exemption of airport revenue bonds would increase to the extent that airport operators used bond financing to substitute for federal aid. Federal user fees for airport development could be eliminated, although the federal government would continue to charge for use of the air traffic control system (see Chapter VI).

Without federal financing, the funds for capital investments would have to come from airport contributions and increased debt issuance, or both. In either case, local user fees would have to rise. Federal measures that allowed charges for use of passenger facilities (head taxes) and peak-hour surcharges could provide airport authorities with the means to substitute local for federal user fees. For small airports, however, state and local governments might be expected to subsidize airport development to some extent to avert the losses of service that could result from higher fees.

Effects on Airport Adequacy. Withdrawing federal aid and permitting airport managers to impose variable landing fees (peak-hour pricing) could lead to substantial improvements in the use of existing airport capacity. Since delay problems tend to be concentrated during certain hours of the day, peak-hour surcharges could disperse peak demands and increase use of idle time and space now available during off-peak hours and at reliever airports. If demand were not reduced, however, the increased revenue would finance the expansion needed to reduce peak-hour delays. Overall, the FAA projects that peak-hour pricing could significantly reduce the cost of air carrier delays anticipated at the largest airports for the next decade. 17/

In combination, congestion fees and reinstatement of head taxes could strengthen the financial performance of air carrier airports. 18/ This would improve airport managers' access to private capital and put them in a position to raise more funds for airport expansion than they could under the current system of federal grants.

This strategy could also improve efficiency in the use of general aviation airport capacity and in the use of investment funds for further development. In the past, general aviation airports have relied heavily on federal grants for capital improvements, although there is little economic

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17. See Federal Aviation Administration, The Upgraded Third Generation Air Traffic Control.

18. Airline operators have opposed reinstatement of head taxes in large part because of apprehension that these charges might be high enough to discourage air travel.

justification for this in view of these facilities' revenue-raising potential and limited contribution to a national transportation system. A withdrawal of federal aid would provide an incentive to general aviation airport managers to levy appropriate user fees. If the primary beneficiaries--the users of these airports--did not find it worthwhile to finance further development through such user fees, then the demand for such services would diminish.

Impacts on Users. Higher landing fees and head taxes would have different implications for different user groups. Commercial airline passengers would probably see little effect on fares; a head tax might range from $1 to $5. Moreover, since airlines schedule flights when they think passengers want to fly, they would probably be willing to absorb moderate increases in peak-hour landing fees to continue using the airports at those times. In the context of the total operating costs of a large jetliner, even a sharply increased landing fee of several hundred dollars per landing would be small when divided among a large number of passengers.

General aviation users, in contrast, would be more sensitive to increases in landing fees. Peak-hour landing fees at New York's Kennedy and LaGuardia are already known to have resulted in a 30 percent decrease in general aviation traffic at those airports, though it is not known how many trips were curtailed, made by other means (such as commercial airlines), or diverted to reliever airports. 19/ Some personal cost and inconvenience seem inevitable, however, particularly to recreational users of general aviation facilities.

Selective Federal Assistance

A strategy of selective federal assistance could include the provisions of the one above but would add federal mechanisms to avert risks of regional imbalances in airport development. Under this diminished but not totally withdrawn federal role, federal matching grant money could be disbursed for three purposes: for large and medium-sized airports that face difficulty in obtaining bond financing; for small rural air carrier (including air taxi and commuter) airports; and for general aviation reliever airports.

Budgetary Implications. Direct grants might total roughly $300 billion a year, about 36 percent of currently planned spending. Because of the healthy financial condition of most major airports--and the added revenue

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19. See Office of Technology Assessment, Airport and Air Traffic Control System (January 1982).

yield of head taxes and congestion fees--the total volume of federal grants for these airports could be reduced substantially.

Effects on Users and Airport Finances. As compared to current policy, such selective federal assistance would permit the commercial ticket tax to fall by more than 60 percent. General aviation fees, however, would have to be increased if the full cost of general aviation's use of federally financed airport development were to be recovered. The extent of this increase would depend on the costs of air traffic control, since aviation user fees cover these as well as airport-related costs.

Effects on Airport Adequacy. Direct grants to certain airports might help foster regional development in economically declining areas. This would result from federal grants' encouraging more commercial air service than the market itself would support. Selective federal aid to upgrade the nation's 155 general aviation reliever airports--particularly in conjunction with congestion fees--might help divert general aviation users away from now overburdened air carrier facilities.

