Brian Brown

EPRI

MWW Municipal Water and Wastewater

Municipal Water and Wastewater Program

Competition in the Water and Wastewater Industries

A Summary of Asset Valuation and Current Trends in Privatization Issues of the Water and Wastewater Industries

Report CR-110244

Industrial and Agricultural Technologies and Services

May 1998

Disclaimer of Warranties and Limitation of Liabilities

NEITHER EPRI, ANY MEMBER OF EPRI, ANY COSPONSOR, NOR ANY PERSON OR ORGANIZATION ACTING ON BEHALF OF ANY OF THEM:

(A) MAKES ANY WARRANTY OR REPRESENTATION WHATSOEVER, EXPRESS OR IMPLIED,

(I) WITH RESPECT TO THE USE OF ANY INFORMATION, APPARATUS, METHOD, PROCESS, OR SIMILAR ITEM DISCLOSED IN THIS REPORT, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, OR

(II) THAT SUCH USE DOES NOT INFRINGE ON OR INTERFERE WITH PRIVATELY OWNED RIGHTS, INCLUDING ANY PARTY'S INTELLECTUAL PROPERTY, OR

(III) THAT THIS REPORT IS SUITABLE TO ANY PARTICULAR USER'S CIRCUMSTANCE; OR

(B) ASSUMES RESPONSIBILITY FOR ANY DAMAGES OR OTHER LIABILITY WHATSOEVER (INCLUDING ANY CONSEQUENTIAL DAMAGES, EVEN IF EPRI OR ANY EPRI REPRESENTATIVE HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES) RESULTING FROM YOUR SELECTION OR USE OF THIS REPORT OR ANY INFORMATION, APPARATUS, METHOD, PROCESS, OR SIMILAR ITEM DISCLOSED IN THIS REPORT.

Ordering Information:

For information about ordering this report, contact EPRI Customer Service at 1-800-313-3774.

Electric Power Research Institute and EPRI are registered service marks of EPRI.

EPRI

MWWW Municipal Water and Wastewater

Municipal Water and Wastewater Program

Competition in the Water and Wastewater Industries

A Summary of Asset Valuation and Current Trends in Privatization Issues of the Water and Wastewater Industries

Report CR-110244

Industrial and Agricultural Technologies and Services

May 1998

EPRI's Municipal Water and Wastewater Program

Clean drinking water and effective wastewater treatment are vital services needed in all communities. These safeguards protect the public health, strengthen the community infrastructure, and provide a foundation for economic growth. Yet increasing concerns about the adequacy of existing services are posing serious challenges to local communities. These concerns are felt not just in the United States, but internationally as well.

More than 60,000 water systems and 15,000 wastewater systems are now operating in the United States. These facilities are among the country's largest energy consumers, requiring an estimated 75 billion kWh nationally, about 3% of annual U.S. electricity use. Their electricity requirements will increase by 20% during the next 15 years as plants expand treatment capacity to meet population growth and as additional treatments are applied to meet the rigorous mandates of the Safe Drinking Water Act and the Clean Water Act. Emerging nonregulatory issues, such as improvement in drinking water taste and color, are expected to create additional energy needs.

To address these concerns, the EPRI Industrial and Agricultural business area established the Community Environmental Center (CEC) in 1993. The CEC, located at Washington University in St. Louis, Missouri, has quickly become a national and international leader in developing and deploying electrotechnologies. Its mission is to accelerate use of innovative electrotechnologies by facilitating partnerships among electric utilities, industry, and research associations.

The first regional center, the Northeast Regional CEC (NRCEC), was established in 1994 and is located in New York City. A second regional center, the South African Centre for Essential Community Services (SACECS), opened in 1996.

EPRI's Community Environmental Center along with the regional centers direct projects to ensure that technology development and deployment reflect the key environmental concerns of the water and wastewater industries. CEC leverages funding from host electric utilities, with resources contributed by industry, government agencies, and other participating research associations. The CEC directs these activities through the Municipal Water and Wastewater (MWW) Program.

