

## **PRIVATIZING INFRASTRUCTURE: OPTIONS FOR MUNICIPAL WATER-SUPPLY SYSTEMS**

### **EXECUTIVE SUMMARY**

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Many municipal water-supply systems in the United States face serious problems associated with capital deterioration, deferred maintenance, unreliable water supply, and underpricing of services. In addition, local governments are projected to fall \$17 billion short of the estimated \$49 billion cost (1993–2000) to comply with the Safe Water Drinking Act amendments.

Because municipal water-supply systems, frequently publicly owned and operated, face little capital-market competition and generally cannot go bankrupt, they lack incentives to operate efficiently. Private systems also face operational and management problems as a result of rate-of-return regulation and unequal tax treatment with publicly owned systems. Rate regulation removes incentives to innovate and adopt least-cost practices. In addition, in contrast to municipally owned systems, privately owned systems pay taxes, do not have wide access to tax-exempt funds, and thus operate at a considerable competitive disadvantage.

Privatization in the form of long-term, competitive-franchise agreements or asset sales, introduces elements of competition that can generate incentives for efficient water-supply system management. France currently uses the franchise model to provide water to over 75 percent of its population. The United Kingdom now provides water to nearly 100 percent of its population through fully privatized water-supply systems. A growing number of other countries—including Argentina, Australia, Chile, and Italy—are turning to similar privatization models to gain private-sector operating expertise and investment.

In the United States, the over 300 operations and maintenance contracts between private operators and municipalities are a form of competitive franchising. These contracts, which generally run for five years, have achieved cost savings of between 20 and 50 percent. Contractual performance and cost guarantees enable municipalities to secure operation's accountability. Removing state and federal laws that restrict the length of contracts would give private contractors more opportunity to make and finance capital improvements, and hence increase potential cost savings.

Compared to competitive franchise, implementing full privatization would be considerably more difficult, but could yield greater benefits by taking advantage of the stronger incentives associated with private ownership. Moreover, the 1989 sale of Britain's 10 major public water authorities, for example, had the important advantage of identifying \$40 billion in investment needs and arranging for the investment to be financed through private-capital markets and rate increases—not public subsidies.

To remove the need for rate regulation, privatization transactions could be structured so that private companies become wholesalers and not retailers of water services. Problems with “cost-plus” rate regulation could also be addressed by replacing it with price-cap regulation. Used to regulate an increasing number of utility services in both the United Kingdom and the United States, this incentive regulatory approach partially decouples compensation that the utility receives from actual cost incurred by linking changes in the price of the regulated service to changes in the retail price index.

To level the “playing field” in which publicly owned and privately owned systems compete, publicly owned water-supply companies could be transformed into stand-alone, government-owned enterprises subject to the same tax and regulatory policies as private water companies. Both this transitory phase and full privatization would expand a municipality's tax base, encourage full-cost pricing, and lead to less reliance on all levels of the government to finance the cost of upgrading facilities and meeting state and federal drinking water regulations.

## **I. INTRODUCTION**

Of all public services, the provision of piped water is the one with which the private sector is the least involved. . . . It may not be a coincidence that water is also the sector that, in many countries, seems to have the greatest problems. [Gabriel Roth, 1987]<sup>i</sup>

Like other forms of public infrastructure, water-supply systems in the United States are experiencing management and operational problems. Whether it is the neglected and leaking water systems of large urban cities like New York and Philadelphia; the inability of many systems to finance the rising cost of meeting environmental standards; or the water-supply reliability crisis facing several states including California, Washington, and New York, the evidence suggests that an important source of the problem is institutional—it concerns the ownership and regulatory structures governing water-supply systems.

The problems that plague municipal water-supply systems become especially significant when it is realized that—unlike gas, electric, and telecommunications utilities—the majority of water-supply infrastructure is owned and operated by municipal governments and hence does not face any form of competition to improve performance. Moreover, under severe fiscal pressure, state and local governments increasingly lack the financial and technical resources to efficiently operate and maintain these systems. Hence, not only are many public water-supply systems in poor physical condition, but governments lack both the resources and incentive to properly repair them.

Privatization of government highway, airport, and port infrastructure—a trend that is occurring overseas and increasingly in the United States<sup>ii</sup>—offers a way for municipalities to harness private-sector resources and incentives to improve water-supply system performance while at the same time preserving public resources. Full privatization (sale of public asset) and long-term franchise agreements are the two privatization models presently being used outside the United States. This paper examines these models and identifies how they compare with the performance of U.S. municipally owned and operated water-supply systems and privately owned water utilities which face rate-of-return regulation.

## **II. OVERVIEW OF THE U.S. WATER-SUPPLY INDUSTRY**

Compared to the provision of standard public utility services—gas, electricity, and telecommunications—water-supply systems in the United States have several unique characteristics:

- Primarily municipal or public ownership;
- Highly fragmented systems that are not interconnected;
- Highly capital intensive (natural monopoly character);
  
- Tax-exempt financed (municipally owned systems); and
- Underpriced services.

A 1987 survey for the U.S. Environmental Protection Agency estimates that there are 52,509 community water systems in the United States.<sup>iii</sup> More than half of this number are privately owned, and include investor-owned and homeowners' associations as well as ancillary systems (mobile home parks, schools, hospitals, etc.). Small water systems, which the EPA defines as those serving a population of fewer than 3,300 (about 1,000 connections), make up over 83 percent of all systems. The vast majority of these systems are privately owned but not regulated utility-type organizations.

As indicated in Figure 1, most of the water-supply systems serving communities over 3,300 people are government-owned. These generally larger systems serve over 85 percent of the nation's population. Investor-owned systems serve the remainder of communities over 3,300 people.

Throughout most of the United States, water systems are not interconnected because of the high asset requirement per revenue dollar involved in collecting, treating, and distributing water.<sup>iv</sup> The high capital cost required in establishing a local water-supply system or connecting with nearby systems means that it is generally not economical for potential rival systems to compete side-by-side with a local supplier. The existence of economies of scale—lower unit costs at higher volumes—indicates that water-supply systems are natural monopolies. However, this cost structure does not preclude competition if competition is organized for the entire market in the form of an exclusive franchise agreement.

Because much of the technology required for productivity growth is embodied in physical capital, which has a relatively long life and represents much of the total water-supply system cost, raising productivity in the water industry is difficult. Consequently, as Steve Hanke and John Boland have pointed out, “Investment decisions related to the construction and financing of water systems are, therefore, of paramount importance.”<sup>v</sup> This is also to say that pricing and maintenance decisions are critical to a water-supply system's productivity.

Another important attribute of water-supply systems, especially municipal systems, is the extent to which they secure their revenue needs from tax-exempt debt. As indicated in Table 1, municipally owned systems receive 60 percent of their financing needs from the tax-exempt municipal bond market while privately owned systems rely primarily (40-50 percent) on retained earnings or the revenues that user charges raise after operating taxes have been subtracted. This breakdown reflects the generally higher cost privately owned systems face in raising capital as a result of having to pay taxes and not being a part of a government entity with taxing powers.

The use of tax-exempt debt does not come without a cost. Estimating the tax revenue loss from the tax-exempt status of state and local bonds at \$0.30 for each dollar of tax-exempt debt, one study calculated that between 1977 and 1984, the federal government lost about \$5.8 billion on the \$18 billion dollars in tax-exempt bonds issued.<sup>vi</sup> The study also notes that the federal government also “provided implicit subsidies to states and localities for infrastructure improvements through the deductibility of state and local income and sales taxes from federal taxation.”<sup>vii</sup>

**TABLE 1**  
**CAPITAL SOURCES OF PUBLICLY AND PRIVATELY OWNED WATER SYSTEMS**

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**Publicly Owned Systems**

<u>Source</u>	<u>Percent of Total</u>
Tax-Exempt Municipal Bond Market	60
Retained Earnings	20-30
Intergovernmental Aid	5-10
Other Sources	5-10
Bank Loans	
Special Tax Assessments	
Developers Contributions, Etc.	

**Privately Owned Systems**

<u>Source</u>	<u>Percent of Total</u>
Retained Earnings	40-50
Stocks and Taxable Bonds	20-30
Industrial Revenue Bonds	10-20
Other Sources	20-30
Bank Loans	
Developer Contributions, Etc.	

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Source: U.S. Congressional Budget Office, *Financing Municipal Water Supply Systems*, May 1986, p. 50.

Directly related to the financing of water-supply systems is the pricing of water services. Prices charged to water consumers have historically not reflected the full cost of water services and thus have fostered deterioration of water-supply systems. Economist Patrick Mann notes that for the years 1970–1980, real water prices for residential and commercial consumers declined,<sup>viii</sup> meaning that measured against the consumer price index, real water prices had fallen. Largely as a result of the Safe Drinking Water Act, water prices for the years 1980–1990 (after taking into account inflation) increased about 1.5 percent.<sup>ix</sup>

Pricing water services below full cost is a practice which only municipally owned systems can afford, given that private systems must meet all the costs of service (including a “normal” or “competitive” profit which owners receive for contributing capital) in order to stay in business. And investor-owned systems, unlike government-owned systems, have no taxing power or ability to readily issue tax-exempt debt.

