ORGANIZING WATER & WASTEWATER INDUSTRIES TO MEET THE CHALLENGES OF THE 21ST CENTURY

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Abstract

The capital intensive, monopolized, and largely government owned and operated water and wastewater industries of the U.S. are facing major challenges. In light of these financial and service quality pressures, designing an optimal organizational structure has taken on greater urgency. Local governments have a variety of options. Some form of public private partnership may be the most efficient organizational format. .

As the United States economy developed and population increased and clustered in urban areas, the challenge of providing a safe and reliable water supply had to be addressed. Both private and public systems were built to access raw water sources, pipe water to treatment plants, and deliver clean water to the final users.

A large and costly infrastructure was built and was largely owned and operated by government organizations, although a viable private sector coexisted. Amid rising costs of maintenance and accessing raw water and a greater emphasis on achieving clean water, a reexamination of the structure of water and wastewater systems is taking place. Hybrid organizational arrangements that utilize private producers have emerged amid a closer look at public structures that is being taken by many local governments. Efforts are being made to make water supply and wastewater treatment more efficient by restructuring and by attempting to inject competition into the marketplace.

STRUCTURE OF THE WATER AND WASTEWATER INDUSTRIES

Structuring water and wastewater systems is fundamentally affected by the existence of an array of economic elements that make monopoly inevitable. Thus, these industries are characterized by a set of geographical monopolies existing side by side. Most of these monopoly systems are owned and operated by government organizations.

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Given major barriers to entry, municipally owned water utilities with monopolistic service territories have become the dominant national model for service delivery in water markets. Similarly, the U.S. wastewater industry that evolved primarily as a governmental response to the public health threat posed by uncontrolled water pollution provides wastewater collection and treatment services that is overwhelmingly provided by local governments (*US EPA, 1998a*). Over most of the twentieth century, these models of public sector monopoly have achieved a high degree of stability, if not always efficiency.

In its most recent national survey (*US EPA, 1997a*), the EPA has estimated that there are more than 180,000 public water systems in the United States. According to EPA and Safe Drinking Water Act definitions, this total includes both "community water systems" serving at least 15 connections or 25 residents year-round, and "non community water systems", such as an individual well serving a school or church, providing water to a nonresidential population at least 60 days of the year. Water that does not come from a public water system, such as a well serving one or just a few homes, is a private supply excluded from the federal government's statistics. While the nation's 50,289 community water systems in 1995 represented only 28 percent of all identified public water systems, they served an estimated 93 percent of the U.S. population.

Table 1 shows that among these more than 50,000 community systems, only 43 percent were publicly owned, 33 percent were privately owned utilities, and 24 percent were classified as "ancillary systems" (i.e., very small systems, typically privately owned, that provide water as an ancillary service to some other enterprise such as a mobile home park). However, because most private systems are relatively small, an estimated 86 percent of the U.S. population received its water from publicly owned community systems, with only 13 percent relying on private utilities and one percent served by ancillary systems.

According to this same EPA survey, total U.S. water industry revenues were estimated to total $25.9 billion as of 1995, primarily from water sales. Of this amount, 86 percent was received by publicly owned systems, mirroring the percentage of the total population served by such systems.

Table 1

U.S. Community Water Systems by Ownership Type, Population Served, and Annual Revenue (1995)

Ownership	Number	% Of Total Number	% Of Total Population Served	Annual Revenue $Billion)
Public	21,789	43%	86%	22.2
Private	16,540	33%	13%	3.7
Ancillary	11,960	24%	1%	N/A

Source: U.S. Environmental Protection Agency, 1997a.

In the wastewater market, according to the EPA's *1996 Clean Water Needs Survey* report shown in Table 2, publicly owned treatment works (POTWs)

serve 190 million U.S. residents, approximately 72 percent of the total U.S. population, and the EPA projects this total to grow to 275 million (90 percent of the projected total population) by 2016. Moreover, almost all of the private sector's involvement in wastewater service delivery has historically been limited to small subdivisions, trailer parks, and individually owned septic systems. Large-scale wastewater treatment facilities and collection systems continue to be almost entirely publicly owned, and, while a handful of wastewater systems have been acquired by investor-owned water utilities and environmental services companies there are no publicly traded U.S. wastewater companies per se.

According to U.S. Bureau of the Census data on government finances (*U.S. Bureau of the Census, 1996*), total state and local government spending to provide sewerage services totaled nearly $23.6 billion in 1995, with by far the largest share of this expense, over $22.1 billion, supported by local governments. Of this total spending, nearly $8.9 billion combined (and over $8 billion in local dollars) were for capital improvements to treatment and collection systems.

Table 2

U.S. Wastewater Publicly Owned Treatment and Collection Systems in 1996			
Treatment Facilities	% Of Total Population Served	Collection Systems	Annual Expenditures, including capital* ($Billion)
16,024	71.8	20,670	$23.6

Sources: U.S. Environmental Protection Agency, 1998c; U.S. Bureau of the Census, 1996 (Note: because this financial data is drawn from a different survey source in a different year from the other data in this table, any correlation involving this fourth column should be considered approximate).

In evaluating U.S. water and wastewater industries, it should also be noted that there is significant overlap between the two sectors. In many cases, both services are delivered by the same public agency, sometimes even as part of a larger municipal utilities authority or public works department. In addition, both industries are typically served by many of the same major engineering firms, consultants, and contract operators.

CHALLENGES FACING the INDUSTRY in the 21st CENTURY

America's water and wastewater industries have met the challenges of adequate coverage and major health concerns over the last century. At the beginning of the 21st century, outbreaks of waterborne diseases are rare, even though water quality and safety issues must continually be addressed. However, innovations in treating water and purifying wastewater lag behind technical progress in many fields. A growing concern about pollution has led to greater government involvement in establishing standards both of drinking water and wastewater.

Despite the two centuries of progress in improving the quality of the

product in the water market, nearly nine out of ten Americans have some concerns about the quality of their home drinking water. Over half of the respondents to the survey have worries about health contaminants in their water and object to the smell or taste. Over 40 percent cite problems of sediment in their water or the presence of hard water according to the Water Quality Association.

Systems across the country now face quality and cost problems. The specific problems of American water and wastewater systems that appear to require immediate attention include the decay of the infrastructure, meeting rising standards for clean water, and developing a reliable financing mechanism.

Replacement of Infrastructure

There are over 700,000 miles of water and wastewater pipes, which is four times the mileage of the interstate highway system, and many of these pipes are old, some over 100 years. Some of the pipes installed in the 1920's and after World War II, were made of materials whose life expectancy is much shorter than the average of older piping. More than one-third of the utilities had 20% or more of their pipelines nearing the end of their useful life. Over 60% of the water and wastewater utilities, especially public systems, had practiced insufficient infrastructure rehabilitation and replacement (*USGAO, 2002*).

The consequences of aging pipes are more frequent water main leaks. When pipes fail, pressure drops and dirt, debris, and pathogens are sucked into the water system. The quality of sewer systems is also of concern since sewer systems are very old and are corroding and leaking. Combined storm water sewer systems with their attendant sewer spillover are commonplace and impose health problems during heavy rain periods.

