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FRAGILE FOUNDATIONS: A REPORT ON AMERICA'S PUBLIC WORKS

FINAL REPORT TO THE PRESIDENT AND THE CONGRESS

National Council on
Public Works Improvement
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advance-funded retirement plans.[15] In contrast, federal retirement plans are funded largely on a pay-as-you-go basis, creating no new savings.

What this government absorption of savings means for capital formation depends on how governments spend the borrowing proceeds. Many state and local governments face constitutional or statutory prohibitions against incurring operating deficits. Such localities incur debt only for capital outlays.

The federal government, in contrast, incurs debt for both operating and capital spending.[16] Federal borrowing is therefore less likely to increase capital formation or complement private capital investments than are state and local government borrowing.

Foreign Investment and U.S. Capital Formation. Americans have been able to increase investment and to finance large federal deficits without saving more in part because the United States is attracting increasing amounts of foreign investment. In 1986, the United States' international debt was $264 billion.[17] This total is more than double the U.S. international debt in 1985 and contrasts sharply with the average annual international surplus of over $65 billion that the United States maintained throughout the 1970s.

Not all components of the international debt have the same economic effects. Foreign purchases of U.S. corporate stock or real assets such as factories are not "debt" in the sense that interest must be paid regularly to the asset's owner. Rather, the return to the investor depends on the success of the enterprise. Foreign investors earn a return if their investments succeed, but U.S. workers, suppliers, and investors benefit as well. In a failure, foreign investors share the costs.[18]

However, the net U.S. balance in equity and direct investment accounted for only 25 percent of its international debt at the end of 1986.[19] Debt instruments, which do require an outflow of payments, accounted for the remainder.

This influx of foreign savings has allowed Americans to maintain a high rate of consumption. Foreign investment is not a bottomless source of capital, however. The income outflows needed to service the debt will come at the expense of future U.S. domestic consumption and investment, both public and private.

MEASURING THE CURRENT PERFORMANCE OF PUBLIC WORKS[20]

The previous three sections discussed various proxies for factors that influence the demand for and supply of public works services. None of the individual measures gives a clear or convincing picture of the state of the nation's infrastructure because they measure only certain aspects of either demand or supply. Only by looking at the interaction of those forces, as manifested in the daily performance of public works, can we gain insight into the state of the nation's public works.

Four Performance Measures

In light of its mandate, the Council undertook an assessment of the current performance of the nation's infrastructure; policy conclusions for the future can be valid only if based on an accurate picture of the present. Research sponsored by the Council measured the current performance of eight categories against four measures: physical assets, product delivery, quality of service, (see Exhibit II-13) and cost-effectiveness. The next section outlines a conceptual framework for evaluating public works performance based on these four measures. The following section then applies this framework to

[15] Between 1980 and 1984 the percentage of new capital borrowing that was offset by contributions to state/local retirement plans ranged from 46 percent to 65 percent. These National Council on Public Works Improvement staff calculations are based on the U.S. Bureau of the Census, *Statistical Abstract of the United States.* (Washington, DC: 1987); and Board of Governors of the Federal Reserve System, *Annual Statistical Digest.* (Washington, DC: various years).

[16] One important exception is the Federal-Aid highway program and its supporting Highway Trust Fund, which, under the Byrd amendment, operates in a pay-as-you-go manner.

[17] U.S. Department of Commerce, *Survey of Current Business.*

[18] This point is made in a staff study prepared for the Joint Economic Committee, U.S. Congress, *The Economy at Midyear: A Legency of Debt,* undated, p. 12.

[19] In 1986, the U.S. ran a surplus of $52 billion in direct investment, which meant that this country invested that amount more overseas than foreigners invested here in physical facilities and real property. In contrast, the U.S. ran a deficit in corporate equity of $116 billion in 1986.

[20] For a more detailed analysis of the performance of individual categories of public works, see Appendix A and Apogee Research, Inc., "A Consolidated Performance Report on the Nation's Public Works," op. cit.

