridge is closed to traffic or subjected to weight restrictions because of deterioration, users' time and money are lost. In the worst cases, there may also be substantially increased safety risks. Airport delays, mostly occasioned by congestion at large commercial airports, cost

the airlines roughly \$1 billion in 1980, wasted some 700 million gallons of fuel, and resulted in 60 million hours of waiting time for airline passengers. Similarly, deterioration of pavement on the nation's highways results in substantial increases in vehicle operating costs. For example, operating costs for a small automobile are almost one-third higher on poor roads than they are on well-maintained roads.

Deterioration of existing facilities and insufficient capacity to accommodate future growth can eventually constrain economic development. The nation's transportation network, water supply, and wastewater treatment facilities provide vital services for both industries and individuals; where capacity is inadequate to meet the needs of growth, that growth can be stunted. Similarly, a community with badly deteriorated roads, bridges, or other transportation facilities is in a weak position to attract new businesses. Though more difficult to quantify than the costs of deferred maintenance, these costs are no less real.

THE COSTS OF CORRECTING INFRASTRUCTURE PROBLEMS

Like estimates of the extent and severity of the nation's infrastructure problems, estimates of the costs of correcting those problems are necessarily imprecise. To some extent, this reflects a lack of aggregate data and differences about what the definition of infrastructure includes. Overestimates may at times reflect the interests of affected parties. In addition, the orientation of current programs toward new construction tends to lead to overstated estimates of need. But most important, the costs of remedying these problems depend on the extent and quality of the infrastructure services the nation wishes to purchase. As a result of these uncertainties, estimates of the costs of meeting the nation's infrastructure needs range widely.

Nevertheless, quantitative estimates are possible, though the evidence they derive from may differ qualitatively. Under current policies, the CBO estimates that annual capital outlays by all levels of government would have to increase from \$36 billion to roughly \$53 billion between 1983 and 1990 to remedy problems in the infrastructure systems considered here (see Table I-2). Part of this increase, roughly \$6 billion a year, is already assured by the new tax on motor fuel enacted by the 97th Congress. Beyond that, however, increases both in federal and in state and local spending would be required to meet the infrastructure investment needs as current policies define them.

More important than the aggregate level of need, however, is the emphasis that current policies place on new construction. Annual invest-

TABLE I-2. ESTIMATED ANNUAL CAPITAL NEEDS FOR SELECTED INFRASTRUCTURE PROGRAMS UNDER CURRENT POLICY, 1983-1990 (In billions of 1982 dollars)

Infrastructure System	Annual Capital Spending			Effective Federal Share of Total
	Total	New Construction	Repair, Rehabilitation, and Replacement	
Highways	27.2	9.9	17.3	13.1
Public Transit	5.5	2.2	3.3	4.1
Wastewater Treatment	6.6	6.1	0.5	4.2
Water Resources	4.1	2.3	1.8	3.7
Air Traffic Control	0.8	0.1	0.7	0.8
Airports	1.5	1.0	0.5	0.9
Municipal Water Supply	<u>7.7</u>	<u>3.6</u>	<u>4.1</u>	<u>1.4</u>
Total	53.4	25.2	28.2	28.2

SOURCE: Congressional Budget Office.

ment to meet needs as they are defined under current policies would be split roughly evenly between two categories: repair, rehabilitation, and replacement of existing structures; and entirely new construction to meet growing demand (shown in Table I-2). Two infrastructure systems appear dominated by a demand for new construction--wastewater treatment (93 percent new construction) and airports (67 percent), while new construction represents roughly half of overall projected spending through 1990. The large role that new construction plays in the apparent demand for infrastructure spending reflects the orientation of current policies, rather than the priority of need.

FEDERAL INVESTMENT AND ECONOMIC EFFICIENCY

The tight constraints now affecting the federal budget--CBO is now projecting a federal deficit of \$201 billion in 1984--give particular urgency to the efficiency with which infrastructure dollars are spent; concern with such efficiency tends to grow in importance relative to other policy objectives as budgetary pressures constrain available resources. In a time of intense budgetary stringency, when the wishes of all sectors cannot be accommodated, decisionmakers face difficult choices: Should the federal government complete the still-unbuilt segments of the Interstate Highway System, or should it repair aging sections of existing Interstates and leave some segments unbuilt? Should the federal government extend East Coast port facilities to accommodate deep-draft ships? Does the nation need a new air traffic control system now, or can modernization wait? Economic efficiency, measured by weighing costs against benefits, points to answers to such questions. Against this yardstick, the investment conferring the greatest economic value (which can be measured by what users are willing to pay for) relative to that investment's cost would be given highest priority.