Some water and wastewater plants are using older technology. Upgrading these plants is a technical and financial task of considerable magnitude.

Meeting Stricter Quality Standards

More stringent federal environmental and public health regulatory standards, coupled with technological change, present a challenge to water systems. New drinking water regulations phasing in at the start of the twenty-first century as mandated under 1996 amendments to the Safe Drinking Water Act, for example, are toughening standards for guarding against bacteria and other microbial contaminants (the Interim Enhanced Surface Water Treatment Rule), while simultaneously requiring that utilities reduce potentially harmful by-products of the disinfection process (the Disinfectants and Disinfection Byproducts Rule). To achieve these somewhat conflicting goals, many utilities will need to significantly upgrade their treatment processes, in some cases switching from chlorination to more complex and less familiar technologies such as ozonation.

In total, the EPA estimates that these two new rules alone will cost over $1 billion per year nationwide (*USEPA, 1998b*). Similarly, Clean Water Act

requirements for wastewater systems are increasing responsibilities and costs not only for plant operation, but also for storm water control and the reduction of pollution overflowing from collection systems. According to the most recent EPA Clean Water Needs Survey of wastewater and storm water infrastructure needs, major upgrades are projected to be required from 1996 through 2016 (*USEPA, 2001*).

Capital Requirements

There have been various projections as to the cost of meeting the required rehabilitation, replacement, and repair of drinking water distribution systems and wastewater collection systems in the United States. Estimates range from $300 billion to $1 trillion over the next twenty years to repair, replace, or upgrade water and wastewater systems; meet rising demand; and accommodate the rising water quality standards (*see USEPA, 1998a; AWWA, 1999; Schearzwalder, 2002; Segal, 2002).* A major infusion of funds is immediately required to avoid major problems. One recent study estimates that $12.1 billion for infrastructure needs to be invested immediately by community water systems to protect against microbiological contamination *(Clark, et al, 2002).*

Generating Adequate Revenue to Cover All Costs

Facing the large capital requirements of a decaying infrastructure and the pressure to upgrade water quality, water and wastewater systems have to face the task of generating sufficient revenue to cover all the required operating and capital outlays. In most cases, rates will have to be raised, possibly doubled. However, political pressure can be intensive to moderate rate hikes, with the result that insufficient revenue may threaten to undercut necessary expenditures.

The GAO finds that water and wastewater utilities do not generate sufficient local revenue from customer charges, taxes, or other local revenue sources to cover all the necessary costs including operations and maintenance, debt service, and depreciation beyond debt repayment. The federal agency argues that about 25% of water systems and 40% of wastewater systems are not generating sufficient revenue. As a consequence, 29% of the systems defer maintenance because of insufficient funds and most systems do not collect enough to cover all capital costs. Almost one-half of the utility managers do not believe that funding over the next decade will be sufficient *(USGAO, 2002).*

Improving Operating Efficiency

Another challenge for water and sewer systems is to control operating costs. Very often there are inefficiencies in terms of excessive staffing or lost revenue due to substantial quantities of unaccounted for water. With low productivity, costs per gallon of water or wastewater service can be excessive; consequently, either rates charged to users will be higher or losses will emerge that will make it more difficult to finance the required refurbishing and upgrades.

Advancing Technology

To improve productivity and produce a good quality product, water and sewer systems continually are challenged. Developing and applying new technology in collecting, treating, and transporting drinking water or wastewater requires expertise, a strong incentive system, sufficient research and development funding, and adequate operating funds. These requirements are often lacking in poorly funded public water systems where governments have other important priorities.

Small System Inefficiencies

The aforementioned issues are particular acute for very small systems that face major disadvantages. Small systems, especially in wastewater, face higher costs and difficulty in providing the necessary management and engineering expertise.

Recent studies suggest that to achieve a reasonable level of unit costs, a system should serve 3,000 persons (or 1,000 connections). To be able to generate the revenue necessary to support a full-time operator and professional manager, a system has to serve from 3,000 to 5,000 persons. The World Bank in its studies in Latin America finds that water and wastewater systems encounter greater efficiency over a range of 10,000 to one million users. The Office of Water Services (OFWAT) in England and Wales find economies of scale up to one million persons (*Cadmus Group, 2002*).

The larger problem, however, is the capacity of small systems to comply with clean water standards. Often small systems lack the operating and financial management skills and sufficient revenues such that they under-invest in necessary repair, maintenance, rehabilitation, and replacement of plant infrastructure and equipment. Small systems have the highest rate of non-compliance with drinking water regulations. They also appear not to make provision for long-term infrastructure repair or replacement (*Shanaghan, 1994*).

STRUCTURING SYSTEMS TO MEET THE CHALLENGES

Despite the monopoly structure, the dominant U.S. model of public sector operation is undergoing change as systems confront these challenges. Alternative models can be mobilized to provide and produce water and wastewater services. Elected officials can choose among these alternative models with the goal of a achieving reliable and quality services at a minimum cost. There are two elements to the models, ownership and mode of operations, as seen in Table 3.

Table 3: Structural Models

Ownership	Mode of Operations

Public	Public
	Executive Department
	Department – Enterprise Accounting
	Agency – Reports to Legislative Branch
	Independent Agency
	Stock Company
	Municipal Water District
	Multi-Jurisdictional Agency
	Public Private Partnership
	Outsourcing
	Operations and Maintenance Contract
	Build, Design, Operate (or variants)
	Franchise
	Leasing
	Concession
Private	Private Subject to Public Regulation
	Private – Not Regulated

Government Ownership and Operation Model

In light of the monopolistic market structure with its potential performance imperfections - as compared to a competitive market - of restricted output, high prices, elevated costs, above normal profits, and poor quality service, controlling the behavior of the monopolist has been treated as a critical policy issue by elected government officials. One policy option is to have public ownership.

In many cases, water or wastewater utilities were not government-initiated. Private companies frequently started piped water systems; eventually they were taken over by government. In the U.S. while many public water systems began as private, profit-motivated companies in the nineteenth and early twentieth centuries, outbreaks of typhoid and cholera and major fires in the young urban centers led to dissatisfaction and eventual government takeover. Regulators enforcing profit restrictions on private utilities, federal and state government subsidies of publicly owned systems, and the taxation of private investments contributed to the dominance of government owned water utilities. By the end of the twentieth century, more than 200 communities had shifted from private to public ownership (*Westerhoff, 1998*) and municipally owned water utilities with monopolistic service territories had become the dominant model for service delivery.

The same process toward government ownership also was present in the case of sewer systems. Benito mentions that private systems were more common in smaller and medium-sized cities but by the beginning of the twentieth century, almost all cities of more than 30,000 had publicly owned systems (*Beito, 1991*).

Organizational Choices

There are several options available in a government ownership model. Possibilities include:
1. government executive department
2. government executive department subject to "enterprise accounting"
3. government agency reporting to legislative branch
4. independent agency
5. government stock company
6. municipal water district
7. multi-jurisdictional agency

One option is to treat the water utility as a regular government department that not only is subject to common operating rules such as personnel and procurement but also is treated as a municipal department for budgeting purposes. Water and wastewater may be combined with other infrastructure operations into a broader "public works" department. All revenues and expenditures go into the general fund and the water department must compete annually for operating and capital funding. The department is subject to the same political and budget pressures as the police, parks, and other typical municipal departments. It is a part of the executive branch and reports to an elected chief executive.

