failing private bus lines and upgrade equipment. During the early 1970s, the capital program expanded dramatically, permitting greater use of funds for both existing and new rail systems. The federal government's transit program is now run by the Urban Mass Transportation Administration (UMTA).

During the 1970s, federal transit aid grew at a 40 percent annual rate--faster than any other transportation program. Federal funding for capital grants climbed from $174 million in 1965 to $2.9 billion in 1981 (see Figure III-1) and totalled $2.6 billion in 1982 (see Table III-1). At least $0.6 billion more was provided by state and local governments to meet the 20 percent local matching requirements. In addition, some large cities (notably New York) financed major investments with their own monies. Current federal authorizations total $3.7 billion a year.

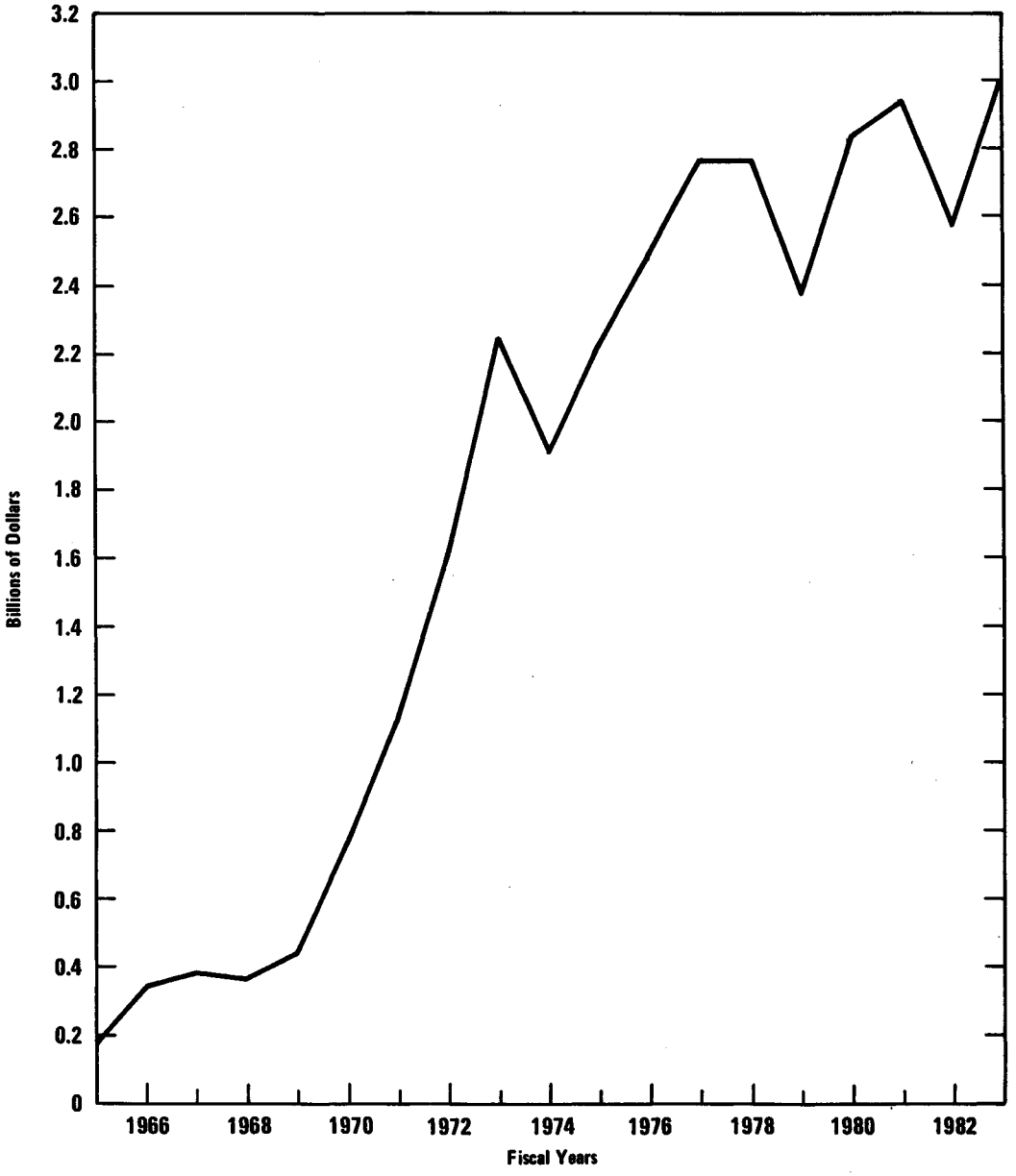
In many cities, fares were held down to encourage ridership. But as systems expanded, transit labor and other costs rose dramatically. As a result, operating deficits grew so large that most systems came to rely on the fare box for less than half their operating costs. In 1975, as cost burdens increased, operating subsidies were added to the federal aid program, peaking in 1981 at $1.1 billion. More recently, the Surface Transportation Assistance Act of 1982 limited federal operating assistance to $0.9 billion a year through 1986. This act dedicated to transit capital grants the revenues from a penny of the tax on motor fuel--permitting an increase in authorizations of $1.1 billion a year. In addition, the basic federal match for capital grants was reduced from the previous 80 percent to 75 percent.