EXHIBIT II-13

ILLUSTRATIVE MEASURES OF PERFORMANCE FOR THE NATION'S PUBLIC WORKS, BY CATEGORY

Public Works	Physical Assets	Service Delivery	Quality of Service To Users
Highways	Lane-miles Number of bridges Vehicle registration Fleet size	Passenger miles Vehicles miles Ton-miles	Congestion or travel time Pavement condition Volume/Capacity ratio Accident rates Population with easy access to freeways
Airports	Number of aircraft Commercial seat-miles Number and type of airports	Passener miles Enplanements Aircraft movements	Number and length of delays Accident rates Near miss rates Population with easy access
Transit	Number of buses Miles of heavy rail Subway seat-miles Bus miles	Passenger miles Percent of work trips Transit trips	Average delays Breakdown frequency Population with easy access Elderly/handicapped access Crowding: passenger miles per seat-mile
Water Supply	Water production capacity Number of water facilities Miles of water main	Compliance with MCLs Reserve capacity Finished water production Fraction of population served	Water shortages Rate of water main breaks Incidence of water-borne disease Finished water purity Loss ratios
Wastewater Treatment	Capacity (mgd) Number of plants Miles of sewer	Compliance rate Reserve capacity Infiltration/inflow Volume treated Fraction of population served	Compliance with designated stream uses (local) Sewage treatment plan downtime Sewer moratoria
Water Resources	Number of ports, waterways Reservoir storage capacity Number of dams Miles of levees, dikes	Cargo ton-miles Recreation days Flood protected acreage Irrigated acreage Kwh hydropower produced	Shipping delays Dam failure rate Power loss rate Value of irrigated agricultural product Value of flood damages averted

EXHIBIT II-13
ILLUSTRATIVE MEASURES OF PERFORMANCE FOR THE NATION'S PUBLIC WORKS, BY CATEGORY (continued)

Public Works	Physical Assets	Service Delivery	Quality of Service To Users
Solid Waste	Landfill capacity Incinerator capacity Number of solid waste trucks	Tons of trash collected Tons landfilled Tons incinerated	Collection service interruptions Facility downtime Rate of groundwater contamination

Note: Possible measures of investment efficiency are not shown since these will show less variation by mode. They are discussed in the text.

an evaluation of eight categories studied by the Council.[21]

Physical assets. The simplest measure of infrastructure is the availability of physical assets. This measure is related to capital investment. Data on physical assets (such as numbers of buildings or rolling stock) are often readily accessible, but this information, by itself, does not show how well the assets are being used or the quality of service provided. An airport's physical assets, for example, could be measured by the number of its runways. But one runway in good repair might support more landings and takeoffs than several in poor condition.

Both public and private investment in public works facilities and other capital are important to the total overall measure of physical assets. For example, highway lane-miles are used to measure the public highway contribution, but privately owned cars and trucks are vital to producing highway transportation services. Substantial public expenditures support solid waste management services. However, recent data suggest that private expenditures are added to new solid waste capital at twice the public rate.[22] Although local governments own most water supply systems, there are about 15,740 privately owned water systems that serve about 38 million Americans.[23]

Service delivery. Service delivery measures the infrastructure's ability to perform at certain service levels. For example community water systems must deliver an uninterrupted supply of potable water; flood control structures must provide storage for floodwater levels expected once every 100 years.

Service delivery depends on three elements: the system's physical capacity, the quality of its operation and maintenance, and the level of demand for its service. For example, the movement of cargo on inland waterways depends on the miles and depths of channels, the condition of locks and dams, and the operation of reservoirs. In addition, the level of service varies according to the demand for commodities transported on the waterways and the competition from other modes of transport.

Quality of service. The quality of service reflects the physical size and condition of public works, the product being delivered, and investment and operating priorities. Quality measurements typically include accessibility, reliability, safety, health effects, and congestion. For example, transit access is measured by the population within walking distance of a bus or rail line. Calculations of accessibility also consider the special needs of such groups as the elderly and the handicapped.

Appropriate quality measures for municipal water systems include the frequency of water shortages and the incidence of water-related disease. Water quality requires the presence and operation of raw water extraction facilities, purification equipment, and distribution systems. The uninterrupted supply of pure water also depends on local water suppliers. Did

[21] A ninth category, intermodal transportation, which concerns linkages between categories, is not examined separately in this assessment.

[22] Apogee Research, Inc., communication with Dr. Charles Johnson, National Solid Waste Management Association, July 1987.

[23] See Wade Miller Associates, *The Nation's Public Works: Report on Water Supply*, op. cit., p. 18.

suppliers anticipate the effects of drought or source contamination? Have operators complied with policy or regulatory mandates?

Economic performance. Economic performance measures can be divided into two broad categories: economic efficiency and cost-effectiveness.