The ordinary departmental budget treatment, however, can lead to budget decisions that obscure the "business nature" of a utility that directly collects revenue for its services. Many governments expect "user fee" services to be completely self-financing. Consequently many municipal governments, especially larger ones, in the U.S. establish an "enterprise accounting" system that allocates all relevant revenues and costs to the utility's operations. If properly configured, the accounting device can reveal whether the utility is fiscally viable or has to be subsidized by tax revenues. Also, budget requests, especially for capital funds, more easily can be judged on the basis of their economic feasibility.

In a study for the Los Angeles Department of Water and Power, the Rand Corporation examined five alternative governance models in addition to the typical government department models (*Baer, 2001*). In a number of smaller cities, the municipal utility reports to the City Council (or legislative branch) directly. The City Council sets policy but the execution is left to the executive director (or chief executive officer) of the utility. The idea is to remove the utility from local politics as much as possible and to give it budget and personnel autonomy. For small utilities this system may work well.

A variant of the City Council model is to establish an independent city agency that reports to an independent governing board appointed by the mayor and approved by the City Council. The board members serve for fixed and staggered terms to remove them from day-to-day politics. Jacksonville, Florida and Knoxville, Tennessee have this arrangement. Again, the board appoints the

chief executive officer who is afforded considerable freedom in running the utility. In this case, the board also sets rates. However, capital outlays typically have to be approved by the city government.

Another option is to have a government-owned stock company with much more freedom to operate. This model is more commonly found in Western Europe, especially in The Netherlands (*Schwartz and Blaakland, 2002*). Generally, this business structure is independent from direct government controls and can operate more like a private enterprise.

The North American version of "corporatization," primarily used for electric utilities as in Toronto and a few smaller U.S. cities, is where the city establishes a municipal corporation and appoints the board members. As in the Dutch case, significant power is placed into the hands of the appointed executive but the agency generally is confined to one political jurisdiction.

California has also been at the forefront of using the idea of a municipal utility district. Under the law, voters can establish a separate public agency to operate a public utility. Board members would come from the various geographical parts of the political jurisdiction. Similar to the other structures, the district is managed by an appointed management group with much autonomy. However, this structure allows the utility to float its own bonds for capital improvements.

California law also allows the establishment of a multi-jurisdictional agency where two or more cities, counties, or public agencies can operate the utility. Initially set up for the electricity market, such a concept could be extended easily to water or wastewater operations.

Benefits and Costs of Government Model

Government operations, however, often may not produce water or wastewater services efficiently. The potential inefficiency of government operated systems flows from the absence of competition[1], the difficulty of providing meaningful incentives for managers to minimize costs and provide a high level of service, and the complexity of rewarding employees for maximizing productivity. Lacking a profit-based measure of performance, rewarding managers on the basis of cost, quality of product, or responsiveness of service is problematic.

Often, little discretion is given to the manager in making personnel decisions including hiring and firing. Also, offering incentives to employees for outstanding performance is constrained in a civil service, typically unionized, environment. Often payrolls may be expanded for patronage or macroeconomic

[1] Often, the prices paid to suppliers and contractors and the salaries paid to managers and workers are in excess of the competitive level. These excess payments are called economic rents (*Seidenstat, 1996*).

reasons. For example, in the experience of Great Britain within a year of privatization the Thames Water's staff was 20 percent below its peak level (*Economist, 1990*).

The existence of organizational slack that results in above minimal costs of operations is commonplace in public systems. A study by the Association of Metropolitan Sewerage Agencies and the Metropolitan Water Agencies (1998) indicates that operating costs in many public systems can be cut by at least 10%. By applying currently available methods four public systems were able to cut costs by 20-25%.[2]

As a government department, additional constraints on managerial decision-making may be imposed on the water or wastewater utility. Budget requests are subject to a political budgeting process. The water department must compete with other government departments for operating or capital funds. Overall, owing to the reoccurring financial problems of many local governments in the 1970's, the early 1980's, and from 2000 to the present there has been a strong effort to strengthen balance sheets and credit ratings by careful management of budgets and debt. The competition for borrowed funds can be especially intense since municipalities face statutory or constitutional limits on the level of outstanding debt and strive to maintain good credit ratings by limiting debt. Thus, under funding presents a major obstacle to improving service or product quality. Consequently, maintenance may be shortchanged or plant upgrading or expansion plans may be cut back.

The enterprise or stock corporation variants may mitigate some of these disadvantages. As an enterprise fund, the water utility can be given some autonomy and could be expected to live within its revenue means with less political interference. However, in practice in many local governments in the U.S., it is still subject to the personnel rules and the budget, especially the capital budget, allocation process. Additionally, the borrowings of the corporation may still be counted again any debt limitations that the local government faces.

The corporate stock model, wherein stock is issued and owned by the government, offers even a greater degree of independence. It may be free of government personnel and budgeting rules. It may also be able to reward managers and high productivity employees based on profit and cost considerations and may not be subject to government budget rules. Public managers will tend to be influenced by political pressures, although this will depend on the degree of corporatization. Corporatization strengthens the political autonomy of a publicly owned enterprise by making it increasingly self-sufficient financially and introducing rules which protect directors and senior managers from being removed on political whim. However, there are constraints on the level of profits and, thus, it may evolve as a cost-plus monopoly subject to rate of return

[2] The four systems were Ft. Wayne, IN; Orange County Public Utilities (Florida); Colorado Springs, CO; and Houston Public Utilities (TX) (*Association of Metropolitan Sewerage Agencies and Metropolitan Water Agencies, 1998*).

constraints. With government ownership of the stock, the operation still may be subject to political interference.

Another potential limitation of the government operations model is that water and wastewater operations are local government functions. In the U.S., municipalities typically have jurisdiction over water and wastewater operations. If there are economies of scale (and scope) in major distribution systems, raw water supply, wastewater treatment, and customer service operations, localized operations may be on too small a scale to achieve these lower costs.

Overall, organizational mechanisms such as regional compacts or inter-government contracts may be used to overcome the scale limitations. However, there are often political obstacles to this form of cooperation.

Public Private Partnerships

As concern grew in many countries about meeting efficiently the demand for safe and clean drinking water, publicly owned and operated systems began to look at enlisting the help of the private sector in improving the efficiency of their operations. There is a long history of private enterprises supplying various services and designing and building projects, and in some countries such as France, supplying full contracted operation. Now, private vendors are offering a much more extensive range of services in a much larger number of countries.

1. Outsourcing

Today government water utilities frequently enlist the assistance of the private sector for some routine operations. It is believed that a limited private partnership for one or more specific functions can be cost effective as the private firms compete for the right to provide the service and the terms (e.g., regarding quality and performance) of the service are regulated by an enforceable contract. Commonly included in these functions are installing and reading water meters, billing and collection, infrastructure maintenance and repairs, and laboratory services. Firms performing these services, especially on a regional or national basis, can take advantage of economies of scale and better utilize the latest technology.

