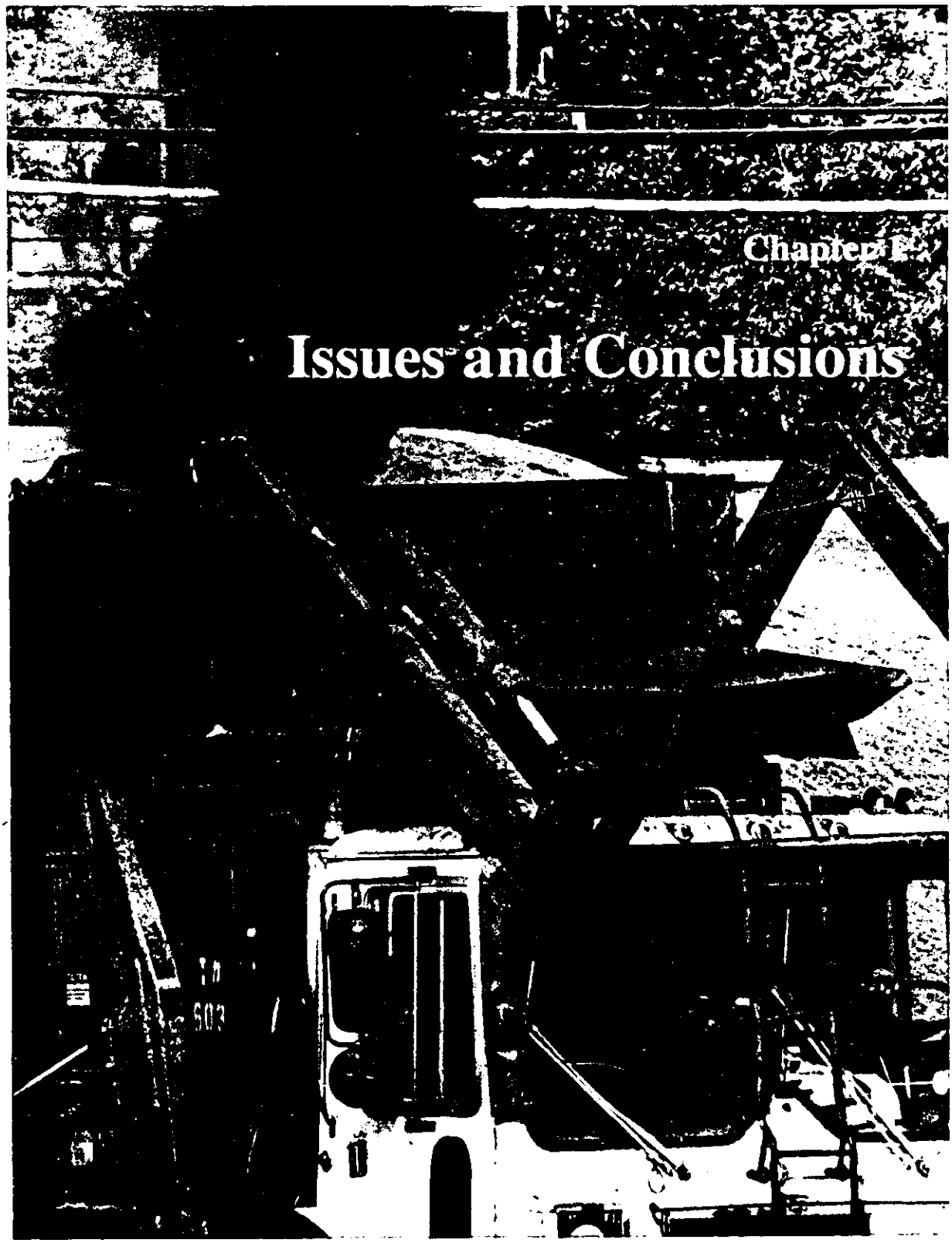

Chapter I

Issues and Conclusions

Photo credit: American Public Works Association

For State and local governments, complying wi h regulations can be a d lemma the solution to one problem such as waste disposal can create another problem air pol ution n this case

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Issues and Conclusions

"We've got all these people moving in from a neighboring State because our taxes are lower. We need roads and sewers for this new development, but we can't pay for them. And no politician wants to raise taxes-that's just too hard!" groaned an *official* from a fast-growing suburban jurisdiction in an industrial Midwestern State.[1]

"We don't need another special purpose tax; we need statewide tax reform," proclaimed the Governor of a Western State that does not have an income tax and relies heavily on sales and property taxes. The legislature did not agree and adjourned without acting on a carefully prepared special tax package for transportation improvements, leaving local officials, who badly needed the revenue, fuming.[2]

Roads, bridges, mass *transportation, airports, ports* and waterways, water supply, wastewater treatment, and solid waste disposal make up the essential infrastructure for public works services. These services underpin the public health and economic vigor of the Nation and are utilized by every citizen and every industry. But as the quotations above make clear, how to pay the bills for our Nation's public works (and other government services) remains a thorny and contentious issue. **As one** informed observer put it: "The impasse is deep: Americans' appetite for government services exceeds their willingness to be taxed."[3]

The Nation's 83,000 local governments are in an unenviable position; they take the direct political heat generated by public works issues. They are responsible for managing and maintaining over 70 percent of the Nation's public works facilities and services. They must also comply with Federal and State standards and regulations over which they have little control. In addition, they are caught in a bind consisting of the need to provide services on the one hand, and laws limiting how much money they can raise and how they can raise it and constituents who resent paying higher taxes on the other.

Federal and State governments, recognizing the importance of keeping the economy running smoothly, have long provided financial assistance for local public works. However, policy changes have reduced Federal contributions over the past decade, and infrastructure needs continue to outrun available dollars. Coping with the fiscal shortfall, meeting higher costs for maintaining transportation services, and ensuring that environmental facilities comply with new national standards create dilemmas for every State and local decisionmaker. Nonetheless, agreement is widespread that public works infrastructure needs upgrading and that additional investment would benefit individuals and the national economy alike. Indeed, one economist projected recently that: "If we increased spending on core infrastructure by $50 billion (1 percent of GNP), productivity would rise by an estimated $62.5 billion in the first year."[4] However, disagreements over how much additional support is needed and the most politically feasible method of providing it dog officials at every level of government.

But money problems are not the entire story. Solutions to urban problems such as air pollution and traffic congestion will require new technologies and 'approaches to transportation and difficult changes in longstanding management practices. For example, the view that". . . unconstrained personal mobility and control of congestion are incompatible in the America of today and tomorrow,"[5] is now widely shared by officials in major cities, but is anathema to many of their constituents. For a number of small, remote communities, compliance with new Federal environmental standards will require financial resources. beyond their fiscal capabilities. The management and technology changes necessary to resolve these problems involve staggering sums of money and require developing consensus among disparate, vocal, and tenacious industry and private citizen interest groups.

Considering all these conflicting pressures, it is small wonder that despairing descriptions of huge needs have not successfully mobilized agreement or a national approach to funding infrastructure. Efforts to date have been piecemeal. Most State govern-

[1]Unidentified official at Dingell/Ford Municipal Officials Conference, Washington, DC, unpublished remarks, June 23, 1989,

[2]John Horsley, commissioner, Kitsap County, WA, personal communication, July 7, 1989.

[3]Robert J. Samuelson, "A Frivolous Decade?" *Washington Post*, Jan. 3, 1990, p. A15.

[4]David Alan Aschauer, economist, Federal Reserve Bank of Chicago, personal communication, Oct. 30, 1989.

[5]Alan S. Boyd, "Transportation Systems of the 21st Breaking Gridlock," *Building Tomorrow: Global Enterprise and the Construction Industry* Academy Press, 1988), p. 19.

Photo credit: American Society of Civil Engineers

State and local **governments must replace and dispose of obsolete transportation equipment and meet competing revenue demands as well.**

ments have increased their support for public works, and local governments have made often heroic efforts. Yet even jurisdictions that have successfully raised taxes or fees for public works have been able to meet only their most pressing needs. Making a difficult situation worse, even when new technologies or management tools are available to make services more productive and efficient, officials are hard pressed to find funds to implement them. The current impasse over public works incorporates three critical and controversial national issues:

- the shortage of money available for competing government services, such as health and social needs, defense, education, and public works;
- the inadequate state of much of the Nation's transportation and environmental infrastructure at a time of rapid technical, industrial, and economic change; and
- the importance of preserving the environment—large, urban areas must address air and noise pollution and land use problems that diminish the quality of life and may limit growth and development, and every jurisdiction must upgrade its public works to comply with new environmental standards.

These three issues are interrelated in numerous, complex ways, but in their simplest forms, they have been on a collision course in recent years. As the 1990s begin, political and financial considerations intrude on every debate about preserving environmental quality and renewing our infrastructure.

To assess the progress of State and local governments in coping with infrastructure problems and to outline the framework for congressional decisionmaking, the Office of Technology Assessment (OTA) has prepared this special report documenting recent trends in public works financing and management. The report presents snapshots of current approaches and identifies successful programs and issues that have yet to be resolved. It provides background information and the State and local context for OTA's forthcoming report, *Rebuilding the Foundation: Public Works Technologies, Management, and Financing,* scheduled to be completed in the summer of 1990.

PAYING THE BILLS

Why have public works reached what many call a crisis point?--primarily because the costs of services that local governments must or wish to provide have outstripped the political acceptability of raising property taxes-their most important source of revenue. In 1987, property taxes generated over 70 percent of the tax revenue collected by all local governments[6]--50 percent for cities, which usually have a more diversified tax base than counties and towns. User fees, sales, income, and dedicated taxes, Federal and State monies, and private sector investment, when it is available, provide the remainder. Required by State laws to balance their budgets and limited by law (in over one-half the States) and by voter resistance in the tax increases they can impose, local governments count on every dollar from each of these sources. Declining Federal monies and State governments that have contributed substantial funding support only for highways and bridges are other contributing factors.

constitutional basis for a Federal role in public works lies in the responsibility of the Federal Government for interstate commerce, the general welfare, and national defense. Over the years our national government has addressed these goals by funding construction of a broad range of public works infrastructure, particularly for transportation and water resources. Historically, transportation facilities that promote interstate commerce-ports

[6]U.S. Department of Commerce, Bureau of the Census, *Government* in (Washington, DC: November 1988), p.

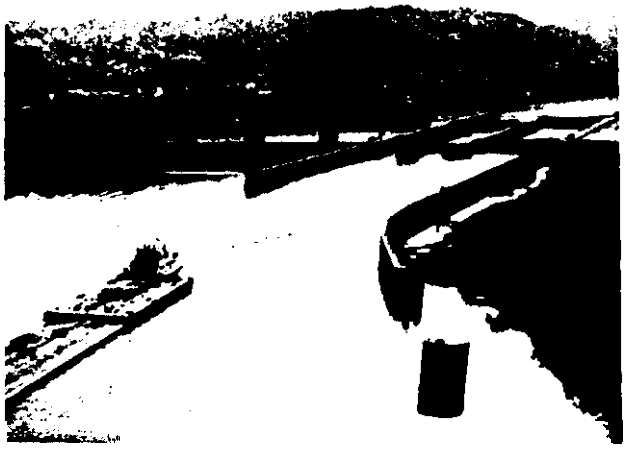


Photo credit: American Society of Civil Engineers

The Federal Government has generously supported construction, maintenance, and operation of ports and waterways.

and waterways, rights-of-way for railroads, airports and airways, and highways-have been supported with Federal monies. Local governments, with some help from their States, have maintained and operated most of these facilities, except for waterways (which are the responsibility of the Army Corps of Engineers) and freight railroads (which are privately owned and managed).

Federal involvement in environmental public works began early in the 20th century with massive investments in reclamation projects to provide water for agricultural and urban development. Over the past several decades, the emphasis has shifted to protecting the public health and natural resources, and the Federal Government has dramatically enlarged its regulatory role by setting standards for air, water supply, and water quality. Greater understanding of health dangers from contaminated drinking water, hazardous waste, improper wastewater treatment, and the health costs of air pollution prompted formation of the Environmental Protection Agency (EPA) in 1970 and tighter Federal regulation. Some Federal finding has been made available through EPA and the Farmers Home Administration of the Department of Agriculture to assist State and local governments in constructing facilities to control health threats.