The water industry's capital-intensive/low-revenue character becomes more apparent by examining the industry's ratio of required capital investment per revenue dollar, relative to other utilities and industries. As shown in Table 2 below, the water industry is by far the most capital intensive.<sup>x</sup>

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**TABLE 2**

<u>Sector</u>	<u>Asset Requirement Per Dollar of Revenue</u>
Water Systems	\$10-\$12
Telephone Companies	\$3
Electric Utilities	\$3-\$4
Railroads	\$2
Airlines	\$1

Source: *The Nation's Public Works: Report on Water Supply*, Wade Miller Associates, May 1987, p. 23.

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Corresponding to these attributes, both the rates of return authorized by public-utility commissions on common equity for private water-supply systems, and the risk-adjusted benchmarks developed by credit-rating companies for municipal water utilities, are lower for water utilities than for other utility sectors.

The lower return on capital invested in water utilities highlights the industry's natural-monopoly character. The water industry's limited exposure to competition suggests that its earnings volatility or business risk should be low. By contrast, regulatory and technological changes in the gas, electric, and telephone businesses have created new competitive pressures that have contributed to greater business risks. Thus, public-utility commissions have compensated these utilities with higher authorized returns.

Yet, as a result of stricter drinking-water standards and technology, water-supply operations today face unprecedented pressures to increase both capital and operating expenditures and even face new forms of competition. In effect, while the scarcity value of drinking water is increasing, municipally owned water systems lack the incentive structure to efficiently respond. Specifically, without exposure to direct competition, these organizations do not acquire market disciplines required for them to properly price water and maintain efficient investment programs. At the same time, under rate-of-return regulation, privately owned water utilities, which do face some forms of competition (from municipal takeover and in the capital market), are also financially and operationally constrained.

These factors help explain why water-supply systems are failing to perform properly, and why it is worthwhile to examine alternative water-supply models that increase private-sector participation and competition. Already, privatization in the form of competitive contracting for operations and maintenance (O&M) of water-supply facilities is a growing trend for many small- and middle-sized municipalities that are searching for cost-effective methods of meeting water quality regulations, upgrading, modifying, and maintaining facilities. Properly designed contracts can increase responsibility and accountability for municipal wastewater treatment operations by guaranteeing performance and cost.

Overseas, a number of countries have water-supply systems that are either operated or owned primarily by the private sector. France, for example, has a long history of private water provision, and today 75 percent of the country's drinking water is supplied through long-term franchise agreements between the public and private sectors. Britain privatized its 10 main water authorities in 1989. To modernize and properly operate their systems, Argentina, Australia, Chile, Italy, and Mexico are also opening up their water facilities to private investment and management.

### **III. DEFICIENCIES OF THE U.S. MUNICIPAL WATER-SUPPLY SYSTEMS**

Government-owned and operated water-supply systems are experiencing financing problems, underpricing, capital deterioration, and inadequate or deferred maintenance. These deficiencies are due largely from the absence of appropriate incentive structures in publicly owned and operated enterprises. The lack of both profit motive and effective ownership control by citizens

(taxpayers) creates an environment where responsibility is not clearly defined. The relatively weaker accountability inherent in public-sector water systems prevents them from operating in the most efficient manner.

From his experience studying public enterprises in different countries, World Bank economist John Nellis has identified four reasons why efficient resource management—the primary goal of a commercial enterprise—is less likely under government ownership than private-sector ownership:<sup>xi</sup>

- public enterprises are more subject to political interference than private firms;
- public enterprises are less capable of offering the right incentives and salaries to attract and retain good managers;
- public enterprises are less subject to the discipline of commercial financial markets than private companies;
- the interests of capital are less well represented in public enterprises than private, that is, the owner of capital, the state, is represented by people who are not personally interested in profits and losses of the firm.

As a result of the incentive structure created by private ownership, private firms generally use fewer resources than do public enterprises to supply the same services.<sup>xii</sup> Competition, whether within the product market, for the entire product market (as in franchise agreements), or in the capital market—both in terms of the market for funds and the market for corporate control—acts as the key constraint differentiating private and public sectors. In addition, the threat of bankruptcy is generally not applicable to public enterprises.

The general cost advantages of the private sector are weakened, however, when government places stringent rate-of-return regulation on privately owned enterprises and does not tax the interest on debt, property, or income of publicly owned systems, as is the case in water-supply systems. Privatization analysts Steve Steckler and Lavinia Payson calculated that the tax-exempt status of government property, income, and debt in effect gave New York State and local governments a subsidy of over 40 percent compared to private firms.<sup>xiii</sup>

Consequently, while there is a bias in favor of public water-supply systems, unlike private enterprises, these systems lack the necessary institutional structure to control costs and efficiently manage resources. The major deficiencies of government-owned and operated water-supply systems are examined below.

#### *A.Financing Drinking Water Investment*

Under the Safe Drinking Water Act (SDWA) of 1974, the U.S. Environmental Protection Agency is charged with establishing minimum national standards for drinking water. The 1986 amendments to the SDWA established specific limits on the amounts of 83 drinking-water contaminants and provided rules for filtration of surface-water supplies and disinfection of all public water supplies.



The 1986 SDWA amendments represent the greatest source of escalating cost pressure on water-supply systems. Unlike the Clean Water Act, which provided significant federal funding to public wastewater systems, the SDWA contains no federal funds, grants, or low interest loans to assist communities in compliance. As a result, the President's May 30 Executive Order on infrastructure privatization is not widely applicable to water-supply systems.<sup>xiv</sup>

Estimates for the cost of complying with the 1986 amendments range from \$21.1 billion (1987–2000)<sup>xv</sup> to \$49 billion (1993–2000).<sup>xvi</sup> Figure 2 provides a historical and projected look at capital spending for drinking water. “Projected spending” indicates what state and local government plan to spend while “projected needs” indicates how much needs to be spent to comply with existing drinking water regulations.

Cost impacts and subsequent rate impacts of the SDWA amendments vary with system size and treatment complexity. The presence of significant economies of scale means that the operating and capital cost of treating water decreases with increasing water-system size. Thus, small systems, which lack efficiencies in large-scale production and generally have the greatest difficulty in raising capital, tend to be the hardest hit by new regulations.<sup>xvii</sup> The EPA has estimated that compared with the 25-percent increase in the annual water-user charge for communities with systems serving over 250,000 people, smaller communities with systems serving less than 10,000 people will require increases of over 35 percent.<sup>xviii</sup>

In a 1990 report for the Clean Water Council, Apogee Research attempted to quantify the projected “gap” between forecasted capital needs for meeting drinking-water standards and the amount states and local governments are expected to spend. Subtracting from the estimated capital needs of \$49 billion for the years 1993–2000 the \$32 billion in capital expenditures forecasted for the eight years, Apogee Research calculated an aggregated capital shortfall of \$17 billion.<sup>xix</sup>

### *B. Underpricing of Water-Supply Services*

One of the most basic problems of public water systems is their practice of charging prices that are less than the real unit costs of providing water service. Underpricing of municipal water services explains the inability of these systems to provide reliable water supplies and to be able to finance the investment needed to meet environmental standards. Moreover, underpricing by public water systems may explain why there are so few privately owned water systems since their (full-cost) rates are often uncompetitive with those of publicly owned facilities.

Prices that reflect the full costs of securing additional units of water are important because they inform consumers about the true value of water and thus encourage efficient use. Because the cost of water provision varies according to time and distance, efficient rate design requires incorporating both of these factors. Yet, as many analysts have noted, water supply decisions have historically neglected to link water demand, costing, and pricing.<sup>xx</sup> Indeed, charging for water usage through

metering is only recently getting under way in some older U.S. urban areas such as New York City. By contrast, in countries like France, where private companies are the predominant suppliers of water services, metering is common practice.<sup>xxi</sup>

Over the last 10 years, the Congressional Budget Office of the United States (CBO), the National Council on Public Works Improvement, and the American Water Works Association, among others, have issued reports finding that public water facilities fail to charge prices that cover the full cost of supplying water.<sup>xxii</sup> The CBO report concluded:

Thus while both public and private utilities usually set prices that are more than sufficient to cover operating costs, only private utilities routinely charge enough to cover fully not only operating costs but also the depreciation of capital facilities.<sup>xxiii</sup>

The CBO conclusion was based on an EPA report on community water systems; the relevant table in that report comparing average water prices has been reproduced as Table 3. In further support of a fundamental difference in public and private pricing practices, the EPA study also noted that the ratio of operating revenues to operating expenses averaged only 1.19 for publicly owned water utilities, compared with 1.59 for privately owned systems.

The lower prices charged by publicly owned water systems can be traced to a number of different factors, all of which relate to the different institutional framework in which public organizations operate in contrast to private firms. The most obvious of these is publicly owned utilities' tax-exempt status, which acts to shield them from taxes on franchise, property, income, and interest on debt, which their private counterparts must pay. In addition, public systems often collect developer fees—service line costs, connecting fees, cost of meters, processing fees, etc.—which private systems can only recover through higher rates.<sup>xxiv</sup>

The obvious fundamental difference between public and private systems is that as government entities, municipally owned water systems do not face a bottom line, i.e., stringent financial constraints. No matter how poorly they perform, public enterprises do not go bankrupt. Nor are government owned entities subject to capital-market disciplines provided by stock prices and the threat of corporate takeovers.

Some fiscal discipline is achieved through the bond covenants that private investors impose on public systems to secure repayment of the (tax-exempt) debt. Thus, a few systems have been required to set rates to not only pay for 100 percent of operating and maintenance expenses, but also some percentage of annual debt service requirements. Generally, rate covenants only aim to generate some reserve above the debt service cost.