2. Operations and Maintenance Contract (O&M)

In this arrangement, private firms are contracted to manage the utility. Since managers work for a private company that can increase profits if costs can be constrained, given a fixed monetary contract, they can be rewarded for effective performance. The vendor may assume the risk of ensuring that minimum water quality levels are reached. Moreover, a company experienced in managing water or wastewater systems can derive the managerial and technological benefits that come from operating a number plants and systems. The private company may not be bound by the government's procurement rules that can raise the costs of supplies and services purchased by the utility.

To be successful, the public authority has to assure fair bidding and design a clear and comprehensive contract. If the contractor is required to follow the government requirements as to personnel policies and procurement, many of the benefits of private operations may be lost. Rather than focusing on input issues, the contracting government can concentrate on specifying output targets. In this fashion, the contractor is free to utilize the most cost-effective technology and resource utilization to meet the terms of the contract.

3. Design, Build, and Operate (and Variants)

When government water utilities decide to expand their facilities, they typically turn to private contractors to design and to build the infrastructure. Usually a separate contractor is used at each stage of the process. In retrospect, this separation of designing and building usually increases the time to complete the project and can lead to less efficient and more costly projects. Since the design engineers do not have to operate the facility their interests are not aligned with the operators. Consequently, the design of the project may not have achievement of operational efficiency in mind. Without the experience or knowledge of operations, builders often overlook aspects of the structure that can simply operations and reduce operating costs.

While the conventional design-bid-build-operate approach to public works contracting is well understood and most appropriate for many applications, it has shortcomings. These include excessive design costs due to "undesirable risk allocation and mixed incentives, failure of designer and builder to collaborate in ways that would lead to reductions in construction costs," problems of low bidding and resultant costly change orders, a greater risk of failure owing to the difficulty in establishing liability among the designer, contractor, and the municipal operator, and several other weaknesses.

Public utilities including water utilities have begun to recognize the inefficiencies of using separate contractors. A new organizational model for expanding facilities is now in place that combines all three functions of design, build, and operate.

There are several variants of this model. One is a straight design, build, operate model (DBO) in which the winning contractor performs all functions except financing the project. The project is owned by the government utility but the responsibility for operations is contracted out to the private sector. Another is where the private entity designs, builds, arranges the financing and operates the project. At some specified future, the project is transferred to the government. This method is referred to as design, build, finance operate, transfer (DBFO, DBOT or, sometimes, BOT or BOO). The experience in the US has proven to be positive as illustrated by the Seattle experience. However, some state laws still preclude this option for many utilities.

4. Franchise[3]

4A. Leasing

This model is similar to the management contract arrangement except that the lessee takes on additional functions. The local government owns the assets but the private partner manages the facilities, provides working capital, and bills and collects from the customer. The lessee is responsible for maintenance and upgrading of facilities. Water rates are determined initially as a part of the bidding process but the operator usually remits part of the revenue collected to the government as a lease payment.

4B. Concession

When a publicly owned system requires both private management expertise and private capital, a concession contract can be arranged. Private firms typically bid for the contract, with the bids representing the level and structure of rates. Besides advancing all capital funds for new construction and working capital, the private firm manages the operation and maintains facilities, and bills and collects from the customer. Concessions usually are granted for a long period (for example, as long as 30 years in some countries and 20 years or less in the U.S., due to tax considerations) so that the concessionaire can recoup his investment. At the end of the contract, the government would acquire the assets and the contract likely would be rebid.

In general, fully utilizing the resources and capabilities of the private sector is a very strong argument in favor of these full privatization alternatives. Another, potentially more telling argument, is that a franchise can inject competition into a monopoly market. The competition is for the rights to the franchise. Since the bidding is stated in terms of rates and services to be provided, the franchisee has the incentive to reduce costs and employ the optimum technology. If the firm's managers perform poorly in terms of cost containment and profit maximization, the managers may be removed or the firm itself may be subject to penalties if contract provisions are violated.

Private Ownership Subject To Public Regulation

Under varying circumstances, governments have decided to rely solely upon private utilities to provide water and wastewater services. In some cases, private ownership developed the local market, as was the case of investor owned water utilities in the United States. There remains a viable private sector in the U.S. In 1995 investor owned water systems accounted for one-third of the nation's community water systems and served 13 percent of the U.S. population, or more than 30 million people (*Hudson Institute, 1999*).

[3] The terminology for both leases and concessions used here is based on *Hanke and Walters (2000*). Water consultants such as *Tasman Asia Pacific (1997*) also use it. The terminology is widely used in the literature.

In other cases, the government owned the water or wastewater utility and decided to sell the assets to a private utility. Great Britain accomplished this "load shedding" in a dramatic fashion in the 1980's when it sold 10 government owned and operated English and Welsh water and sewerage companies.

Normally, the private company is awarded a monopoly right to serve a particular franchise area and, in some cases, a companion wastewater market. Since the private utility is a monopoly and is not subject to competitive constraints as to output or price, the government regulates the utility in terms of rates, quality of product, and service.

Operating a regulatory system that can enforce effectively an economically efficient level of rates, costs, productivity, product quality, and service are very difficult at best. The various approaches to regulation; i.e. rate of return, price cap, or New Zealand's regulation by threat, are not as distinct in practice as in theory. The dilemma of regulation is to provide incentives for cost reduction while ensuring that prices that are not too far out of line with costs. Also the regulators should attempt to allow a reasonable chance of cost recovery without condoning excessively high costs. Moreover, the regulator might resist regulatory opportunism; i.e., taking advantage of the regulated company if it earns high profits because of efficient operations or moving sluggishly to adjust rates in the face of rising costs. Conditions for efficient regulation include commitment and stability of regulation, openness, transparency, consistency, and accountability.

THE MOVEMENT TOWARD PUBLIC PRIVATE PARTNERSHIPS

While all of the alternatives outlined above are widely used, U.S. experiences at the end of the 20th century vary significantly from category to category. The major change that is occurring in the U.S. is to move to some version of full contracting out operations to privately owned water companies in addition to a small number of asset sales. In the decade of the 90's, privatization rose by 84% and increased by another 13% in 2001 (Reinhardt, 2002). At the end of 2001, approximately 1,100 water systems and 1,300 wastewater systems had been privatized (*Segal, 2003: 4*).

Contracting Operations

In the United States, the strongest privatization trend of the last decade has been in operations and maintenance (O&M) contracting and some form of leasing. From about 400 in 1997, contracts for water system operations now total about 1,100. Perhaps reflecting the widespread involvement of French investors and parent companies among the major contract operators, this rapidly evolving model mimics loosely the competitive system of France. At the same time, however, this practice has clearly been spurred on by favorable changes in the U.S.' own tax code.

Following substantial lobbying from the United States Conference of

Mayors, the Department of the Treasury issued new tax regulations in 1997 supporting long-term contracting for the operation and management of water and wastewater facilities. Under previous rules, if a facility was under contracted operation for more than five years, it was deemed to be for "private use" and ineligible for tax-exempt capital financing. Under the 1997 modifications, however, contracts of up to 20 years are now permissible without affecting the tax-exempt status of a utility's debt. With longer term contracting now rendered practicable, necessary capital investments can be incorporated into O&M or leasing agreements and amortized over a period that makes such agreements more cost-competitive.