Federal Aid to Mass Transit Under Current Policy

Unlike most other federal programs for infrastructure services, virtually all transit grants go to local rather than state governments, and transit operators are largely responsible for the selection and management of projects. The federal government provides 75 percent or more of each project's cost, with the balance shared by state and local governments. After receiving federal and state contributions, a typical city may pay less than 10 percent of the costs of a project. For 1982, almost two-thirds of all federal capital grants were made at the discretion of the UMTA administrator. As a rule, most bus-related projects are approved, while proposals for new rail systems receive closer scrutiny and may be delayed or even rejected. There is also a "formula grant" program for routine bus investments, which include replacements. These funds are allocated to urban areas according to a formula based on vehicle miles of operation and population size and density. In addition, capital funds are also provided by

Figure III-1.

Total Federal Funding for Public Transit Capital Grants, 1965-1983



SOURCE: Congressional Budget Office from Urban Mass Transportation Administration data and Federal Highway Administration.

TABLE III-1. FEDERAL CAPITAL GRANTS FOR PUBLIC TRANSIT, 1982

Program	Estimated Grant Funding (In millions of dollars)	Typical Projects Funded
Discretionary Grants	502.3	Bus fleet and service expansion
	704.0	Rail system modernization
	144.9	Rail system extension
	225.4	New rail systems
	57.9	Others a/
Subtotal	(1,634.5)	
Capital Formula Grants	297.7	Bus replacement
Interstate Substitutions b/	567.9	Rail system extensions, new rail system construction, bus purchases
Small Urban and Rural Capital	18.2	Capital aid for transit in small urban c/ and rural areas
Federal Aid to Urban Systems d/	52.6	Rail modernization and bus replacement
Grand Total	2,570.9	

SOURCE: Congressional Budget Office from Urban Mass Transportation Administration data.

NOTE: Details may not add to total because of rounding.

a. Includes funding for privately provided public transit service for the elderly and handicapped, and the Urban Initiatives program supporting intermodal transfer and joint development projects. Urban Initiatives were discontinued in 1982.

b. Various capital mass transit projects substituted for withdrawn segments of the Interstate Highway System, but subject to appropriations and financed out of the general fund rather than the Highway Trust Fund.

c. Urban populations below 50,000.

d. Transit capital projects financed by Highway Trust Fund.

"interstate substitution grants" for cities that have decided not to build particular segments of the Interstate Highway System. 10/

Trends in Federal Program Emphasis

Throughout its history, the federal program of transit capital assistance has focused on big cities. From 1965 to 1976, six large cities received two-thirds of federal capital funding commitments, and ten urban areas together accounted for four-fifths. 11/ Even so, the very largest cities have not received funds in proportion to their shares of the nation's transit riders (see Table III-2). This reflects an apparent desire to encourage transit growth elsewhere in the country and a belief that the largest cities may be more willing and able to finance transit on their own. As federal funding increased in the 1970s, commitments were made to construct new rail systems in Atlanta, Baltimore, Buffalo, Miami, and Washington, D. C.

In recent years, growing recognition of the need to rehabilitate existing rail transit facilities has combined with increasing reluctance to commit federal funds to build costly new fixed rail transit systems. 12/ In 1978, the Surface Transportation Act specifically required that a minimum of $350 million be spent each year to modernize existing systems. In 1982, the Administration proposed ending all federal aid for construction of new rail systems and extensions of existing rail systems (excluding projects already approved) and targeting federal capital assistance exclusively to-

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10. If the Federal Highway Administration agrees that a particular route is not "of national significance" (see Chapter II), the city has the option of using these funds, subject to appropriations, either for transit or for other highway projects. In contrast to the rest of the transit program, the federal government has relatively little influence over where or how these grants are used. Interstate transfer grants are available on an 85 percent federal match.

11. See Consad Research Corporation, A Study of Public Works Investment in the United States (April 1980), prepared for U. S. Department of Commerce, Volume III, pp. 52-53. In order of decreasing size of commitments, recipients include the Tri-State area constituting New York City and environs, Boston, Chicago, Atlanta, San Francisco-Oakland, Washington, D. C., Philadelphia, Baltimore, Seattle, and Pittsburgh.

12. For further analysis, see Congressional Budget Office, Urban Mass Transportation: Options for Federal Assistance (February 1977).