Financial accountability problems are accentuated where municipal water departments do not operate autonomously. As reported in the National Council on Public Works comprehensive study on the U.S. water industry, serious problems of accountability arise when the operations and financing of publicly operated facilities are integrated or “co-mingled” with other government

operations: “When water systems are fiscally co-mingled with multi-purpose local governments there is no means of assuring optimal pricing and production decisions for water supply.”<sup>xxv</sup>

Moreover, under these circumstances, government departments must compete for attention and tax dollars. Less publicly visible than other government programs such as police and fire departments, public water services often fail to get close scrutiny and, as a result, maintenance and capital improvements are inadequate, postponed, or neglected. This has been shown to be particularly true especially for fiscally distressed cities.<sup>xxvi</sup>

In addition, cost-accounting practices for both publicly owned and privately owned (rate-regulated) water-supply systems tend not to account for total economic costs—out-of-pocket operating costs, economic amortization charges for all capital employed, and opportunity costs for the raw water used. For example, the use of historical accounting costs rather than present cost in the ratemaking process, and the use of average embedded instead of incremental cost as the basis for increasing real unit-water costs, indicate that economic costs are not being covered and underpricing is likely to result.<sup>xxvii</sup>

Finally, in addition to failing to price water services to recover cost, publicly owned water systems generally have less incentive to adopt complex rate structures that reflect demand conditions of various customer classes. Economist Steve Hanke has noted that “private firms do have more price schedules [than publicly owned water systems] and that these private rate schedules more closely reflect cost and demand conditions than do public schedules.”<sup>xxviii</sup> These results are consistent with those showing that privately owned electric utilities have more innovative and efficient rate structures than publicly owned electric utilities.<sup>xxix</sup>

In sum, the failure of government-owned water companies to charge the full cost of providing water services (in combination with the limitations upon return on investment which investor-owned water companies are permitted), may go a long way to explain the significant shortfalls in capital needed in both types of systems to comply with mandates on water quality and wastewater treatment. In summarizing three major studies assessing the national needs of the U.S. water industry, the National Council on Public Works Improvement reported that “it is the conclusion of these studies that the [capital] shortfall exists primarily due to the artificially low water rates.”<sup>xxx</sup>

### *C. Deteriorating Infrastructure*

Deferred or neglected system maintenance and delayed capital replacement are the frequent outcomes of government-managed systems generally, and underpricing of water services in particular. By denying or delaying necessary revenue increases, rigid rate-of-return controls on private systems can create the same adverse outcomes. In part, because of the general long life of water-supply assets, deterioration and its accompanying problems are most noticeable in water-supply systems of the larger and older U.S. cities. In Boston, for example, where ratepayers face water and sewer bills averaging about \$545 in 1993 to pay for the estimated \$6.1-billion harbor

sewage cleanup,<sup>xxx</sup> the city water supply system's rate of leakage is 27 percent.<sup>xxxii</sup>

According to a recent Standard & Poor's report, parts of the water distribution network of the Philadelphia water supply system “are over 100 years old and need extensive restoration and replacement.”<sup>xxxiii</sup> As a result of its age, the system, which serves 502,000 customers from three water treatment plants rated at 480-million gallons per day (mgd), is experiencing considerable leakage. The city's water department manages both the water-supply system and sewer system, and its funds are commingled with other city monies in the city's consolidated cash account. In its most recent fiscal year, the department had a net loss of \$42.5 million on operating revenues of \$270.4 million.<sup>xxxiv</sup>

The New York City water-supply system is also in disrepair. The Department of Environmental Protection estimates that the distribution system's leakage is 5 to 7 percent.<sup>xxxv</sup> Because the city is not universally metered, this number is not likely to be precise. The city program to install meters for most of its 800,000 accounts only got started in the mid-1980s.<sup>xxxvi</sup> The New York City-based Cooper Union Infrastructure Institute issued one of the more comprehensive independent reports on the age and condition of New York City's water and sewer infrastructure.<sup>xxxvii</sup> The report noted that:

- Approximately 6 percent of the water-main system and 7 percent of the sewer system is over 100 years old. By the year 2020, both percentages will climb to over 25 percent;
- The current cycle of replacement for water mains is 150 years; sewers is 255 years;
- The current median age of water mains is 63 years while the median age for sewers is 62 years. At current rates of replacement, the median age of water mains will increase to 75 years by the year 2020 and sewers will increase to 80 years by the year 2010;
- The annual number of water-main breaks averaged approximately 500 per year in the early 1980s but in 1989 surpassed 700 per year. The number of breaks per mile is expected to double between 1990 and 2030, from one break per 10 miles to one break for every 5 miles of water main.

Poorly maintained water supply systems can generally be traced to insufficient financial resources and poor management. Well-managed systems are able to make their limited available resources go further. Preventive maintenance programs, for example, by resolving small problems, may remove the need for more significant long-term capital improvements. Similarly, metering water use saves resources by discouraging wasteful consumption and allowing for the detection of system leakage.

Studies in other areas of public infrastructure have shown that publicly owned capital deteriorates faster than similar privately owned capital because private owners tend to devote greater resources to maintenance than do public owners.<sup>xxxviii</sup> This outcome has been traced, in part, to the effect of government subsidies and the different institutional environments under which governments and private firms operate.

#### *D. New Competition for Centrally Supplied Water Systems*

In addition to the above challenges, water-system operations are facing new forms of competition as a result of changing consumer tastes, technology, law, and general water-supply constraints from traditional sources.

Consumer demand for safe and good-tasting water has led to a dramatic growth of the bottled water industry. According to the International Bottled Water Association, approximately one out of every six households in the United States currently consumes bottled water instead of tap water (in California the proportion is one out of every three homes).<sup>xxxix</sup> This is especially noteworthy since the typical residential customer pays about \$.002 (two-tenths of a penny) per gallon of piped water,<sup>xi</sup> while the average retail price of a one-gallon bottle of domestic water is \$.90—450 times more expensive.<sup>xli</sup>

Central water systems also face competition in the form of desalination plants and water-recycling facilities. Particularly in coastal areas in the South and West, where population growth is outpacing development of new resources, technology that converts saline water (e.g. seawater, brackish water, or treated water) into fresh water, is becoming economical. According to the International Desalination Association, there are approximately 8,000 desalination plants in operation around the world, producing about 10,000 acre-feet per year (an acre foot of water is about 326,000 gallons, enough to supply a household for one or two years). Most of the production capacity in the United States, which is located in California and Florida, is privately owned and operated.<sup>xlii</sup>

Instead of drinking water, reclaimed water (treated wastewater) can be used to irrigate community greenbelts, parks, golf courses, and landscaped medians. A number of western state and local governments are encouraging programs to recycle wastewater. To reduce its ocean discharge of treated wastewater, Los Angeles sells up to 62.5 mgd of secondary treated water.<sup>xliii</sup> According to water analyst Roger Vaughan, after tertiary treatment, “customers will pay \$235 per acre foot for treated water, only 10 percent less than the district's rate for potable water.”<sup>xliv</sup> In one commercial section of Orange County (California), a dual plumbing system has been installed to allow reclaimed water to be used for toilets, which account for 60 to 70 percent of all water used in high-rise office buildings.<sup>xlv</sup> Finally, the California legislature hopes to require local governments to more than double the volume of wastewater recycled by the year 2000—from 325,000 acre feet/year to 700,000 acre feet/year.

The growing importance of bottled water, desalination, and wastewater recycling indicate that the customer base for municipal drinking water-supply systems is no longer guaranteed and that, at least for certain areas of the country, the industry will increasingly be exposed to competitive market forces.

## IV.OVERSEAS WATER-SUPPLY MODELS

Outside the United States, the French and British models of private-sector provision of water services stand out as notable, either in terms of long-term success or the magnitude of investment capital. In contrast to the U.S. model, competition underlies the French and British models. Indeed, the private-water companies in these two countries are considered leaders in technological innovation<sup>xlvi</sup> and are aggressively competing to design, build, operate, and own, water and wastewater treatment facilities throughout the world. Finally, a relatively new model being developed in Sydney, Australia, which involves financing, constructing, operating, and owning new water facilities, is also noteworthy.

### *A.The French Model: Franchise Agreements*

Probably no other country has had greater or longer private-sector involvement providing water services than France. Dating back to the 19th century, private-sector participation has been encouraged in France. The responsibility for the management of France's approximately 12,000-independent water utilities is under the jurisdiction of the over 36,000 local municipalities or communes which have adopted a legal framework that provides flexibility in choosing contractual arrangements. Today, over 75 percent of the country's population (over 40 million people) are provided water and about 40 percent are provided sewage service by private companies.<sup>xlvii</sup> These percentages have roughly doubled in the last 40 years.<sup>xlviii</sup>

Under the French approach, municipalities own the treatment facilities, pipes, and reservoirs, and secure management through a wide range of long-term franchise agreements with private companies. Patrick Cairo, Director of Lyonnaise des Eaux-Dumez, explains that the strength of this format “is that it provides competition between numerous management options and numerous water suppliers.”<sup>xlix</sup> The French model has two additional and important contrasts with U.S. municipal water-supply systems: (1) French local governments are required to keep separate and balanced budgets for water and sewer departments;<sup>l</sup> and (2) all households are metered.<sup>li</sup>

Municipalities in France use three general types of contractual approaches that vary in the degree of responsibility assigned to the private companies for managing water-supply systems. Depending on the particular circumstances, variants of these approaches are available. The three contract types include:

- Concession** - A private company contracts to finance, build, and operate all installations. Bids represent what a firm will charge for water service, with the contract duration usually 25-30 years—enabling the company to amortize its investments. The private firm is responsible for handling customer relations and billing.
  