Within this general category, contract lengths and provisions have varied significantly. In both the water and wastewater, many recent contracts range from 5 to 30 years. Table 4 notes some recent contracts among major cities.

Table 4
Ten Largest Cities With Long-Term Contracts
(out of 33 cities)

Municipality	System Type	Capacity (mgd)	Yrs. Of Contract
Augusta, GA	wastewater	46	10
Evansville, IN	water	60	10
Hamilton, Ont	water/wastewater	300/5	10
Indianapolis, IN	wastewater	250	14
Milwaukee, WI	wastewater	550	10
New Haven, CT	wastewater	45	15
Seattle, WA	DBO water	120	25
Springfield, MA	wastewater	67	20
Tampa, FL	DBO water	66	15+5
Wilmington, DE	wastewater	105	20

Source: (*Reinhardt, 2001*)

Some longer-term privatization initiatives have also been noteworthy for the payment of cash upfront to the municipality. In Cranston, Rhode Island, for example, an existing short-term O&M contract was rebid in 1996 as a 25-year lease that included $48 million in upfront cash for the city and significant capital improvements. As part of this Cranston transaction, current federal regulations permitted the Environmental Protection Agency to forgive repayment of over $5 million in undepreciated grant funds (*U.S. Conference of Mayors, 1997*). In Hawthorne, California, the first long-term (15-year) lease for an existing system in the water industry was reached in 1996, featuring an upfront payment to the city of $6.5 million and $100,000 annual lease payments (*Reason, 1997).* In North Brunswick, New Jersey, a 20-year franchise was also negotiated in 1996 for both the water and wastewater systems of the township. This agreement included an upfront payment of $30 million, $24 million of which was used to retire existing system debt, and also featured concession fees throughout the contract term (*Reason, 1997*).

For cash-strapped municipalities, such substantial upfront payments are clearly often attractive. As pointed out in a recent draft EPA Guidance on the Privatization of Federally Funded Wastewater Treatment Facilities, however, such upfront payments do not come without a price. Rather, "any payment a local government receives from the sale or lease of a wastewater infrastructure asset is like a loan from the buyer or lessee which must be repaid with interest by the wastewater users in the form of additional user fees." (*US EPA, 1998c*). In some cases, the private operator may achieve efficiencies that enable user fees to remain stable (or even decrease) in spite of the cost of this "loan." Even in such cases, however, user fees could have been lowered even further had such a loan not been taken out upfront. Therefore, while such practices may make good sense in the context of an individual community's circumstances, it is more accurate to think of such upfront payments as more of a potential financing tool than as a windfall.

Whether or not such upfront payments are part of the package, however, it is clear that many communities are benefiting financially from contracting. Moreover, to date, the service quality and environmental records of such arrangements generally have been strong. Absent further change to the current tax code and regulatory structures that present few barriers to such arrangements (particularly relative to asset sale and full private ownership), it is likely that contracting will continue to be the fastest growing strategy for communities privatizing their water and wastewater systems.

Design-Build-Operate (DBO); Design-Build-Finance-Operate (DBFO)

Where publicly owned systems are faced with the decision to meet increasing demand by new construction the Design-Build-Operate (DBO) approach has been attractive. This technique that requires bidding that would lead to a single contractor being engage to design, construct, and operate a facility. This approach gives control over a project to a single entity, and focuses them on long-term performance of the facility. As a result of this more interactive and integrated process, some analysts estimate potential savings of 15 to 25 percent of construction costs and 20 to 40 percent of operating costs (*Dysard and Callahan, 1998: 62*).

A leading example of the DBO approach in the U.S. water industry is the Seattle Public Utilities 1997 Tolt River project. In this initiative, Seattle competitively selected a private contractor to design, build, and provide 25 years of operation for a new, 120 million gallon per day filtration/ozonation water treatment plant. Pursuant to the contract structure negotiated, Seattle Public Utilities provides project financing, retains ownership, and assumes liability for future capital improvements. At a cost of $101 million ($56 million for design and construction and $36 million for 25 years of operation), Seattle estimates that it has saved 40 percent over its estimated total cost of $171 million had it used conventional design, low-bid construction, and City operations (*U.S. Conference of Mayors, 1997*).

In the Build-Own-Finance-Operate (DBFO) approach, the primary change from the DBO model is that the private sector finances the project. Generally, this approach is not advantageous under the current U.S. tax code, given the lower interest rates available to public sector because of the tax-exempt status of municipal debt. When a public entity's debt capacity is constrained, however, DBFO does provide an alternative financing option.

Cost Saving With Contracting

Table 5 lists the major contracts that have been negotiated in the last several years. Generally, the partnerships anticipate significant cost savings for the municipal systems.

Table 5
Public-Private Partnerships in Selected Cities

Municipality	Service Population (1,000s)	Term (yrs)	Type*	Private Partner	Total Savings (estimated) ($ million)
Atlanta	1,500	20	O&M	United Water	400- 20 yrs
Bessemer, AL	45	20	DBO	Ogden Water	100- 10 yrs
Camden, NJ	85	20	O&M	US Water	2- annually
Chester, NJ	1	20	O&M	Earth Tech	1.9- total
Danville, VA	54	10	O&M	American Water W	0.8-first yr
Devens, MA	3.5	20+10	DBO	Earth Tech	N/A
Easton, PA	80	10	O&M	US Water	0.6-annually
Gardner, MA	23	20	DBO	Earth Tech	11- 20 yrs
Gary, IN	179	10	O&M	White River	20- 10 yrs
Honolulu	N/A	20	DBFO	US Filter	N/A
Milwaukee	1,200	10	O&M	United Water	140- 10 yrs
San Antonio	250	10	DBO	United Water	0.6 annually
Plymouth, MA	36	20	DBFO	US Filter	15- 20 yrs
Scranton, PA	78	5	O&M	American Water W	0.5 annually#
Tampa & St. Petersburg	2,000	30	DBFO	Poseidon Resources	300- 30 yrs
Woonsocket, RI	55	20	O&M	US Filter	0.8- annually

Source: *U.S. Conference of Mayors, 2000.*
for years 2 to 5.
* O&M = Operation & Maintenance, DBO = Design, Build, Operate, DBFO = Design, Build, Finance, Operate

Major Private Partners

Table 6 lists the major private water companies that bid for the contracts. The dominant ones are international. The European companies have been the most active participants. In fact, the recent acquisition of American Water Works

by RWE means that American owned companies have become even less than a factor in the private market.