TABLE III-2. DISTRIBUTION OF TRANSIT USE AND FEDERAL AID BY CITY AND POPULATION (Shares of total in percents)

Urban Area	Nationwide Mass Transit Work Trips a/	Federal Capital Grants, 1964-1980 b/	Federal Operating Aid, 1964-1980 b/
New York	28	20	22
Los Angeles	4	2	9
Chicago	9	8	8
Philadelphia	5	6	5
Subtotal	(46)	(36)	(44)
Other over 750,000	29	53	34
200,000-750,000	20	8	15
50,000-200,000	5	3	7
Total	100	100	100

SOURCES: See notes below.

a. Congressional Budget Office, from Bureau of the Census, 1980 Census, Journey-to-Work Trips in Standard Metropolitan Statistical Areas (forthcoming).

b. Congressional Budget Office.

ward improvement and modernization of existing facilities, including bus and rail rolling stock replacement. 13/

13. This policy appears to have been changed as a result of the extra $1.1 billion a year in transit funds provided under the Surface Transportation Assistance Act of 1982 as part of the 5-cent-per-gallon increase in the motor fuel tax.

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Estimates of Transit Investment Needs Under Current Policy

Over the next decade, UMTA estimates the nation's public transit systems would require an annual investment of about $3.3 billion to repair, modernize, or replace existing facilities (see Table III-3). 14/ The American Public Transit Association (APTA), an organization of local transit system operators, estimates the potential need for new and expanded rail transit systems at $2.2 billion a year. 15/ Combined, these estimates total $5.5 billion a year--60 percent for repairing, modernizing, and replacing existing facilities, and 40 percent for expanding rail transit capacity.

Repair, Modernization, and Replacement. Of the $3.3 billion total annual investment, two-thirds would be needed to restore existing rail rolling stock, track, and maintenance facilities to good condition. This estimated need is geographically concentrated, with two cities--New York and Chicago--accounting for more than half the costs. A significant portion of this estimate represents a backlog of unmet past needs, since much normal maintenance has recently been deferred because of the fiscal straits of city governments. Rail rolling stock modernization requirements of $500 million a year are based on an UMTA survey that asked transit authorities to estimate their current needs, an approach that can at times lead to overestimates.

According to UMTA, a further $1.1 billion per year would be needed for bus systems. Of this sum, bus repair and replacement account for just over half--$610 million a year. About three-quarters of this $610 million would be spent in 17 percent of the nation's urban areas, since buses are concentrated in these areas and since buses in larger cities have a shorter life expectancy. The ten largest cities account for at least half of these needs. In addition, UMTA estimates $500 million a year would be needed to replace

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14. Urban Mass Transportation Administration, "10-Year Federal/State/Local Transit Investment Requirements," estimates prepared as part of the Department of Transportation's study of gasoline tax proposal that culminated in the Surface Transportation Assistance Act of 1982.

15. American Public Transit Association, "Rail Capital Needs, February 1982 Update," and Testimony before the House Committee on Public Works and Transportation, Subcommittee on Surface Transportation (February 24, 1982). Needs assessments have at times led to overstated estimates in other areas of transportation such as local Interstate highways. In part, this may result from the lack of objective standards for assessing potential investments.

TABLE III-3. ANNUAL PUBLIC TRANSIT REPAIR, MODERNIZATION, REPLACEMENT, AND ADDITIONAL CAPACITY NEEDS UNDER CURRENT POLICY, 1983-1990
(In millions of dollars)

	Annual Needs			
	High Estimate		Low Estimate	
Category and Program	Total	Federal Share at 75 Percent	Total d/	Federal Share at 75 Percent
	REPAIR, MODERNIZATION, AND REPLACEMENT			
Bus Rehabilitation and Replacement	610 a/	458	610	458
Bus Maintenance Facilities Modernization	500 a/	375	340	255
Rail Rolling Stock Replacement and Modernization	500 a/	375	250	188
Track and Signal Improvements	1,200 a/	900	1,200	900
Rail Maintenance Facilities Modernization	500 a/	375	500	375
Subtotal b/	(3,310)	(2,483)	(2,900)	(2,175)
	ADDITIONAL CAPACITY			
Rail System Extensions	1,191 c/	893	500	375
New Rail Systems	1,012 c/	759	200	150
Subtotal b/	(2,203)	(1,652)	(700)	(525)
Total Needs	5,513	4,135	3,600	2,700

SOURCES: See notes below.

a. Congressional Budget Office from Urban Mass Transportation Administration, 10-Year Federal/State/Local Transit Investment Requirements, 1982.

b. Details may not add to totals because of rounding.

c. Congressional Budget Office from American Public Transit Association, Rail Capital Needs, February 1982 Update.

d. Congressional Budget Office modification of high estimates.

bus garages, but this estimate may be high. APTA has estimated the requirement at $340 million a year--only two-thirds of UMTA's figure. 16/

Additional Rail Capacity. Additions to existing rail systems, costing some $1.2 billion a year, would link suburbs of Boston, Pittsburgh, Philadelphia, and other cities with their downtown areas. According to APTA estimates, the construction of new subway systems in Los Angeles, Houston, Honolulu, San Jose, San Diego, and elsewhere would require an additional $1 billion a year between 1983 and 1990. (The costs of rail systems now well under way, such as those in Washington, D. C. and Baltimore, are included in one of these two groups.)