- Affermage (leasing or farming out)** - The municipality finances and builds the facility and

contracts out to private companies (usually for no longer than 12 years) for operations and maintenance. Remuneration for the private contractor comes from user fees, which the contractor collects, and reflects full operating costs plus profit. A “municipal surcharge” is added to finance fixed assets and is transferred to the public authority.

**Management or service contract** - Municipality contracts out a specific part of the operations and maintenance services. The municipality retains responsibility for billing customers and remunerating the contractor. The duration of the contract is usually less than 10 years.

Under the first two contracting formats, the initial price of water is fixed by the contract, which may include an escalation formula using a price index for salary, energy, public works, and other items. In addition, agreements include periodic reviews and “cost pass through” procedures.

Water rates generally recover both capital and operating cost of water-supply services (including depreciation). Because sewage charges generally do not cover the full cost, subsidies from the municipal, regional, and national government levels are required. According to Jean Pierre Tardieu, a senior vice president at Compagnie Generale des Eaux, funding for French water and sewage capital expenditures in 1991 came from the following:<sup>lii</sup>

	<u>£ Millions</u>
River Authorities	160
Region	10
Departments (political divisions)	150
National Funds	65
Water Companies	400
<u>Local Communities</u>	<u>415</u>
	1,200 (approx. \$1.9 billion)

The cities of Cannes and Orleans presently have “concession” contracts for water-supply services. The Cannes contract is for a system that serves 200,000 people and dates back to 1870. The Orleans city contract was initiated in 1987 to manage and expand the city's water-supply system, which serves 135,000 people. As part of the 20-year contract, the private company committed \$13 million within the first five years to finance construction of new facilities.<sup>liii</sup>

The city of Paris entered into an “affermage” contract in 1985 for the management of its water-distribution system. The water system of France's largest city (population 2.8 million) required a major renovation and replacement program. The city split the contract in two, with one company given responsibility for the water-distribution system on the Left Bank of the Seine River and another for the Right Bank. The two companies sell water retail to households from the water they buy wholesale from the city, which retains water treatment, monitoring, and storage responsibilities.<sup>liv</sup>

As economists Harold Demsetz and Steve Hanke have observed, bidding for a franchise monopoly has the great advantage of preserving competition and eliminating the need for rate-of-return regulation (which removes incentives to adopt cost-saving innovations).<sup>lv</sup> Because all cost savings accrue to the franchisee during the life of the contract, a franchise contract encourages cost-efficient practices. Problems involved in the transfer of long-lived assets between different franchisees, investment incentives at the end of contracts, and adaptation to changing circumstances are important potential constraints, but as shown by France's experience, can be resolved through well-specified contract design.<sup>lvi</sup>

The French approach to water-supply management has succeeded in nurturing competitive water companies that are internationally recognized as the leading innovators and management experts in the industry.<sup>lvii</sup> A 1992 report by the London-based National Economic Development Council noted in terms of level of R&D expenditures, the French company Lyonnaise des Eaux-Dumez spent £20 million (about \$33 million), an amount equivalent to 5.5 percent of sales, while the U.K. water industry spent only 1.1 percent.<sup>lviii</sup>

By not having to face rate-of-return regulation in their home country, the French water companies apparently have been able to allocate more resources toward innovation. Economist Nina Cornell has pointed out that this form of regulation naturally impedes beneficial innovation:

By holding down the rate of return to “normal” levels, it takes away the incentive for the regulated firm to engage in high-risk research and development. Such activities pay off only if a high rate of return can be earned on the successful invention.<sup>lix</sup>

Ozonation technology, for example, which is expected to replace chlorine as the chief means of purifying water, was pioneered by the French.<sup>lx</sup> Unlike chlorine, the use of ozone does not produce potentially harmful by-products. Through their U.S. subsidiaries, French water companies are active in the United States supplying ozone equipment.<sup>lxi</sup>

The status of the French companies contrasts remarkably with U.S. firms, which, subject to rate-of-return regulation, are discouraged from engaging in high-risk research and development. French water companies, in addition to supplying water and wastewater treatment services to customers in France, Europe, Asia, and Latin America, now serve, through their U.S. subsidiaries, an increasing number of U.S. customers.<sup>lxii</sup>

#### *B. The British Model: Full Privatization*

In December 1989, the British Government sold its ownership interest in 10 regional water holding companies and raised \$8.38 billion.<sup>lxiii</sup> The 10 water companies had been restructured from 10 multipurpose regional authorities whose boundaries are determined by the main river basins of England and Wales. The 10 water companies, which integrate water and wastewater treatment, serve about 75 percent of the population of England and Wales, with the remainder of the population served by 29 statutory (privately owned) water companies.<sup>lxiv</sup> The British government is presently



examining options to privatize Scotland's water supply and wastewater treatment, which is the responsibility of local governments and was not privatized.

Under the 1989 Water Act, three new regulatory bodies were established to regulate the different aspects of the new private industry: (1) regulation of drinking water quality by the Drinking Water Inspectorate (DWI), (2) regulation of wastewater discharges by the National Rivers Authority (NRA), and (3) economic regulation by the Office of Water Services (OFWAT). The core businesses of the private water companies—water supply and sewage treatment—are licensed by OFWAT for 25 years. In the event of inadequate performance, OFWAT has the power to revoke licenses.

In a February 1986 White Paper, the British Government outlined its reasons for transferring the 10 water authorities to private ownership:<sup>lxv</sup>

- the authorities will be free of government intervention in day-to-day management and protected from fluctuating political pressures;
- the authorities will be released from the constraints on financing which public ownership imposes;
- access to private capital markets will make it easier for the authorities to pursue effective investment strategies for cutting costs and improving standards of service;
- the financial markets will be able to compare the performance of individual water authorities against each other and against other sectors of the economy. This will provide the financial spur to improved performance;
- a system of economic regulation will be designed to ensure that the benefits of greater efficiency are systematically passed on to customers in the form of lower prices and better service than would otherwise have occurred;
- measures will be introduced to provide a clearer strategic framework for the protection of the environment;
- private authorities will be better able to compete in the provision of various commercial services, notably in consultancy abroad;
- privatized authorities will be better able to attract high quality management from other parts of the private sector;
- there will be the opportunity for wide ownership of shares both among employees and local customers;
  
- most employees will be more closely involved with their business through their ownership of shares, and motivated to ensure its success.

Prior to privatization, drinking water in many parts of the country did not meet U.K. or European Community (EC) standards and more than 20 percent of the country's wastewater treatment plants failed to meet compliance standards.<sup>lxvi</sup> To meet European Community water-quality standards, the authorities were expected to have to initiate capital-spending programs totaling \$40 billion over the 10 years 1989–1999—double the expenditure in real terms of the previous 10 years.<sup>lxvii</sup> The size of

the funding needs, combined with the British Treasury's insistence that public-sector borrowing for environmental infrastructure be reduced, persuaded some authority chairmen to support privatization.<sup>lxviii</sup> Table 4 provides a brief statistical profile of the U.K. water industry prior to privatization.

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**TABLE 4: UK Water Industry Pre-Privatization, 1986–1987<sup>lxix</sup>**

Annual Turnover (Revenues)	£2.60 billion
Capital Expenditure	£.90 billion
Value of Total Net Assets (on replacement cost basis)	£27.00 billion
139,000 miles of water mains	
141,000 miles of sewers	
6,500 sewage treatment works	
800 water treatment works	
Employment	50,000
Assets per Employee	£.5 million
Asset per Revenue Pound	10.38*
[*Calculated by author of this paper]	

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Self-financing by water authorities was made more difficult since, prior to privatization, over 70 percent of the country's water supply was not metered. Almost 100 percent of households and half the nondomestic customers did not pay quantity-related charges, but paid instead according to their property's rateable (taxable) value.<sup>lxx</sup> Under the 1989 Water Act, compulsory water-metering trials were to be conducted to assess the costs and benefits of introducing unit charges to domestic water customers. After the year 2000, rateable values will not be available for computing water charges.

Economic regulation of all water companies (including private, statutory) is accomplished primarily through price-cap regulation, an “incentive” approach to regulation that the British government applies to privatized monopolies. Under the formula RPI + K, price changes for the “basket” of regulated services<sup>lxxi</sup> are controlled by changes in the retail price index (RPI, a measure of inflation) and an adjustment factor (K) set for each company. Coinciding with the industry's capital intensive nature and low rate of productivity growth, this formula differs from the RPI - X formula (where X represents productivity improvements) used to regulate other privatized monopolies.

Together, OFWAT and each water company set levels of K which will allow companies to meet their obligations and provide a reasonable return to their investors. The “K” factor, which can be

positive, negative, or zero, is reviewed every 5 years. Reflecting the significant investment needed to meet EC standards (see Table 5), presently, K factors are positive. As a result, capital investment by water companies for the year 1990, for example, increased 40 percent over the previous year.<sup>lxxii</sup>

An additional mechanism, “cost pass-through,” enables costs that cannot be controlled by management to be passed through into charges between K-review periods. The initial K, which was set before privatization, averaged 5 percent. Thus, over the next ten years, combined sewerage and water rates will increase at the rate of inflation plus 5 percent. This is expected to generate about \$28 billion worth of capital expenditures over 10 years.<sup>lxxiii</sup>

Price-cap regulation is designed to give companies incentives to reduce costs and avoid a cost-plus regulatory system that is associated with U.S.-style rate-of-return regulation. Because the average price level of a company's regulated services is meant to be independent of a company's costs for at least five years, over this time period the firm can retain as profit all cost savings realized from more-efficient performance. Similarly, the firm bears all costs of inefficient performance.<sup>lxxiv</sup>

An important complement to price control is comparative, or yardstick competition. By monitoring the achievement of certain service standards and by comparing the performance of the 39 different water companies, OFWAT is better able to assess the setting of Ks that are consistent with meeting efficiency targets. Comparison of K and a company's share price also provides information for shareholders to monitor and discipline management in the stock market.