As the impacts of rising national debt service and payments to individuals for health, welfare, and retirement made themselves felt (see figure l-l), Federal support for infrastructure, which had steadily expanded after World War II, began to shrink in the late 1970s. Indeed, between 1979 and 1989, Federal grants to States and local governments for all purposes, excluding payments to individuals, fell from 11 percent of the Federal budget to 5 percent.[7] Equally striking is the expansion in the share of their Federal grant monies that States and localities provided to individuals for health. These burgeoned from **3** percent of their Federal aid in 1960 to 30 percent in 1989, while the portion of aid used for public works dropped from roughly 46 percent to about 18 percent (see table 1-1, categories of natural resources and environment and transportation).

and local officials accept the need for Federal standards and regulations to protect the public health and welfare. They contend, however, that many grant requirements raise their costs by requiring expenditures for procedures that seem extraneous and by adding substantially to the time needed to complete the project. For example, Federal aid for bridge repair requires that a percentage of Federal monies be used for repairs to "off-system" bridges (bridges on highways that are not eligible for Federal aid); often these bridges are on underutilized or unimportant roads, and the State would prefer to use the money for bridges on major highways.[8] Concerns about Federal programs center on unfunded mandates, grant requirements, such as a focus on new construction rather than maintenance or management improvements, and on the regulatory process,[9] including:

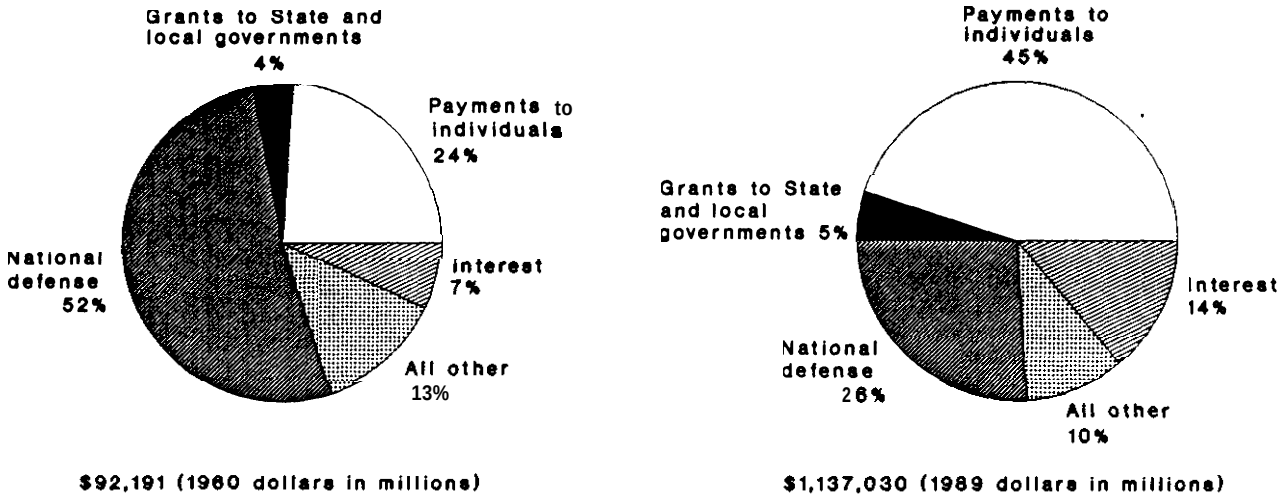
- inflexible administration of standards (standards aim at uniform performance and do not accommodate local variations in need and conditions);
- lack of coordination among Federal agencies engaged in related activities;
- frequent changes in Federal regulations, which may require major local program adjustments;

[7]Office of Management and Budget, Historical *Tables: Budget* of the U.S. Government, *FY* 1990 (Washington, DC: 1989), pp. 128130.

[8]Ian MacGillivray, director, Planning Research Division, Iowa Department of Transportation, in U.S. Congress, Office of Technology Assessment, "Transcript of Proceedings —State and Local Infrastructure Financing and Management Workshop," unpublished transcript, July 7,1989, pp. 118-119,

[9]Office of Technology Assessment Advisory Panel meeting, unpublished remarks, March 1989; and participants in Office of Technology Assessment, op. cit., footnote 8.

Figure 1-1—Federal Expenditures, 1960 and 1989[a]



[a]1989 figures are estimated.
SOURCE: Office of Technology Assessment, 1990, based on Office of Management and Budget data.

- length of time required for Federal review and approvals; and
- requirements for meetings and paperwork.

The complicated application process for approval of a major harbor improvement (shown in chapter 2, figure 2-5) gives ample evidence that these concerns are justified.

The need to conserve and stretch Federal revenue has also created conflicts between Federal tax policies and State and local financing for public works. Tax reforms enacted in 1984, 1986, and 1988 raised the costs of some forms of infrastructure financing by limiting the types of projects eligible for tax-exempt bonds. Arbitrage arrangements, sale/leaseback, and other forms of public-private funding that local governments had used to leverage investment for infrastructure improvements, were **sharply** curtailed. Congress relaxed some of the most severe restrictions on **arbitrage in legislation passed in** late 1989, and while **it is too early** to be certain, OTA **analysis indicates that the** impact of tax reform on traditional public-use projects (sewers and roads, for example) may not be significant in the long term. The decrease in tax-exempt private activity bonds for facilities, such as convention centers and sports complexes, contributed to the significant drop in municipal borrowing between 1986 and 1987. However, the municipal bond market returned to its pre-1985 level in 1988, signaling that jurisdictions were taking on new debt for their traditional public works needs.[10] (For further details see chapter 2.)

State and local governments contribute about 75 percent of total public spending for public works, with most of their share supporting operations and maintenance. Federal grants financed between 40 and 50 percent of capital spending for public works construction during the 1980s,[11] and Federal support plays an important role in finding new projects and major reconstruction. Over the past decade, only highway and air transportation received increasing portions of total Federal funds spent on infrastructure, thanks to trust funds supported by dedicated user fees (see table 1-2). (Although mass transit and waterways also have trust funds, the annual revenues are much smaller.) The fact that no similar dedicated Federal revenue sources have been enacted for environmental programs has had a significant im-

[10]Government Finance Research Center, "Federal Tax Policy and Infrastructure Financing," OTA contractor report, Sept. 13, 1989, p. II-4.
[11]Apogee Research, Inc., database derived from U.S. Department of Commerce, Bureau of the Census and Office of Management and Budget.

Table 1-1—Distribution of Federal Aid to State and Local Governments by Major Categories (In percent)

Categories	1960	1975	1989 (estimated)
Physical infrastructure:			
Natural resources and environment[a]	1.5	4.9	2.9
Transportation	42.7	11.8	15.0
Community and regional development[b]	1.6	5.7	3.7
Human services:			
Education, training, employment, and social services	7.5	24.4	18.2
Health[c]	3.0	17.7	29.5
Income security[d]	37.5	18.8	27.2
	6.2	16.7	3.5
Total	100.0	100.0	100.0

[a]Primarily Environmental Protection Agency construction grants.
[b]Primarily Housing and Urban Development grants; small portions were used for infrastructure improvements.
[c]Primarily grants for medicaid.
[d]Primarily grants for child nutrition, family support, and housing assistance.

SOURCE: Office of Technology Assessment, 1990; Office of Management and Budget, *Historical Tables: Budget of the United States Government, Fiscal Year 1989* (Washington, DC: 1988).

Photo credit: American Society of Civil Engineers

Federal support for construction of wastewater treatment plants is diminishing; at the same time, Federal requirements are becoming stricter.

pact. In 1980,20 percent of Federal grants for public works infrastructure was budgeted for water quality programs, while 80 percent supported transportation. By 1988, funding for water quality had dropped to 10 percent. Concurrent with the drop in Federal appropriations, local costs for complying with Federal environmental standards began to increase as new standards began to take effect.

each State has assumed some greater financial responsibility for public services, increasing expenditures an average of 6 percent over the last 3 years, the fiscal strain has begun to tell. The average rate of State revenue growth (estimated to be 5.4 percent in 1989) has fallen behind the growth in expenditures; in fact, 18 States had to cut back budgeted spending in 1988 because of revenue shortfalls.[12] Moreover, no State has entirely filled the chasm created by cost increases for its infrastructure needs and reductions in Federal support for public works—and funding infrastructure is a lower priority in every State than Medicaid, education, and law enforcement.

Each State has a unique fiscal and economic framework, and several factors bound its capability to plan and pay for public services. For example, the strength and balance of a State's economic base determine its ability to raise both public and private funds. Some tax their residents almost as heavily as the economic base will allow, while others are wealthier than the tax burden suggests. (See figure 1-2 and table 1-3 for information on State fiscal standing.) Most New England and Mideastern States have had strong economies in recent years, enabling them to raise State and local revenues and to offer attractive opportunities for private investment. States without a strong economic base, like West Virginia, or dependent on one resource, like

[12]National Governors' Association and National Association of State Budget Officers, *Fiscal of the* (Washington, DC: 1988), p. 3.

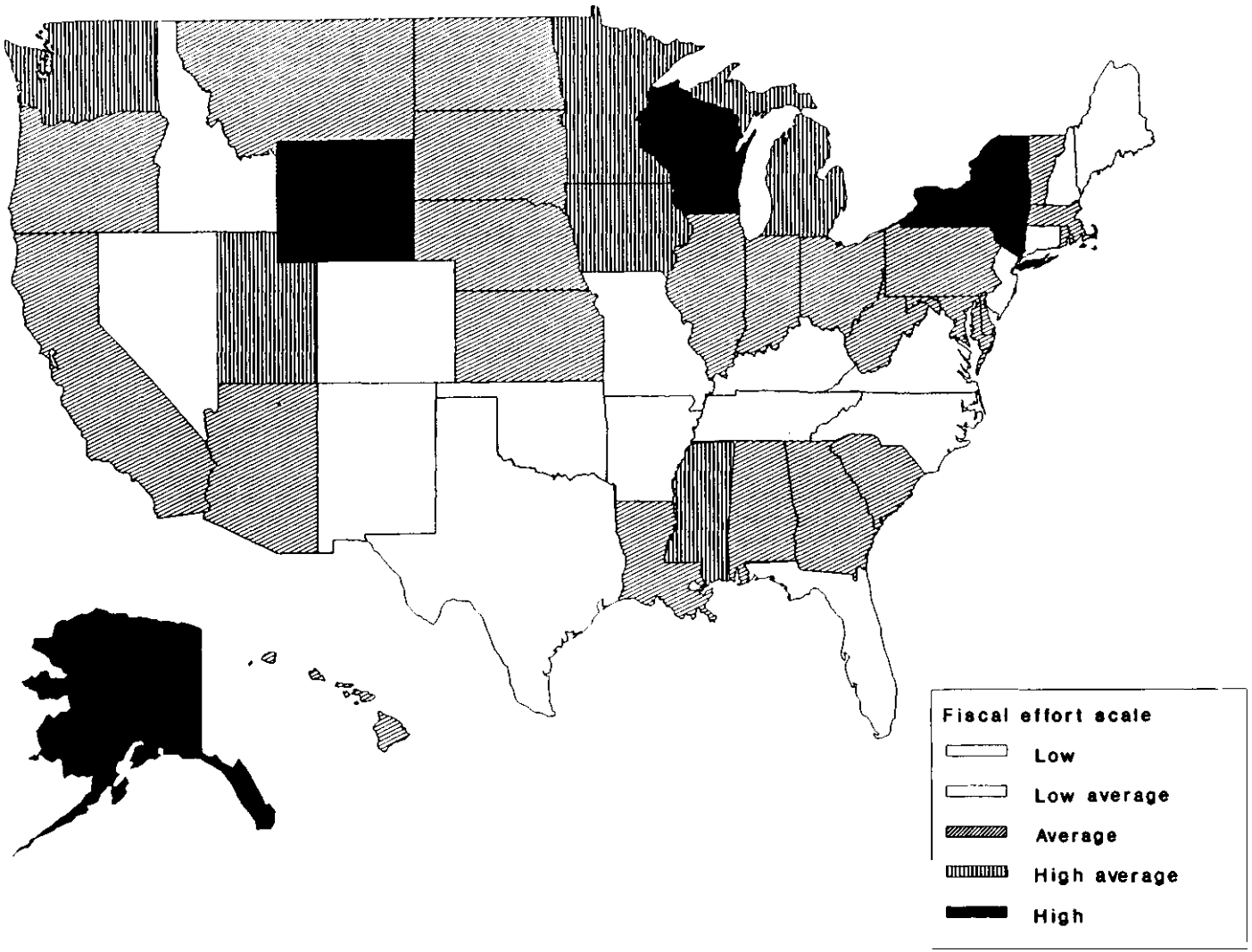
Table 1-2—Federal Infrastructure Expenditures, 1980-88 (1984 dollars in millions)

	1980	1981	1982	1983	1984	1985	1986	1987	1988
Total	$37,164	$35,520	$29,312	$29,009	$29,594	$30,805	$32,240	$28,171	$28,656
Transportation:									
Highways	11,112	10,008	8,204	8,790	9,991	11,796	12,639	10,999	11,746
Mass transit	3,858	4,164	3,930	3,618	3,539	3,090	2,984	2,849	2,740
Rail	2,852	3,993	2,188	1,322	1,473	989	817[a]	722	512
Aviation	4,344	4,057	3,526	4,199	4,347	4,455	4,671	4,690	4,874
Shipping[b]	2,601	2,533	2,687	2,857	2,795	2,886	3,480	2,940	2,571
Water resources[c]	4,927	4,396	3,948	3,755	3,777	3,717	3,548	3,214	3,333
Environmental:									
Water supply	1,380	1,291	599	918	700	705	783	134[d]	449[d]
Wastewater	6,089	5,079	4,231	3,551	2,971	3,167	3,317	2,624	2,430

[a]Drop in expenditure reflects sale of Conrail.
[b]Maritime

reflect repayments of Farmer's Home Administration water supply loans.
on Office of Management and Budget historical data.