Program Objectives

- Supporting collaborative research, development, and demonstration projects addressing high priority equipment, process, and energy management needs
- Providing technical support to member utilities in assisting water and wastewater customers and the communities they serve
- Developing and disseminating technical information through case study reports, publications, videos, seminars, and workshops

Program Research Partnerships

MWW partnerships enrich project effectiveness and eliminate duplication of services between agencies. Partnerships also increase each group's ability to plan technology applications within the uncertain environment of business and regulatory change.

MWW Program sponsors include the American Water Works Association Research Foundation (AWWARF) and the Water Environment Research Foundation (WERF).

Cooperative agreements can also be established with individual utilities, groups of utilities, and equipment suppliers.

MWW participants, including funding contributors, project sponsors, and advisors, take active roles in determining which R&D projects will best meet their needs and defining their levels of participation. By belonging to committees, participants have direct influence in developing and implementing innovative and cost-effective technologies and processes. Participants receive priority in sponsoring demonstration projects, favorable terms for using proprietary EPRI products and services, access to EPRI's consultants, and first-hand knowledge of project results.

The Municipal Water and Wastewater (MWW) Program brings together more than 120 organizations, including electric and municipal utilities, government agencies, academic organizations, and research groups. Over eighty projects, completed or under way, are accelerating the availability of technologies that can improve energy efficiency and environmental compliance at water and wastewater treatment plants.

Program activities are conducted in five technical committees, including:

Electrotechnologies

Many new and emerging electrotechnologies are superior to certain conventional treatment techniques and can offer substantial operating savings to the municipal utility industry.

Technology Applications and Services

Optimization of newer electrotechnologies greatly improves their acceptance by the water and wastewater treatment industries. Automated controls (SCADA) and ozone optimization are two examples.

Desalination and Water Reuse

Desalination and water reuse technologies provide two means of increasing water supply. This benefits regions of the United States that experience serious shortages of surface and groundwater supplies.

Small Community Systems

Small rural community water and wastewater systems currently account for approximately 90% of environmental regulation violations. Current activities include demonstrating alternative, low cost wastewater treatment facilities for single-family households and developing alternative remote system operation and management options.

Industrial Water and Wastewater

As industrial sewer charges climb and pretreatment requirements stiffen, industrial water reuse becomes economical for more industries. These customers often lack the expertise to implement such systems.

Communications and Delivery

The MWW Program uses an array of media to keep electric utilities and customers informed on technology advancements, Program services, and opportunities to collaborate on projects.

Publications

- *Center Reports*—in-depth results of Program research, development, and demonstration projects
- *TechCommentaries*—informative overviews of specific electrotechnologies
- *TechApplications*—case histories of implementations of electrotechnologies
- *TechBriefs*—current information on technologies or research projects
- *Innovators*—utility testimonials on the benefits of innovative uses of electrotechnologies
- *Newsletters*—explore regulatory trends, technology advances, and applications of technologies in the industry

Conferences, Workshops, and Seminars

Meetings are offered periodically on topics of key interest to Program participants and on an as-needed basis when requested by an electric utility or municipal utility. These events include reviews of existing technologies, training, customer-focused workshops, and presentation of research results.

Research and Demonstration Projects

Participating electric utilities can sponsor research and demonstration projects with individual customers. Projects include testing of new and existing technologies and pilot- and full-scale demonstrations. Participants receive expert assistance in gaining regulatory approval; technology, process, or system design; funding support; performance monitoring and analysis services; and project management assistance.

For more information on EPRI's Municipal Water and Wastewater Program, contact the Community Environmental Center staff listed on the inside back cover.

Competition in the Water and Wastewater Industries

By Brian Browne

Executive Summary

This report is a follow-up to my 1994 "Water Privatization and Investment Study." In 1994, I suggested that U.S. electric utilities might investigate investing and contracting in the public U.S. water and wastewater systems.