CHAPTER VIII. MUNICIPAL WATER SUPPLY

Despite clear indications of physical and financial problems in the nation's municipal water supply systems, the CBO analysis points to no need for any appreciable expansion of the now small federal role. Federal outlays for municipal water systems totalled about $900 million in 1982. Physical problems are characterized as deterioration of existing distribution facilities, inadequate treatment facilities, and insufficient capacity to meet projected population growth. Overall funding to remedy these problems in the 756 urban systems that serve the most densely populated areas would total $6 billion to $9 billion a year by 1990. Up to 95 percent of these needs could be met with increased consumers' rates, many of which are now held at very low levels, and with a variety of state and local financing sources to which many water authorities might have access if certain barriers were overcome. The emphasis of such federal aid as is now provided seems properly targeted toward federal concerns--toward urban areas in fiscal distress and impoverished or thinly populated rural areas.

THE PROBLEMS IN MUNICIPAL WATER SUPPLY

Of the 756 urban water systems that serve city populations of 50,000 or more, 552 are publicly owned and 204 are investor-owned utilities; together, these systems provide water for 54 percent of the U.S. population. 1/ About 58,000 community systems serving smaller populations provide water to another 30 percent of the U.S. population. Another 15 percent of the population have their own water wells. The last 1 percent have no piped water supply. 2/ The systems that furnish potable water in

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1. See The President's Intergovernmental Water Policy Task Force, Subcommittee on Urban Water Supply, Urban Water Systems: Problems and Alternative Approaches to Solutions (June 6, 1980).

2. See Water Resources Council, The Nation's Water Resources 1975-2000, Volume I: Summary, Second National Water Assessment by the Water Resources Council (December 1978).

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the United States have three components: supply works (reservoirs, well fields, or river diversions), treatment works, and distribution networks. Problems affecting municipal water supplies fall into the categories of physical and financial.

Physical Condition of Facilities

Because no comprehensive nationwide assessment has been made of the physical condition of community water supply systems or of their need for capital improvements over the next decade, generalizations cannot be made with any confidence. Anecdotal reports on the physical condition of water supply systems suggest three types of problems, but no consensus has been reached regarding the severity of these problems.

Deteriorated or Inadequate Distribution Systems. A 1979 study by the General Accounting Office (GAO) notes water leakage losses of up to 46 percent of total water supplied in one city (Scranton, Pennsylvania) resulting from cracked distribution mains or poor conduit joints. 3/ Other cities also reported high losses: Boston, 43 percent; New Orleans, 36 percent; Wilkes-Barre, Pennsylvania, 35 percent. A 1980 study, in contrast, set the average leakage loss in 21 city systems at only 9 percent of water supplied. 4/ No standard exists to determine what an economically acceptable percentage loss might be; for some systems, developing and pumping additional supplies--albeit through leaky distribution systems--may be more economical than undertaking repairs. Clearly, though, such losses as these will increase if regular maintenance and rehabilitation continue to be neglected.

The Need for New Sources of Supply. One recent study concluded that about 23 percent of all U.S. cities with populations above 50,000 will require new sources of water supply by 1990. 5/ This estimate was based primarily

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3. See General Accounting Office, Water Supply for Urban Areas: Problems in Meeting Future Demand (June 15, 1979).

4. See Nancy Humphrey and Peter Wilson, Capital Stock Condition in 28 Cities, report prepared for the Urban Institute (February 15, 1980).

5. See SMC-Martin Consulting Engineers and Temple, Barker, & Sloane, Inc., An Analysis of the Nation's Urban Water Systems: Characteristics, Investment Requirements and Policy Options, report prepared for the Institute for Water Resources, Department of the Army (February 29, 1980).

on patterns of consumption and estimates of projected population growth. Rehabilitation or replacement of water mains and new conservation efforts were not taken into account, however. The former can prevent large leakage losses, and the latter can reduce consumption; together, these measures can obviate or at least forestall the need for new water supplies.