Three features shared in some degree by most federal infrastructure programs underlie problems in the cost effectiveness of current public works spending:

- o **Undercharges to users.** The direct beneficiaries of infrastructure services often pay fees that recover less than the cost of providing those services, thus leading to excessive demand for infrastructure services. This in turn can lead to overestimates of investment needs.
- o **Failure to differentiate federal and nonfederal needs.** The eligibility of projects for federal funds often extends to projects of primarily local significance, thus diverting funds from investments of national importance and allowing federal funding decisions to influence the pattern of state and local investment.
- o **Bias toward capital-intensive projects.** Cost sharing in federal programs tends to direct funds to capital uses only and to pay a very high share of these, thus causing a bias toward capital-intensive projects regardless of the merits of alternative approaches.

This section assesses the inefficiencies these federal investment practices can cause in light of shifting infrastructure priorities.

Undercharges to Users

Though users of many of the nation's infrastructure facilities pay some sort of fees under current policies, most user fees are set well below levels that would recover all the federal government's costs. In effect, these differences are financed by federal subsidies, and thus they are supported by the general taxpayer. In only two of the seven programs considered here--highways and airports--are fees now high enough to defray all federal costs. And even in these two programs, some users--notably, operators of heavy trucks and private planes--pay less than their share of federal outlays, while other users--light truck operators and airline passengers--make up the difference by paying fees that recover more than their share of costs.

By stimulating demand, subsidies can lead to exaggerated perceptions of infrastructure expansion needs. Overstated demand promotes unneeded new construction--often done instead of needed repairs--and thereby diminishes efficiency in the allocation of scarce public investment capital. Fees that do not fully recover the cost of a certain service can result in localized demand by regions or user groups for services that may not benefit the economy at large.

Where regional economies have matured and subsidized development is no longer needed, perpetuation of below-cost user fees has led to economic distortions. The effects of federal subsidies to inland navigation are a case in point. Similarly, federal water subsidies for Western irrigation have induced many farmers to grow water-intensive crops such as rice or cotton, sometimes in competition with farmers in other regions.

In other instances, subsidies have been less effective in reducing external costs than the decisionmakers who initiated them once hoped. For example, the evidence available suggests that reductions in public transit fares in urban areas have little effect on road traffic, even though the purpose of the transit subsidies required to lower fares includes reductions in auto congestion and air pollution. Hence, the decongestion and environmental benefits of transit subsidies may be small compared with their costs.

Also, subsidies designed to alleviate personal hardship do not always benefit the people who most need the help. For example, household expenditure on mass transit, which the federal government subsidizes heavily, is concentrated in the upper-income groups. Households in the top one-third of the nation's income distribution receive more than twice as

much in operating subsidies as do the poorest one-quarter.^{3/} Thus, the subsidy for urban transit tends to shift income to high-income households.^{4/} There are, however, many cases in which the subsidies for infrastructure services are both relevant and effective; market forces alone undervalue these services. Subsidies targeted to specified groups, such as wheelchair users, can prove effective in alleviating those individuals' travel problems.

Federal Priorities and Nonfederal Needs

A key feature of most federal infrastructure programs is their dual focus on national and local projects. Access to federal money extends not only to major national investment projects, such as Interstate highways, but also to locally oriented projects, such as water supply facilities and farm-to-market roads. Federal involvement in local projects can at times promote economic efficiency and improve equitable distribution of resources over what states alone might achieve. For example, a state might build a wastewater treatment plant that is well suited to its own needs but that discharges pollutants down-river to neighboring states; in such a case, the neighboring state stands to bear costs. By funding wastewater treatment, the federal government encourages states to build sufficient capacity to prevent harmful spillovers, and thereby reduces overall wastewater costs to the economy. In other cases, coordinated planning of locally oriented infrastructure services may also improve economic efficiency and help ensure the widespread distribution of associated public benefits. For example, in the early days of aviation, local governments operated their own air traffic control towers. Today, the federal government equips and operates the towers, thereby reducing system-wide administrative costs and overhead and ensuring safe air travel.