Stephen Littlechild, who provided much of the early analytical support that led to the adoption of U.K.-style economic regulation, has indicated how yardstick competition will spur efficiency:

If it [a water company] fails to maintain comparable efficiency to the rest of the industry, it loses profits and its shareholders suffer. If it performs above average, it keeps the profits and its shareholders benefit. Future levels of K will reflect the past and expected future performance of the water industry as a whole. Thus the benefits of increased efficiency will be systematically passed on to consumers in the form of lower prices (or alternatively higher standards). The crucial advantage of the industry yardstick is that no authority [company] has any incentive to hold back on improving performance for fear that it will jeopardize the prices and profits allowed to it in the future.<sup>lxxv</sup>

In addition to greater freedom to raise capital and greater incentive to operate efficiently, the British model also exposes the industry to competition. While competition in the product market is limited, competition in the capital market in terms of corporate takeovers provides an important disciplinary force on poorly performing management.<sup>lxxvi</sup>

For example, the French water company Lyonnaise des Eaux-Dumas has bought four of the 29 statutory water companies and taken equity positions in three of the 10 privatized water companies.<sup>lxxvii</sup> The capital market is thus not only an important source of investment capital, but through its monitoring and disciplining role, provides an important source of needed technical and

management expertise.

Like the French, subsidiaries of the British water-holding companies are actively investing and competing for contracts to design, build, and increasingly operate water and wastewater systems abroad.

### *C. Other Notable Overseas Models of Water-Supply Privatization*

In Sydney, Australia, the city's water board is turning to the private sector for the design, finance, construction, and operation of four water-filtration plants, costing more than \$450 million. International consortia are bidding for three 25-year contracts: (1) a \$250 million, 950-mgd Prospect Reservoir plant, (2) a 100-mgd Macarthur plant and, (3) the combined 50-mgd Avon Dam and 50-mgd Woronora plants.<sup>lxxviii</sup> The new plants will serve 3.5 million people.

The approach, which follows the French concession model, is notable because it indicates how municipal governments can build large-scale water-supply systems quickly and with little up-front capital. By structuring the project on a pay-as-you-go basis, the water board will not incur debt. And under the turnkey approach, construction and performance guarantees ensure that the new facilities will be built on time and operated efficiently.

The key principles of this approach include:<sup>lxxix</sup>

- Government long-term commitment to purchase treated water from the facility;
- Long-term capital for construction provided by private investors and secured by the nonrevocable revenue stream generated by the completed project; and
- Timely construction guaranteed by tying the construction loan to requirements that the project is constructed and placed into service within budget and on time.

Mexico and a number of other Latin American countries are also turning to the French-style concession model for expanding and modernizing their water-supply systems. In Mexico, water infrastructure needs are dramatic: 26 million people (30 percent of the population) lack access to potable water and 44 million (51 percent of the population) have no sewage drainage systems.

Economist Roberto Salinas Leon has noted that under the present government-owned and operated water system, water waste is high and “administrative inefficiency prevents authorities from collecting fees for 40 percent of annual water use.”<sup>lxxx</sup>

The Mexican City of Puerto Vallarta has signed a construction and operations agreement with the U.K. company Biwater, whereby the company is committed to invest \$3 million annually for modernization of the city's water and wastewater plants. The Mexican City of Monterrey (population 3.2 million) is expected to use a long-term franchise to secure the construction and operation of three

large wastewater facilities: 15-mgd, 50-mgd, and 125-mgd.<sup>lxxx</sup>

Similarly, a 30-year concession to operate the Buenos Aires waterworks, which includes over \$1 billion in new investment, is being put out to bid by the Argentine government. The French concession-style model is particularly attractive to developing countries that have neither the expertise nor the capital to invest in needed water systems.

## **V.OPTIONS FOR A NEW PRIVATE WATER-SUPPLY MODEL FOR THE UNITED STATES**

### *A.Limited Use of Privatization Today*

Neither the French nor the British water-supply systems appear to suffer to the same degree from the deficiencies faced by U.S. water-supply systems. Both the British and the French models rely to a greater extent on private companies and each has to some degree exposed its water industry to competition. In addition, both use a similar form of price-cap regulation for setting water rates—the French by contract and the British by regulation. Both approaches contrast with U.S.-style rate-of-return regulation, a method detrimental to cost-efficient operations and innovation.

In a 1988 World Bank paper, Daniel Coyaud identified the important differences between the American (rate-of-return) and French (franchise bidding) regulatory structures:

[I]n the United States the financial statements of the company are reviewed every year by a public utility commission and, if necessary, the rates are adjusted so that the rate of return is kept within a range of 10 to 15% after taxes. In France, water rates are predetermined at the outset of the contract period. This results in differences in attitude and motivation. Under the French arrangements, the private company is motivated to increase productivity because it can benefit from it, at least during the contract period. At the end of the contract period, productivity gains are passed on to the consumers through the market price mechanism.<sup>lxxxii</sup>

Similarly, the British approach, by focusing on prices and not rates of return, and adjusting prices over five-year periods, provides more incentive for efficiency while lessening the regulatory burden. In France, competition is focused on winning franchises. In Britain, competition primarily takes place in the capital market (for funds and corporate control), and in the market for noncore services such as international consulting.

Ownership structures present another important difference among the three systems. U.S. water-supply systems are predominantly government-owned and regulated. By contrast, the separation of the provision of water-supply functions from the regulatory functions in France and Britain provides for greater transparency (openness) and minimizes opportunities for conflicts of interest among system managers vested with both regulatory and water-provision tasks.

The problems experienced by U.S. water supply systems are creating pressure for change in how water supply is organized. Today, over 300 municipal water and wastewater treatment facilities across the country are privately operated. Under operations and maintenance (O&M) contracts with private engineering-consulting firms, which last between one and five years, municipalities are able to achieve operating-cost savings of between 20 and 50 percent.<sup>lxxxiii</sup> Through contractual performance and cost guarantees, the contracts increase operation's accountability. Private operators take full responsibility for meeting environmental regulations and are compensated through a fixed price agreement.

Similar to the franchise model used by the French, O&M contracts provide a structure for competition in the provision of water services. Like their larger French counterparts, private contractors in the United States have been successful primarily by taking advantage of their accumulated (often international) experience operating several plants, technical resources like off-site laboratories, more highly trained personnel, more rigorous maintenance practices, and bulk purchases of materials and supplies.

A few of the more recent contracts and the cost savings achieved are given below:

- New Orleans, Louisiana** signed a five-year contract for the operation of the city's 100-mgd and 10-mgd wastewater plants. The contract will allow the city to achieve a cost savings of 40 percent, or \$720,000 per year.
- Houston, Texas** contracted out the operation of its 80-mgd Southeast Water Purification Plant. The five-year contract is expected to yield an annual cost savings of approximately 35 percent, or \$400,000 per year.
- Schenectady, New York** awarded a 5-year contract to operate the city's 12-mgd wastewater treatment facility. The contract will save the city an estimated \$300,000 per year, or nearly 30 percent.
- Ridgefield, Connecticut** contracted out the operation of its one-mgd wastewater facility. The five-year contract will save the city \$50,000 per year, or about 30 percent.
- Farmington, New Mexico** turned over operations and maintenance of the city's entire water and wastewater system: 20-mgd water treatment plant, 10-mgd sedimentation basin, water distribution system, water meter shop, 5.8-mgd wastewater treatment plant, wastewater collection system, and environmental laboratory. The five-year contract is expected to save the city an estimated \$1.1 million per year, or almost 30 percent.<sup>lxxxiv</sup>

Though an increasing number of municipalities are turning to O&M contracts that are similar to the

French model, there is no trend in the United States for the ownership of municipal water-supply facilities to be taken over by private firms as took place in Britain. Where full privatization has occurred (both for water and wastewater treatment systems) it has generally been driven by a municipality's difficulty in issuing bonds or by a need to quickly meet environmental regulations. Such efforts have tended to focus on the construction of new facilities rather than the sale of existing facilities.

The small number of municipalities that took advantage of the tax benefits available before the 1986 Tax Reform Act and turned to the private sector to design, construct, own, and operate new or upgraded facilities obtained new facilities ahead of schedule and at a lower cost.<sup>lxxxv</sup> As a result of the increase in capital costs caused by tax-code changes, studies evaluating privatization options for a municipally owned and operated water (or wastewater) system post-1986 indicate that O&M and turnkey contracts yield lower user-charge costs than full privatization.<sup>lxxxvi</sup>

Instead of British-style privatization, what is occurring is municipalization or condemnation, whereby a local government takes ownership control of a private water-supply company. As a result of ongoing disputes over water rates, JWP, Inc. recently announced, for example, that it plans to sell its two subsidiaries—Jamaica Water Supply Company and Sea Cliff Water Company—possibly to a newly formed public water authority. Jamaica Water Supply Company, which serves 118,000 households in Queens, N.Y., is the state's largest private water utility and has been an acquisition target of New York City for the past three years.<sup>lxxxvii</sup> The rate disputes arose because the two private utility rates compare unfavorably with nearby municipal utilities.