Figure 1-2—State Fiscal Effort[a]



[a] Fiscal effort measures how much each State chooses to tax its revenue base compared to other States.

SOURCE: Office of Technology Assessment, 1990, based on Advisory Commission on Intergovernmental Relations data.

Table 1-3—State Fiscal Summary

State	Per-capita income, 1988 (dollars)	Fiscal[a] effort rank, 1986	Personal income tax revenue per capita, 1987	Sales tax rate, 1988	Gas tax rate, 1989 (cents)	Number of interstate miles rated deficient, 1988	EPA revolving wastewater loan fund established, 1989	Wastewater needs,[b] 1988
Alabama	12,851	16	Average	Low	13[c]	Low	Yes	Average
Alaska	19,079	2	No tax	No tax[d]	8[c]	High	Yes	Low
Arizona	14,970	31	Average	Average[d]	17	High		Average
Arkansas	12,219	41	Average	Low[d]	14	Low	Yes	Low
California	18,753	30	High	Average[d]	9[c]	High	Yes	High
Colorado	16,463	45	Average	Low[d]	20	Low	Yes	Low
Connecticut	23,059	46	Low	High	20	Low	Yes	High
Delaware	17,661	25	High	No tax	16	Low	—	Low
District of Columbia	21,389	3	High	High	16	Low	—	Low
Florida	16,603	48	No tax	High[d]	10[c]	Average	Yes	High
Georgia	15,260	23	Average	Low[d]	8	High	Yes	Average
Hawaii	16,753	17	High	Low	11[c]	Low	Yes	Low
Idaho	12,665	38	Average	Average[d]	18	Average	Yes	Low
Illinois	17,575	29	Average	Average[d]	16[c]	Average	Yes	High
Indiana	14,924	27	Average	Average	15	Low	Yes	High
Iowa	14,662	6	Average	Low[d]	20	Average	Yes	Average
Kansas	15,759	34	Average	Low[d]	15	Average	Yes	Low
Kentucky	12,822	35	Average	Average[d]	15	Low	Yes	High
Louisiana	12,292	22	Low	Low[d]	16	Low	Yes	Average
Maine	15,106	39	Average	Average	17	Low	Yes	Low
Maryland	19,487	26	High	Average	19	Low	Yes	Average
Massachusetts	20,816	32	High	Average	11	Low	Yes	High
Michigan	16,552	7	Average	Low	15	High	Yes	High
Minnesota	16,674	8	High	High[d]	20	Low	Yes	Average
Mississippi	11,116	9	Low	High	18[c]	High	Yes	Low

Table 1-3—State Fiscal Summary—Continued

State	Per-capita income,1988 (dollars)	Fiscal[a] effort rank,1986	Personal income tax revenue per capita,1987	Sales tax rate,1988	Gas tax rate,1989 (cents)	Number of interstate miles rated deficient,[b] 1988	EPA revolving wastewater loan fund established, 1989	Wastewater needs,[b] 1988
Missouri	15,452	49	Average	Average[d]	11	High	Yes	Average
Montana	12,866	19	Average	No tax	20[c]	Average	—	Low
Nebraska	14,774	12	Average	Low[d]	22	Low	Yes	Low
Nevada	17,511	50	No tax	High[d]	18[c]	High	Yes	High
New Hampshire	19,434	51	No tax[e]	No tax	14	Low	Yes	Average
New Jersey	21,994	35	Average	High	11	Low	Yes	High
New Mexico	12,488	36	Low	Average[d]	16[c]	Low	Yes	Low
New York	19,305	1	High	Low[d]	8[c]	Average	—	High
North Carolina	14,304	43	Average	Low[d]	21	Low	Yes	High
North Dakota	12,833	15	Low	High[d]	17	High	—	Low
Ohio	15,536	21	Average	Average[d]	18	High	Yes	High
Oklahoma	13,323	40	Low	Low[d]	16[c]	High	Yes	Low
Oregon	14,885	14	High	No tax	16	High	Yes	Average
Pennsylvania	16,233	24	Average	High	12	Average	Yes	High
Rhode Island	16,892	18	Average	High	20	Low	—	Low
South Carolina	12,926	20	Average	Average	16	Low	Yes	Low
South Dakota	12,755	33	No tax	Low[d]	18[c]	Low	Yes	Low
Tennessee	13,873	42	No tax[e]	High[d]	21[c]	High	Yes	Average
Texas	14,586	47	No tax	High[d]	15	High	Yes	High
Utah	12,193	10	Average	Average[d]	19	Low	Yes	Low
Vermont	15,302	28	Average	Low	16	Low	Yes	Low
Virginia	17,675	44	Average	Low[d]	18[c]	High	Yes	Low
Washington	16,473	11	No tax	High[d]	18[c]	Low	Yes	High
West Virginia	11,735	13	Average	High[d]	20	Low	—	Average
Wisconsin	15,524	4	High	Average[d]	21	High	Yes	High
Wyoming	13,609	5	No tax	Low[d]	9	Low	—	Low

[a]Fiscal effort measures how much a State chooses to tax its revenue base compared to other States. See app. B for a full explanation.
[b]Estimates of the relative State cost to build all needed publicly owned wastewater treatment facilities to meet the requirements of the Clean Water Act.
[c]Local option motor fuel tax permitted.
[d]Local option sales tax permitted.
[e]Interest and dividends only.

SOURCE: Office of Technology Assessment, 1990, based on a variety of Federal and State data summaries.

Louisiana have difficulty raising both public and private investment funds, because their low per-capita income limits their taxing ability.

While a rapid rate of population growth heightens demand for services, it can also provide a broader tax base. Fast-growing States and communities can make significant demands on private developers for infrastructure investment, a practical impossibility in nongrowth areas; private investors see little opportunity to recoup an investment in infrastructure where real estate markets are weak. Low-population, low-density States also have great difficulty financing infrastructure programs. Their tax base is limited compared to the scale of needed investments, and costs are relatively higher than those of more populous districts, which can benefit from economies of scale.

Finally, political factors can override physical and economic variables and have a major influence on a jurisdiction's ability to raise revenues. Taxpayer revolts against local property tax increases have made State legislatures reluctant to raise sales or income taxes. Political pressure has pushed many States to limit the amount of bonds local jurisdictions can issue, creating barriers to traditional avenues for public works funding. To finance services needed in specific regions, many States have begun to permit local jurisdictions to impose special levies or taxes for infrastructure projects. California's efforts to overcome the effects of its well-known Proposition 13 illustrate this point (see chapter 3 for details), and a number of local financing districts have been created to finance construction, operations, and maintenance for public works. California's experience has been replicated in **a** number of States.

Yet while special districts ease States' fiscal burdens, they make State comprehensive planning and budgeting for capital improvements extremely difficult. At the local level, too, having a number of independent, separate districts complicates regional planning and management, makes political coordination a formidable task, and places a heavy burden of debt payments on district residents. **Easing restrictions on local find-raising capabilities and consolidating small districts are actions States could take to coordinate and rationalize the financing of public works.**

States coping most effectively with infrastructure financing issues and Federal requirements are those with the capacity and political will to raise capital from a variety of public and private sources, and with an available pool of technical and financial know-how. For example, two States, Washington and New Jersey, have funded special State assistance programs to make low-cost loans to local jurisdictions for infrastructure improvements. The Washington State program was carefully structured to ensure that local jurisdictions tap their own resources fully and plan carefully. (For further information, see boxes 3-B and 3-F in chapter 3.)

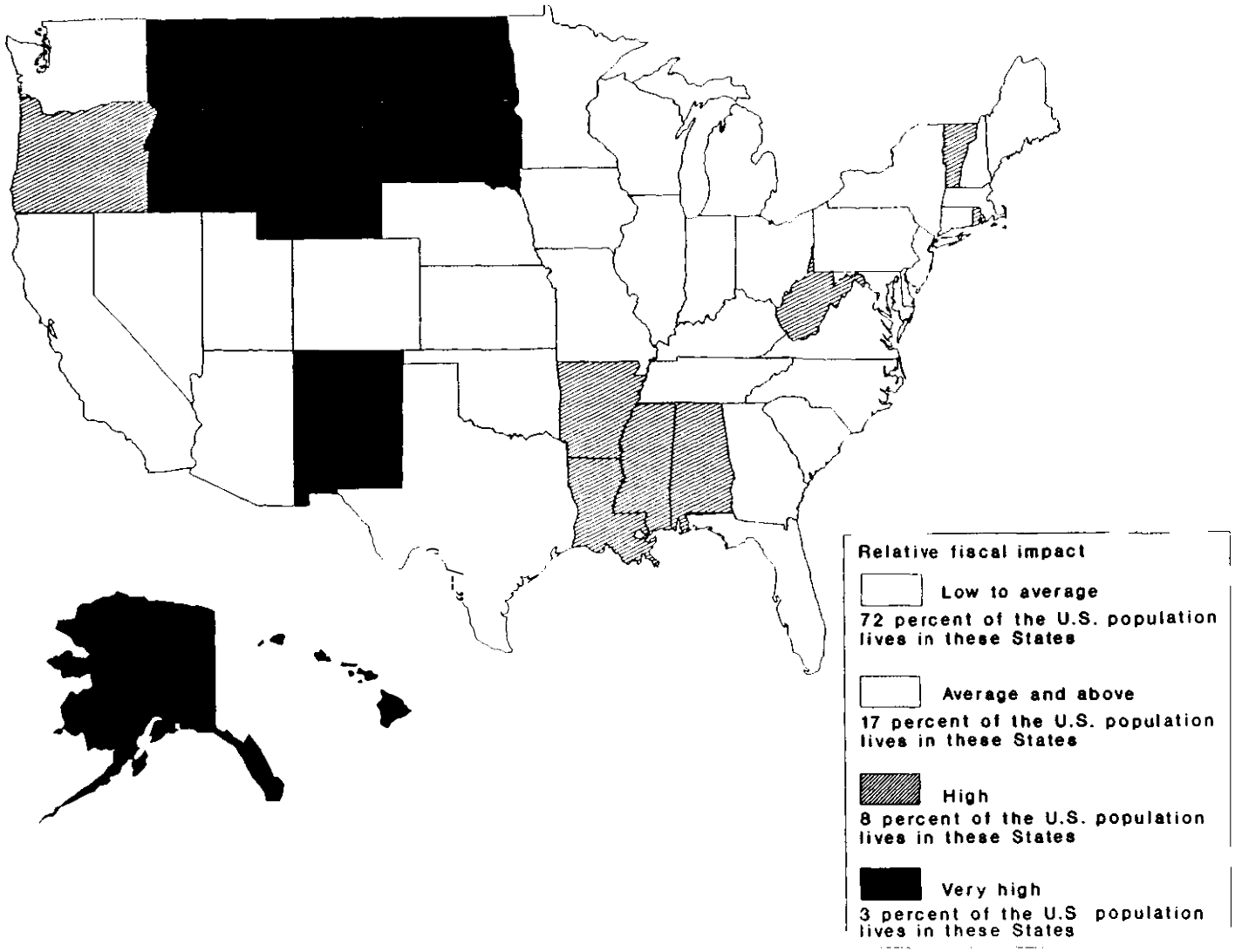
States that would be most affected by additional reductions in Federal grants are large, rural States with small populations; those with poor economic bases; and those heavily dependent on extractive industry (see figure 1-3). Although these States are **home** to less than 11 percent of the Nation's population, their problems are pressing, and OTA finds that some categorical Federal programs designed to help them are based on criteria that work at cross purposes (see box 1-A). In another example, a Federal-aid program that targets bridge repair funds to States with large numbers of substandard bridges penalizes States that have developed bridge maintenance management programs and keep their bridges in good repair.[13]

Benefit Charges or User Fees

When there were fewer demands on State and local financial resources, broad-based sales and income taxes could carry most of the public works funding burden. However, funding programs, such as health care, education, and criminal justice, have depleted general revenues and reached debt ceilings in many States. Accordingly, most States and localities have turned to benefit charges (such as user fees and special assessments) and to State loan programs that promote self-supporting projects for financing public works capital. **Benefit charges are attractive and effective strategies because of their revenue potential, voter acceptability, and service management opportunities. A** few local jurisdictions, such as Phoenix, for example (see chapter 4, box 4-C for details), target service beneficiaries to pay full cost for many public services because of their relative ability to pay compared to social service users. States with low

[13]Representatives of the Departments of Transportation of Georgia, Florida, and Minnesota, at a National Transportation Safety Board Bridge Safety Workshop, unpublished remarks, Sept. 2s, 19s9.