Economic Efficiency: The economic efficiency of a project or program is reflected by the excess of its benefits over costs. Using the net present value approach to public spending analysis, we can discount such benefits and costs, using the appropriate social discount rate, for each year during the life of the project/program to the present time. These net benefits can then be compared with those of other programs so that current public resources can be allocated to provide maximum social benefit, i.e. the greatest net benefits. This approach is analogous to private sector capital budgeting models where the firm's profit reflects net benefits.

Such analysis, however, is not used systematically to evaluate governmental investments (except by the Corps of Engineers).[24] It is difficult to use rate-of-return analysis to rank and choose among alternative government investments,[25] in part, because it is difficult to define and value future public benefits. Moreover, using rate-of-return analysis for entire public works programs would require far greater data collection than is now used to support program decisions. Special factors also affect the assessment of governmental spending; for example, when considering the efficiency of the Interstate Highway System, national defense concerns must be taken into account.

The time lag between expenditures and delivery of infrastructure services makes it difficult to measure program investment efficiency. Finally, an often overlooked measurement problem concerns the interaction of public and private investments. For example, the private sector efficiency of highway and aviation services depends on their use by privately owned and operated vehicles and aircraft.

Cost-Effectiveness: The difficulties of measuring investment efficiency may make it more convenient to measure the cost-effectiveness of public works programs. Cost-effectiveness provides simpler measures of services delivered per dollar spent. It can compare the delivery of services with the financial and operating characteristics of facilities.[26]

Efficiency is only one goal of public works programs and sometimes it is ignored altogether. For example, the congressional statement of U.S. water quality policy in the 1972 Clean Water Act (P.L. 92-500) recognized that certain levels of pollution control are—*de facto*—worth their cost.[27] In practice, this led to enforceable standards that required the best controls technology could produce, with little concern for their cost.

It does not necessarily follow that because the benefits of a public works system outweigh its costs, users should be willing to pay, or indeed are able to pay, for particular services. The 1964 Urban Mass Transportation Act implied that the benefits of urban mobility, especially for low-income communities, outweigh the costs of providing transit. This justification is still used to support federal capital and operating grants. Individual transit users probably receive a quality of service greater than that for which they would be willing to pay. However, the system provides additional benefits in the form of reduced highway congestion, a more mobile labor pool, and more effective housing and urban renewal programs.

The Performance of Individual Public Works Categories

In most cases, all four measures must be considered to best understand their implications for a category's performance; then, together with the factors discussed below, the measures can begin to show system performance. We now describe the performance of eight categories of

[24] For an in-depth discussion of the limitations of rate-of-return analysis in public decision making, see Apogee Research, Inc., "Infrastructure Issues Problems and General Solutions," prepared for the National Council on Public Works Improvement, October 1986.

[25] For a recent example of the use of such efficiency measures to evaluate public works programs (the expected economic efficiency of the $12 billion air traffic control modernization plan), see Congressional Budget Office, *Improving the Air Traffic Control System: An Assessment of the National Airspace System Plan.* (Washington, DC: August 1983).

[26] For additional discussion of project versus program efficiency and controlling for quality of service, see Congressional Budget Office, *Efficient Investments in Wastewater Treatment Plants.* (Washington, DC: June 1985).

[27] See Joan Kovalic, *The Clean Water Act of 1987,* Water Pollution Control Federation, July 9, 1987.

public works.[28] Naturally, the performance measures are more applicable to some categories than to others; nevertheless, taken together they provide a reasonable basis for comparison (see Exhibits II-14 and II-15).

Highways. The overall performance of the nation's system of highways, streets, roads, and bridges has been good. During the 1960s, while the country was building the Interstate Highway System, the net capital assets of the entire road network grew continually. Since the completion of the majority of the Interstate System, the accumulation of total net capital assets has slowed and even decreased as some roadways reached the end of their useful life. In 1984, however, net capital assets once again began to grow, due to additional capital spending made possible by the federal five cent tax increase on motor fuel, four cents of which goes to highways and one cent to public transit.

Although levels of capital spending have varied, vehicle-miles of travel on the entire system have risen steadily since 1960 at an average annual rate of 3.0 percent. As a result, existing capital facilities in highways, streets, roads, and bridges are being used at an ever-increasing rate. The quality of service (as measured by overall pavement conditions) generally declined through 1984, but pavement conditions have been improving since 1985. Congestion is an increasing problem, particularly in rapidly growing suburban areas.