Because they do not pay income and property taxes, have access to tax-exempt financing, and also do not fully cover their nonoperating costs, publicly owned water utilities are generally able to offer lower water rates to customers. This advantage is made more significant given the capital-intensive nature of water utilities, which requires significant revenue backing. Moreover, unlike telecommunications and electric utilities, water utilities are not as technologically dynamic and thus have fewer opportunities to significantly reduce costs.

High capital needs combined with strict rate-of-return regulation also mean that privately owned water utilities may find themselves unable to undertake important capital-financing programs. As a consequence, they may have to reduce the level of their service. Thus, differential tax

treatment and adverse effects of rate regulation give municipal water-supply systems an artificial competitive advantage over privately owned systems, which explains the presence of only a relatively small number of privately owned water utilities in the United States.

A viable alternative water-supply model for United States, which taps private-sector competition therefore must successfully side-step these two impediments or must address them head-on and create a level playing field between private and public ownership.

## *B. Alternative Water-Supply Models in the U.S. Context*

### 1. Franchise Water-Supply Agreements

The easiest way to facilitate private-sector provision of water services given the present tax and regulatory policies in the United States is to follow the French model of franchise agreements. This approach is especially attractive because it creates competition in a monopoly service, and because it gets around the very real problems of differential tax treatment and rate-of-return regulation. This approach is also conducive to the highly fragmented structure of the U.S. water-supply industry, which is more analogous to the French industry's structure than to the totally integrated, regionalized structure of the British water industry.

In part, this approach is already being employed by a growing number of municipalities. The one major difference between the agreements in the United States and France is that the duration of U.S. contracts is much shorter and, consequently, the degree of responsibility assigned the private contractor is narrower. While in France, franchise-management contracts generally last at least 10 years, in the United States, similar contracts are no longer than five years.

In order to increase the opportunity for greater cost savings, the length of management contracts in the United States should be extended. Longer contracts would enable a private company to take on more functions, including more-complex functions like making major capital repairs and system expansions. An important benefit of longer contracts is that these types of capital-investment functions could be financed by the private franchisee if the agreement was long enough to provide a sufficient payback period.

The major barriers to lengthening management agreements are state laws governing private-sector contracts and federal tax laws regarding facilities using tax-exempt bonds.<sup>lxxxviii</sup> In its May 1992 progress report to the Administrator of the EPA, the Environmental Financial Advisory Board (EFAB) recommended that the EPA provide guidance on privatization legislation that “would authorize long-term contracts between local governments and the private sector where feasible, practical, desirable.”<sup>lxxxix</sup>

More generally, in order to achieve the flexibility offered by the French model, a legal framework must be adopted that gives municipalities the ability to choose from different management options the one that best serves their needs and particular circumstances.

### 2. Full Privatization of Municipal Water-Supply Facilities

To fully privatize public water-supply facilities, both tax and rate-of-return regulations must be addressed. Two options are available: (1) follow the precedent set by the wastewater treatment privatization transactions that occurred in the early and mid-1980s, or (2) reform rate-of-return



regulation and transform municipal-water facilities into state- or government-owned enterprises (SOEs), that, in terms of tax and regulatory policy, would be treated exactly like private companies. A more substantive change, the second approach also represents an institutionally and politically more difficult option to implement.

The tax benefits available prior to the 1986 Tax Reform Act, which encouraged private-capital investment in public wastewater facilities, included the use of tax-exempt Industrial Development Bonds, Investment Tax Credits, and accelerated depreciation.<sup>xc</sup> These tax benefits were viewed as significant in order to equalize the financing advantages between the private and public sectors. By one estimate, as a result of the elimination of the tax advantages by the 1986 Act, “the tax penalty paid to privatize may be on the order of 30 percent of the capital cost of the privatized facility.”<sup>xc</sup>

To prevent a privatized facility from coming under the jurisdiction of the public utility commission and being subjected to rate-of-return regulation, privatization agreements were structured so that the private owner would provide wholesale service to the municipality, which in turn would act as the retailer. The municipality would be responsible for customer relationships and pay the privatizer a set fee for supplying the service.

The above approach has been tried and, in about a dozen cases, found to have worked. However, under the present tax code, equalizing the “cost of money” between private and public sectors is not possible. This may change depending on the outcome of two separate government forums. Congress is reviewing legislation which would “level the playing field” by creating a new infrastructure tax-exempt bond for state and local governments.<sup>xcii</sup>

Secondly, the issue of private-sector ownership in municipal facilities that have been constructed using tax-exempt financing is being addressed by the EPA. In response to the President's April 30, 1992 Executive Order 12803 on infrastructure privatization, the EPA initiated a proceeding to determine policy for facilitating private investment in EPA-funded municipal wastewater plants.<sup>xciii</sup> In addition to resolving other questions, this proceeding is likely to determine whether private equity can participate in projects that are municipally financed. In its May 1992 report, the EFAB recommended that public ownership of grant-funded municipal wastewater treatment facilities be redefined to allow private equity participation.<sup>xciv</sup> More flexible federal grant policies would allow private-sector investment in federally funded State Revolving Fund programs.

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) provides an important model for the EPA to follow. Signed by the President in December 1991, the act permits federal funds to be used on a wide variety of toll projects, most of which can be privately owned.<sup>xcv</sup>

The second approach to full privatization—regulatory reform and transforming public water-supply utilities to fully autonomous, state commercial enterprises—is likely to be more difficult to implement, but has potentially greater long-term efficiency benefits. This is because the first approach is an incremental strategy which would encourage privatization of new facilities, but would not address the artificial competitive disadvantage public water-supply systems have now

over existing private systems as a result of differential tax treatment and adverse effects of rate-of-return regulation.

British-style price-cap regulation offers the most-promising alternative to U.S.-style rate-of-return regulation. By setting prices that guarantee that all costs are covered, rate-of-return regulation removes the incentive to adopt the least-cost provision of a service. Price caps, by severing the link between the price a company is allowed to set for its product and the cost it reports, do provide economic incentives to reduce costs and innovate.

Today, price caps are no longer a policy tool used exclusively by British private monopolies—British Telecom, British Gas, British Airport Authority, and the Water Service Companies. Price caps have also been adopted by the U.S. Federal Communications Commission to regulate AT&T's long-distance telephone service (1989) and by many states to regulate local-telephone service (1990). More recently, the U.S. Federal Energy Regulatory Commission issued new rules that allow gas pipeline companies to choose price-cap instead of rate-of-return regulation.

Transforming public water-supply systems into stand-alone, government commercial enterprises may be politically difficult, but less so than divestiture. Already a number of large urban water systems are operating as financially and politically independent authorities. Yet these bodies still do not pay taxes and maintain access to tax-exempt financing. Consequently, while the problems arising with intergovernmental transfers are reduced, the incentives for full-cost pricing and efficient investment and maintenance programs remain absent.

A number of countries including Britain and New Zealand have used the SOE or corporatization model to increase the accountability and effectiveness of government organizations with commercial functions. NZ Post, for example, the New Zealand SOE for postal service, no longer receives a subsidy and has been operating at profit for the last few years. In addition to improving performance, the great advantage of the SOE model is that, by restructuring a government-owned enterprise along commercial lines—requiring entities to use commercial financial reporting procedures, pay taxes, have well-defined performance targets, and have a dividend policy—a public organization is prepared for privatization.

In the 1970s and 1980s, Britain restructured its publicly owned water industry into commercial, autonomous operating authorities. The 1972 Water Act and the 1974 Control of Pollution Act reorganized the approximately 1,600 separate government water and sewage bodies into 10 hydrologically-based regional Water Authorities. In the 1980s, the Water Authorities were subjected to strict financial controls and monitoring by independent boards. As a result of these changes, the U.K.'s water industry saw a reduction in operating costs and manpower, and a “turnaround in the proportion of capital expenditure financed from internal sources.”<sup>xvii</sup>

Transforming a city water department into an independent public authority may also significantly improve a municipality's cash position. The Greater Philadelphia First Corporation, for example, has estimated that the city of Philadelphia could net \$335 million to \$515 million by selling its water and

sewage treatment system to a public authority.<sup>xcvii</sup> In its study, the corporation suggests that the new operator of the systems could reduce operating expenses by 15 percent through consolidation of operations, acceleration of leak-detection programs, streamlining management, and independence from the city's procurement system.<sup>xcviii</sup>

From this discussion it is likely that reorganizing U.S. municipal water-supply systems into SOEs would have three major benefits: (1) it would remove the artificial and unfair advantage public systems have over privately owned systems, (2) it would improve the accountability and performance of publicly owned systems, and (3) it would prepare publicly owned systems for future privatization.