Inadequate Treatment Facilities. One measure of the adequacy of raw water treatment is compliance with the Environmental Protection Agency's (EPA) drinking water standards for bacteria and other contaminants. In 1980, 97 percent of all community water systems (serving 84 percent of U.S. population) met the standards for bacteria, and 89 percent met the standards for turbidity (suspended solid matter). 6/ No federal health standards exist for many of the synthetic organic compounds--industrial wastes--found in drinking water, though many, in high concentrations, are known or suspected carcinogens. Data on the occurrence of these substances are not routinely collected, but in many instances when drinking water supplies have been tested, these compounds have been found at alarmingly high levels. 7/ Estimates of new treatment facility needs may not take account of expenditures to remove organic toxins.

CURRENT POLICY IN WATER SUPPLY

Developing municipal water supply has traditionally been a local responsibility, and the federal role has been small. In 1982, the combined federal expenditures for municipal water supply amounted only to an estimated $900 million, while all state and local jurisdictions together spent an estimated $11.6 billion for water supply capital and operating expenses (see Figure VIII-1). Since 1960, annual combined state and local spending for municipal water supply has fluctuated between $8 billion and $11 billion, but in the last decade, it has increased at a consistent annual rate averaging 4 percent. The federal role has remained limited. Rural areas receive federal assistance through a grant and loan program for water and sewer systems administered by the Farmers Home Administration (FmHA), and economi-

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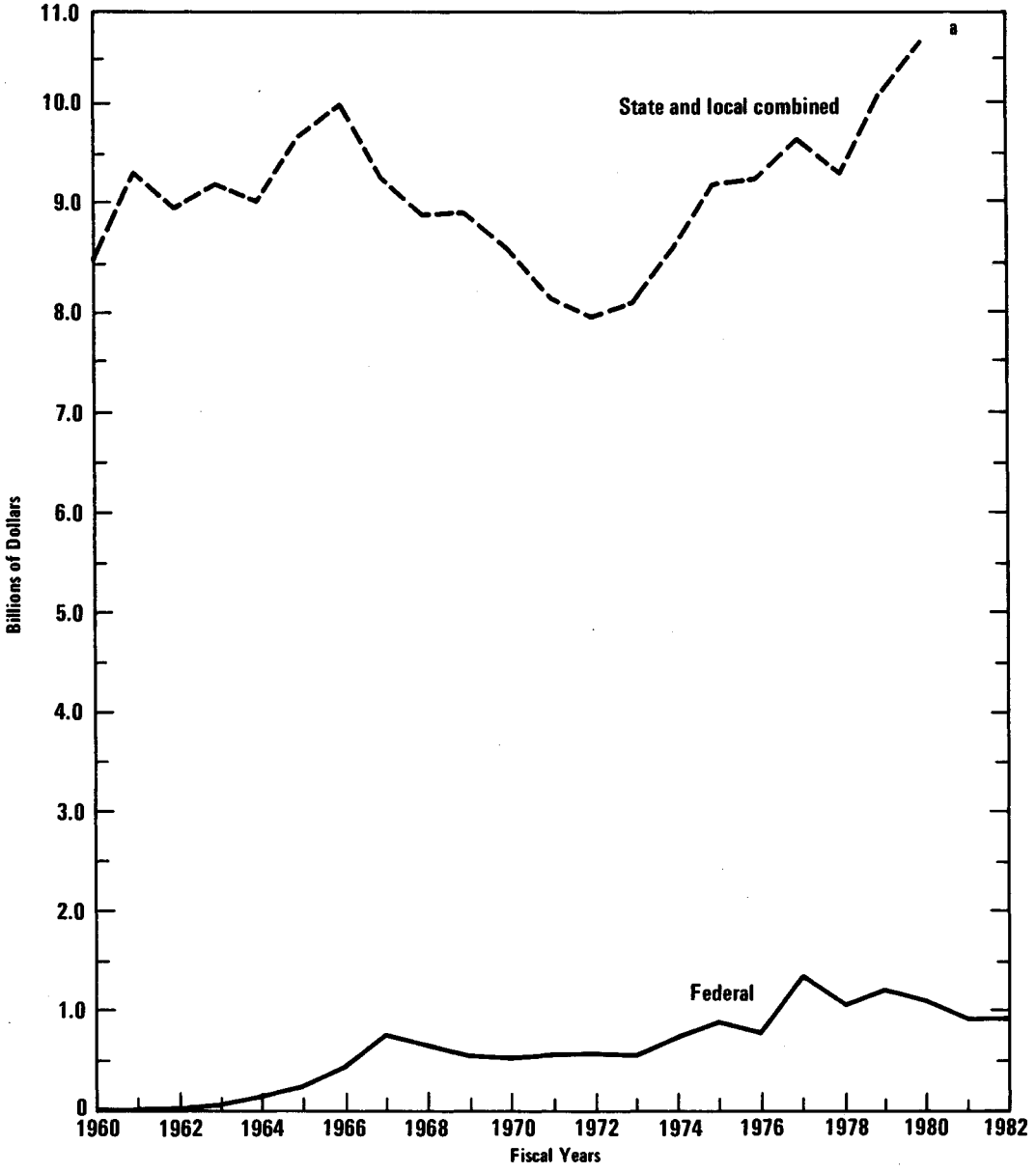
6. See Environmental Protection Agency, "A Status Report--The National Public Water System Program," Office of Drinking Water (May 1982).