Since 1960, vehicle-miles travelled per dollar of public spending have been increasing by 3.5 percent annually. This suggests that either the nation may be making more productive use of its roads and bridges, or the public sector is not spending enough to meet growing transportation needs, in essence living on past investments. To a certain extent, both were true through 1984. Beginning in 1985, however, increased user taxes, supporting greater investment, have helped spending keep closer to need. However, given increasing population, regional shifts and growing intersuburban travel patterns, the capacity of the nation's highway and road network will have to expand further to avoid serious problems in the future.

[28] The category of intermodal transportation is omitted for lack of comparable data.

Aviation. Until recently, the aviation system has responded well to rising demands for service within the limits of existing capacity. However, projected growth in demand suggests that over the long term, capacity may be the system's biggest problem. One indicator of this trend is the decline in the number of public-use airports. However, those lost were small general aviation facilities that were replaced easily in the public system.[29]

The number of commercial airports has changed little over this period. Thus, to absorb the rapidly increasing demand (reflected by passenger enplanements), commercial airports and airlines have had to add capacity through additional runways, improved air traffic control procedures, and expanded terminal facilities. Some airports are exploring the use of pricing mechanisms to increase capacity through charging higher landing fees during peak demand periods to spread traffic flow more evenly throughout the day.

Ordinarily, increased demand for limited facilities would mean lower quality services. Measured by the number of fatal accidents, however, the quality of aviation services is actually improving. (Domestically, the number of fatal commercial accidents is so small as to show no statistically significant trend.) Even given this extraordinary safety record, the cost-effectiveness of the aviation system is improving rapidly. Passenger load factors, for example, used as an indicator of capacity utilization rates, have jumped significantly, particularly since deregulation in 1978. However, delays, congestion, and the limits of the air traffic control system are of increasing concern. If not addressed, they could compromise the overall safety of the system.[30]

Mass transit. While the post-World War I physical decline of the nation's mass transit was reversed during the 1970s, the output of the system has dropped relative to the growth in urban travel. The total number of transit vehicles now exceeds 100,000, an increase of 75 percent since 1970, while the estimated value of fixed assets is over $30 billion, more than double the $14 billion in 1970. Much of the increase in fixed assets and vehicles

[29] Private-use facilities over that same period have grown at an annual rate of 6.3 percent.

[30] In fact, reported near-collisions have increased in recent years, in part because of a vastly expanded system of reporting and data collection.

Exhibit II-14
CATEGORICAL ANALYSIS: PHYSICAL ASSETS AND PRODUCT DELIVERY

Mode	Physical Assets			Product Deliery		
	Measure	Time Frame (Yrs)	Annual Change (%)	Measure	Time Frame (Yrs)	Annual Change (%)
Highways	Net Capital Assets	1960-85	3.5	Vehicle-miles	1960-85	3.0
Aviation	Public-Use Airports	1970-85	−1.1	Passenger Enplanements	1970-85	5.5
Mass Transit	Vehicles	1970-85	1.8	Passenger Trips	1970-83	0.9
Wastewater	Net Capital Assets	1960-85	5.7	Volume of Waste-water Treated	1976-86	0.8
Water Supply	Net Capital Assets	1960-85	2.5	Water Delivered	1984	(a)
Water Resources,						
Flood Control	Dams	1960-85	3.3	Flood Storage	1960-85	2.3
Navigation(b)	Locks & Dams	1960-85	1.8	Ton-miles	1960-85	−2.8
Solid Waste	Net Capital Assets	1973-84	1.5	Tons of Trash Per Capita	1986	(c)

Notes: (a) No time series available. Based on a 1984 survey, 39.7 billion finished gallons were delivered, an equivalent of 175 gallons per person per day.
(b) Inland water navigation only.
(c) No time series available. Estimated to be 1 ton per capita per year.

Exhibit II-15
CATEGORICAL ANALYSIS: QUALITY OF SERVICE AND COST-EFFECTIVENESS

Mode	Quality of Service			Cost-Effectiveness		
	Measure	Time Frame (Yrs)	Annual Change (%)	Measure	Time Frame (Yrs)	Annual Change (%)
Highways	Pavement Conditions	1977-83	(a)	Vehicle-miles Travelled Per $ Pub Spend	1963-84	3.5
Aviation	Fatal Air Carrier Accidents	1970-85	−0.1	Passenger Load	1970-85	2.6
Mass Transit	Avg Hours Betwn Bus Bkdwns	1981-84	10.5	Trips/Bus-mile	1970-83	−0.8
Wastewater	Ambient Water Quality	1974-81	(b)	Unit Water Treated Per Dollar O&M	1976-84	−4.5
Water Supply	Water Losses	1982	(c)	Internal Rate of Return	1970-82	(d)
Water Resources,						
Flood Control	Damages Prvntd	1960-85	(e)	Benefits/$ Assets	1960-85	(e)
Navigation	Avg Tow Delay	1986	(f)	O&M Costs/Ton-mile	1977-85	−0.8
Solid Waste	Collection & Disposal Rtg	1984	(g)	Tons per Dollar O&M	1974-80	−0.7