Table 6
Value Of Investor-Owned Water Companies
(in millions of 2002 dollars as of January 2002)

Company	Market Capitalization
U.S. Companies:	
American Water Works, Ltd	4,324
Philadelphia Suburban Corp.	1,531
California Water Service Group 359	
American States Water Co.	367
Connecticut Water Services, Inc.	216
Southwest Water Co.	133
International Water Utilities:	
Suez	28,142
RWE AG (Thames)	19,313
Vivendi Environment	11,111
United Utilities 2,772	
Severn Trent	2,114
Anglian Water Group	1,262
Kelda	1,168

Source: Schwab Capital Markets LP

Asset Sales

In the 1990s, asset sales in the U.S. water and wastewater industries have been relatively rare. Most typically, such asset sales have occurred where smaller water systems can be sold to existing, neighboring investor-owned water utilities that offer economies of scale and more sophisticated management. For example, in 1996 alone, United Water Resources acquired two small New Jersey systems to gain approximately 40,000 new customers, Consumers Water Company purchased three local systems, and the Philadelphia Suburban Corporation acquired eight systems to add over 17,000 new customers (*Price Waterhouse, 1997*). In the wastewater industry, the first sale of a federally subsidized municipal wastewater facility–the Franklin Area Wastewater Plant in southwestern Ohio–took place in 1995, and has not been widely replicated.

A key factor in the limited sale of water and wastewater facilities in the second half of the twentieth century has been the structure of the U.S. tax code, which has implicitly discouraged private ownership in these infrastructure-intensive industries. For many years, significant federal construction grants were available to public utilities. Until 1992, municipalities that had received such federal grants were required to make 100 percent repayment upon sale to a

private operator. However, in the Executive Order 12803 on Infrastructure Privatization, municipalities were given new flexibility to sell public infrastructure while only being required to repay any remaining "un-depreciated" portion of the grant. Private operators were also made eligible to receive federal grants as well. In conjunction with the decreasing availability and significance of such subsidies since the 1990s, this policy change has served to shift the playing field much closer to a level position between public and private utilities.

Even with these Executive Orders, however, significant structural barriers remain to the widespread sale of water and wastewater systems. First and foremost, municipal debt continues to be tax-exempt, while privately issued debt remains taxable. As a consequence, public sector entities generally enjoy a lower cost of borrowing, which can lead in turn to significantly lower debt service costs, particularly given the highly capital-intensive nature of these industries.

Beyond this financial consideration, some other government regulations still apply differently to public and private sector utilities. Probably the most significant example involves the environmental regulations applied to wastewater treatment facilities. For a publicly owned treatment works (POTW), discharge standards for the facility and any industrial dischargers to the facility are governed by the permit standards of the National Pollutant Discharge Elimination System (NPDES). A privately owned facility and any industrial dischargers to it, however, could be deemed to be governed by the requirements of the Resource Conservation and Recovery Act (RCRA). According to the EPA, in such a situation, "higher treatment costs may occur if the wastewater treatment facility is designated as a RCRA hazardous waste treatment, storage, or disposal facility". In fact, to avoid just this potentiality, even the much-publicized Franklin, Ohio wastewater plant sale featured continued, partial, public ownership under a lease arrangement to retain POTW status (*US EPA, 1998c*).

In addition, community concerns regarding control over water and wastewater rates and systems have also inhibited the spread of asset sales. Where investor-owned utilities do exist in the U.S., they continue to receive rate hikes under traditional rate of return regulation, ensuring relative stability, but not creating the incentives for increased efficiency sought by the British "price cap" model or the deregulating models of the U.S. energy and telecommunications industries. Beyond whatever near-term restrictions on rate increases may be negotiated as a condition of sale, a community selling its system gives up any local political involvement in rate setting. Along parallel lines, an asset sale involves less long-term local control over such matters as quality and supply of services that involve essential public goods.

For some small communities that happen to be near to major, existing, investor-owned utilities, however, the economies of scale afforded by such larger systems may overwhelm any drawbacks. In addition, other communities may be motivated by the one-time influx of capital that such a major asset sale may bring. For example, after paying off its system debt, Franklin, Ohio's $6.8 million sale generated more than $1 million in proceeds for the county and municipal

governments served by the plant (*Arrandale, 1995*). Similarly, in 1998, the Mayor of Birmingham, Alabama proposed the sale of that city's water and sewer system primarily to capitalize a school construction trust fund, following voter disapproval of a sales tax increase targeted for school improvements (*McEntee, 1998*). Perhaps exemplifying the difficulty of such a major sale, however, Birmingham voters rejected this proposal in a November 1998 referendum.

Although continued incremental growth in asset sales is likely among communities with small systems adjacent to large and sophisticated investor-owned utilities, widespread private ownership remains many decades away. While some regions, such as Pennsylvania and New Jersey, have begun to see significant use of this strategy, most areas of the nation do not yet have private water or wastewater utilities large enough to pursue this approach. In fact, in certain regions, the era of municipalizing small, poorly coordinated private water utilities is still very much alive. In early 1999, for example, Florida's Brevard, Polk, and Sarasota counties approved an interlocal agreement to form a new Government Utility Authority intended to buy several small water and sewer systems from a private real estate firm in order to strengthen regional water resources management (*McEntee, 1999*). Absent dramatic government intervention to overhaul the tax code, modify environmental regulations, and generally restructure the market, asset sales face far greater obstacles to implementation than most other competitiveness tools.

Outsourcing

Not all governmental contracting is driven by the pursuit of private sector efficiencies and incentives. Rather, governments and utilities may also contract for many of the same reasons that have made outsourcing a major trend within corporate America in the 1980s and 1990s. By contracting with a specialized firm for specific, non-core functions, an enterprise can leverage their partners' expertise and/or economies of scale, while increasing their own focus on core functions that they may do best. According to one 1995 survey, many of the services most commonly contracted out by local governments are often the same type of non-core functions that many private sector companies have outsourced, including janitorial services (70 percent), building maintenance (42 percent), and security (40 percent) (*Wessel, 1995: R8*).

In addition to such ancillary functions, water and wastewater utilities may also look at secondary functions such as billing, call center management, and meter reading as potential candidates for outsourcing. In 1997, for example, the Philadelphia Water Department outsourced the installation of a citywide automatic meter reading (AMR) system, as well as long-term operation and maintenance of the system, under a 20-year agreement with a private vendor. Through this arrangement, the city was able to implement a new technology projected to achieve net present value savings of more than $30 million over the 20-year contract term, while placing performance risk on the shoulders of its vendor. No less important, this initiative is helping to sharpen the focus of the utility's revenue collection staff by reducing the size and scope of their direct

operations *(Blair, 1998).*

Managed Competition

Paralleling the growth of contracting, a strong trend of managed competition has also emerged. Under managed competition, public sector utility managers and employees are encouraged to develop their own restructuring plan and bid for continued operation alongside bids from private operators. While varying accounting methods, budgeting practices, and tax considerations make it difficult to judge such public versus private competitions, there is little question that such processes have helped to spark major cost reductions among utilities that have opted to remain under public operation after their own staff "won" the bid.

In reaction to this trend, some proponents of privatization have challenged the fairness and legitimacy of managed competitions, particularly where public sector bidders do not bear the risk of overruns or failure, and where no allowances are made for the taxes paid by private firms. Such privatization advocates argue that such processes only serve to delay and discourage the industry's transition to a competitive private market that will ultimately prove more cost-effective (*Eggers, 1997*).