EFFICIENCY OF CURRENT PROGRAMS

The 75 percent federal match, usually augmented by state money, gives local authorities an incentive to buy new equipment rather than invest in continued maintenance and repair of existing equipment. For example, UMTA guidelines automatically allow replacement of buses 12 or more years old. If all costs are considered, however, rehabilitating the older buses and keeping them in service longer may actually be more cost effective.

The formula guiding bus replacement grants may also tend to favor certain areas in less need than others. Distribution based in part on population size and density, and not solely on measures of bus age or use, means that some cities with fleets in relatively good condition may receive too much assistance, while other areas with more serious need to upgrade their bus fleets may receive too little.

Estimates of the cost effectiveness of expanded transit capacity often derive from presuppositions rather than numerical analysis. For example, a major benefit commonly attributed to new rail lines is reduced road congestion. But recent studies indicate that, although new rail systems do attract bus and carpool passengers, they do not significantly reduce the number of automobiles on the roads. 17/ Another important assumption underlying the justification for new rail systems is their energy-saving potential. In this area, evidence suggests that new subway systems probably

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16. See American Public Transit Association, Bus Capital Needs (November 19, 1981).

17. See, for example, Institute of Public Administration, Financing Transit: Alternatives for Local Government (July 1979), prepared for U. S. Department of Transportation, pp. 9-10.

waste energy, in large part because most new riders come from relatively more fuel-efficient buses or carpools rather than from single-occupant cars. 18/ Finally, mass transit's benefits to disadvantaged groups, such as the poor, the elderly, and the disabled, are often taken for granted. Though this assumption appears valid for highly specialized public transportation services, such as "dial-a-ride" vans, most forms of mass transit serve predominantly higher-income persons of working age. 19/

Correcting for these analysical shortcomings, CBO's reestimates of projected mass transit needs suggest that annual total transit capital requirements over the next decade could be as low as $3.6 billion. This is $1.9 billion less than the $5.5 billion reported by UMTA and APTA together (see Table III-3). The major reason underlying this marked discrepancy is a different view of the effectiveness of new rail transit systems. In addition, several years of planning and detailed engineering work usually precede the start of construction. Thus, federal financing will not be committed immediately but will be phased in over a period of years. Assuming that the current 75 percent cost-sharing arrangement were continued and that all transit projects were financed at that ratio, the annual federal investment in mass transit would range from $2.7 billion to $4.1 billion. The difference would depend on whether a low or high estimate of needs prevailed.

Even a more moderate estimate need not be equated with required federal assistance. All benefits from mass transit are local. Therefore, the justification for federal assistance--especially for projects with large initial capital costs that are far beyond local financing resources--must rest with a federal decision to assist urban areas.

FEDERAL STRATEGIES TO IMPROVE PUBLIC TRANSIT INVESTMENT

Rather than increase federal funding by the 10 percent needed to meet the higher estimate of needs--that is, $400 million in addition to the current

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18. See Congressional Budget Office, Urban Transportation and Energy: The Potential Savings of Different Modes (December 1977). Extensions of existing systems do, however, appear to offer some energy-saving potential.

19. See Robert B. Cervero and others, Efficiency and Equity Implications of Alternative Transit Fare Policies (September 1980), and Congressional Budget Office, Urban Transportation for Handicapped Persons: Alternative Federal Approaches (November 1979).

$3.7 billion--the Congress could consider revising those features of the current grant system that tend to promote inefficient investment. This section reviews several options that, by improving the targeting of federal dollars, might help meet current and future demand for capital investment. These options include reducing the federal match for transit capital grants, redesigning grant allocation formulas to improve targeting, providing alternative financial mechanisms, and encouraging cost-effective innovative modes of operations.

Reducing the Federal Match

For most urban areas, access to the current 75 percent federal match strongly influences local decisions in favor of capital-intensive transit projects. A more limited federal match on UMTA capital grants--60 percent, for example--would help return priority-setting for transit development to the local level, where needs can often be assessed most accurately. Though still offering substantial federal assistance for capital-intensive projects, a 60:40 federal:local matching ratio would encourage localities to commit funds only to projects they really need, and to make better decisions regarding the trade-off of improved service versus reduced fares. For example, more attention might be focused on the fact that service improvements attract more riders than do fare reductions. In general, localities would be encouraged to serve such basic objectives as cost effectiveness in moving large numbers of people, rather than build capital-intensive projects made attractive by generous federal funding.