For many cities facing serious financial difficulties, immediate sale of their water-supply systems may be a sound economic strategy. By selling municipal water-supply assets and wisely investing the proceeds, cities merely change the form of the asset—from physical capital to financial capital. Investing the principal and designating the earnings to specific cash-short public programs (such as police and fire protection, for example) thus would not be “selling the family silver,” but would enable a city to get more value for its taxpayer's dollars.<sup>xcix</sup>

As the British have shown, privatization of water-supply assets can also benefit employees. Responding to the special incentives offered by the government, about 90 percent of the employees of the 10 British water authorities bought shares when the water-holding companies were floated in 1989.<sup>c</sup> By linking the value of the enterprise to an employee's productivity, employee share ownership may improve labor productivity. The World Bank has found evidence of this effect for both British Telecom and Telmex (Mexico's telephone system).<sup>ci</sup>

Consumers of water services can also benefit from privatization of water-supply assets. In the floatation of the British water-holding companies, customers of each of the 10 companies were given share-buying preferences over institutional and overseas investors. In the United States, there are some private water companies, such as Philadelphia Suburban, which have special customer stock purchase plans that enable residential customers to purchase shares of common stock at discount.

What is the potential market value of U.S. municipal water-supply systems? In an earlier study, the Reason Foundation calculated that the more than 34,000 municipal waterworks are likely to be worth around \$24 billion and the more than 15,000 municipal wastewater treatment works worth approximately \$31 billion.<sup>cii</sup> In addition to the one-time retrieval of capital that these sums represent, local governments would benefit by an expanded property tax base, and state and federal governments would benefit from a new stream of corporate tax revenue.

Furthermore, private owners of municipal water-supply systems would be in a position to tap private-capital markets to finance the upgrade of facilities and to meet drinking-water standards. Less reliance on tax-exempt financing would benefit the federal government and enable there to be

more of these funds available for other municipal programs. Finally, by employing full-cost pricing, private owners of municipal water-supply systems would provide greater revenues from water sales and encourage more efficient use of water.

## VI. CONCLUSION

Municipal water-supply systems are capital-intensive enterprises which require ongoing capital investment and maintenance programs. Many publicly owned water supply utilities are confronted with deteriorating and leaking systems, deferred capital investment and maintenance, water-supply reliability problems, and financial inability to meet stricter drinking water standards.

The primary cause of this failure is institutional—publicly owned water-supply systems lack the appropriate incentive structure required to achieve efficient resource management. Having diffused ownership, lacking both full exposure to competition and the inability to become insolvent, government enterprises are unable to replicate the incentives of private companies.

As natural monopolies, water-supply systems face no competition *within* their markets but, in the form of franchise agreements, competition can be generated *for* the market. In addition, competition can occur in the capital market for funds and in the market for corporate control. And unlike public enterprises, private monopolies face the threat of bankruptcy.

Because they face taxes and do not have wide access to tax-exempt funds, privately owned water companies are handicapped in competing with publicly owned utilities and consequently have higher rates. Private companies are also adversely affected by rate-of-return regulation which removes incentive to innovate and adopt least-cost practices.

The French and British models for organizing private competition in the water industry offer two important approaches to privatization that the United States should consider. The great merit to both of these approaches is that they introduce competitive forces into a monopoly service.

The long-term franchise approach is the simplest approach to implement and, in part, is already in practice in this country. To provide greater flexibility and opportunity for larger cost savings, barriers to extending the length of U.S. management contracts should be removed.

Implementing full privatization, similar to the British approach, is more difficult, but would probably yield greater long-term benefits. An incremental approach would involve providing private water-supply utilities equal access to tax-exempt financing and structuring privatization transactions so that the companies become wholesalers of water services and thus not subject to Public Utility Commission regulation.

Alternatively, rate-of-return regulation could be replaced with price-cap regulation as used in Britain

and increasingly in the United States, and publicly owned water suppliers could be transformed into stand-alone commercial enterprises—subject to the same tax and regulatory policies as private water companies.

The significant financial capital tied up in the municipal water-supply assets suggests that many financially constrained cities may want to transform their physical capital to financial capital. By waking up this “sleeping equity,” and wisely investing the proceeds, municipalities could achieve both improved water services and much-needed cash to fund essential public services.

### **About the Author**

David Haarmeyer holds an M.A. in economics from Clemson University and is a Reason Foundation Policy Analyst. He is managing the Foundation's project on water policy and writes about water and wastewater privatization in *Privatization Watch*, the Foundation's monthly newsletter.

### **ENDNOTES AND REFERENCES**

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xiii.Steve Steckler and Lavinia Payson, "Infrastructure," in *Privatization for New York: Competing for a Better Future* (A Report of the New York State Advisory Commission on Privatization) edited by E.S. Savas, January 1992.

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February 1991 U.S. EPA study "Establishing Programs to Resolve Small Drinking Water System Viability" found that they account for 70 percent of the SDWA standards, monitoring, and reporting violations. Edward Tenny, "Why Cities Must be Involved in Safe Drinking Water Debate," *Nation's Cities Weekly*, May 20, 1991, p. 6.

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xx.Patrick Mann (1989, p. 175). See also:

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Steve H. Hanke and M. Fortin, "The Economics of Municipal Water Supply: Applying the User-Pay Principal," Research Paper No. 21, Commissioned by the Inquiry on Federal Water Policy, June 1985;

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xxiii.Congressional Budget Office (May 1987), p. 2.

xxiv.*Statistical Profile of California Water Industry*, prepared for California Water Association, by Dominguez Water Corporation, 1988, p. 10.

xxv.National Council on Public Works Improvement (May 1987) p. 92. The Council's report does point out that in an effort to gain fiscal autonomy, some municipalities have initiated enterprise fund accounting or established politically and financially independent water commissions or districts to manage public water systems.

xxvi.Mary Bumgarner, Jorge Martinez-Vazquez, and David L. Sjoquist, "Municipal Capital Maintenance and Fiscal Distress," *The Review of Economics and Statistics*, 1991, pp. 33-39.

- xxvii. Patrick Mann, NNRI, December 1990, p. 2.
- xxviii. Steve Hanke, "The Economics of Municipal Water Supply: Applying the User-Pay Principal," A Report Prepared for Inquiry on Federal Water Policy, Ottawa, Canada, April 1985, p. 13.
- xxix. Michael A. Crew and Paul R. Kleindorfer, "Public versus Private: Alternative Ownership Scenarios for Electric Utilities, Reason Foundation Policy Study No. 121, Los Angeles, June 1990.
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- xxxii. Standard and Poor's, *Rating Analysis: Boston Water & Sewer Commission, Massachusetts*, June 1991, p. 2.
- xxxiii. Standard and Poor's, *Credit Review: Municipal Water and Sewer*, February 13, 1989, p. 15.
- xxxiv. "There Could be Some Buyers for the Drinking Water System," *Philadelphia Business Journal*, May 25, 1992.
- xxxv. Standard and Poor's, February 13, 1989, p. 12.
- xxxvi. Patrick Mann (1989) notes that in New York City, unmetered water accounts for about 80 percent of consumption.
- xxxvii. Cooper Union Infrastructure Institute, *The Age of New York City Infrastructure*, The Cooper Union for the Advancement of Science and Art, New York, 1991.
- xxxviii. Brian A. Cromwell, "Public Sector Maintenance: The Case of Local Mass-Transit," *National Tax Journal*, June 1991, Vol. XLIV, pp. 199-212.
- xxxix. In 1989, there were 600 different brand labels, total value of sales was \$2 billion, and sales had increased by 9 percent from the previous year. "20 Questions About the Bottled Water Industry," International Bottled Water Association, Alexandria, Virginia, 1990, pp. 1-4.
- xl. American Water Works Association, "The Water Industry Data Base," Denver, Colorado, February 1991, p. 1.
- xli. The striking disparity in the U.S. prices of private and publicly provided water represents a clear indication of the U.S. consumers' willingness to pay for reliable, safe water.
- xlii. International Desalination Association estimates that U.S. capacity could expand 15 to 20 percent a year during this decade. While most of this growth is expected to come in California, Florida's daily production is expected to jump to 250 million gallons from 50 million gallons per day.
- xliii. Roger J. Vaughan, "Reclaiming Western Water," *Governing*, April 1992, p. 76.



xliv. Ibid, p. 76.

xlv. *Water Intelligence Monthly*, May 1991, p. 10. According to *Public Innovation Abroad* (August 1991), a new suburban community under construction in Sydney is being fitted with dual water supply systems.

xlvi. The \$25 million the French water company Lyonnaise des Eaux-Dumez spends on three research laboratories which specialize in water and wastewater treatment "form the largest research center in the world in this field." Patrick R. Cairo, "Delegated Municipal Services for the Water Supply Industry in France," Presented at the 1991 Annual Conference of the Canadian Water and Wastewater Association, Montreal, Quebec, November 3-5, 1991, p. 2.

xlvii. The market for privately provided water is divided primarily among four large water companies:

Generale des Eaux (35%)

Lyonnaise des Eaux-Dumez (23%)

Saur (10%)

Cise (6.5%)

"French Water Companies," *Public Innovation Abroad*, July 1991, p. 7.

xlviii. M. Jean Pierre Tardieu, "A French Assessment of the Industry Prospects," Financial Times Conference on the European Water Industry, March 6-7, 1991, London, p. 7.1.

xlix. Patrick R. Cairo, "Delegated Municipal Services for the Water Supply Industry in France," Presented at the 1991 Annual Conference of the Canadian Water and Wastewater Association, Montreal, Quebec, November 3-5, 1991, p. 4.

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i. Dominique Drouet, "The French Water Industry in a Changing European Context," (Paris, France: Recherche Developpement International) p. 4.

ii. OECD (1987) p. 105.

iii. Jean Pierre Tardieu, "A French Assessment of the Industry Prospects," *The European Water Industry*, Financial Times Conference, March 6-7, 1991, London, p. 7.2.

liii.Patrick R. Cairo (November 3-5, 1991), p. 7.

liv."Paris Contracts Out Water Distribution," *Public Innovation Abroad*, February 1985, p. 3.