Notes: (a) Measures exist on the basis of road type. No single measure is a good quality indicator.
(b) Although no detailed data exist, trends suggest little, if any, change.
(c) No time series data exist to assess the annual rate of change in water losses. In 1982, water losses as a percent of total production stood at 10-20 percent.
(d) Data for 30 California water systems suggest internal rate of return ranging from 2-14 percent on capital invested between 1970 and 1982.
(e) Erratic based on flood control structure and rainfall. Over the 1960-85 period, 78 percent of total possible damages were prevented.
(f) No time series available. Median delay was 23 minutes in 1986.
(g) Based on a 100 point scale (1 = best), the 1984 collection and disposal rating was 36.25.

represents replacement of facilities that had deteriorated badly during the 1950s and 1960s. However, major physical problems remain in the subway systems of large older cities such as New York, Chicago, and Philadelphia.

In part as the result of a large infusion of federal funds to purchase more buses, trips per bus-mile fell at an annual rate of 0.8 percent between 1970 and 1983. Labor productivity also declined, from nearly 14,000 vehicle-miles per employee in 1965 to under 11,000 in 1983. Costs per passenger, after adjusting for inflation, have more than doubled since 1970.

In addition, evidence indicates that transit is over-capitalized in many places.[31] Important exceptions occur in cities like New York that have large rehabilitation requirements.) This over-capitalization is reflected in the relative growth in the number of vehicles in the system compared to ridership. The number of transit vehicles grew by 2 percent annually from 1970 to 1985, while ridership over the same period increased at only half that rate. As a result, trips per bus-mile have fallen since 1970. On the other hand, it appears that the quality of transit services has improved. The annual improvement in the average hours between bus breakdowns has been exceptional (10.5 percent).

Much of the decline in performance is due to forces beyond the control of transit managers. The most important factors have been the increased suburbanization of jobs and residences, greater use of automobiles, and growing intersuburban travel.

Water supply. Relatively little data and few analyses are available to evaluate the performance of community water facilities on a nationwide basis. The few statistically significant samples of the nearly 60,000 water systems reveal a largely self-sufficient cross-section of publicly and privately owned utilities, the majority of which produce a high-quality product at reasonable cost. Nationwide, annual 2.5 percent growth in net capital assets suggests a continuing dedication to investment.

Yet, national numbers mask regional and facility variations. One such regional concern is the deterioration of storage and distribution systems in older cities, mostly in the Northeast. Some water systems in western states are beginning to have allocation problems; users compete as regional supplies are consumed.

Public water systems in all regions of the country face potential performance difficulties that could arise from (1) artificially low, subsidized pricing conventions that exacerbate revenue shortfalls and encourage over-consumption; (2) compliance with increasingly strict water purity standards, particularly among small systems with limited funds; and (3) acute or chronic source contamination, especially among groundwater users.

Wastewater. Wastewater treatment has made significant gains in the United States in the past decade. From 1978 to 1986, the total value of wastewater facilities rose 25 percent from $110 billion to $138 billion. This is the fastest growth rate of any of the infrastructure categories studied by the Council for which there is consistent data. This growth reflects the nation's commitment to preserving water quality. However, the volume of effluent treated increased by only 6 percent, from 26.205 billions of gallons per day (BGD) to 27.692 BGD.

There is some concern that asset values have increased about 4 times as fast as volume of effluent treated. Some suggest that these trends reflect increasingly inefficient use of wastewater treatment resources. However, it must be remembered that there has been an overall improvement in the quality of treatment—68 percent of all treatment plant capacity was secondary or greater in 1978, 82 percent was secondary or greater in 1986; and that 8 percent more of the U.S. population is now served by centralized sewage treatment facilities making a total of three-quarters of all inhabitants served by central facilities.

These improvements have served to hold the quality of the nation's waters at nearly a constant level over the past decade in the face of population and industry growth. Such growth and the emerging concern about nonpoint sources of pollution, groundwater contamination, and threats to wetlands are challenges to the nation's commitment to preserving our water quality.