Figure 1-3—Projected Impact on States of Reduced Federal Aid for Public Works[a]



[a]OTA established an arbitrary 50 percent reduction in Federal aid to evaluate the impact on each State (impact is defined as the fiscal burden on each State of replacing lost Federal aid).

SOURCE: Office of Technology Assessment, 1990, based on information provided by Apogee Research, Inc.

Box 1-A—Rocksprings, Texas[1]

Rocksprings, Texas (pop. 1,350) lies 80 miles north of the Mexican border. It is the only incorporated city in a county twice the size of Rhode Island; the nearest neighboring jurisdictions of comparable or larger size are at least 50 miles away.

Agriculture is Rocksprings' economic base, and the average per-capita income is under $6,000—less than that in Mississippi, the poorest State in the country. The city's annual budget is $221,000, and annual property tax revenues are only $30,000, with the remaining revenues coming from the municipally owned water system and franchise sales taxes. How to provide wastewater treatment and solid waste disposal facilities that meet new Federal standards are pressing dilemmas for Rocksprings. The city's budget is already strained, and State and Federal regulations present the city with seemingly insupportable burdens. In the case of wastewater treatment, compliance will exact a heavy price—perhaps greater than the city can bear. In the case of solid waste disposal, there is no workable or affordable alternative to simple noncompliance.

Wastewater Treatment

Rocksprings has no community wastewater collection and treatment system, and residents have taken care of their own sewage treatment needs as they see fit. Some families have installed legal double septic systems with drain fields, while others use sewage injection systems[2] (now illegal) on their properties or resort to cesspools. State environmental and health officials have declared the city's approach unacceptable, and Rocksprings faces the prospect of constructing a $3.5 million wastewater treatment plant.

Though Rocksprings' mayor praises the efforts of the Texas Water Development Board (see chapter 3, box 3-D) to offer advice, the complex Federal grant and loan application process has proven troublesome. The city has applied for a $2 million wastewater treatment plant construction grant (representing 55 percent of the project's costs) from the U.S. Environmental Protection Agency (EPA), and local officials are optimistic about receiving the grant. The rest of the $3.5 million plant would be financed with a Farmers Home Administration (FmHA) grant for 20 percent of the remaining costs, and an FmHA loan for the balance. However, FmHA will not announce grant and loan recipients until long after the EPA decision is made. If Rocksprings does not receive the FmHA funds, it will not be able to proceed with the project and will have to return the EPA grant money. Worse, the city will have spent $43,000 on preliminary engineering work and will have no source of funds to pay the bill.

The alternative to constructing a major wastewater treatment facility would be to continue to permit individual treatment systems, but insist that they be legal, double septic systems or some other type of approved system. These potential solutions seem unworkable for two reasons. First, a legal system cannot be built on less than one-half acre, and most of Rocksprings' residential lots are scarcely one-sixth of an acre. Second, each new legal system would cost the homeowner $12,000 to $15,000—more than the value of the average Rocksprings house. As of September

[1] Material in this box is from Mary Simone, mayor, Rocksprings, Texas, in Office of Technology Assessment "Transcript of Proceeding—Workshop on State and Local Infrastructure Financing and Management," unpublished transcript, July 7, 1989.

[2] A sewage injection well consists of a septic tank that channels sewage through sand and into an injection well which filters the effluent into the caverns under the city. Though these caverns lie over a major aquifer, Rocksprings residents have always theorized that by the time the effluent gets into the aquifer, it has been sufficiently filtered through the limestone.

economic bases and/or small populations cannot assemble sufficient capital from these sources.

Recognizing the advantages of user charges, especially for transportation, a few States are expanding paid highways by authorizing privately funded toll roads, while 47 States have raised gasoline taxes and other motor vehicle user charges over the last 10 years. Sixteen States permit local governments to levy local gasoline taxes (see table 1-3, again). The gas tax is a substantial revenue producer and often more acceptable to voters than broad-based taxes for supporting transportation improvements. Gas taxes and other vehicle user charges are also used in many jurisdictions to finance public transit; a few use such revenues to support a variety of other services. A number of States use aviation-related taxes and fees to support airport development Currently, about 60 percent of road and highway improvements are funded by user charges. 14

Environmental capital improvement programs are increasingly paid for by debt, in the form of revenue

[14] Federal Highway Administration, *Our Nation's Highways: Selected Facts and Figures* (Washington, U.S. Department of Transportation, 1987), p. 20.

1989, the city refused water access rights to any builder who did not install **a legal septic system.** Though denying water rights allows the city to comply with State regulations, it also thwarts chances of attracting much-needed economic development.

Solid Waste Disposal

Since 1931, Rocksprings has maintained a landfill just inside the city limits. The region's geology—solid rock 1,500 to 2,500 feet above sea level—leaves Rocksprings with virtually no soil, so the city has always maintained the landfill by burning weekly and covering remaining garbage with dirt whenever possible. These procedures became illegal in September 1989, when Texas terminated all burning permits. The region simply does not haveenough dirt to cover the waste, and if Rocksprings complies with the order not to burn, its "landfill" will be little more than an open dump—equally illegal.

In seeking an alternative to noncompliance, local officials face the irony that while most areas suffer from an overabundance of garbage, Rocksprings does not have enough. To incinerate efficiently, a city must generate 15 tons of solid waste daily; Rocksprings generates that in a week—an amount also insufficient to make recycling a viable alternative. Private companies will not contract to provide service to Rocksprings because of its remoteness and the small amounts of waste generated. Though the region's Council of Governments is trying to develop a regional plan, the great distance between cities, the unwillingness of one jurisdiction to take another's garbage, and differing standards between communities make a solution through regional planning a doubtful proposition.

Photo credit: Mary Simone, Mayor of Rocksprings, Texas

The Rocksprings landfill

A final alternative for Rocksprings would be to unincorporate. State law mandates that all counties with a population of 30,000 or more and all cities, no matter how small, must provide for the disposal of solid waste within their jurisdictions. Because Rocksprings' county has fewer than 30,000 people, the town could unincorporate, close its landfill, and thereby meet State regulations. But this kind of formal compliance would do nothing to end trash burning; on the contrary, it would encourage it. Faced with the prospect of 579 individual barrels of trash burning within Rocksprings' 1.2 square miles, Rocksprings' mayor wonders why individual burning is considered better than burning 15 tons a week in a supervised landfill. The costs of closing the landfill—$400,000, almost double the city's annual budget—make the prospect of unincorporating even less attractive. Rocksprings will remain incorporated, and a stunning example of the dilemmas associated with establishing appropriate national environmental standards.

bonds backed by user fees. No State has a broad tax or revenue base for environmental services, and no dedicated Federal trust fund exists. A significant share of environmental capital currently comes from Federal grants, which face the perils of annual appropriations and have already fallen significantly from previous levels. Grants for wastewater treatment are scheduled to be eliminated entirely in 1994. The capacity of low-income users to pay significantly higher fees for environmental services is an unresolved issue, and Federal tax code changes have made private capital for environmental programs harder to attract. Because **of Federal trust fund support and because transportation benefit** charges **are proven revenue sources, OTA concludes that States and local governments are currently better able to finance transportation improvements than environmental programs.**

Revolving Loan Funds

Most States have established revolving loan programs for wastewater facilities in anticipation of the phasing out of Federal construction grants. Several have created similar programs for transportation infrastructure as well. Many States remodeled existing loan and grant programs to create these; others started entirely new programs. It is too early to tell how the new revolving loan funds will work,

although some States have already found that local districts accept multiple, complicated Federal regulations much more reluctantly for a loan than for the accustomed grants. **Many States are in the process of working out the technical, administrative, and institutional difficulties inherent in such a complex financial activity. Cuts in Federal appropriations to support State administration of environmental programs hamper their efforts.**

States face two additional challenges: accommodating the needs of those districts too poor to afford a loan and expanding **the** supply of capital needed both now and when **Federal grants** end in 1994. **At that time, funds** for environmental programs must come from higher user charges, State or local general revenues, from new, earmarked State taxes, or a new Federal program.

Earmarked or Dedicated Taxes

From a public policy perspective, earmarking or dedicating revenues for special purposes has the disadvantage of restricting policymakers' fiscal options in responding to changes in priorities. Nonetheless, States have found that earmarking is the best way to ensure a reliable revenue stream. Pressure is heavy in some States without strong general tax bases to use gas tax revenues to pay for social or education programs. Transportation advocates are adamant that States reserve these funds for transportation capital or replacement accounts, which can otherwise be vulnerable to budget cuts.

Despite budget difficulties and objections to new taxes, voters in a number of States and localities have supported new spending initiatives for transportation or environmental improvement programs that meet well-defined priorities. (See chapter 3 for examples in New York, Iowa and Washington State.) One measure of the willingness of a State's voters to pay for public services is the tax burden its voters have accepted relative to the State's economic base and per-capita income (or ability to pay—see table 1-3). Federal grant programs do not take into account the needs of States that have low fiscal capacities, but are already taxing their residents relatively heavily, nor the possibility that States in good financial condition, but which tax relatively lightly, could make a greater fiscal effort. **State and local officials consulted by** OTA **indicated that they would support a larger matching requirement for State and local contributions in return for Federal funds, if the formula recognized** State **and local level of effort.**[15]

States also provide local governments with nonfinancial support for both transportation and environmental public works funding. Such aid may take the form of enabling legislation to permit local option sales, fuel, or income taxes, public-private ventures, and other types of innovative strategies. Some States have established bond banks to help local districts cut the costs of acquiring capital; many are offering technical assistance and help with capital budgeting, and several have established infrastructure research programs. See chapter 3 for more complete descriptions of state programs.

Local

jurisdictions, too, have taken on additional fiscal responsibilities, although many find their financing problems overwhelming. These governments have historically relied on the broad-based property tax to finance public services from education to water supply and streets, largely because no major alternatives were needed. Moreover, the property tax was an approximation--albeit crude—of both ability to pay and benefits received. However, the property tax is no longer adequate. Costs have climbed significantly, and elimination of Federal block grants and revenue sharing, the need to support Medicare and social programs, reductions in Federal categorical grants, and higher Federal standards for environmental services have exacerbated local fiscal woes. Repeated property tax hikes to support public services needed to serve population growth or economic development have met with local resistance, often leading to initiatives that result in State limits on local taxes. Finally, just as for State governments, competition for local general tax revenue is intensifying from education, law enforcement, housing, and social welfare programs, which have no other revenue source. Forty-four percent of localities surveyed by the National League of Cities cut capital spending in 1988[16] and deferred maintenance spending because of budget constraints. Local governments have been particularly hard hit by Federal policy changes and plead for

[15] Office of Technology Assessment, op. cit., footnote 8.

[16] Douglas D. Peterson, *City Fiscal* Research Reports on America's Cities (Washington, DC: National League of Cities, July 1988), p. Ill.