7. In 1979, one-third of Massachusetts' communities were affected by chemical contamination of drinking water. In 1980, 37 public wells in 13 cities were closed in California because of chemical contamination. For many more examples and additional details, see Council on Environmental Quality, Environmental Quality--1980, pp. 81-135.

Figure VIII-1.

Federal and Nonfederal Spending on Municipal Water Supply, 1960-1982



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

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

cally depressed areas through grant and loan programs administered by the Economic Development Administration (EDA), the Department of Housing and Urban Development (HUD), and the Appalachian Regional Commission (ARC).

Since its authorization in 1926, the FmHA rural grant and loan program has been the most important of the federal single-purpose water supply assistance programs, with annual loan and grant funding ranging from $400 million to more than $1 billion. 8/ Federal funds are available to all public entities below the state level with populations of 10,000 or less; these monies can be invested in installation, repair, improvement, or expansion of rural water facilities, but they cannot go toward operation or maintenance of existing works. In place of loans, the federal government offers direct project grants with no local matching requirements, but only to reduce user charges to what federal authorities deem a "reasonable" level, based on the ratio of debt service to median local income. Funds are allocated to states on the basis of rural population and number of households with annual incomes at or below the federally established poverty level.

The federal government also helps states and localities by including water supply storage under two general water resources development programs administered by the U.S. Army Corps of Engineers and the Department of Interior's Bureau of Reclamation. These agencies do not develop single-purpose water supplies, but they may add municipal water supply storage to multipurpose water projects (primarily impoundments for flood control, navigation, hydroelectric power, irrigation, and recreation). As of 1979, these two agencies together had invested about $225 million to provide municipal water storage in completed reservoirs, and they will invest another $746 million for storage in reservoirs that are under construction or planned. 9/ Under the Corps of Engineers and Bureau of Reclamation programs, the federal government effectively pays 46 percent and 29 percent, respectively, of combined construction and operating costs of providing municipal water supplies. 10/

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8. About $2.60 in loans were made for every $1 in grants since 1975. Before that, the ratio averaged about 11:1.

9. See General Accounting Office, Contracts to Provide Space in Federal Reservoirs for Future Water Supplies Should be More Flexible (May 16, 1980).

10. See Water Resources Council, Options for Cost Sharing: Implementation and OM&R Cost Sharing for Federal and Federally Assisted Water and Related Land Programs, Part 5A (November 1975).

Local Financing and the Adequacy of Municipal Water Supply

The key issue in municipal water supply is whether local authorities can pay for needed projects. The weak financial condition of many systems has resulted in postponed maintenance and ultimately, in higher repair costs. Between 1968 and 1977, water supply revenues for all community water systems increased at an 8 percent annual rate, while expenditures for these systems increased 10 percent a year. Either this 2 percent annual deficit in operating expenses was compensated by federal payments to states (which increased 17 percent a year between 1968 and 1977), or systems went farther and farther into debt. One way city managers chose to handle this operating deficit was to cut back on maintenance despite growing maintenance needs. Again, no comprehensive data adequately document a trend toward deferred maintenance on a national basis, but in 19 major U.S. cities, between 1973 and 1978, the average water system maintenance workforce was cut back by about 10 percent (11 cities cut back; four remained the same; four increased their workforces). 11/