Water resources: inland waterways and ports. The nation's waterborne transport system has performed moderately well over the past 25 years. Since 1960, the value of the physical assets of the inland waterway system has grown at an annual rate of 1.8 percent. During that same time, ton-miles of cargo handled grew at an annual rate of 2.8 percent. This represented 15 percent of all intercity freight traffic.

The quality of inland waterway transportation is based on such things as congestion at locks, processing time at locks, use rates, dollar losses due to delays, and the amounts of time that locks

[31] Apogee Research, Inc., "A Consolidated Performance Report on the Nation's Public Works," op. cit., p. 147.

presence in the market for state and local government securities due to elimination of the deduction for the interest costs of holding state and local debt.

The elimination of prior-law investment incentives will change some of the options available to localities for financing public works projects.[43] In recent years, many state and local governments have involved private firms in the financing, design, construction, and operation of public facilities and services.

These arrangements brought tax benefits to the private firms and cost reductions to the governments. In particular, the Accelerated Cost Recovery System (ACRS), enacted in the Economic Recovery Tax Act of 1981 (P.L. 97-248), substantially reduced the period over which property could be depreciated for tax purposes. Municipalities claimed to have saved money because of private participation stimulated by the tax advantages to private developers.

Arrangements with the private sector sometimes offer potential advantages.

- *Maintenance.* State and local government fiscal pressures have contributed to undermaintenance. Private firms have an incentive to maintain facilities, since maintenance costs are operating expenses that are tax-deductible.
- *Setting priorities.* Governments must weigh public works against other spending priorities. As a result, capital improvements and maintenance are often postponed in favor of operating expenses. Private firms, in contrast, have fewer competing responsibilities. This should encourage more efficient construction, maintenance, and operating deci sions.
- *Performance sanctions.* Private firms can lose contracts or profitability for inadequate performance. Equivalent sanctions generally do not exist for public agencies.

Potential disadvantages of privatization include the possibility that private firms will "skim" the more profitable public-sector functions that could, if maintained as public functions, generate a surplus to help finance deficit-producing activities.

In a recent survey of city and county governments, about one-third of the officials responding reported having contracted for services from the private sector.[44] Reasons for doing this included capital-cost savings and lack of needed expertise in the municipality.

Nearly 40 percent of the survey respondents plan to privatize facilities in the next two years, even though the elimination of many prior-law investment incentives reduced the savings localities will realize. The survey respondents plan to privatize an estimated $3 billion worth of facilities over the next two years.[45]

In sum, the Tax Reform Act of 1986 is likely to increase the cost of providing public works through public-private partnerships. This will discourage some projects, reduce the size of others, and move still others entirely into the public sector. For some localities, however, the advantages of privatization still remain.

RESTRICTIONS ON STATE AND LOCAL INFRASTRUCTURE FINANCE[46]

Federal tax policy sets limits on the ability of state and local governments to issue tax-exempt obligations. State constitutions and statutes further limit state and local capacity to finance public works. States limit state and local spending, taxing, and borrowing powers; prescribe

[43] For a more detailed discussion of privatization, see Scully Capital Services, Inc., "Impact of the Tax Reform Act of 1986 on Privatization," prepared for the National Council on Public Works Improvement, June 1987; John E. Petersen, et al., "Constitutional, Statutory and Other Impediments to Local Government Infrastructure Financing," prepared for the National Council on Public Works Improvement, October 1987; and Shearson Lehman Brothers Inc., "Impact of the Tax Reform Act of 1986 on Resource Recovery Projects," New York, March 1987.

[44] Touche Ross & Co., "Privatization in America: An Opinion Survey of City and County Governments on Their Use of Privatization and Their Infrastructure Needs," Washington, DC, 1987. The survey was mailed to 5,718 governments; 1,086 responded.

[45] Extrapolating these sample results to the universe of governments surveyed suggests that cities and counties could privatize as much as $16 billion in new facilities over the next two years. This would be equivalent to just over one-sixth of all local capital spending in 1985 and would suggest that privatization will be a major public works financing trend. However, such an extrapolation could generate an estimate that is too high. The respondents were self-selected and those officials who chose to respond could have had a higher interest in privatization than those who did not.

[46] For a more detailed discussion, see John Petersen, et al., "Constitutional, Statutory and Other Impediments to Local Government Infrastructure Financing," prepared for the National Council on Public Works Improvement, October 1987.

interest rate limits and referenda requirements; and impose conditions on privatization.

State Tax and Spending Limits

State limits on revenues and expenditures that affect public works financing fall into three categories: restrictions on local property taxes; limits on local revenue collection; and limits on local government spending.