In response, proponents of managed competition argue that such processes simply add another layer of beneficial competition that helps to ensure that a municipality receives fair bids from potential private operators. In addition, such managed competitions are often touted as only fair to the people already employed in operating public facilities. At the Charlotte-Mecklenburg Utility Department, for example, a City team developed a proposal to cut costs by nearly 50 percent for two facilities. This public sector bid beat its closest private competitor by 19 percent, resulting in a five-year operating plan projected to save a total of $4.2 million (*Eggers, 1997*; *Westerhoff, 1998*).

At this point, however, many private utilities are not willing to participate in bidding on these contract competitions since they believe that the odds are strongly slanted in favor of the public water department. Consequently, this device is not likely to be an effective alternative in the near future.

Pressure on Municipal Utilities and Internal Improvement Programs

Even among utilities where little or no contracting or managed competition has yet taken place, the effects of privatization within the industry are often evident. Many water and wastewater utility managers report that they have competitiveness programs underway. Among leading industry associations, benchmarking efforts and competitiveness initiatives have also increased steadily. The largest professional organization in the drinking water industry, the AWWA, is promoting a major self-assessment and peer review program, Qualserve, to promote best management practices. Moreover, multiple engineering and other specialized firms are offering consulting services to public utilities that profess to

assist in the implementation of the same strategies that a contract operator would use if the utility were to be privatized. As the Reason Foundation reported in a 1998 update on water and wastewater trends, "one of the private sector's most effective advantages, the ability to assimilate technologies and cost-effectively employ expertise at multiple facilities, may be shrinking as a result of these cooperative public sector efforts." (*Reason, 1998*).

RESULTS OF CONTRACTING IN MEETING CHALLENGES

Although there are few comprehensive reviews of the payoffs from various privatization initiatives, it is clear that the many municipalities moving toward private partnerships fully expect important cost savings as seen in Table 5. Cost savings would not only ease the pressure to raise water or sewer rates or to dip into general fund tax receipts but also would free up water revenues to fund necessary infrastructure investments.

Equally important may be the prospect that by partnering with a technically advanced, large private water enterprise, the public partner would be in a better position to meet quality standards at an acceptable cost level. This result will also put less pressure on rates but still allow the public system to utilize the latest treatment technology

Hudson Institute Study

In a major study, twenty-nine water privatizations serving over 3 million customers were evaluated in a study commissioned by the National Association of Water Companies and conducted by the Hudson Institute in 1998 (*Hudson, 1998*). These projects include all forms of privatization and are distributed across a broad population and geographic base.

	Number of Projects	Connections
Asset transfer	9	180,850
Billing	2	31,500
Lease	4	25,300
Long-term contract	3	156,700
Short-term contract	11	350,250
TOTAL	29	744,600

These contracts resulted in several positive results. They included: additional capital investment resources, improved operating efficiencies, compliance with drinking water standards, control of rate increases, and improved customer service.

In about one half of the projects contracting was primarily initiated as a result of unmet investment requirements and ongoing operating deficits. The private partners helped to meet these infrastructure financing needs by investing

$55.3 million in facilities, paying $34.6 million in concession fees and acquiring assets valued at $536.6 million. Financial details are shown below.

	# of Project	Annual Fee	Concession Fee	Transfer Fee	Capital Expenditures
Asset transfer	9	-	-	$536,000,000	$37,800,000
Billing	2	$46,800	-	-	$25,000
Lease	4	$845,000	$30,800,000	-	$17,500,000
Long-term contract	3	$75,000	$1,250,000	-	-
Short-term contract	11	$26,852,800	$2,500,000	-	-
TOTAL	29	$27,818,800	$34,550,000	$536,000,000	$55,325,000

The projects also aided in reducing costs. Although many of the projects demonstrated some cost savings or cost containment, five projects indicated major cost savings with reductions ranging from 10 percent to 40 percent.

A number of municipalities also were suffering from water quality problems and were out of compliance with government standards prior to privatization owing to an aging infrastructure base and limited operational resources or expertise. The private partner had the operating expertise and the capital required to bring facilities back in compliance. As a result of significant investment to repair or upgrade facilities and the application of advanced operating systems and processes, all 12 facilities that were privatized were in compliance within one year after privatization.

	Projects Out Of Compliance Before Privatization	Projects Out of Compliance After Privatization
Asset transfer	5	0
Billing	-	0
Lease	3	0
Con-Ops	4	0
TOTAL	12	0

Prior to privatization, a number of facilities were facing major rate increases as a result of infrastructure investment requirements and operating inefficiencies. Ten percent to 50 percent rate increases were being contemplated and in some cases the municipal system had recently doubled rates to finance capital investments. Many of the private partners were able to reduce or even eliminate anticipated rate increases.

The private operators by being also able to integrate the public operators' customer service functions into its own systems and processes. This has resulted in significant customer service improvements. The higher level of service with a lower cost structure resulted from integrating customer service functions such as call-in centers, billing and collections into parent company systems.

Potential Problems and the Atlanta Experience

However, a cautionary note needs to be struck. Contracting out can yield large benefits if a well-structured contract is drawn, if both parties fully understanding what they are getting into, and the contract is aggressively monitored and enforced. In any business, not every contract yields the results initially promised. The Atlanta case points up these issues.

Atlanta is an example of a major city water system that had skimped on maintenance and on the replacement of a very old and rapidly deteriorating infrastructure. Some water pipes were installed in the 19th century. At the same time by the mid-1990s, Atlanta was badly out of compliance with EPA wastewater standards and was being fined. The city water management estimated that to make necessary upgrades, meet the growth of demand, and achieve compliance would require $ 850 million over the next five years. To finance that effort would require more than doubling water rates and/or a very large infusion of funds from the city's general fund.

Therefore, in 1997 the city decided to let an O&M contract for its water system. It estimated that it could save $400 million over the term of the contract (del Rosario, 2000). There were problems with the contracting process; the RFP went through a series of modifications almost up to the bid deadline. The city only had a vague idea of the location of water mains or their condition but they knew that there were serious leaks in the system. Bidders wanted a contingency fund to cover unexpected problems. However, the city would not agree. City officials were very happy with the winning bid and the outlook for the future.

The winner bidder was United Water Services, the U.S. subsidiary of the large, French water company, Suez. The contract involved United receiving $27.5 million a year in fees and expense reimbursement. This was only a little more than half of what Atlanta was spending annually to operate its system ($49.5 million). It was estimated that the contract would cut the costs of upgrading and operating the utility by 44% and, thus, water rates would only have to be raised by 30% to finance upgrades.

United was responsible for operating the treatment plants and administering all meter reading, billing, and customer services. The contractor also agreed to hire and retain all the city water system employees for the entire contract period. The city was responsible for setting rates, financing capital improvements, delivering raw water to the treatment plants, and monitoring the contract. (*Moore, 1999*)

Apparently, in the contracting process the bidders were not fully aware of the desperate state of disrepair of the system or underestimated the costs of operating and repairing the system. United immediately began to run into operating problems as the system began to fall apart, began to hemorrhage cash in trying to fix the system, and had to mollify an increasing unhappy group of

customers.

Many of the problems with the infrastructure quickly surfaced. The contract under projected the number of meter repairs and main breaks; for example, United expected 100 main breaks a year but the actual figure was 279 (*Bennett and Hairston*, 2003). It had anticipated 100 main breaks a year but the actual number was about 1,000. Many more fire hydrants and pipes malfunctioned than were expected.