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3. See, for example, John Pucher, "Who Benefits from Transit? Recent Evidence from Six Metropolitan Areas," in Transportation Research, Vol. 17A, No. 1 (January 1983).
 4. A similar pattern of income redistribution has been attributed to federal subsidies for intercity rail passenger service, analyzed in detail in Congressional Budget Office, Federal Subsidies for Rail Passenger Service: An Assessment of Amtrak (July 1982). Rail freight service is not analyzed in this paper because deregulation has provided the means for most railroads to finance their own investments, and government aid is being phased out. Rail passenger service carries only about 0.3 percent of all intercity passenger travel and thus does not play a major part in the nation's economy.

But when no rationale exists for national involvement in local projects, federal funding can distort economic choices by diverting federal funds from more pressing national needs. As an example, the financial advantages to states through 90 percent federal matching shares for Interstate highway construction encourage states to build many highway projects that the nation as a whole does not need. This can divert federal resources that could otherwise be used to repair key national routes.

Federal subsidies can also produce distortions with purely nonfederal consequences. To the extent that states and localities fund their own projects, they have an incentive to assure that only economic investments are made; to whatever degree the federal government shares the costs, that incentive may be blunted. At one time, federal investments in many locally oriented public works were needed to help local governments amass sufficient capital to pay the large initial costs. This need is less acute today. Various nonfederal financing mechanisms are now available to draw together the resources for infrastructure investment, and many of these are especially well suited for application on the state and local level. Indeed, many states and localities are already exploring such options with notable resourcefulness. A good example is New Jersey, which has recently proposed a state infrastructure bank to provide a revolving loan fund for local construction and improvement projects. State and local financing mechanisms are extensive and varied, and they include earmarked revenue sources including local user fees, state bond guarantees, flexible instruments to improve access to credit markets, and lease-purchase arrangements. With these emerging financial sources, states and localities may no longer require substantial federal aid to finance large up-front capital costs. Many community airports, for example, which still draw 90 percent federal grants for capital improvements, are now rated in the municipal bond market as premium investments and might easily finance their own capital development without federal aid.

Bias Toward Capital-Intensive Projects

Over the years, most federal infrastructure programs have offered high matching grants to states and localities for new construction and replacement, while providing relatively few incentives for the rehabilitation and maintenance of existing facilities. This federal emphasis derives from two factors: the special financial difficulties imposed by the high capital requirements of major infrastructure projects, and the reluctance of states to shoulder these burdens when so many of the benefits accrue to out-of-state residents and businesses. Indeed, the high share of costs assumed by the federal government has at times proven most effective in stimulating investment. For example, while the federal share of Interstate highway

financing was still relatively low (50 percent), progress in building the network was slow. But construction increased quickly when the federal share rose (to 90 percent in 1956), and by 1980, the 42,944-mile system was nearly complete.

Today, with the nation's infrastructure systems largely built, a continued emphasis on new construction and replacement can induce states and localities to neglect needed repairs. Although documentation of this practice is far from comprehensive, a recent survey of 300 cities reported by the General Accounting Office found that federal grants prompted 90 percent of the cities questioned to shift their resources to seek federal matching capital construction funds, rather than apply their resources to needed infrastructure repairs. ^{5/}

The capital-intensive bias also encourages states and localities to build new infrastructure capacity when more cost-effective investments are possible. For example, the 80 percent federal matching grants available for new transit bus purchases have led many local transit authorities to ignore the economic merits of rehabilitating older buses. ^{6/} And in a still more extreme example, the 90:10 federal:state financing for new Interstate highway construction gives states an incentive to build new roads without regard even to those roads' local economic merits. A recent analysis indicates that 56 percent of all uncompleted Interstate highway projects are economically unattractive when their total costs are weighed against their benefits. ^{7/}

FEDERAL STRATEGIES FOR INFRASTRUCTURE INVESTMENT

The CBO has considered three strategies by which the federal government might attempt to correct inefficiencies stemming from current federal policies:

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5. See General Accounting Office, Effective Planning and Budgeting Practices Can Help Arrest the Nation's Deteriorating Public Infrastructure (November 1982).
 6. The Surface Transportation Assistance Act of 1982 decreased the match to 75 percent starting in 1983.
 7. See Mark Skrotzki, Economics of Completing the Interstate Highway System, reproduced in Congressional Record (December 15, 1982) p. S14841.

- o **Adjusting federal user fees** both to produce a reliable measure of national needs and to correct present misalignments among users;
- o **Limiting the federal role** to infrastructure investments with clear national importance; and
- o **Redirecting existing federal aid** to alter the current bias toward capital-intensive investment decisions.