At the current level of spending, reducing the federal match to 60 percent would save the federal government $0.7 billion a year. In fact, a much greater reduction could be realized, since the increase in the nonfederal share (from the current 25 percent to 40 percent) would probably stimulate serious reevaluation of many projects and cancellation of some. A 60 percent federal share of the high estimate of transit needs would require $3.3 billion a year (see Table III-4), slightly less than current federal funding levels. On the basis of the lower estimate of needs, however, only $2.2 billion would be required, which could permit elimination of the recently imposed 1-cent-per-gallon tax on motor fuel.

Redesigning Grant Allocation Formulas

Use of mass transit, and the consequent need for capital expenditures, is concentrated in a small number of urban areas. Federal spending, on the other hand, is dispersed widely. As a result, the highest priority projects are not always funded.

TABLE III-4. FEDERAL INVESTMENT IN MASS TRANSIT BASED ON LOW ESTIMATE OF NEEDS, 1983-1990
(In millions of dollars)

Category and Program	Current Spending a/	Annual Needs With Low Estimate	Federal Share of Low Estimate: Current Policy	Federal Share of Low Estimate: 60 Percent
	REPAIR, MODERNIZATION, AND REPLACEMENT			
Bus Rehabilitation and Replacement	1,223	610	458	366
Bus Maintenance Facilities Modernization		340	255	204
Rail Rolling Stock Replacement and Modernization	1,250	250	188	150
Track and Signal Improvements		1,200	900	720
Rail Maintenance Facilities Modernization		500	375	300
Subtotal	(2,473)	(2,900)	(2,175)	(1,740)
	ADDITIONAL CAPACITY			
Rail System Extensions	534	500	375	300
New Rail Systems	664	200	150	120
Subtotal	(1,198)	(700)	(525)	(420)
Total Costs	3,671	3,600	2,700	2,160

SOURCE: Congressional Budget Office from data in Table III-3.

a. Preliminary. Includes $1.1 billion from the 1-cent-per-gallon fuel tax. This sum has been allocated in proportion to previous grants from Section 3 of the Urban Mass Transportation Act of 1964.

The current formula for bus replacement, for example, emphasizes population size and density, but neither factor gives a good indication of bus replacement needs. Though the formula was modified in 1982 to include bus miles, it still does not take into account local financial effort or system performance. In fact, the formula treats efficient and inefficient systems identically. Distribution formulas could be redesigned to reward efficiency and to target the greatest resources to areas whose needs are greatest. 20/ As an example, a revised formula could be based on number of passengers or passenger miles; this would allow federal grants to be set in proportion to direct measures of demand.

Block Grants

One way to help correct distortion of local priorities brought about by federal policies would be to consolidate further the assorted transit grant programs into unified block grants. (The current formula-based funding is already a form of block grant.) In general, block grants carry relatively few federal conditions, and they can avoid much cumbersome administrative overhead. In transit, they could be distributed according to revised formulas as discussed above, allowing size of federal assistance to be tailored to urgency of need in terms of both function and locale. If the grants were made available for operating purposes as well as capital needs, then a cap on the amount to be used for operating assistance might be stipulated to encourage a balanced use of federal funds and discourage a return to the practice of deferred maintenance. 21/

Innovative Operations

In recent years, an array of innovative alternatives to conventional, fixed-route bus and rail systems have developed to reduce costs and mesh the operating characteristics of urban transit with the changing needs of urban and suburban riders. For example, private taxicabs for shared-ride operations, small buses (jitneys) on irregular routes, and reservation van

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20. For a preliminary calculation of each urban area's allocation under several alternative formulas, see Congressional Budget Office analysis in Oversight Committee of House Committee on Public Works and Transportation, Oversight of the Federal Public Transportation Assistance Program (May 1982), Appendix B, pp. 33-40.

21. See discussion of the block grant concept in Oversight of the Federal Public Transportation Assistance Program (May 1982), pp. 23-26.

pools for travel to and from specific work places and shopping centers have proven cost-effective substitutes for conventional services. 22/ In addition, these innovative operations have proven the most effective method for providing transit to meet the special needs of persons who are dependent on public transportation, such as the poor, the elderly, and the disabled. 23/

Although proposals with considerable potential for improved cost effectiveness exist, a number of regulatory barriers inhibit their introduction beyond the experimental phase. For example, the cost effectiveness of private taxicabs under contract to transit operators hinges on the fact that most taxicab personnel are not unionized. But under current federal law, transit authorities can be made to pay union-level wage rates in contracting with such companies. 24/ The local regulation of who can offer transit services and how rates are set also inhibits innovation in transit operations. Relaxation of these and other regulatory strictures could encourage transit operators to implement readily available transit innovations.