At the time of writing that report, the main catalysts for investor-owned electric utilities to diversify were capital accumulation from plant rate base depreciation and shrinking investment opportunities in traditional electricity markets. Since the 1994 report was written, many states have developed plans to restructure their electric system and unbundle rates or are in the process of doing so. A strong movement is developing for a nationwide electric market, not as constrained by state boundaries and state regulators as in the past. One could even go further and envision a North American electric market in the not-too-distant future. Inevitably, this approach to what was formerly considered a classic "natural monopoly" raises the question of whether it portends a correlative change for the water sector.

The current changes in the electric industry may or may not create viable additional investment opportunities for investor-owned electric utilities. However, recent changes to the tax codes, a weakening of legislative commitment to the basic tenets of the "natural monopoly" concept, dwindling government budgets and, in California, the implementation of Proposition 218 are a few of the forces that could further open up public sector water and wastewater companies for varying types of private sector involvement, especially by investor-owned electric utilities. Institutional changes, in the form of federal, state and local laws and IRS rules, have the potential to catalyze or inhibit the process and structure of privatization.

Electric utility investment in the water and wastewater industry could also have a complementary impact on local economic growth. Expansion of an electric utility's customer base can be enhanced or constrained by the availability or lack of water and wastewater facilities. Thus, an investor-owned electric utility, by investing in the water and wastewater infrastructure of the service community area, may be making a prudent stand-alone investment, as well as encouraging community economic growth and hence, in the longer term, an expansion of its traditional customer base. These ripple or secondary effects will increasing be an incentive for electric utilities to consider investment in water and wastewater facilities in their own service areas.

The U.S. water system is largely publicly owned. Ninety-five percent of wastewater customers and 85% percent of water customers are supplied by public entities. However, there are many small privately owned community and non-community water systems, in addition to the viable larger investor-owned water companies. Only 95 of all investor-owned individual utilities have annual revenues in excess of one million dollars. Unlike most public sector water systems, private utilities are generally rate-regulated by a state agency.

In my 1997 survey of regulators, as compared with previous annual surveys, a small but perceptible increase in privatization surfaced. However, changes were mainly in the contract and operations fields, rather than in asset transfers. In the U.S., as in most countries studied, there is a reluctance to transfer assets from the public to the private sector. Contracting or outsourcing are preferred as methods of achieving some privatization. Such public-private partnerships appear to establish a working balance between capital requirements, efficiency and social goals.

Currently, there are over 1,000 operation and maintenance contracts in the U.S. for water and wastewater systems. The number is increasing rapidly. Many of these contractors are foreign and many of them have established business relationships with U.S. firms. Often, the lead operators have a general strategy of exporting domestic technologies to first- and third-world markets. U.S. companies are gradually becoming players in the overseas privatization arena.

Australia has embraced a National Competition Policy (the "NCP"). The driving force behind this policy is to make the Australian economy competitive with its many trading partners. Government business enterprises have been corporatized, and the states, territories and federal government have embarked on a policy of competitive neutrality by removing the "the shield of the crown" as a protective barrier against competition. In addition, the NCP has decreed "open access" to major infrastructure resources. Australia is a possible source of lessons for the U.S., particularly given the already existing high level of American participation in the Australian electric privatization process (Victoria).

Economic change, such as infrastructure privatization, can produce winners and losers. Investors may achieve higher returns on capital, while certain employees (human capital) may find themselves without a means to their customary income sources. Moreover, the costs of economic change do not appear to be spread evenly by age classification.

This work, both in the U.S. and abroad, is ongoing. The world needs viable water systems. Economic growth is related to their availability. Every economy requires an efficient infrastructure, either to enable or sustain economic growth. Water and wastewater systems are at the heart of the infrastructure package. They are highly valued on a global basis. There can be no doubt that there will be a continuing strong demand for improved water and wastewater systems.

Chapter 1 Water and Wastewater Systems

Introduction

Efficient and cost-effective water and wastewater systems are necessary and integral to economic development. The U.S. has numerous and diverse systems. Historically, there has been large public sector involvement in both water and wastewater systems. Until recently, a large percentage of the wastewater industry has been directly financed by federal government grants.