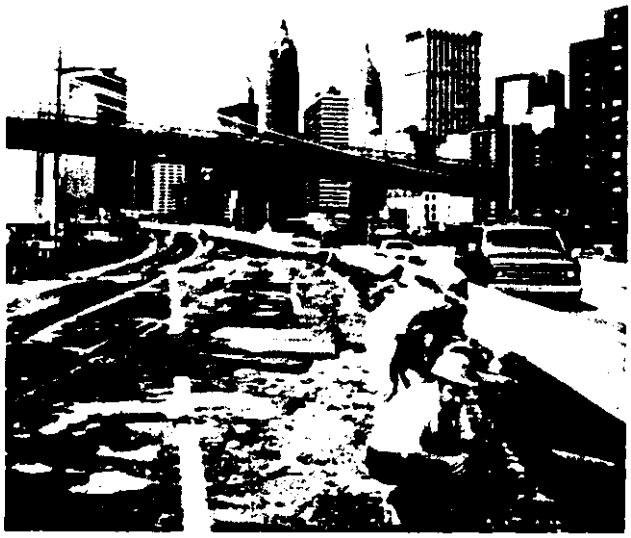


Photo credit: American Society of Civil Engineers

New York City typifies older urban areas with aging facilities that need major rehabilitation.

a consistent Federal tax policy that does not change annually. Recently implemented Federal environmental requirements for solid waste facilities and drinking water will require new or upgraded infrastructure facilities but provide no seed grant money. Costs for complying with the new standards will be substantial and will fall most heavily on small communities and large cities where major improvements are needed (see table 1-4).

Most local governments have diversified and expanded local revenue sources, raising nonproperty taxes, including user fees. Local income and sales taxes have proven to be successful revenue raisers for communities constrained by State-imposed property taxing caps. Earmarking portions of revenues from these taxes for specific improvements, such as public transit or streets and bridges, helps win public approval for the increases. Although these taxes have become an important source of revenue, few communities raised them during 1988, indicating that these sources, too, may have temporarily exhausted their voter acceptability. (See table 1-5 for a summary of local options for meeting environmental standards. Further information may be found in chapter 4.)

State caps on local taxing (in 32 States) or bonding (in 46 States) fall especially heavily on small jurisdictions, because their limited tax bases make them reliant on the property tax. Yet only some States-New Jersey, New Mexico, and Washington, for example-have special programs to aid their *small communities. The* unit cost of public works facilities for small systems is high, since the facilities are small in scale and must be customized to meet local conditions.

Tapping Private Investment

At present, jurisdictions seeking new revenue are likely to target specific areas or beneficiaries as funding sources. Approximately one-quarter of local districts have successful programs using private capital. In some growth regions, costs for infrastructure expansion to serve new development are passed directly to the private sector through developer charges, such as facility construction requirements and impact fees. Chapter 4 gives numerous examples of such programs. The private sector is initiating for-profit ventures in some districts, primarily solid waste projects, with major efforts under way to develop privately financed toll roads in Virginia and California, and high-speed rail lines near Orlando, Florida, and between Las Vegas,. Nevada, and Anaheim, California. Other transportation services that have potential for operating revenues and land development profits may successfully attract direct private investment. See chapter 4 for further details.

Paying Local Bills

Current trends indicate that new infrastructure, particularly in growth areas, will be financed increasingly with funds from benefit charges. This is the result of several factors, including *State* and voter limits on broad-based taxes, the steady and growing demands of social programs on genera! fund revenues, and the relative ability and willingness of beneficiaries to pay.

Utilizing benefit charges, such as targeted user fees, developer charges, and special district revenues, has some compelling advantages over raising broad-based taxes. **First, citizens seem willing to accept the principle that "you pay for what you get," under which they pay directly for services or developers pay for the facilities needed by their projects. Second, higher user fees raise revenues closer to full service costs, and may cut demand, hold steady or even reduce capital**

Table 1-4—Increase[a] in Household User Charges in Municipalities Attributable to Environmental Regulations[b]

Size of municipality	Number of municipalities	Distribution of municipalities (in percent) (up to 50 percent increase in charges)	(50-100 percent increase in charges)	(over 100 percent increase in charges)
Up to 2,500	26,315	45	35	20
2,500-10,000	6,279	90	10	0
10,000-50,000	2,694	80	20	0
50,000-250,000	463	100	0	0
Over 250,000	59	80	20	0
Percent of all municipalities		56	29	15
Percent of total population living in incorporated areas[c]		83	15	2

[a]No jurisdictions will have lower costs.
[b]Because of many simplifying assumptions, the potential increase in user charges may be underestimated.
[c]According to the 1982 Census of Governments, approximately 15 percent of the U.S. population live in unincorporated areas.

SOURCE: Office of Technology Assessment, 1990; based on data in U.S. Environmental Protection Agency, Office of Policy Planning and Evaluation, *Municipalities, Small Business and Agriculture* (Washington, DC: 198S), p. 2-14.

requirements, and permit local governments to design projects that are relatively self-supporting. Third, the community often can collect capital funds up front, avoiding the necessity for bond issues, thereby eliminating interest costs and reserving debt for other public facilities. Last, benefit-based financing gives local governments more autonomy, making them less dependent on State and Federal programs and the strings attached. In many communities, developers support these strategies, finding them systematic and predictable time and money savers.

INADEQUATE PUBLIC WORKS INFRASTRUCTURE

The need to replace and improve public works has been well-documented in more than a dozen national studies since 1980. The National Council on Public Works Improvement estimated in 1988 that annual future infrastructure investment needs could require double the $45 billion invested in 1985.[17] Nationally, county governments project their infrastructure needs to be at least $18 billion a year through 1990,[18] and a single State, Washington, calculates its long-range capital needs to be almost $1 billion annually.[19]

governments aided by States have always been the principal providers of funding for infrastructure (see table 1-6). When Federal funds were more plentiful, State and local governments used such funds for capital to support construction of public works facilities--completion of the Interstate highway system, major improvements to ports such as Long Beach and airports, and transit improvements in Washington, IX, and Boston are examples. State and local governments focused their own revenues on meeting needs in education and other special program areas. Thus, critical as State and local capital is in providing infrastructure, their combined total investment peaked at $34 billion (1984 dollars) in 1972,[20] and recently has languished between $20 billion and $28 billion annually.

Shortfalls in infrastructure funding coincide with major maintenance and capital needs for public works structures that have reached the end of their design lives or have been used much more heavily or deteriorated much more rapidly than anticipated. While the exact magnitude of essential public works improvements may be open to discussion, recent policy statements by major transportation and environmental interest groups[21] demonstrate that a strong consensus has solidified about the inade-

[17]National on Works Improvement, *Foundations: Report on* America's *Public* (Washington, DC: February 1988).
[18]National Association of Counties, *America's Public Works Leaders* (Washington, July 1987), p. 6.
[19]Analytic Services, "State Finance for Local Public Works: Four Case Studies," OTA contractor paper, December 19ss, p. 30.
[20]National Council on Works Improvement, op. cit., footnote 17, p. 7.
[21]Selected examples include: Transportation Alternatives Group, *Basic Directions National Transportation* (Washington, DC: winter 1989); American Association of State Highway and Transportation Officials, "New Transportation Concepts for a New Century," unpub W document, February 1989; the National Governors' Association, *Environmental Programs: Examination of Alternatives* (Washington, DC: 1989); and Victoria Price Kennedy, *New Directions Infrastructure* (Washington, Council of Infrastructure Finance Authorities 1988).

Table 1-5--Local Options for Addressing the Costs of Federal Environmental Standards

Option 1: Search for Funds From State and Federal Governments and Private Sector
Prognosis: Limited additional public funding except as loans; private investment attracted only in growth areas
Option 2: Raise Additional Funds Locally by Increasing:
• **User fees**
Prognosis: Potential for tax-payer acceptance where need is clear and fiscal capacity exists; regressive aspects and equity issues must be addressed; good potential for reducing service demand
• **Developer charges**
Prognosis: Good potential as a source of capital, but limited to growth areas and where State laws permit
• **General taxes**
Prognosis: Tax-payer resistance, perhaps leading to State legal restrictions on increases
• **Dedicated taxes (e.g., portions of sales, income, or "sin" taxes)**
Prognosis: Potential for tax-payer acceptance if need established and fiscal capacity exists
• **Revenue-backed debt**
Prognosis: Potential for tax-payer acceptance unless debt service costs push taxes or fees too high
Option 3: Reallocate Funds From Other Local Programs
Prognosis: Political battles between conflicting goals; likelihood of smaller allocations all around
Option 4: Fail To Comply With Federal Standards
Prognosis: Federal enforcement action, fines and litigation; extensions or waivers; possibility of increased health risks

SOURCE: Office of Technology Assessment, 19S0.

quacy of our infrastructure and the need for more investment. We have fallen behind in repairing potholes, easing traffic congestion to help curb air pollution, providing wastewater treatment, and disposal of municipal solid waste.

Local governments include major cities, tiny townships, and sparsely populated rural counties, as well as a multitude of single-purpose districts, such as the Nation's 600 highway districts, 356 airport authorities, 163 port authorities, and numerous water supply districts.[22] They are the level of government that has day-to-day responsibility for most public works services. For many years separate branches of Federal and State governments have funded and managed the individual public works for which they have responsibility as separate programs. For example, Federal highway programs have not

Photo credit: Massachusetts Port Authority

Facing mounting airport access problems, the Massachusetts Port Authority established a water taxi between Logan Airport and downtown Boston.

considered rail or mass transit alternatives, or the access needs of airports, ports, and waterways. Water supply, wastewater treatment, and solid waste disposal requirements have been set by separate divisions of EPA with inadequate consideration of the interactions of pollutants in different environmental media. (See chapter 2 for a more complete discussion.) State agencies often mirror the Federal structure. The diverse, long-established management patterns virtually ensure that Federal and State subsidies for transportation modes will conflict with each other and that coordination of environmental programs will be minimal.

Rapid shifts by industry, such as the move to just-in-time delivery, to adjust to global economic changes have radically altered infrastructure use. Local governments have tried to respond, but categorical Federal programs give them little flexibility to do so. For example, Federal aid for highway funds may not be used for modernizing traffic management systems to speed traffic flow.[23] Under these circumstances, State and local officials find the large unspent balances in Federal transportation trust funds especially galling (see table 1-7).

Federal program management has created some major obstacles for local governments trying to maximize *the* productivity and efficiency of their

[22]Douglas R. Porter et al., *Special Districts—A Useful Technique for Financing Infrastructure* (Washington, DC: The Urban Land Institute, pp. 4-6.

[23]For further details, see UCongress, Office of Technology Assessment, "Advanced Vehicle/Highway Systems and Urban Traffic Problems," Science, Education, and Transportation Program staff paper, September 1989.

Table 1-6--Public Works Spending by Level of Government (In percent)

Year	Federal			State and local		
	Capital	Operations and maintenance	Total	Capital	Operations and maintenance	Total
1960	28	3	31	36	33	69
1970	23	5	28	37	35	72
1975	22	6	28	31	41	72
1980	25	7	32	23	45	68
1985	22	5	27	21	52	73
1987	19	5	24	24	52	76

[a]Includes spending for highways, airports, mass transit, water resources, wastewater, water supply, and solid waste. Data for 1988 and 1989 are not available.
SOURCE: Apogee Research, Inc., based on data from the U.S. Department of Commerce, Bureau of the Census, and the Office of Management and Budget.

Table 1-7--Federal Public Works Trust Fund Summary, 1988 (current dollars in millions)

Trust Fund	Revenues	Outlays	Balance (end of year)
Highway Trust Fund:			
Highway Account.. .	$13,645	$14,036	$9,020
Transit Account	1,661	696	5,167
Airport and Airway Trust Fund	4,081	2,896	5,841
Inland Waterway Trust Fund	102	59	315
Harbor Maintenance Trust Fund	161	169	8

SOURCE: Office of Management and Budget, *Budget of the United States Government, Fiscal Year 1990* (Washington, DC: 1989).

public works and make them into mutually supportive systems. The following summary provides a snapshot of each transportation and environmental public work infrastructure segment and identifies possible short-term relief options. For a more complete picture, see the analogous sections of chapters 2, 3, and 4. **Long-term improvements to public works management and financing will require major changes in Federal transportation and environmental program management and congressional oversight** and will be discussed in **OTA's** forthcoming report on public works technologies, management, and financing.