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22. See Ronald Kirby and others, Para-Transit: Neglected Options for Urban Mobility (1978), the Urban Institute.

23. See Congressional Budget Office, Urban Transportation for Handicapped Persons.

24. Section 13(c) of the Urban Mass Transportation Act of 1964.

CHAPTER IV. WASTEWATER TREATMENT

Inadequate sewer pipes and sewage treatment as well as insufficient system capacity to handle storm runoff characterize many of the nation's 15,000 wastewater treatment systems. If uncorrected, these problems could compromise federally mandated ambient water quality standards. Costs to meet wastewater treatment needs are estimated by the Environmental Protection Agency to total $118 billion by the year 2000, but projected federal and nonfederal outlays combined fall short of that goal by about 24 percent. The federal role in financing a major share of wastewater treatment has already begun to decline under recent legislation from 75 percent of capital costs since 1972 to 55 percent in 1985. To compensate for near-term losses and longer-term reduction of federal support prompted by budgetary strictures, local wastewater authorities, assisted by states, could step up efforts already under way to explore other public and/or private financing sources. Further, federal regulatory measures governing wastewater treatment might in certain instances be waived at no risk to natural water quality.

THE PROBLEMS IN WASTEWATER TREATMENT

Traditionally, the provision of wastewater treatment has been almost solely a nonfederal responsibility, with the states and localities operating and financing the nation's treatment systems. In the early 1970s, public concern over the declining condition of the nation's natural waterways prompted the federal government to assume a greater role. That part, which began very small and has since increased markedly, now provides partial financing and technical assistance to localities in support of local operation and maintenance of sewage treatment facilities. Late in the decade, the states too became involved in the funding of local wastewater treatment facilities.

Three types of physical problems in the nation's wastewater systems are evident: leaking, blocked, or undersized sewer pipes; undersized or inoperative treatment facilities; and facilities that cannot handle storm water. In some places, treatment facilities simply do not exist. The

Environmental Protection Agency (EPA) assesses capital needs of publicly owned treatment works every two years partly on the basis of reports of physical condition; EPA evaluations provide the basis of this analysis. The EPA's estimate of needs attests to the pervasiveness of physical problems.

A study of 28 cities conducted in 1980 for the Urban Institute found that system failures were concentrated in the older cities of the Northeast, Midwest, and South. 1/ But age alone was not the cause of most failures; rather, infrequent maintenance was the direct cause most commonly identified. For example, the new and modern system in San Jose, California had the second highest rate of stoppages of all cities studied. Officials in San Jose claimed that this high failure rate reflected low system maintenance.

Another indicator of the physical integrity of wastewater conveyance systems (collectors) is infiltration and inflow (referred to as I/I), which can result in high treatment costs. Infiltration is groundwater that seeps into sewer pipes through cracks and loose joints. Inflow is the water entering sewer pipes from heavy rainfall. As a collector system cracks or separates at pipe joints, levels of I/I rise. In the EPA's 1980 Needs Survey, the agency found that, of the 19,000 treatment plants and collector systems assessed, about 16 percent, or 3,000 plants, had significant I/I problems amounting to about 25 percent of total flow. 2/ To translate that rate into practical terms, communities were treating as much as one-third more wastewater than they needed to because of cracked or loosely fitting sewer pipes.

To meet the statutory mandate of the Clean Water Act (Public Law 92-500), the EPA estimated that, as of 1980, about 8,000 facilities, or about half of all existing sewage treatment plants, would need enlarging, upgrading, or replacing. 3/ Every state has some such needs, and requirements for upgrading generally correspond to population, with New York accounting for 19 percent of total U.S. expansion needs, California for 9 percent, Florida for 7 percent, and Pennsylvania for 6 percent.

Communities in 40 states have combined sewers designed to collect storm runoff as well as wastewater. During heavy rain, these sewers can back up, causing basement flooding. They can also overload treatment plants, causing raw waste to be discharged to receiving rivers, lakes, and

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1. See Nancy Humphrey and Peter Wilson, Capital Stock Condition in Twenty-Eight Cities, Urban Institute (February 15, 1980).

2. See Environmental Protection Agency, The 1980 Needs Survey--Summaries of Technical Data (February 10, 1981), Table 49.

3. See Environmental Protection Agency, 1980 Needs Survey, Table 3.

streams. This problem is present in 34 of the 40 states with communities served by combined sewers, and it is most acute in Illinois, Indiana, Michigan, New York, Ohio, and Pennsylvania. 4/

Costs of Deferred Maintenance

Not maintaining sewer systems and treatment plants can exact high costs from both users and the economy in general. When regular maintenance is neglected, user-borne costs include increased sewer fees (from I/I flow and poorly operating treatment plants) and increased capital outlays for major rehabilitation. Of 126 Wisconsin collector systems studied, for example, 84 percent of the total wastewater flow delivered to the treatment plants was I/I flow, not wastewater. Such a high proportion of I/I flow could increase users' costs by as much as 500 percent. Though this example may be extreme, I/I problems of some magnitude exist in all states. 5/

The general economic toll includes the costs of street repair caused by failing sewer pipes, the additional economic costs of degraded water received downstream of a failing treatment plant (such as additional treatment to render river water potable in a downstream community), and economic losses associated with fish kills or low fishery productivity caused by polluted water. In an area that does not provide adequate wastewater treatment, economic costs can also take the form of lost industry, commerce, and residential development.