One trend does seem clear: privately owned systems, which charge 71 percent more for water than do municipal systems, have generally been better able to increase rates to meet escalating operating costs than have public systems. In general, public pressure has kept water rates low in systems that are operated as divisions of, or in close association with, municipal governments. In 1978, only 5 percent of all privately owned systems operated with a deficit, and this gap averaged only 2 percent of revenues. By contrast, 13 percent of all publicly owned systems operated with deficits, averaging 14 percent of revenues. 12/

With regard to the capital needs that result from deferred maintenance and from new requirements, marked differences between public and private systems also emerge. In 1978, the public water utilities financed their capital needs from four sources: retained earnings (36 percent); debt (26 percent); connection fees (35 percent); and intergovernmental grants and transfers (3 percent). Private water companies, in contrast, financed their capital needs by relying more heavily on retained earnings (51 percent) and debt (32 percent), and less heavily on connection fees (16 percent). In addition, privately owned water utilities raised 1 percent of their capital in 1978 by issuing stock.

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11. See Humphrey and Wilson, Capital Stock Condition, p. 11.

12. See SMC-Martin and Temple, Barker, & Sloane, "The Nation's Urban Water Systems," pp. 27-28.

Major Investment Needs

Total annual needs for the 756 urban systems were estimated to be between $6.3 billion and $9.1 billion for the period 1980-1990, as shown in Table VIII-1. On the basis of population-adjusted extrapolations to all community systems, CBO estimates that annual capital needs would be between $10 billion and $15 billion. These water supply investment needs fall into three categories: replacement and rehabilitation of existing systems, servicing new growth, and new source development.13/

Replacement and Rehabilitation. The treatment and distribution components of many urban systems have now reached the end of their useful lives. In several large northeastern cities, where water mains have been in service for a century or longer, leakage losses of up to 40 percent are common. But such problems can occur regardless of age. Water losses result from corrosive soil chemistry, harsh weather, ground vibration, and the limited lifespan of materials; over time, these factors take increasingly heavy tolls. For the 756 urban systems, between $63 billion and $100 billion will be needed by the year 2000 to replace all water mains older than 90 years and to rehabilitate others as necessary. Extrapolations to all community systems (again, adjusted for population variations) suggest that total replacement and rehabilitation needs for all communities could run as high as $100 billion to $160 billion by the year 2000.

New Growth. Servicing new growth includes providing new water mains to developing suburbs or increasing the size of mains to accommodate increased population density accompanying center-city redevelopment. Developers may be required to pay the direct costs of servicing new growth (laying new water mains or tapping into existing mains), but indirect costs (pumping stations, additional pumping costs, extra storage, and treatment) are shared by all customers. To provide service to expanding populations for the 756 urban systems by 1990, between $6.1 billion and $9.6 billion would

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13. For additional detail, see The President's Intergovernmental Water Policy Task Force Report, Urban Water Systems: Problems and Alternative Approaches to Solutions (June 6, 1980). "Needs" were estimated independently within three categories. Replacement and rehabilitation needs estimates were based on age of components, leakage, and standard life estimates. Estimates of servicing new growth needs were based on the cost of new connections, on treatment plant expansion costs per incremental population increase, and on population projections. Estimates of new source development needs were based on population projections and/or maximum sustainable water delivery estimates for a cross-section of existing systems.

TABLE VIII-1. ESTIMATED ANNUAL CAPITAL NEEDS BY 1990--SHORTFALLS AND REGIONAL IMPLICATIONS FOR 756 URBAN WATER SUPPLY SYSTEMS

Category	In billions of dollars: Annual Capital Needs	In billions of dollars: Annual Shortfalls a/	Locations of Greatest Need
Replacement and Rehabilitation of Existing Systems	3.2-5.0 b/	0.3-0.4	40 percent in Northeast
Servicing New Growth	0.6-1.0 c/	0.2-0.3	Southeast, Southwest
New Source Development	2.5-3.1 c/	0.4-0.5	Southeast, Southwest, West
Total	6.3-9.1	0.9-1.2	

SOURCE: Adapted by the Congressional Budget Office from data in The President's Intergovernmental Water Policy Task Force, Subcommittee on Urban Water Supply, Urban Water Systems: Problems and Alternative Approaches to Solutions (June 1980).

a. Defined as that portion of the capital investment that cannot be financed based on projected expenditures and on revenue increases up to a doubling of present rates.

b. Annualized from a 20-year estimate (1980-2000).

c. Annualized from a ten-year estimate (1980-1990).

be required. Extrapolating to all community systems, this range could increase to $9 billion to $15 billion.