Highways

The Federal Government provides about one-quarter of the financing for highways and bridges, sharing the responsibilities with States, which fund about one-half, and local jurisdictions, which provide the remainder. Federal finding is administered through State highway departments, usually long-established and experienced organizations. The Federal-Aid Highway Program supports about 22 percent of the Nation's road mileage; these streets and highways carry 79 percent of the total vehicle-miles traveled.[24] Federal funds to State highway agencies primarily target the Interstate Program. In addition, the Federal-Aid Primary Program aids major arterial highways; the Federal-Aid Urban System targets aid to urban areas; the Federal-Aid Secondary Program supports farm-to-market roads; and the Highway Bridge Replacement and Rehabilitation Program funds bridge improvements.

The Federal Interstate highway program encouraged suburban development, although this was not its major purpose. The development occurred under weak State requirements and inadequate local land-use planning and zoning laws and has badly overloaded many local roads. State and local officials claim that Federal grant requirements and construction standards have contributed significantly to raising capital and maintenance costs. Recent changes in Federal policies on permissible truck lengths and weights brought productivity gains to industry, but increased government costs for highway and bridge maintenance and repair.

- *Problem ureas:* Central cities where roadways are decaying faster than they can be rebuilt, the tax base is burdened with special programs, and the capacity to pay higher taxes is limited. (Taxes on the commercial sector may be increased at the risk of business moving out.) Sprawling suburbs; inadequate investment in technologies and management tools to increase road capacity without building more roads; weak land-use planning and development controls. The need for small towns and rural counties to maintain many miles of lightly traveled roads and numerous bridges at service standards necessary for heavy trucks carrying

[24]Federal Highway Administration, op. cit., footnote 14, p. 5.

seasonal agricultural products only a few weeks a year. Low-income States with heavy tax burdens.

. *Possibilities: Increasing* Federal and State fuel taxes; enacting State legislation to permit local levies. Private investment-not a realistic option for the neediest areas. Toll roads and bridges; dedicated State and local revenues from taxes and benefit charges. Revising Federal grant requirements to allow funds to be used for relieving traffic congestion and alternative mass transportation projects, and to permit tolls on highways constructed with Federal aid. Eliminating tax subsidies for alternate fuels.

Mass Transit

Local governments or public transit authorities operate most systems, although State and Federal sources provide substantial assistance. After reaching a peak in the mid-1980s, Federal support for transit declined to $2.7 billion in 1988 (see table 1-2, again). State and local governments finance most operating and maintenance costs, and State contributions outstripped Federal funds for the first time in 1988. Across the country, transit user charges (fares) account for just under 40 percent of operating expenditures, although this varies according to region.[25] The transit users' willingness and ability to pay are both sensitive to individual incomes and local economic conditions. In addition to fares, mass transit revenues come from agency-issued revenue bonds, subsidies from local and State general funds, Federal grants from a dedicated 1 cent share of the 9-cent per-gallon Federal gas tax, State gasoline taxes and vehicle registration fees, tolls, and in some metropolitan areas, a dedicated sales tax.

Federal tax and regulatory policy has had a small but important impact on mass transit financing, usually raising costs. The Tax Reform Acts of the 1980s eliminated many private investment opportunities, particularly for purchase of equipment, while Federal equipment requirements, air quality regulations, and fuel taxes all affect costs. Federal grant categories do not always fit well with a jurisdiction's critical needs; small cities may receive more capital funds than they can use, while large cities remain in desperate need of new equipment and facilities.

- *Problem areas:* Suburb-to-suburb commutes where conventional mass transit is not appropriate, but alternatives have not been developed. Growth areas where planning and development controls are weak. Old central cities and older suburbs where capital facilities are wearing out and the percentage of users below the poverty line is increasing. Jurisdictions in which the population is aging and the tax base is eroding. Diffuse mass transit benefits, which affect many only indirectly through easier access to downtown and reduced traffic congestion and air pollution. These make it difficult to establish an adequate, reliable, and equitable local revenue base.
- *Possibilities:* Political leadership and focus on transit needs and benefits. Requiring nonusers who are indirect beneficiaries to share the costs through dedicated taxes. (See the French program discussed in chapter 4, as an example.) Increased support from State and local government general revenues. Additional Federal support from fuel taxes for the largest urban areas. Public-private partnerships.

Aviation

Most major, commercial airports support themselves (with the exception of air traffic control activities) with user charges. Federal investment in aviation increased from $4.3 billion in 1980 to $4.9 billion in 1988 (see table 1-2), with most of the increase used to modernize air traffic control and to expand and renovate airports, especially reliever and general aviation airports. User fees (ticket, cargo, and fuel taxes) provide the majority of these funds. State and local capital funding grew from $960 million in 1980 to $1.3 billion in 1987.[26]

Large commercial airports, usually structured as independent public authorities, rely primarily on debt financing for capital investment. Bonds are backed by revenues from airlines, parking, and concessions. Smaller airports (especially those for general aviation) depend much more heavily on Federal and State assistance, and special Federal subsidies go to a few small airports (at very high unit costs) in remote areas. Some States support airports with general fired appropriations and through dedicated revenues from user fees; some States include airport improvement in State-funded economic de-

[25]Thomas D. Hopkins, "Benefit Charges for Financing Infrastructure," OTA contractor report, August 1989, p. 15.

[26]Apogee Research Inc., op. cit., footnote 11.

velopment programs. Many local communities regard airports as key to economic development

Federal tax and regulatory policy does not significantly increase airport costs, but does limit revenue raising capacity. Federal air traffic control improvements will increase airport capacity and thus increase airport revenues in the long term.

- *Problem areas:* Noise and vehicular traffic and unplanned, uncontrolled development near metropolitan airports; these all restrict airport expansion potential. Large urban hub airports, which need improved ground access and air traffic control equipment to increase capacity. Small- and medium-size airports important to local travelers and economic activity and as relief airports, but which do not generate enough revenue to support bonds. Equipping, maintaining, and operating airports in remote areas where demand is low. Growing metropolitan areas where land used by small airports is attractive to developers for commercial or residential use.
- *Possibilities:* Continued Federal trust fund support for medium and smaller airports; increased State support where fiscal capability exists; and stronger land-use regulations to protect essential airports from development pressures. Authority to levy an airport head tax to support airport expansion and improvement. Air traffic control and runway improvements, larger aircraft, industry scheduling changes, and minihub development to relieve crowded hubs. Public-private partnerships to provide for ground-side needs. Development of high-speed rail as alternative transport for crowded air corridors.

Railroads

Although rates and service are regulated by the Federal Interstate Commerce Commission, the vast majority of railroads in the United States are privately owned and operated. The major exception is Amtrak, a Federal corporation, which since 1971 has provided subsidized passenger service. In 1987, Federal outlays included $595 million for Amtrak and $23 million for Local Rail Service Assistance, a program aimed at helping local districts rehabilitate worn-out track.[27] At least 20 States provide assistance to local rail service, mostly as grants or loans to small short-line freight carriers. **A** few States with major urbanized areas, such as California, Illinois, and Pennsylvania, subsidize intercity passenger train service to relieve traffic congestion and air pollution.

Sagging railroad profits and investment rebounded in the 1980s after Federal deregulation, although profit margins for railroads still average 5 percent, making it difficult for most to attract new investment capital.[28] Nonetheless, during the 1980s over 200 new, small, short-line railroads have formed, generally using track abandoned by the long-haul companies. Many are undercapitalized, and much of their track was purchased from main lines that had neglected maintenance in preparation for abandonment Thus government support will be important if service is to continue. For railroads to play a much larger role in local transportation, however, rail service must be better integrated with other transportation modes, public officials and private executives must work in concert, and legal and institutional issues (liability is one example) must, be resolved.

- *Problem areas: States,* regions, and especially agricultural areas and small communities where rail service is inadequate, undercapitalized, or has been abandoned. Locations where potential profit margins are too low to warrant" private investment, and public resources are not available for expanded service. Areas that have excess capacity and tracks that remain underutilized. Adequate funding for passenger service.
- Possibilities: Increased flexibility in Federal transportation grant programs to permit States to opt for rail alternatives to highway. State aid to underserved regions; flexibility in Federal regulations unrelated to safety, for low-profit lines. State, Federal, and industry policies that encourage public-private partnerships.

Ports and Waterways

Ports and waterways can be as important as airports to local economic development. Generally port facilities are owned and managed by a public authority, while inland waterway terminals are privately owned. The Federal Government funds the

[27] Congressional Research Service, *The FY 1989 Federal Budget for Public Infrastructure* (Washington, DC: 1988), p. 6.

[28] "Making Rail Competitive," *Congressional Quarterly,* Aug. 11, 1989, p. 455.

majority of navigation infrastructure costs and has thus played a large role in economic development and competition between ports. Federal policy has changed, and costs for channel dredging must now be shared by local sources. Federal capital outlays for ports and waterways declined from $4.9 billion in 1980 to $3.3 billion in 1988 (see table 1-2). Although more than one-half of the States have funded port and terminal facilities and their outlays for maintenance and operations increased, State and local capital investment dropped from $1.1 billion to about $750 million between 1980 and 1987.[29]

Federal grants and government bonds provide the bulk of capital investment. Most large port authorities can support operating and capital costs with user charges. Small, privately owned terminals may have a difficult time generating adequate revenue if their customer base is limited.

- *Problem areas:* Older ports that need to modernize and expand facilities to remain competitive, but cannot support the investment without raising fees so high as to threaten their competitive position. Port and terminal owners' and waterway users' heavy dependence on Federal financing. Overcapacity-more competing ports and terminals than large modem freight vessels need. Identifying priorities for Federal funds among main system waterway and competing ports-political support may keep small, marginal projects alive, slowing completion of major projects. Ports where disposal of dredged material is a major environmental and cost issue. Absence of well-integrated land transportation systems to support port activity.
- *Possibilities: State* and local public-private partnerships to finance improvements. Higher user charges and stable State funding. Industrial partnerships; industry modernization and development of diverse markets. Reducing the number of ports and shrinking the size of the waterway system to ensure maintenance of essential commercial service.

Drinking Water Supply

The benefits of a pure water supply extend beyond individual users to commerce and industry. Local governments are responsible for most of the Nation's 60,000 water supply systems, although about one-quarter are privately owned. Federal outlays to support water supply in 1988 were small--$449 million-targeted at central cities and poor, rural areas. In comparison, State and local capital expenditures were $5.6 billion in 1987, with operations and maintenance outlays an additional $11.1 billion.[30] State assistance also includes establishing bond banks, revolving loan funds, and interest subsidy programs, and providing technical advice. Local governments finance capital expenditures primarily through bonds backed by user fees and government funds, generally recovering 75 to 80 percent of costs through user fees.[31]

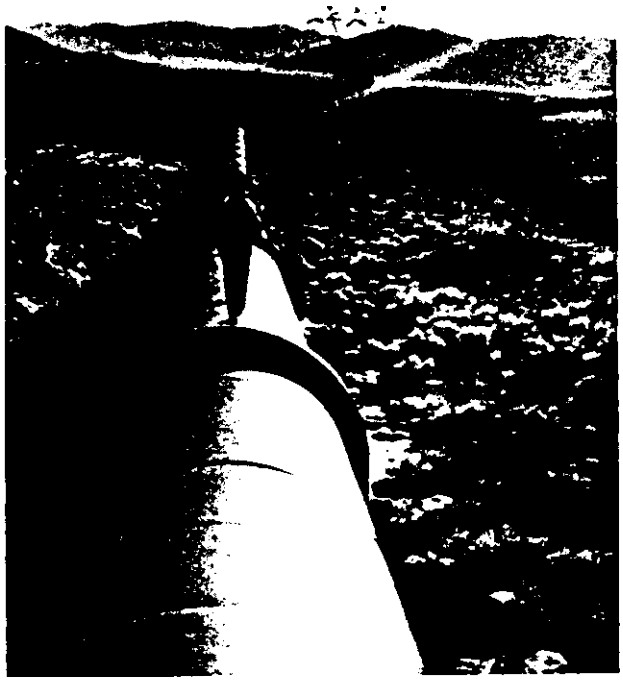


Photo credit: American Society of Civil Engineers

Although clean water is considered a right, supplying urban areas with potable water often involves extensive, costly systems.

The impact of Federal tax and regulatory policy is significant. New water quality standards will require regular monitoring of drinking water sources and filtration to remove specific contaminants. Tax reforms have increased capital costs, particularly for public-private ventures. Many communities will need to increase rates substantially, both to fund

[29] Apogee Research, Inc., op. cit., footnote 11.

[30] Ibid.

[31] Hopkins, op. ciL, footnote 2s, p. 14.

rehabilitation of obsolete facilities and to conserve and regulate water use, possibly reducing the need for new facilities.