The role of the public sector is evolving in the context of budgetary constraints, contractual outsourcing, tough environmental laws, and recent (January 10, 1997) IRS rule changes. Most municipalities and districts are self-regulating with regard to rate-making. The 1996 California constitutional initiative, Proposition 218, may create a new wrinkle in how California sets water and wastewater rates (see discussion below).

There is a viable but relatively small investor-owned water industry in the U.S. The rates of this private sector industry are regulated by state public utility organizations. Eighty-five percent of U.S. drinking water and ninety-five percent of wastewater services are supplied by public sector entities. Most U.S. investor-owned water companies are relatively small. Even if the individual subsidiaries of larger conglomerates are included, only about 100 U.S. investor-owned water companies make revenues in excess of one million dollars. Tables 1-1 and 1-2 compare public and private water utilities in terms of (1) number and type, and (2) number of users of various type water facilities. Tables 1-3 and 1-4 express these key indicators in percentages.

Table 1-1. Number and Type of Water Facilities in the USA[1]

Type	Public	Private	Totals
Community Water Systems	14,081	36,208	50,289
Non-transient Non-community Water Systems	3,073	20,566	23,639
Transient Non-community Water Systems	62,797	43,639	106,436
Totals	79,951	100,413	180,367

Table 1-2. Number of People Using Various Types Water Facilities in the USA

Type	Public	Private	Totals
Community Water Systems	226 million	17 million	243 million
Non-transient Non-community Water Systems	.12 million	5.88 million	6 million
Transient Non-community Water Systems	.68 million	12.92 million	13.6 million
Totals	226.8 million	35.8 million	262.6 million

Table 1-3. Percent Number and Type of Water Facilities in the USA

Type	Public	Private	Totals
Community Water Systems	8	20	28
Non-transient Non-community Water Systems	2	11	13
Transient Non-community Water Systems	35	24	59
Totals	44	56	100

Table 1-4. Percent Number of People Using Various Type Water Facilities in the USA

Type	Public	Private	Totals
Community Water Systems	86	6	93
Non-transient Non-community Water Systems	<1	2	2
Transient Non-community Water Systems	<1	5	5
Totals	86	14	100

Two major legislative initiatives which cover water on the federal level are:

- The 1974 Safe Drinking Water Act (SDWA), as amended, addresses the quality of water at the tap.
- The 1972 Clean Water Act (CWA), also known as the federal Water Pollution Control Act, as amended, addresses the release of pollutants to surface waters.

The 1996 Amendments to the Safe Drinking Water Act,[2] focuses on the most serious water contaminants, but its scope and funding are limited. Congress authorized a $7.6 billion program in theory[3]. However, Congress must appropriate these funds each year. The Centers for Disease Control (CDC) estimates that 900 people in the U.S. die from contaminated tap water and over 940,000 people fall ill each year. More than 600 water-borne disease outbreaks have been reported to the EPA since 1971. A September 3, 1996 article in the Hearst Newspapers noted that the lack of a nationwide monitoring program suggests that this estimate could be "... just a fraction of the outbreaks that occur." Furthermore, in the United States, according to a 1996 report by Environmental News Network Inc., "...nearly 40 percent of rivers and streams are too dangerous for fishing and swimming, let alone drinking." The Hearst article, noted above, also states that a survey by Opinion Research Corporation found that "... a third of Americans believe their drinking water is not as safe as it should be."

In 1996, Jane Kay wrote an article in the *San Francisco Examiner* headlined "Chemicals used to cleanse water can also cause problems." The article explains that while chlorine does kill off microbes that spread cholera, typhoid fever, and other waterborne diseases, it can produce byproducts in a water treatment plant that cause cancer in laboratory animals. The U.S. Environmental Protection Agency (U.S. EPA) classifies three of these byproducts—chloroform, bromoform, and bromodichloromethane—as possible human carcinogens. Erik Olson, an analyst with the National Resources Council, Washington D.C., is quoted in the same article as saying: "Probably in 15 to 20 years most U.S. systems will catch up with Europe and use ozone to kill the resistant things like *crytosporidium.*" Tom Crubbs of U.S. EPA's Standards Division countered that even ozone may produce carcinogens, i.e. bromate—adding that not all ozonation byproducts had been identified.