Property tax restrictions. Accounting for 74 percent of local government tax revenue in 1985, the property tax is the largest revenue source for local governments. Rapidly increasing property taxes led to taxpayer revolts in the 1970s and early 1980s, and resulted in the passage of laws to limit the use of property taxes.

States use three methods to directly restrict local governments' ability to raise revenue from property taxes: property tax rate limits; limits on the property tax levy; and limits on the amount that property assessments can increase annually. Some such limits are written into local charters.

As of October 1985, 31 states had imposed specific property tax rate limits on local governments. Where property is increasing in value, such limits may not halt growth in property tax revenues. Combined with limits on increases on the assessed value of property, however, property tax rate limits can have a substantial impact. As of October 1985, 22 states imposed limits on the assessed value of property. Seven states set limits on the annual increase in assessed valuation. States may also control local property tax revenues by placing a limit on the assessment ratio, which is the percentage of a property's full market value subject to taxation.

While the short-term effects of restricting property tax revenues to local governments are substantial, the long-term implications of such limits are unclear. Some local governments turn to other revenue sources, such as user fees or increased use of state funds. Others reduce budgets and levels of service, which may increase fiscal pressure on state governments. Tax limits also have a negative effect on a locality's credit standing and may increase the cost of its debt.

State restrictions on local revenues. As of 1985, six states set either constitutional or statutory limits on the total amount of revenues local governments could collect annually. Such limits hinder the ability of local governments to deliver services and adversely affect credit ratings.

Spending restrictions. Limits on the amounts that a local government can appropriate or spend in a given year may be expressed as an allowable percentage increase or as an absolute dollar amount. Six states imposed such limits on local governments as of October 1985.

At least 20 state governments have revenue and expenditure restrictions. Such limits often tie increases in revenues or expenditures to growth in the state's economy, growth in total state personal income, or to a specific percentage. As with local governments, such restrictions limit revenues collected from various tax and user charges and curb their ability to deliver services; they also may affect state credit ratings.

Debt Limits

Traditional general obligation bonds and project-specific revenue bonds are the two debt financing mechanisms that local governments have at their disposal. Revenue bonds are typically regulated at the state level by placing a cap on debt levels through state-mandated debt limits or referenda requirements.

Municipalities in 44 states face constitutional or statutory limits on the amount of general obligation debt they can incur; two other states impose specific indirect limits. Such limits, related to some percentage of a municipality's real property, are designed to cap local indebtedness.

In reality, such limits often have little impact since municipalities maintain indebtedness levels far below the cap. In 1981, for example, a study prepared for the New York State Assembly showed that over 75 percent of the nation's cities used less than 40 percent of the general obligation debt capacity and 97 percent of smaller towns use less than 20 percent of their legal capacity. The study demonstrated that since 1975, the amount of debt margin of general obligation debt used by New York local governments has seen a downward trend, partly due to a shift of debt to revenue bonds.[47]

These findings are reinforced by the results of a 1986 national survey that found that only 3.8 percent of local officials considered debt limits to be the

[47] New York State Legislative Commission on State-Local Relations, *New York's Limits on Local Taxing And Borrowing—A Time for Change?* (Albany: 1983), p. 119.

major constraint on borrowing.[48] Local officials report that other considerations, including taxpayer disapproval and the adverse effect of higher taxes on economic growth, are more important in limiting the amount of debt issued.

Interest Rate Limits

States also use statutory interest rate limits, procurement or bidding requirements, and referenda requirements to curb municipal general obligation borrowing. The relevance of such controls is often questionable, due to the states' willingness to adjust limits as needed. Although every state has statutory language designed to ensure the most favorable interest rates to municipalities on the issuance of bonds, such regulations are often unclear or contradictory.

Referenda Requirements

Some form of voter approval of general obligation bond issues is required in 42 states. While a majority of local officials believe they need more capital expenditures for public works, 35.9 percent of local officials questioned in a recent survey listed referenda requirements as the major impediment to indebtedness.[49] Municipalities have, however, found several other ways to issue debt without voter approval. These include the following:

- Allowing general obligation debt issues of certain sizes without referenda.
- Issuing revenue bonds for activities previously financed by general obligation bonds.
- Shifting the cost of capital construction forward to developers while rebating the cost through tax incentives or abatements.