- *Problem areas: Small systems* with water supplies that do not meet current standards. Older cities where pipes and facilities are obsolete and decaying, causing significant leakage. Regions with serious contamination of ground and surface water sources. The custom of low pricing for water, which impedes cost recovery and encourages consumption.
- *Possibilities: Dedicated State* or local revenue funds to allow renovation and regular preventive maintenance. Raising rates to recover full service costs. Policies and pricing to manage supply and demand. Separating residential drinking water and outside water supplies. Treatment technology development.

Wastewater Treatment

Federal grants for wastewater facilities have declined from $6 billion in 1980 to $2.4 billion in 1988 (see table 1-2) and will continue to drop as capital grant programs are eliminated. To help fill the revenue gap, State and local capital spending for wastewater treatment rose from $2.3 billion in 1980 to $4.1 billion in 1987. However, a major shortfall in capital investment continues; at least two large cities, Boston and New York, deferred construction of major sewage treatment facilities for most of the 1980s.

More impressive have been increasesin expenditures at State and local level for operation and maintenance, which climbed from $4.6 billion in 1980 to $6.8 billion in 1987.[32] For many years, some States have provided general fund appropriations or bond funds for local wastewater improvements, but local governments have paid the major share of costs for sewage treatment facilities with Federal grants, user fees, and general taxes. In 1987, user fees accounted for between 40 and 70 percent of public expenditures for wastewater treatment, depending on the region.[33]

The potential to raise user fees to cover needed capital investment (in addition to operating expenses) is problematic depending on economic conditions of the community and State. Growing, affluent districts will be able to increase fees, but small towns and older cities with stable or declining populations will find it hard to raise rates the necessary 100 percent or more (see table 1-4). These jurisdictions may not be able to support full capital costs, even though wastewater charges are low compared to those for other utilities.

Federal tax and regulatory policy has a major impact on wastewater treatment. The tax reforms in the 1980s discouraged private investment capital, and new Federal regulations will require many communities to upgrade their facilities. The benefits of wastewater treatment improvements include the health of the general public, the convenience and well-being of individual users, and commercial and industrial establishments, and protection of the Nation's water resources.

- *Problem areas: Small* communities that cannot benefit from economies of size and have low per-capita incomes. Communities where Federal standards disallow natural water (water sources in some regions contain more radon than allowed by EPA, for example). Older cities with obsolete pipes and facilities and insufficient revenues to rebuild or begin preventive maintenance. Low level of technical expertise of many operating personnel. Inadequate research into new technologies and limited access to existing advanced technologies.
- *Possibilities:* Higher user fees. Regional planning and consolidation or sharing of facilities. Federal or State funds targeted at specific problem areas in the form of grants or low-interest loans and technical support. Dedicated Federal or State revenue support for capital needs.

Municipal Solid Waste

Traditionally, the management of solid waste has been the responsibility of local government, but the private sector plays a major role in collection, disposal, and operation of the Nation's 6,000 municipal landfills, in operating incinerators, and in processing recyclable materials. About two-thirds of all solid waste management expenditures are made by private firms, which recover costs through charges.[34] However, during the 1980s State and

[32] **Apogee Research,** Inc., op. **cit., footnote** 11.

[33] **Hopkins,** op. **cit., footnote** 2s, p. 14.

[34] **National Council on Public Works Improvement,** op. cit., footnote 17, p. 78.

local capital expenditures for solid waste more than doubled, reaching almost $1 billion in 1987.[35] Local service is financed by local taxes and by disposal fees, which have increased dramatically during the last decade.[36] Capital expenditures are usually financed by bonds or through commercial loans.

The Federal Government does not finance solid waste facilities with the exception of limited outlays to rural areas. States have enforcement authority over landfill compliance with Federal criteria, which have become increasingly stringent since passage of the Resource Conservation and Recovery Act in 1976 and its 1984 amendments. The requirements have caused bitter struggles over siting and opening new landfills and have forced existing ones to close.[37]

- *Problem areas:* Urban areas without accessible landfill sites and small, rural communities that cannot physically or financially meet Federal criteria. Metropolitan areas where citizen opposition prevents siting of incinerators or landfills. Lack of manufacturing capacity for certain recycled materials, such as newsprint and plastics, and small market demand for some recycled products.
- *Possibilities:* Federal, State, and local policies to encourage waste reduction and recycling; State support of regional cooperation to promote joint use of existing and new facilities; adoption of known improvements in incineration and landfill technology; public education.

PRESERVING THE ENVIRONMENT

Environmental problems represent an excruciating modern dilemma the need for better stewardship of our air, water, and land resources has become critical due to many of the very practices that have helped our Nation grow and flourish. Land use and transportation patterns that fostered economic development and personal mobility in the past now embody environmental issues that will require changes beyond our current ability to conceive in industry operations and personal living and travel habits. State and local officials in major urban and high-growth areas understand that congested highways and airports, substandard air quality, and inadequate solid waste and wastewater facilities make them less attractive to business. However, the changes needed to resolve the issues are so difficult and far reaching that they cannot be understood, developed, or implemented quickly, easily, or inexpensively.

Moreover, Federal policies and programs provide few tools for State and local governments to use in managing the interactions between transportation modes and environmental media Both Congress and the executive branch oversee individual environmental and transportation modes (e.g., air and water quality, mass transit, highways, railroads) through dozens of committees, separate Cabinet departments, and a score of separate agencies. (See chapter 2 for further discussion.) Competition for policy support and revenue among these Federal agencies and State and local governments is characteristic of our governmental system; each industry interest understands this competition well and pursues its goals accordingly. Often the result is Federal programs that are ad hoc and haphazard.

Fragmented responsibility, strong opposing factions, and a focus on individual programs have led to failure by the Federal Government to modernize obsolete management of transportation and environmental programs. For example, an airport official in a city with air pollution problems, who is seeking Federal assistance with multimodal ground access, would need to contact five separate Federal agencies. Local officials needing funding aid for wastewater treatment plants (like the mayor described in box l-A) are frustrated by Federal agencies that work at cross purposes. Air quality standards are currently such potent forces in public policy and transportation discussions in large cities from southern California to New England that regional curbs on individual transportation choices long taken for granted are under serious consideration. Protection of ground water and transportation needs dominate the public agenda for land-use planning and real estate development in Florida. The scale of the environmental agenda is daunting-just to maintain current levels of compliance with environmental standards will require additional local spending

[35]Apogee Research, Inc., op. cit., foonote 11.

[36]National Council on Public Works Improvement, op. cit., footnote 17, p. 55.

[37]U.S. Congress, Office of Technology Assessment, *Facing America's Trash: What Next for Municipal Solid Waste?* OTA-O-424 (Washington, DC: U.S. Government Printing Office, October 1989), p. 3.

estimated at $15.8 billion annually by the year 2000.[38] These local and **regional** issues **are interrelated and so difficult that more comprehensive, systems-oriented, Federal program management and support will be needed if the problems are to be resolved.**

Federal Policies

Since the turn of the century, Federal public works funding has been directed through categorical grants to spur economic development as a way of meeting special needs, but not much consideration was given to the environmental consequences of the development. Specific groups, such as the unemployed or farmers; or resource-poor regions, such as Appalachia, decayed urban cores, or the arid Southwest, were targeted for Federal assistance. Beginning in the 1960s, the Federal Government varied the packaging for Federal funding, moving from tightly structured categorical grants, through loosely bound block grants, to lump-sum revenue sharing. Each grant structure has its political and public-policy trade-offs. State and local governments particularly appreciated revenue sharing, as it gave them the independence to use funds to meet their own priorities.

Congress, however, appears to believe that political and policy goals are better served by categorical grants. These grants permit the Federal Government to target special goals such as highway construction, or to require fair labor and safety practices and environmental assessments, to cite only a few examples, as a condition for receiving Federal dollars. Categorical grant requirements can be important national policy tools, although they do add costs to projects. Preserving them also enables senior congressional members to continue to provide funds directly for specific, home district projects. These projects may or may not match the priorities for funding set by groups established to analyze system needs.[39] For further discussion, see chapter 2.

The wide variation in economic capabilities and tax effort among States and local governments **virtually** ensures that some districts, especially small, rural communities, island territories,[40] and large, urban areas, will not have the necessary resources to upgrade environmental services. Moreover, they have much more difficulty undertaking economic development programs, because many cannot afford to offer tax breaks or infrastructure upgrades to attract a new business or industry. Inflexible Federal grant conditions and standards are a major frustration to State and local managers. A requirement to remove from a water supply substances added to purify it in the first place is baffling to local officials, and finding an acceptable alternative can be difficult.[41] **The Federal challenge is to develop standards that consider local conditions and health risks, that implement national public health and safety goals, and that maintain accountability.**

Public Works Management

Government officials at every level find the lure of economic development compelling, and local growth has been the major driving force for most public works infrastructure construction. Rural communities and economically distressed cities often focus on attracting industry, overlooking the costs of providing transportation infrastructure and environmental services to support new growth. Once these costs are calculated, areas experiencing rapid growth can levy impact fees on development to fund infrastructure; officials in small communities and large, older cities that are losing population do not have that option.

However, even when funding is available, major urban jurisdictions find that transportation decisions have environmental impacts or constraints that limit their options. Examples include the lack of available land for constructing new highways or disposing of solid waste in congested urban areas, noise problems that hinder airport expansion and construction, and traffic-related air quality problems.

Southern California's preliminary air quality control plan, which proposes banning outdoor barbecuing and curtailing truck operations during rush hour

[38] U.S. * ~tal Protection DC: July 1989), p. 2.

[39] Neil H. Diehl, president and chief executive officer, Ingram Barge Lines, and member, Waterway Users Board, personal communication Oct. 18, 1989.

[40] Carolyn Imamura, "Building Foundati"ens: A Pacific Island Perspective," draft background paper prepared for the Pacific Basin Development Council, September 1989, p. 1.

[41] Peter Rogers, professor of environmental engineering, Harvard University, personal communication, Sept. 13, 1989. The substance in question is chlorine.

or requiring them to operate at night, indicates the steps local governments are contemplating to combat air pollution. Traffic congestion in the area is acute almost around the clock; a one-way commute on the freeways can take 2 hours on a bad day. Yet many businesses in southern California, a rapidly developing transportation hub, depend on truck transport. A number of such companies find unacceptable the noise problems and costs of keeping their loading facilities open at night to accommodate deliveries.[42]

In every jurisdiction facing air quality or equally difficult and interrelated environmental and infrastructure issues, alternatives must be examined closely and decisions reached through consultation where possible and negotiation where necessary. The process will inevitably be lengthy and excruciatingly difficult; one participant in the California discussions compared the experience to being" . . . strung up in wet clothes on a cold, windy day."[43]

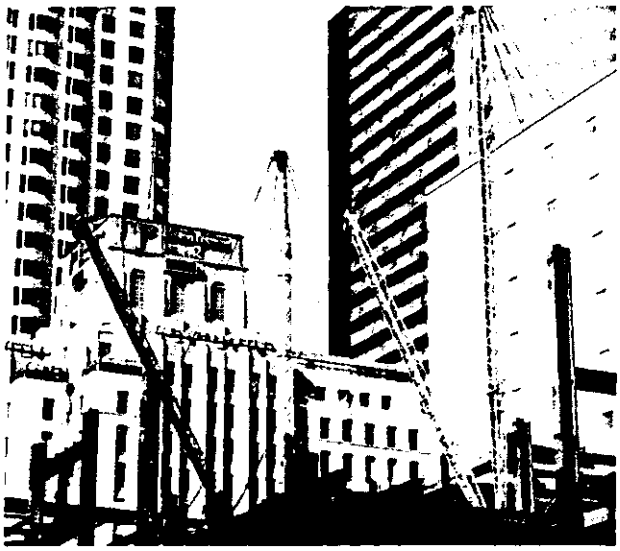


Photo credit: Thomas Burke

Downtown Los Angeles continues to grow, attracting new businesses and revenue, compounding traffic congestion and air quality problems, and highlighting the urban difficulties that accompany weak regional planning.

Regional Planning

Transportation and environmental issues are interrelated in complex ways, and managing them requires good information, careful planning and budgeting, evaluating and monitoring impacts, and the flexibility to devise alternative solutions as unforeseen events unfold. Transportation, environmental, and land-use problems are all multifaceted, and changes in one have major and complicated impacts on the others. Yet few government programs, Federal, State, or local, support or lead to systematic solutions that utilize the multimodal transportation resources available and that are sufficiently sensitive to environmental impacts.