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Steve H. Hanke and Stephen J.K. Walters, "Privatization and Natural Monopoly: The Case of Waterworks," *The Privatization Review*, Spring 1987, pp. 24-31.

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lvii.Hanke and Walters (Spring 1987, p. 30) note that "water professionals increasingly are traveling to Paris to absorb the most recent developments in waterworks management and technology."

lviii.National Economic Development Council, *The United Kingdom Water Industry*, London, February 1992, p. 18.

lix.Nina W. Cornell, "Rate-of-Return Regulation: Protecting Whom from What?" *Regulation* (American Enterprise Institute: Washington, D.C., November/December 1980) pp. 36-41.

lx.Neil D. Berlant, "Water Research Associates Water Industry Forecast," *Profiting From Water Conference*, Los Angeles, May 10-11, 1989, section 2, p. 35.

lxi."Ozonation is Wave of Future for Drinking Water," *Environmental Business Journal*, (EnviroQuest Inc.: San Diego, CA, July 1989) Vol. II, No. 7, p. 1.

lxii.Compaigne Generale des Eaux (CGE), the largest private water company in France, has ownership interests in Philadelphia Suburban and Consumers Water Company, two U.S. water companies; and Air & Water Technologies Inc., a firm whose subsidiary Metcalf & Eddy is a leading U.S. water and wastewater contract operator; and Professional Services Group, another U.S. water and wastewater contract operator.

lxiii.Like the previous privatization stock issues, the British Government ensured that the water company stocks were priced to ensure a capital gain. By writing off virtually all debt (\$7.8 billion) and injecting \$1.9 billion in cash, the Government made the water companies an attractive investment.

- Ixiv. Statutory water companies, which are unregistered companies that were incorporated by individual Acts of Parliament, do not have wastewater treatment responsibilities. Shares of the statutory companies are traded on the Stock Exchange.
- I xv. "Privatization of the Water Authorities in England and Wales," White Paper presented to Parliament by the Secretary of State for the Environment, the Secretary of State for Wales and the Minister of Agriculture, Fisheries and Food by Command of Her Majesty, February 1986, p. 1.
- Ixvi. Michael Carney, "Privatized Water Service Companies," *Water Management in Europe*, (London: Sterling Publications, 1992) p. 10-11.
- I xvii. Mike Carney, Secretary of Water Service Association, "Privatization of Water Authorities in England and Wales," 1990, p. 10.
- I xviii. Mike Carney, Secretary of Water Service Association (1990), p. 3.
- Ixix. John Vickers and George Yarrow, *Privatization: An Economic Analysis*, (MIT Press: Cambridge, Mass., 1988) p. 393.
- Ixx. "Privatizing Water: This Time, Ridley is Right," *The Economist*, September 19, 1992, p. 68.
- Ixxi. The "basket" of regulated services, or "core services," include unmeasured and measured water supply and sewage services as well as industry effluent. Nonregulated services include consulting and contracting work.
- Ixxii. National Economic Development Council, p. 1.
- Ixxiii. "Utilities Up for Sale as Britain Continues to Privatize," *Environmental Business Journal*, October 1989, p. 12.
- Ixxiv. Because the resetting of "K" brings a firm's costs and price level into line, as the interval between price adjustments gets smaller, the more price-cap regulation takes on the characteristics of traditional rate-of-return regulation.
- Ixxv. Stephen Littlechild, "Economic Regulation of Privatized Water Authorities and Some Further Reflections," *Oxford Review of Economic Policy*, Vol. 4, No. 2, 1988, p. 59.
- Ixxvi. Because mergers between existing water enterprises in England and Wales may inhibit OFWAT's ability to compare performance measures between the 29 water companies, all such mergers are to be scrutinized to ensure that the benefits of the merger outweigh any loss in making inter-company comparisons.
- Ixxvii. Lyonnaise bought 9 percent of Anglian Water, 6 percent of Wessex, and 2 percent of Severn Trent for a total investment of \$480 million. There is a 15 percent upper limit that any single shareholder may own in any one of the ten water companies. "Britain's Privatized Water Companies: Eau to be in England," *The Economist*, December 23, 1989, p. 88.
- Ixxviii. "Sydney Privatization Targets Water Supply," *Engineering-New Record*, February 2, 1992.

lxxxix. George W. Johnstone, President and CEO of American Water Works Company, Inc., "Public/Private Partnerships in Water Supply," paper delivered to Privatization Council's Sixth Annual National Conference, Washington, D.C., April 27, 1992, p. 4.

lxxxx. Roberto Salinas Leon, Academic Director, Center for Free Enterprise Research, Mexico City, "Water and North American Free Trade: Problems for a Viable Water Market in Mexico," Draft Paper, 1992, p. 4.

lxxxixi. "Wastewater Treatment Privatization Trends at Home and Abroad," *Privatization Watch*, (Los Angeles: Reason Foundation) No. 187, July 1992, p. 4.

lxxxixii. Daniel P. Coyaud, "Private and Public Alternatives for Providing Water Supply and Sewage Services," Report No. 31, Infrastructure and Urban Development Department (World Bank: Washington, D.C., 1988) p. 9.

lxxxixiii. Steve Hanke, "The Literature on Privatization," in S. Butler, ed., *The Privatization Option*, 83-97, (Washington, D.C.: Heritage Foundation, 1985). See also U.S. Environmental Protection Agency, Administration and Resources Management, *Public-Private Partnerships Case Studies: Profiles of Success in Providing Environmental Services*, September 1989, p. 53.

lxxxixiv. This contract is particularly noteworthy in that it enabled the city to achieve a 15 percent reduction in wastewater rates. Neither water nor wastewater rates are expected to increase over the contract's five-year life. See David Haarmeyer, "Farmington Turns Over Entire Water System: Big Savings for a Small Town," *Privatization Watch*, October 1992, No. 190, p. 1.

lxxxixv. See U.S. EPA, *Public-Private Partnership Case Studies: Profiles of Success in Providing Environmental Services*.

lxxxixvi. David F. Russell (Camp Dresser & McKee), "Evaluation of Privatization Alternatives for Municipal Water Service," Presentation to a Joint Meeting of the MA Water Works Association & The New England Water Works Association, April 25, 1992.

R.V. Anderson Associates Ltd., *Private Sector Participation in Provision of Halifax-Dartmouth Wastewater Treatment Services: Study to Investigate Benefits and Feasibility*, Task Group on Private Sector Participation, Final Report, October 1990.

lxxxixvii. "JWP to Sell Water Utility," *Water Investment Newsletter*, May 15, 1992.

lxxxixviii. According to Johnstone, the 1986 tax law changes limit the life of contracts to three years if a revenue tax exempt bond issue is involved. George W. Johnstone, American Water Works, 5th Atlantic Workshop, "Public or Private: Regulation and Rates," 1991, p. 6.

lxxxixix. Environmental Financial Advisory Board, *Narrowing the Gap: Environmental Finance for the 1990s*, U.S. Environmental Protection Agency, May 1992, p. A-14.

xc. The Accelerated Cost Recovery System (ACRS) established a new method for determining the deduction for amortizing the cost of equipment and buildings. Investors could achieve federal income tax savings equal to over 30 percent of the initial cost of equipment under the five-year accelerated cost recovery. T. Jeff Martin and Chris D. Hosler, "Pros and Cons of Privatization," Proceedings AWWA Seminar on Contract Administration, Denver, CO, June 22, 1986, p. 62.

xcii. Randall G. Holcombe, "The Tax Cost of Privatization," *Southern Journal of Economics*, January 1990, p. 742.

xciii. For example, Sens. Domenici and Boren have proposed the "Environmental Infrastructure Act," which would create a new category of tax-exempt bonds for environmental facilities and place them on the 7-year Accelerated Cost Recovery System class for depreciation.

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xcv. Environmental Financial Advisory Board (May 1992), p. A-10.

xci. Robert Poole, Jr., "New Federal Highway Bill Boosts Privatization," *Privatization Watch*, February 1992, p. 3.

xcvi. John Vickers and George Yarrow, *Privatization: An Economic Analysis*, (MIT Press: Cambridge, Mass., 1988) p. 398.

xcvii. Greater Philadelphia First Corporation, *Report on Asset Sale Options for the City of Philadelphia*, Philadelphia, PA, January 17, 1991, p. 16.

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xcix. For a proposed application to municipal airports, see Robert W. Poole and Bryan E. Snyder, "Privatizing Los Angeles International Airport: Analyzing the Alternatives," Policy Insight Number 143 (Los Angeles: Reason Foundation, August 1992).

c. Thelma Triche, "Seminar on Privatization of Water Supply in the U.K. and the Role of the Private Sector in France, September, 1991: Summary of the Two Approaches and Discussion of Issues," World Bank Water and Sanitation Program, April 6, 1992, p. 2.

ci. World Bank Conference (June 11-12, 1992), "Welfare Consequences of Selling Public Enterprises," see "Synthesis of Cases and Policy Summary," p. 20.

cii. Robert W. Poole, Jr., David Haarmeyer, Lynn Scarlett, "Mining the Government Balance Sheet: What Cities and States Have to Sell," Policy Insight Number 139 (Los Angeles: Reason Foundation, April 1992).