New Water Sources. As population and related economic activity burgeon, providing new water supplies to meet additional demand can become increasingly difficult and expensive. Degradation of natural water quality can preclude the use of some drinking water sources. Growing competition for readily available surface and groundwater supplies from

agriculture and industry can further complicate new source development. Environmental effects or public reaction against new impoundments or long-distance water transfers may also hamper new source development. Of the 756 urban systems, an estimated 170 will require an additional water supply by 1990 at an investment of between $25 billion and $31 billion. This range could increase to $40 billion to $50 billion if all community water systems are considered.

Shortfalls in Municipal Water Supply Investment Under Current Policy

The annual "shortfalls" in water supply investment that might occur under current policy are displayed in Table VIII-1. If a water system were unable to finance its needs (replacement, rehabilitation, expansion, or new source development) even after rate increases up to 100 percent, then a shortfall would occur. (A doubling of water rates is an arbitrary cut-off point, chosen simply to illustrate the possible magnitude of investment need. Shortfall estimates are based on incomplete data and may vary as much as 100 percent.)

Of the total annual needs estimated for the 1980-1990 period ($6.1 billion to $9.1 billion), about $0.9 billion to $1.2 billion may be considered annual shortfalls under this definition. Expressed as a percentage of need, the greatest potential for shortfalls emerges in the second needs category--servicing new growth--in which as much as 30 percent may be lacking. But the dollar value of estimated shortfalls in this category is low. New source development in the Northeast, Southwest, and West together could generate the highest shortfall--between $400 million and $500 million a year. In general, publicly owned systems seem four times as likely as privately owned systems to experience shortfalls. This is not surprising, in view of the fact that private systems, on average, charge 71 percent more for water than do public ones.

EFFICIENCY OF CURRENT MUNICIPAL WATER PROGRAMS

Growing requirements of municipal water supply systems need not entail an increased commitment of federal resources. In fact, current federal programs appear well matched both in size and direction to federal responsibilities. Federal aid is targeted to economically depressed urban areas in which populations may not be able to pay high costs to meet water supply needs and to rural communities in which the costs of serving a dispersed population can be prohibitive. In such situations, federal loans or grants are probably warranted both from an efficiency and an equity perspective. Though increased federal spending could help local govern-

ments meet their water supply capital needs over the next decade, the resources available directly to state and local jurisdictions are likely to be sufficient in most cases. Increased federal aid could divert resources away from other federal interests and possibly substitute for local capital. Local decisions on commitment of local funds, on the other hand, tend to favor the most cost-effective solutions. Local decisionmaking can also avoid some cumbersome administrative delays and costs associated with federal aid. Alternatives available at the local level--rate reform, water conservation, growth-related charges, and greater use of existing capital markets--could probably meet up to 95 percent of estimated needs.

FEDERAL STRATEGIES TO IMPROVE MUNICIPAL WATER SUPPLY INVESTMENT

The federal government can choose between maintaining its now small role in municipal water supply or adopting an alternative course that would increase federal spending in those few areas where state and local initiatives prove inadequate. Even within the context of current policy, however, changes at the state and local--not the federal--level might improve the efficiency of investment. Although the current federal effort in water supply is well matched to meeting future needs from an economic efficiency perspective, its continuation implies changes in the ways that states and local jurisdictions conduct their business.

Rate Reform

Water rates are low in the United States for no intrinsic reason. In fact, in most instances when utilities face new investments to expand service, there are good reasons to consider rate increases first. As with other services, low rates for water lead to high consumption, at times calling for unnecessary investment in new supply or added treatment and delivery costs. This can be construed as a signal of economic inefficiency. In the United States, where water rates average about $1.00 per 1,000 gallons, consumption is about 100 gallons per person per day. In European countries, where water rates are generally more than twice U.S. rates, daily per capita consumption is about half the average U.S. level (Germany-37 gallons; Sweden--54 gallons; France--30 gallons; the United Kingdom--53 gallons). 14/

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14. A typical rate can be found in Frankfurt, Germany, where consumers pay a rate of about $2.80 per 1,000 gallons.