Traffic congestion, air quality, and water supply problems do not respect local boundaries; they are regional issues. **Regional planning organizations are the most logical institutions to address these issues, but OTA found that such groups are almost universally underfunded and lacking in authority to prepare and implement plans tied to capital budgets.** Because of their institutional weaknesses, regional planning agencies are highly dependent on the talents of individual personnel and have little political clout. (See chapters 3 and 4 for further details.)

Although planning agencies are able to generate income by charging for some services, the revenue is insufficient to allow them to maintain core staff and support their technical and service capabilities. However, many of the Federal programs that together funded the necessary overhead for regional planning agencies have been eliminated, and only a few States provide any substantial support. Cuts in planning funds from Federal housing and environmental programs have left transportation monies as the primary Federal underpinning for regional planning. **Lack of Federal finding support for environmental planning is a major concern, and new Federal regulations have escalated the need for good planning.** Regional agencies have demonstrated some aptitude and success in this area. For example, in 1988, Maricopa County, Arizona, adopted a new air pollution control plan, and since then the State legislature has adopted four of the five priority recommendations of the Maricopa Association of Governments' plan.[44] **Because of local government revenue shortages and their reluctance to share planning, decisionmaking, and budgetary powers with neighboring jurisdictions, Federal and State government leadership**

[42]Sarah Siwek, manager of transportation, South Coast Air Quality Management District, personal communication, Nov. 10, 1989.

[43]Karen E. Rasmussen, director, Governmental and Industry Affairs, California Trucking Association, personal communication, Jan. 9, 1990.

[44]Campbell Associates, "Regional Planning," OTA contractor report, June 1989, app. A-4, p. 4.

and perhaps funding will be necessary if regional planning activities are to be effective.

Management Tools

In most areas of environmental infrastructure and many in transportation, the Federal role is primarily that of regulator. Federal enforcement powers and shrinking Federal program funds place strong conflicting pressures on State and local public works providers. While these officials understand the need to meet Federal health and safety standards, many lack the technical expertise and management tools for collecting data to assess needs, develop plans, and choose appropriate technologies to meet Federal requirements. These problems exacerbate the difficulties of making cost-effective decisions.

Advanced technologies can provide some relief for a variety of environmental problems, including air pollution caused by traffic congestion in urban areas.[45] Technological and management alternatives to new construction can increase the capacity of existing highways. **However,** all **the new technologies now under development will not eliminate the need for more effective land-use planning and personnel trained to use, operate, and maintain available equipment and facilities.** Investment in better management tools could enable local governments to link comprehensive land-use plans to capital improvement programs and to affect demand by pricing services according to costs. More flexibility in Federal grants will be necessary for jurisdictions to use such monies to support investment in upgraded management tools and personnel trained to use them.

CONCLUSIONS

If owners of highways, transit, and water treatment systems could charge tolls and fees high enough to cover full capital and operating costs and make a profit besides, transit systems would be as sought after as are airlines, and investors would find toll highways and water treatment facilities as good an investment as the gas company. But this is not the case; to make a profit and meet Federal standards, owners would have to set charges and fees so high as to be politically unpalatable and a hardship for many. Although their economic, social, and health benefits are indisputable, most public works services that are the responsibilities of local governments are not sufficiently lucrative to be attractive to private investors. Accordingly, Federal, State, and local governments are likely to continue to subsidize most roads, ports, airports, public transit, and environmental services, such as wastewater treatment plants, with public tax dollars. **All levels of government will inevitably have to raise taxes or fees to cover their costs, however--or they will have to eliminate or reduce programs and services.**

OTA found widespread agreement on the need to maintain and upgrade public works and to increase support for infrastructure. Yet for the foreseeable future, Federal spending will probably focus on social programs, such as Medicare; on defense (although this is likely to decline slowly); and on servicing the national debt. Consequently, State and local governments must continue to finance a larger share of their public works needs with their own revenues-general and dedicated taxes, fees, and benefit charges-and where feasible, with private sector partners. Each of the revenue sources has political, fiscal, and policy trade-offs (summarized in table 1-8).

Because property taxes have reached levels that burden low- or fixed-income homeowners in many areas, State and local governments need to give serious consideration to other broad-based income possibilities. OTA **finds that benefit charges and earmarked taxes have proven to be relatively reliable and politically acceptable revenue sources.** Many State and local governments have successfully increased the levels of these charges and taxes for specified, top-priority public works projects. However, approval at the ballot box does not come easily, and funding programs often must be submitted to the voters more than once. **Strong and committed political and community leadership, persistence, and a good public information program are key ingredients for success in efforts to increase State and local revenues (see** chapters 3 and 4 for examples).

When the State or locality has made a clear connection between the benefits and the tax or user charge, as is easy to do with fuel taxes and surface transportation improvements, voters are much more likely to approve a finding package. Because the Federal Government provides approximately 24

[45] U.S. Congress, Office of Technology Assessment, op. cit., footnote 23.

Table 1-8--Major Infrastructure Financing Mechanisms: Advantages and Disadvantages

	Advantages	Disadvantages
General fund appropriation . .	*Administrative:* appropriations reflect current legislative priorities *Equity:* all taxpayers contribute to capital projects *Fiscal:* no debt incurred, so projects cost less during periods of inflation	*Administrative:* infrastructure must compete with other spending priorities each year; cannot plan long-term projects around uncertain funding *Equity:* no direct link between beneficiary and who pays, and current generation pays for capital projects that benefit future generations
General obligation bonds	*Equity:* capital costs shared by current and future users *Fiscal:* bonds can raise large amounts of capital; general obligation bonds usually carry lowest available interest rates	*Administrative:* States often impose debt ceilings and require voter approval *Fiscal:* adds to tax burden, especially if interest rates are high
Revenue bonds	*Administrative:* do not require voter approval and are not subject to legislative limits *Equity:* debt service paid by user fees, rather than from general revenues	*Administrative:* require increased reporting and restricted by Tax Reform Act limitations *Fiscal:* usually demand higher interest rates than general obligation bonds
State gas tax	*Administrative:* established structure allows tax increase without additional administrative expense *Equity:* revenues are usually earmarked for transportation, so users pay *Fiscal:* revenues relatively high compared to other user taxes	*Administrative:* revenue fluctuates with use of gas *Equity:* fiscal burdens are not evenly distributed between urban and rural areas *Fiscal:* revenue does not rise with inflation or reflect differences in infrastructure use that may determine capital needs
Other dedicated taxes	*Administrative:* voters prefer dedicated taxes *Fiscal:* provides relatively reliable funding source not subject to annual budgeting	*Administrative:* reduces districts ability to meet changing needs *Fiscal:* major economic downturns can reduce revenues significantly
State revolving funds	*Administrative:* promote greater State independence in project selection Fiscal: debt service requirements provide incentives for charging full cost for services; loans can leverage other sources of funds; loan repayments provide capital for new loans	*Administrative:* States bear increased administrative and financial responsibility *Equity:* poor districts cannot afford loans *Fiscal:* repaying loans will mean increases in user charges or taxes

SOURCE: Office of Technology Assessment, 1990.

percent of total national highway expenditures,[46] raising the Federal fuel taxes could provide funds for a major boost to transportation infrastructure. Increases in the taxes are less likely to encounter opposition from large and powerful transport and construction industry interests if the revenues are targeted for transportation improvements.

The long history of substantial intergovernmental cost-sharing for transportation contrasted to the present uncertainties over funding for environmental infrastructure highlights the importance of consistent Federal support (see table 1-9). While officials are disenchanted with the snail's pace of expenditures from the airport and highway trust funds, none deny that without these funds, our transportation network would be in even worse condition.

In contrast, chances are good that finding difficulties will force a number of local jurisdictions to seek waivers or be unable to meet the costs of compliance with Federal environmental standards unless additional assistance is forthcoming. The needs for environmental services in communities across the country are huge; a stable Federal revenue source would provide assistance to State and local governments struggling with environmental issues that often extend beyond jurisdictional boundaries. OTA **concludes that a strong case can be made for a dedicated source of revenue to bolster local environmental program funding. This is especially important for the Federal Government to consider if it wishes localities to meet its timetable for compliance with newly enacted standards.** A portion of the monies could be used for enhancing EPA's technical capabilities, but the bulk is needed for States to use to provide financial and technical assistance to local jurisdictions.

[46] Federal Highway Administration, op. cit., footnote 14, p. 4.

Table 1-9--Current Sources of Capital for Local Public Works

Sources of revenue-relative share is indicated by one, two, or three stars (*), with three stars (***) signifying the largest.

Public works	Federal contributions[a]	State government contributions[b]	Local government revenues[c]	Private investment[d]
Environmental:				
Water supply	e	*	***	*
Wastewater treatment	**f	*	***	
Solid waste management			**	**
Transportation:				
Highways:				
Interstate	***			
Non-interstate	*	**	***	
Mass transit	***	*	*	
Airports:[g]				
Large	*	*	***	
Medium-small	***	*	*	*
Ports		*	***	h
Waterways	***		*	h
Railroads	*	i		***

[a]Includes Federal taxes and user fees.
[b]Includes State taxes and user fees.
[c]Includes revenues raised locally such as taxes, user fees, and developer charges.
[d]Investment generally reflects ownership of the facility.
[e]Housing and Urban Development (HUD) and Farmers Home Administration (FmHA) grants have been an important source of capital in small communities and rural areas.
[f]Environmental Protection Agency grants are scheduled to end in 1994; HUD and FmHA grants have been an important source of capital in small communities and rural areas.
[g]Category does not include air traffic control.
[h]Small inland ports and waterways are frequently financed with private capital.
[i]Some States have bought abandoned track to support continuation of local rail service.

SOURCE: Office of Technology Assessment, 1990, based on a variety of government data summaries.

Attractive though they may be, benefit charges and private sector strategies frequently are not workable for low-growth districts or small, rural communities where investment of private capital is unlikely to pay off, credit costs are high, and residents have limited ability to pay higher user fees. In many of these communities, the major issue is how to maintain existing levels of services, much less improve them to Federal standards.

Moreover, user fees and benefit charges have socioeconomic trade-offs that pose complex practical and public policy issues. These include equity and administrative issues, and revenue reliability in the case of an economic slowdown, a political backlash, or real hardship. The fairness of requiring a new resident to pay up front for infrastructure through higher land prices compared to long-time residents who paid gradually through property taxes is one issue. Setting and administering fees so they are not an excessive burden on the poor, determining accurately the full costs of public services and allocating costs among direct and indirect beneficiaries pose other complex problems. Services like public transportation and wastewater treatment also benefit people who do not use them directly, making it unfair to depend solely on user fees and requiring hardy political leadership to raise taxes for them. Removing fiscal and land-use decisions from the political process by establishing independent special financing districts is a further **concern. OTA concludes that while issues related to benefit charges are difficult, they are not without solutions. Before embracing user fees as a major means of public works financing, decisionmakers will want to weigh and address each choice carefully.**

Finally, **OTA's** research for this document indicates that State and local public works problems could be eased significantly if the Federal Government developed and implemented a national transportation policy and restructured transportation and environmental program management including congressional oversight.

Despite the interrelated nature of public works infrastructure, Federal-State-local relationships are strongly tied to existing programs that limit the potential for integration across infrastructure functions. For example, Federal subsidies for each of the transportation modes are so different, and industry

and congressional turf battles so vigorous, that making rational plans and decisions about the best use of our Nation's multimodal transportation system is virtually impossible. State and local governments must put together infrastructure improvement programs in a manner currently distorted by outdated Federal program management and conflicting tax policies. Local governments in small towns need technical assistance so that they can determine the most suitable type of wastewater treatment or solid waste disposal facility for meeting both **EPA standards** and their budget requirements. Current Federal regulations and management of environmental programs do not allow for this flexibility.

Given the current Federal and intergovernmental framework, it is unrealistic to expect that States will fired and administer transportation and environmental programs in a comprehensive and systematic manner. Local governments are burdened with difficult public works-related problems, most of which extend beyond their borders and affect the surrounding region as well. Moreover, regional difficulties often do not end at a State boundary. **It is time for the Federal and State Governments to acknowledge these broader aspects of public works and to create a coherent, supportive management framework that includes adequate financing.**

Photo *credit: U.S. D*epartment of *Housing and Urban Development*

Lower income families' ability to pay must be considered in setting higher user fees.