Limits on Public-Private Partnerships

Many states have explicit constitutional statutory provisions governing private development of capital-intensive public services. Twenty-eight states permit private solid waste collection and disposal, and 24 states permit private sewer and water facilities.[50] In addition, some municipalities may be able to privatize services under their home rule power even if this is not explicitly permitted by state law.

Intergovernmental Tax Comity

Some groups at the state and local level have expressed concern about potential encroachment of the federal (or state) government on state and local tax bases. The concern is that the use of certain taxing techniques at the federal (or state) level could restrict state and local government finance capacity. However, federal use of a tax base need not bar its use at other levels of government; income, for example, is commonly taxed at all levels of government. In some cases, however, federal use of a tax base may make state and local taxation of that base more difficult. For example, the multiple use of certain excise taxes (e.g. gas or beverage taxes) may increase prices of goods and services so much that actual tax receipts could decline if each level of government acted independently.

There is a need for more information on the effect of taxes at the federal (or state) level on the effective tax capacity and spending levels of state and local governments. Some evidence exists that federal abandonment of certain tax bases might not result in more state and local spending. For example, in a recent survey, the ACIR asked local government officials what they thought their state would do if federally aided highway programs and revenue bases were transferred to the states.[51] Over half the officials surveyed thought spending in their state would increase, but nearly 20 percent thought it would decline.[52]

Local governments, the primary provider of most public works, are taking an increasing share of financing those public works as well. In this environment, the Council believes more attention should be paid to the effect of federal and state tax

[48] Michael A. Pagano, "How the Public Works: Major Issues in Infrastructure Finance," (Washington, DC: of The National League of Cities, September 1986), pp. 16-18.

[49] Ibid., pp. 15-16.

[50] Petersen, et al., "Constitutional, Statutory and Other Impediments to Local Government Infrastructure Financing," op. cit., p. 45.

[51] John Kincaid and Max B. Sawicky, *Local Perspectives on State-Local Highway Consultation and Cooperation: Survey Responses From State Associations of Local Officials.* (Washington, DC: July 1987).

[52] NCPWI calculations based on ACIR, ibid., Table 13.

increases and initiatives on the capacity of other levels of government to finance their infrastructure investment, operation and maintenance.

State and Federal Restrictions in the Context of a National Strategy

State and local spending, taxing, and borrowing restrictions are numerous and complex; they stem from the unique historical, constitutional, and political framework of each state. The effects of these restrictions are also complex; they may affect political structures, spending priorities, and accountability (see "Special Districts and Authorities," above, for further discussion). Such restrictions may increase the cost of financing infrastructure and reduce public works spending. As all levels of government work toward a reinvestment strategy for the nation's infrastructure, unduly restrictive fiscal limitations must be reassessed.

CONCLUSIONS AND POLICY OPTIONS

Infrastructure finance policy debates revolve around three questions:

- How much should we spend?
- Who should pay?
- How should spending be financed?

The answers to these questions are interdependent. How much to spend depends on who will pay and how the charges will be collected. The financing method chosen, in turn, will determine whether the revenues are adequate and reliable.

Implementing the Benefit Principle in Public Works Finance

Public works services should be priced so that direct users, indirect beneficiaries, and producers of wastes pay the costs of services. If prices reflect costs, the public's use of a facility and its willingness to pay for services will indicate the appropriate scale and distribution of public works. Using such an approach will be easier with better information about the relationship between use patterns and charges. More sophisticated pricing techniques can then be developed. Nevertheless, general-fund subsidies will still be necessary to promote society's interest in the quality of services and to retain fair and affordable distribution of services.

Reliable Revenue Streams for Public Works Finance

The various dedicated financing techniques examined in Council research can improve public works management. Public works lend themselves particularly well to dedicated financing techniques because of their long lives, need for continued maintenance, and the unevenness of their replacement and rehabilitation expenditures. In addition, a clear benefit-cost connection often promotes easier acceptance of new spending programs by voters and legislatures. Making this connection clear could become particularly important for financing new needs such as hazardous waste disposal. Few institutional structures currently cover this problem.

However, these techniques are not foolproof. At all levels, the political process responds to changing public priorities regardless of institutional rigidities and constraints. Legislatures can fail to appropriate already collected trust-fund balances; earmarked revenues can be offset by reduced general-fund spending; and special districts can fail to carry out their mission because of their financial dependence on general-purpose governments.

Most important, perhaps, Council research suggests that sound public-sector fiscal policy and a strong economy are crucial to good public works programs. Where these are present, institutional arrangements to protect public works are less significant. In the absence of sound fiscal policy and a strong economy, public works programs will not succeed.