Vanessa Leiby, Executive Director of Association of the State Drinking Water Administrators, told a house panel in 1996: "America's infrastructure is aging and in many cities has deteriorated to the point where providing a constant source of safe drinking water is a daily challenge." U.S. EPA estimates that for the next twenty years annual water infrastructure needs are $11 billion (constant/$1992) annually, while only $1.4 billion is currently spent. The American Water Works Association puts this latter amount at $4.1 billion.

Between 1984 and 1992 major outbreaks of waterborne illnesses have occurred in a number of U.S. city water supplies. For example:

- 1984—Braun Station Texas.
- 1987—Carroliton, Georgia. Thousands fell ill due to a technical failure on the part of plant operators.
- 1989—Cabool, Missouri. 243 people were sick because the 50 year old distribution pipes were at fault allowing *E. coli* bacteria to enter the system.
- 1992—Medford, Oregon.
- 1993—Milwaukee, Wisconsin. 403,000 people were ill and there were dozens of deaths.
- 1993—New York and Washington D.C. advised their residents to boil tap water because it contained *E. coli* or fecal bacteria.
- 1994—Las Vegas, Nevada. *Cryptosporidium* managed to sicken 100 people and contribute to 19 deaths.

- 1995—On December 19, the San Francisco Health Commission voted unanimously to order the San Francisco Department of Public Health to "inform persons who are immunocompromised about the risks of drinking untreated San Francisco tap water," and to take other measures to protect public health, due to *cryptosporidium* parasite in the water.

The Milwaukee incident, which took place in May of 1993, was caused by a tiny parasite called *cryptosporidium.* The incident was caused by reduced efficiency at one of the plant's filter systems due to a change in the plant's process of spiking the water with polyaluminum chloride. Over 403,000 people contracted diarrhea of varying severity. Eight thousand people are served by the system.

Another contaminant in the U.S. water system is lead. EPA testing in 1992 determined that 819 water systems serving 30,000,000 people have excessive levels of lead. Pollution can be generated from point (specific outlet sites) and non-point (rain run-off, etc.) sources.

Water Systems

The United States uses approximately 338 billion gallons of fresh water daily or 1,400 gallons per capita. This is the largest use of water by any industrialized country and many times that of developing countries. Water use may be broken down as follows:

- Tap water (public use) 10%
- Industry 11%
- Power generation cooling 38%
- Irrigation/Agriculture 41%

Most of the 10 percent of "*public use*" water requires disinfecting to meet standards set by the EPA under the 1986/96 amendments to the original Safe Drinking Water Act (SDWA) of 1974. Costs for treatment vary considerably, often depending on location.

Ground water supplied from deep aquifers may require little treatment (western cities). In other cities/locations, heavy treatment is required. The federal Safe Drinking Water Act requires public water suppliers to test for numerous chemicals and bacterial pollutants and to notify the public if these standards are violated. The federal requirements apply to any system serving 15 or more connections or 25 people. About 15 percent of Americans (40 million people), rely on private wells, springs, or cisterns for their water. These people, unlike users of public systems, must gauge water safety for themselves.

Economic development requires abundant water for residential, commercial, agricultural, industrial, and environmental purposes. Water is a limited resource. To ensure an adequate supply of clean water, there will be an increasing reliance on rates or market pricing. This anticipated trend will guarantee that scarce water resources are allocated effectively between many competing uses.

In the U.S., there are approximately 181,000 water systems (see Table 1-1). Using EPA classification, roughly 140,000 of these are considered small. The Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA) have produced financially difficult situations for many of these systems. Full compliance with all state and federal regulations could produce additional industry financial hardships.