Applied in combination, though with varying emphasis to reflect program and needs differences, the strategies might improve the efficiency of federal infrastructure investments. Table I-3 summarizes the possible areas of application of the three strategies.

TABLE I-3. APPLICATION OF FEDERAL STRATEGIES TO INFRASTRUCTURE SYSTEMS

Infrastructure System	Federal User Fees <u>a/</u>	Limited Federal Role	Redirected Federal Spending
Highways	Yes <u>b/</u>	Yes	Yes
Public Transit	No	Yes	Yes
Wastewater Treatment	No <u>b/</u>	No	Yes
Water Resources	Yes <u>b/</u>	Yes	Yes
Air Traffic Control	Yes	No	No
Airports	Yes <u>b/</u>	Yes	No
Municipal Water Supply	No <u>b/</u>	Yes	No

SOURCE: Congressional Budget Office.

- a. Reflects possible adjustments in federal user fees only and does not reflect user fee increases at the state and/or local level.
- b. State and local user fees may be applicable in addition to or in lieu of federal user fees.

Adjusting User Fees

User fees that fully recover the federal government's costs can yield a good gauge of need for infrastructure services. They can result not only in services that are self-financing, but also in a more accurate measure of needs. To the extent that users of services are willing to repay the government for investments made in their behalf, revenues become available to support those projects. But to the extent that higher fees prompt users to reduce demand, investment needs decline. When high fees cause reductions in demand, investments can be tailored accordingly.

Aviation user fees provide a good example of this. At present, these fees are too low to cover the costs of the additional runways and air traffic control services needed to alleviate delay and safety problems during periods of peak demand. If user fees were raised to cover such costs, some traffic would shift to less crowded airports, thereby reducing the need for airport expansion, while users willing to pay the price of extra capacity would provide the necessary revenue through their payment of fees.

User fees that recover full government costs may not be appropriate in all cases, however. For services designed specifically to benefit users and non-users alike (as is the case, for example, with wastewater treatment), full-cost recovery can lead to insufficient capacity. At the same time, increased federal user fees could interfere with state and local governments' ability to impose their own fees; highway taxes are a good example of such possible displacement. In general, however, increased federal fees could play a major role in water resources and air traffic control program developments. In highways, as stated earlier, federal user fees appear to undercharge heavy trucks at the expense of light trucks, even though the overall level of revenues from fees does cover expenses. Increased local fees could be appropriate for airports, municipal water supply, and wastewater treatment. Mass transit, however, offers limited opportunities for cost recovery.

Limiting the Federal Role

Limiting the federal role could release federal funds for investments that are clearly national in scope. At the same time, a narrowing of the federal role could be done in a way that both encourages localities to assign priorities to their own investment undertakings and that gives them greater latitude in dealing with their own needs. In general, a more restricted federal role could be considered for highways, transit, and airports. Reduced federal funding for local airport facilities, for example, would permit the federal government to channel more funds to modernizing outmoded air

traffic control equipment. Moreover, local responsibility for airport funding could lead states to make more cost-effective investment decisions as they assessed their needs for local airport expansion. The already restricted federal role in municipal water supply could be kept small.

Clearly, though, any move toward a more limited federal role would impose high transition costs on state economies, even if the policy were beneficial in the long run. For example, if the federal government withdrew financial support for deep-water ports, state and local governments, to avoid reductions in service, would need to increase general taxes or specific user fees. Such increases would have to be substantial, and if imposed suddenly, they could result in local economic dislocation. To avoid such shocks, the federal government could reduce its role gradually. In highways and airports, for example, the federal government could follow an interim policy of turning back user fee revenues to allow states and localities to phase in their own higher taxes.

In addition, the federal government might continue to provide some local infrastructure services because of its cost advantage (as in most water resources), or because state and local governments, acting alone, have weak incentives to provide adequate facilities (as in wastewater treatment).

Redirecting Federal Assistance

Though the first two strategies would reduce total federal capital spending for public works infrastructure, this approach would promote more effective use of the remaining funds and reduce possible capital biases in investment decisions. It could be most usefully applied to infrastructure programs in highways, wastewater treatment, water resources, and mass transit. It could include three major modifications to current policies: changing the definition of what federal funds can be used for, reducing the federal matches on capital grants, and replacing rigid federal regulations with more flexible cost-sharing arrangements.