CURRENT POLICY IN WASTEWATER TREATMENT

Federal involvement in funding wastewater treatment facilities began in 1957 under the U.S. Public Health Service (PHS). Between 1960 and 1966, only about $200 million a year in direct expenditures went toward wastewater treatment grants to states. In 1966, the PHS wastewater treatment grants program was transferred to the Department of Interior, and in 1970, it was again transferred to the then new Environmental Protection Agency. Wastewater facilities grants have been available under two other federal programs since the 1960s and 1970s--one administered by the Economic Development Administration (EDA) beginning in 1965, and another by the Department of Housing and Urban Development (HUD)

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4. See Environmental Protection Agency, 1980 Needs Survey, Table 54.

5. See Environmental Protection Agency, 1982 Needs Survey--Cost Estimates for Construction of Publicly Owned Wastewater Treatment Facilities (December 31, 1982).

beginning in 1975. In the early 1970s, improving water quality became a national priority because of rapidly degrading waterways and heightened public awareness.

The EPA Municipal Wastewater Program

Since 1970, by far the most important wastewater treatment program has been the wastewater facilities grants program under the EPA, accounting for about 85 percent of all federal wastewater spending (see Figure IV-1). 6/ The EPA's outlays for wastewater facilities grants more than doubled between 1971 and 1974, from $1.1 billion to about $2.9 billion. Between 1975 and 1982, the EPA made between $3 billion and $5 billion in wastewater facilities grants a year. Under this program, the EPA now pays 75 percent of the capital costs of constructing or improving conventional publicly owned treatment works, or 85 percent for so-called "innovative" technologies. 7/ Beginning with fiscal year 1985, the federal share under this program will be reduced to 55 percent of capital costs for conventional systems and 75 percent for innovative systems. Project grants are available to states according to an allocation formula based on population and the EPA's assessment of needs. Local recipients of EPA grants are responsible for paying all operation and maintenance costs.

State and Local Spending

State aid to local government for financing wastewater facilities is relatively new. It began in 1978, when all states combined spent about $400 million for this purpose. But by 1981, 41 states had established some sort of program extending grants (32 states) and/or loans (13 states) to localities to help them meet the 25 percent local share of capital costs required under the EPA's 75 percent matching program. Most local jurisdictions finance the remaining capital portion of wastewater facilities by issuing revenue