United claimed it was losing $10 million per year on the contract but Atlanta refused to renegotiate the contract under which it was saving $10 million per year, half the saving which it had estimated. United also argued that Atlanta was not using its saving to make necessary capital investments in the system.

In the face of rising citizen discontent and political turmoil, even as United sunk more resources to solve the problems, the city reexamined the contract. In February of 2003 the contract was terminated.

In spite of the breakdowns of the system during United's tenure, the city received several benefits. Operating costs to Atlanta were significantly lower than if it operated the system itself. Water rate increases were only 10% compared to a much higher level that would have been required under city management.

Having removed the private partner, Atlanta now faces a difficult future. Although United Water began to catch up on replacing or rehabilitating the infrastructure, much still has to be done. Atlanta will probably have to spend more than the annual $49.5 million for system's operations that it had expended prior to the contract. It appears likely that major increases in water rates will have to be put into effect. Moreover, politically the utility has to be able to show that it can improve performance and additional expenditures will be required to move to a higher level of service.

Renewal of Contracts: A Measure of Success

One measure of success for private contract operations is what happens at the conclusion of the contract. Table 7 shows this data for contracts that expired in the 1998-2001 period.

Table 7
Outcome of Water/Wastewater Privatization Contract Renewals

Private Partner	Outcome	Pecent of Contracts
Original	Renewal by Negotiation	75
Original	Renewal by Competition	10
New	Competition	6
None	Deprivatized	8
Other		1

Total	100

Source: *Reinhardt, 2002*

In the vast majority of cases, the original private partner was retained, suggesting that the experiment was successfully carried out to the satisfaction of both parties. Only in eight percent of the cases did the dissatisfaction concerning the results of the contracting process lead to the public system resuming its own operation.

The Role of Competition in Generating Results

A primary reason for the movement to public private partnerships in their various forms is that they offer a practical mechanism to deal with the challenges facing systems. One reason for successful outcomes of privatization is that it offers a degree of competition that can have the effect of altering the monopoly model.

Competition is introduced by requiring private firms with extensive expertise in operating water and wastewater systems to bid for O & M or franchise contracts. Even if contracts are for multiple years, there is not only the initial bidding process by also the subsequent contract competitions. Also, diligent contract enforcement can continually pressure the contractor to perform well.

Moreover, once private enterprises enter the picture existing publicly owned and operated systems are challenged. One challenge is the threat to bid out their operation to the private sector. Another feature is that benchmarking of operating data, especially cost and service variables, can make more transparent the efficiency of existing public systems when O & M contract results are compared. The interest toward competitive contracting and reengineering suggests that concern about privatization have pushed publicly owned systems to improve operations.

For the most part, such competition appears to be a positive force. As seen by the available studies of public private partnerships, most water and wastewater systems that have contracted out operations to date are reporting significant cost savings and/or performance improvements. Among public sector utilities that have retained operations in-house following managed competition, similar reports of improvement are made. As in any business with a tendency toward monopoly, the injection of competitive forces is clearly sparking a newfound drive to improve the “bottom line.”

At the same time, however, it is important to remember that the infrastructure-intensive characteristics of these industries–the very factors that created their monopolistic tendencies in the first place–still remain. Absent wise market structuring and regulation, the potential always exists that privatization will simply replace traditional public monopolies with nothing more than newer private monopolies. Looking toward the long-term, the ultimate results of the current trends – however positive so far – are yet to be determined. While competitive private firms offer real advantages in terms of more flexible operating

strategies, readier access to capital, and greater incentives for efficiency, these advantages are strong only when competition is actively sustained. In an era of greater contracted operation, it is essential that government retain or obtain sufficient independent expertise – both technical/operational and in management and contracting – to ensure that the public continues to receives good value.

Greater private operation also requires wise regulation to avoid, or at least to minimize, the extent of regulatory capture. Not only is this risk present with regard to ratemaking, but also it is no less a factor in the regulation of environmental and public health externalities. Government owned utilities are sometimes criticized for opposing more stringent environmental and public health regulations, a common position given the pressure on elected and appointed public officials to minimize the rate increases driven by system improvements.

For a private company, however, such system improvements could well appear as welcome opportunities for increasing profits. As a consequence, much as defense contractors have long had an incentive to lobby for greater military investment – whether or not truly needed or cost-effective – private water and wastewater contractors and utilities could have an incentive to exaggerate their need for system improvements. On the other hand, if the incentives provided to private system operators weight too heavily toward cost containment, there is also a risk that dangerous corners may be cut.

Other Competitive Steps

Some commentators suggest that by treating the pipeline distribution or collection system as a common carrier, entry of adjoining water treatment plant competitors is feasible. Allowing entry could transform the retail step of the industry from monopoly to a structure with competitive elements, allowing the elimination of public regulation. However, there are some major technical and administrative problems that would have to be overcome.

LESSONS TO BE APPLIED IN CHANGING ORGANIZATIONAL STRUCTURE

In moving toward change, the results of the last two decades can help steer decision makers in the right direction and can assist in avoiding wreckages like Atlanta. The major lessons learned would include the following:

1. Public private partnerships seem to offer the most cost effective organizational structure. The extensive experience, expertise, flexibility, and profit-oriented incentives of the private large water/wastewater operator can improve the performance of the publicly owned system. At the same time, the government entity can exercise direct control over rates and other performance variables through contract oversight but can benefit by invoking competition among the potential partners. If performance is unsatisfactory, another partner can be substituted.

2. To maintain maximum flexibility in its ability to change partners, the government should maintain sufficient expertise to oversee the contract and to take over the operation if necessary. Additionally, the public agency can utilize specialized private firms to write the RFP, oversee the bidding process, help design the contract, or monitor the contract.

3. To make contracts effective devices to improve performance they should focus upon measurable outputs and outcomes related to cost, quality, and reliability rather than inputs.

4. Under some circumstances, long-term contracts are useful in allowing time for the private partner to make necessary changes and to make it worthwhile to invest in new systems, technology, and equipment. Where the present system has been under financed or mismanaged, a longer period to make changes may be required. However, in the absence of serious problems, such contracts may reduce the threat of competition and may not be as cost effective as shorter-term arrangements.

5. Very small publicly operated systems often generate high operating cost and poor quality water. Consolidating them either by absorption by adjoining private utilities or by merger with adjoining public systems is quite likely to occur within the next decade because of quality concerns or cost pressures.

6. Water and sewer rates should be set at a level to cover all costs including the debt service necessary to refurbish the infrastructure and meet quality standards. In the likely situation where little fiscal help will be forthcoming from the federal or state governments, the local government will have to finance necessary outlays since depending upon tax revenue will likely lead to less than optimal investment spending.

In the face of rapidly growing demand on slowly growing municipal resources, the challenges facing water and wastewater systems will be difficult to overcome. Partnering with efficient private sector utilities offers a promising approach to upgrade infrastructure, ensure clean water, and provide sufficient water supply. The federal system allows many different approaches to meeting the challenges facing our water networks. Examining the outcomes of these many experiments, eventually will allow us to determine what works and which options would yield results that local governments desire.

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