These changes might encourage state authorities to broaden the range of alternatives to new infrastructure construction they consider. More flexible cost-sharing terms and reduced federal matching ratios would induce states and localities to allocate federal funds among new construction, rehabilitation, and repair according to their own priorities. For example, requiring localities to contribute two-fifths--instead of the current one-fourth--toward new bus purchases might stimulate reconsideration of the cost effectiveness of rehabilitating older buses. In certain instances, performance-oriented federal regulations would also permit state and local governments to implement more cost-effective programs than they now can.

For example, in the area of wastewater treatment, waivers of federal standards granted to certain specific projects could permit local authorities to save on wastewater treatment costs without compromising overall water quality.

Increasing the use of federal block grants for infrastructure would also give states and localities greater discretion to use available resources to meet their most pressing needs. Water resources investment priorities, for example, are shifting from large interstate developments to smaller intra-state projects. Replacing federal project-specific appropriations with block grants to states for any water development purpose might allow a closer match of authority and local priorities.

Rapid change in current arrangements, as with the other strategies, could impose transition costs for regions that have become heavily dependent on the current structure of federal aid. If the federal government reduced its matching share for new bus purchases from 75 percent to 60 percent, for example, localities would need to spend an estimated additional \$100 million a year to replace buses at the current rate. (The rate of replacement might decline, however, with the diminution of the federal subsidy.) An inability to raise such funds quickly could result in reduced transit service, slowed bus sales, and dampened local economic activity. As before, this suggests that a gradual shift in federal investment practices might be the more appropriate course.

CHAPTER II. HIGHWAYS

From a federal perspective, the area of most pressing need is the heavily traveled Interstate System, which, though not yet complete, suffers from accelerating deterioration. Though lesser roads also show signs of neglect, the Interstate System confers the clearest economic benefit to the nation as a whole. The federal cost of meeting major highway needs (including bridge work) is roughly \$13.1 billion a year through 1990, of which the Interstate share would be some \$7.5 billion. In size, the current federal commitment of \$12.7 billion a year to highways seems reasonably matched to needs, and collections from user charges, substantially increased by 1982 legislation, cover federal costs adequately. But the structure of current policies does not always foster effective investment. Favoring new construction, current policies do not do enough to meet mounting needs for repair, resurfacing, and rehabilitation; by offering high federal matches to states and localities for construction investment, current policies promote states and localities to neglect repair. A redirection of policies to increase federal funding for nonconstruction purposes and/or to limit the federal role to those areas of clearest national importance would permit a reduction in federal highway taxes.

THE PROBLEMS IN HIGHWAYS

Of the nation's 3.9 million miles of roads, the most important are the 20 percent that make up the 820,000 mile Federal-Aid System. ^{1/} Besides its 260,000 bridges, the system has four major parts: more than 40,000 miles of Interstate routes, 260,000 miles of major Primary System arterials, nearly 400,000 miles of rural collector routes in the Secondary System, and another 125,000 miles in the Urban System (see Table II-1). Altogether, the Federal-Aid System carries four-fifths of the nation's highway traffic, but on only about one-fifth of the highways. The Interstate

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1. Further analysis can be found in Congressional Budget Office, Financial Options for the Highway Trust Fund (December 1982).

TABLE II-1. MAJOR PARTS AND PHYSICAL STATUS OF THE NATION'S HIGHWAYS, BY FINANCING SOURCE

Highways by Financing Category	Route Miles	Percent of Total Vehicle-Miles
Federal-Aid Highway System		
Interstate	41,216	19.0
Primary ^{b/}	259,240	29.5
Secondary	398,108	8.7
Urban	124,115	21.9
Bridges (number)	<u>(259,950)</u>	<u>c/</u>
Total Federal-Aid ^{e/}	822,679	79.1 ^{b/}
Non-Federal-Aid System		
Roads	3,034,179	20.9
Bridges (number)	<u>(313,700)</u>	<u>c/</u>
Total Roads	3,856,858	100.0

(Continued)

SOURCE: Congressional Budget Office based on data in Federal Highway Administration Highway Statistics for 1980, and The Status of the Nation's Highways: Conditions and Performance (January 1981) and other data from the Federal Highway Administration.

System alone accounts for 1 percent of the nation's roads but carries about one-fifth of all traffic and nearly half of all travel by combination trucks (mostly 18-wheel tractor-trailer trucks).

Physical Problems

The problems facing the Federal-Aid System over the next decade fall into the categories of repair and construction. Both the Interstate and other major road and bridge networks will need repairs, and construction of the