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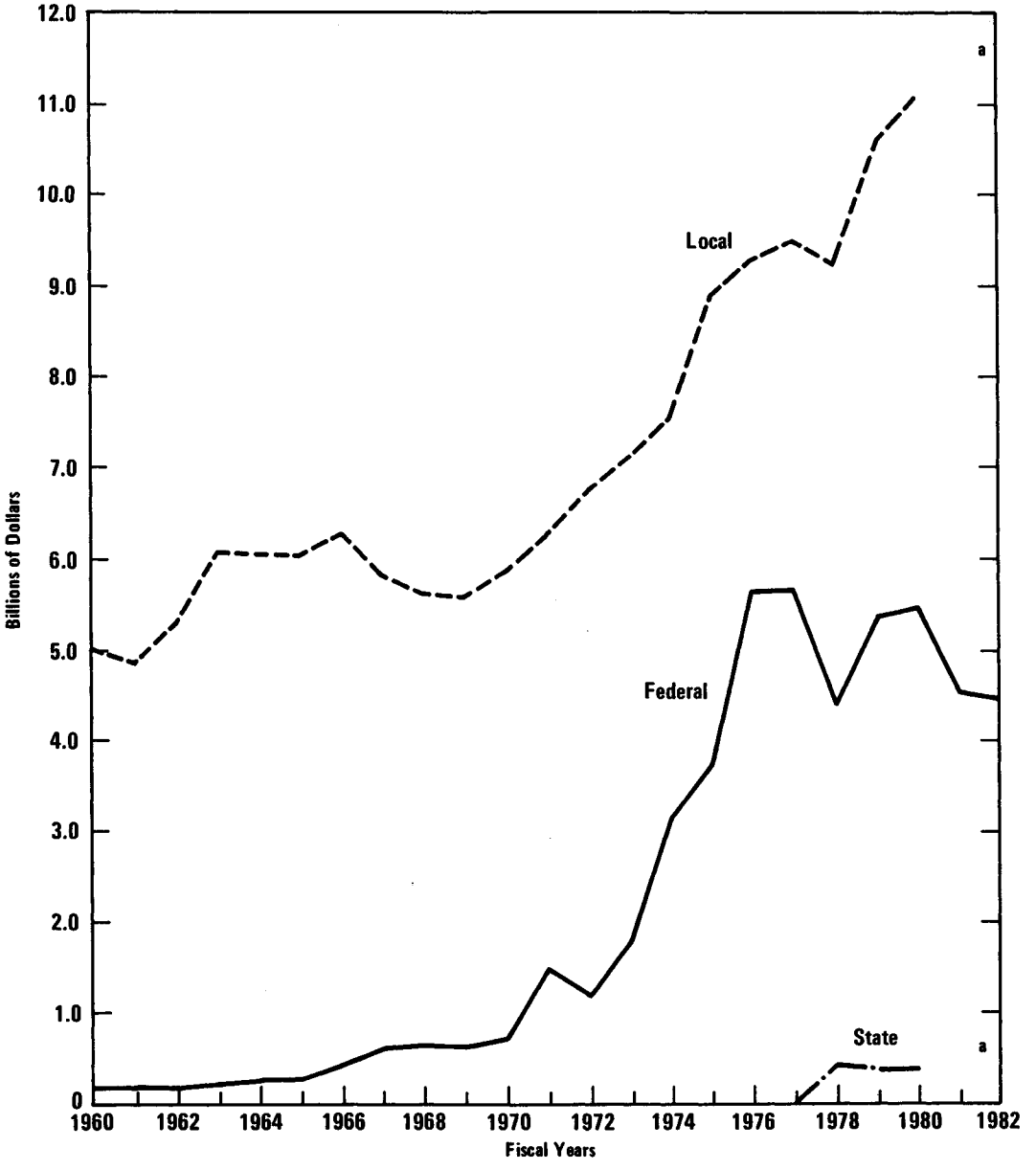
6. These grants were authorized under section 201 of the Federal Water Pollution Control Act of 1972 (P.L. 92-500).

7. Under provisions of the Clean Water Act, both "innovative" (new and unproven) and "alternative" (proven in practice) technologies qualify for the higher federal share. These technologies may be more cost effective than conventional collection and treatment systems, particularly for small or rural communities. For example, alternative treatment processes include land application of wastewater or processes that reclaim or reuse wastewater.

Figure IV-1.

Federal, State, and Local Spending for Wastewater Services, 1960-1982



SOURCE: Congressional Budget Office from data provided by the U.S. Environmental Protection Agency and the U.S. Department of Commerce, Bureau of the Census.

[a] Actual state and local data for 1980-1982 not available.

bonds and imposing on users the costs of operation, maintenance, and repayment of debt. Throughout the 1960s and early 1970s, local jurisdictions spent between $5 billion and $6 billion a year on wastewater treatment (capital plus operation and maintenance expenditures). But in 1973, in response to the EPA's grant program, local spending increased dramatically. In the late 1970s, total local spending on wastewater treatment (including EPA capital grants, passed through states to localities) increased about 7 percent a year, from about $7 billion in 1973 to $11 billion in 1980.

Major Needs

The needs estimates for wastewater systems' capital improvements are based on achieving water quality goals stipulated in the Water Pollution Control Act of 1972 and in subsequent amendments (Clean Water Act of 1977 and Municipal Wastewater Treatment Construction Grant Amendments of 1981). These acts mandated, at a minimum, construction of "secondary" wastewater treatment facilities for all publicly owned wastewater treatment plants by a set date. 8/ The 1981 amendments shifted federal spending priorities. They extended the deadline for secondary treatment or better from 1983 to 1988, expanded the definition of eligible secondary treatment processes, limited new treatment plant sizing to current populations, and made fewer needs categories eligible for federal grants.

In 1982, the EPA estimated that, by the year 2000, about $118 billion would be needed to provide wastewater collection systems, install secondary treatment facilities (or better in some instances), correct I/I problems, replace or rehabilitate malfunctioning sewer pipes, and correct storm water problems for all publicly owned wastewater treatment systems. 9/ Given the current federal share, and with needs distributed uniformly over 18 years, the federal government would have to spend about $5.1 billion a year in 1983 and 1984 and $3.9 billion each year between 1985 and 1990 to meet

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8. Secondary treatment generally includes mechanical and biological processes to remove 85 percent of solid matter and organic oxygen-demanding substances; effluents are also chemically disinfected before discharge.

9. See Environmental Protection Agency, 1982 Needs Survey. Estimates were based on population, projected flows, and engineering cost estimates derived from past experience. The EPA projected needs in eight categories (three levels of treatment, four types of sewer pipe needs, and combined sewer overflow needs). About half of total needs were estimated by reliable techniques according to the EPA.