Over the past ten years, the United States' public water utilities have had difficulty raising water rates to keep pace with increases in operating expenditures. Four main influences have kept rates low: eroding city tax bases, economically depressed service areas, consumer resistance, and political pressure. So, though rate reform may be the utilities' single most important capital formation measure, rate increases must be considered on a case-by-case basis, taking the social, political, and economic environment of each municipality into account. Where a municipal water administration is closely linked to, or even a branch of, municipal government, both rate increases and the earmarking of the resulting revenues for water supply investment may be difficult to achieve.

One recent estimate for the 756 urban water systems suggested that between 87 percent and 90 percent of the identified water supply needs (see Table VIII-1) could be accommodated with rate increases no greater than twice current rates.[15] Even if this estimate is overoptimistic by 50 percent, this option alone would reduce all water supply needs by almost half. The remaining systems would probably experience shortfalls because of four factors: underlying economic barriers (that is, economically depressed service populations unable to pay higher rates); low bond ratings, which impede access to debt-generated capital; political resistance to increased rates; or statutory limitations on incurring debt or raising revenues. For systems encountering these obstacles, different strategies might be appropriate.

Water Conservation

Water conservation programs can reduce capital shortfalls in two ways. First, for systems facing new source development needs, a water conservation program can reduce demand enough to forestall the need for new supply, extending the time communities have for capital formation. Second, water conservation can reduce demand and thus the capital needs to develop new sources of supply. For example, the East Bay Municipal Utility District in San Francisco, faced with a drought-caused water shortage in 1977, undertook new source supply development and imposed strict water conservation measures; as a result, demand was reduced and needs were met

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15. See The President's Intergovernmental Task Force, Urban Water Systems. In 1978, water rates in the 756 urban systems varied from 26 cents per 1,000 gallons to $1.29 per 1,000 gallons ($38 per year to $188 per year for a family of four), so a doubling in rates for many systems appears reasonable just on the basis of this wide variation in actual practice.

at a total cost of $14.7 million (1977 dollars)--roughly two-thirds the cost of an equivalent solution involving new source development alone. 16/

Charging New Users for New Supply Costs

In areas facing expanding needs to serve population growth, there are several ways to impose the cost of growth on the incoming users. These include increasing connection or tapping fees, requiring repayable advances from developers, or imposing water supply taxes on real estate sales. In Florida, for instance, water management districts im~ose a transfer tax amounting to 1 percent of the value of the real property sold. Revenues from this tax are earmarked for regional water supply development funds. The cost of developing new sources may be reduced in some instances by using conjunctive groundwater and surface water supplies (dual sources used alternately, according to available storage) or groundwater alone, rather than building costly surface reservoirs.

Improved Access to Capital

Many of the institutional barriers that can obstruct access to capital at the local level could be overcome by a variety of activities available to states. For instance, seven states have set up water-project bond banks to purchase previously unmarketable local bonds, repackaging them for sale as state bonds at lower interest rates. Some states impose debt limitations or interest rate ceilings on local debt that could be removed if local jurisdictions were to issue revenue bonds and increase water rates to a level sufficient to guarantee revenues. Some states issue state revenue bonds guaranteed with local water supply revenue; others simply guarantee local bonds. States can also offer localities financial management or bond marketing assistance.

Increased Federal Funding

Whatever needs remained after all other options were fully explored could be met by federal assistance. For systems still facing insurmountable capital restrictions, a federal loan or grant program--perhaps an expansion

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16. See Mark Hoffman, Robert Glickstein, and Stuart Liroff, "Urban Drought in the San Francisco Bay Area: A Study of Institutional and Social Resiliency," in Water Conservation Strategies, American Water Works Association (1980).

of the current EDA, HUD, or FmHA programs--could be effective. Alternatively, the Corps of Engineers' water resources development program could be expanded to include construction of single-purpose water supplies with cost-sharing provisions designed to let local jurisdictions repay capital costs (with interest) over a period of perhaps 50 years. If half the shortfalls (see Table VIII-1) were met by applying state and local strategies and half were met with increased federal spending under one or more of these programs, federal outlays for municipal water supply would increase by roughly 56 percent from about $900 million a year to about $1.4 billion. Alternatively, increasing federal spending by the ratio of current federal to nonfederal spending--about 1:11--would result in a $1 billion federal program for municipal water supply.