Water Delivery Systems

Water delivery—supply and distribution—generally consists of four key elements:

1. **Source**—Where the water comes from; namely, surface or groundwater sources. The water infrastructure includes facilities related to water development and watershed protection.
2. **Storage**—Storage facilities are required if there is to be a consistent quantity and quality of water over time and subject to varying demands. Infrastructure costs include site acquisition and development, construction, repair and improvements of reservoirs, standpipes, elevated tanks, etc.
3. **Treatment**—Treatment is necessary to maintain and/or improve water quality.
4. **Transmission and distribution**—The system designed to bring water from the initial source of supply to the storage and/or treatment facility and then to the end user. The infrastructure used here includes aqueducts, pipes, valves, pumping stations, meters, and hydrants.

Water System Classifications

Water delivery systems are divided into two classifications: (1) Community Water Systems (CWS) and (2) Non-Community Water Systems (NCWS). CWS are in general larger than NCWS. CWS are defined as those serving 25 or more persons and having at least 15 hook-ups. These systems serve fixed or residential populations for periods of sixty days or more each year. NCWS serve mainly transient or non-residential populations. Approximately 28.8 percent of the nation's public water systems are community water systems, serving approximately 243 million people. Non-community water systems make up 72 percent of the total number of water systems and serve some 19.6 million people.

Ownership of Community Water Systems

In the U.S., approximately 45 percent of Community Water Systems (CWS) are classified as publicly owned and fall into the categories of: (1) local water districts or municipalities (43%), (2) federal government (2%), and (3) wholesalers (less than 1%). Nearly 27 percent of the U.S. CWS are classified as privately owned. The private sector ownership is divided into: (1) investor owned (12%), (2) home-ownership or subdivision (8%), (3) parent company (3%), (4) wholesalers (less than 1/10 of 1%), and (5) "other" (3%). A final category of CWS, classified as "ancillary," accounts for nearly 29 percent of the total number of systems. These ancillary CWS serve 1.7 million people, who live in trailer parks and small developments. These systems are generally not subject to conventional utility regulation and hence are placed in this separate classification. Most, however, are privately owned.

Table 1-5 summarizes how the over 50,000 CWS are classified by (1) size—based on population base served, and (2) type of ownership.

Table 1-5. Water Systems Ownership Structure—National Totals (Number of Systems—USA)

	POPULATION CATEGORIES												
	25-100	**101-500**	**501-1000**	**1,001-3,300**	**3,301-10,000**	**10,001-25,000**	**25,001-50,000**	**50,001-75,000**	**75,001-100,000**	**100,001-500,000**	**500,001-1,000,000**	**Over 1,000,000**	**TOTAL**
Ownership Structure													
Local Municipal Govt.	1,287	5,701	4,184	5,558	2,823	846	804	152	68	159	15	9	21,606
Federal Govt.	121	495	85	0	117	36		0	0	855		0	1,004
Wholesalers	0	0	0	0	0	0	0	3	2	7	2	3	41
Total	1,408	6,196	4,269	5,558	2,940	882	804	155	70	166	17	12	22,478
Ownership Structure													
Investor-Owned	2,312	2,001	560	543	162	63	84	21	9	22	6	1	5,786
Homeowner or sub-division	2,699	1,167	160	145	48	16	0	0	0	0	0	0	4,235
Parent company	569	751	60	72	81	73	98	11	5	10	1	0	1,739
Wholesalers	0	0	0	0	0	0	4	0	0	0	0	0	4
Others	962	250	220	145	48	6	0	4	2	0	0	0	1,636
Total	6,549	4,170	1,001	905	338	158	186	36	16	32	7	1	13,400
Ownership Structure													
Mobile home park	7,139	3,512											10,651
Hospital	193	0											193
School	0	190											190
Institution	772	94											867
Other	1,543	949											2,493
TOTAL	9,648	4,745											14,393
GRAND TOTAL	**17,606**	**15,111**	**5,271**	**6,463**	**3,278**	**1,040**	**990**	**191**	**86**	**198**	**24**	**13**	**50,271**

Note: In addition to the expected ownership patterns between public and privately systems, there are 12,000 mobile home parks and nearly 5000 homeowner association/subdivisions.

Source: Summary of Operating and Financial Characteristics of Community Water Systems EPA Office of Drinking Water 1982. This table was recreated from the original 1994 study—using the ratio of 50,289/58,071 (facility change). Errors are in rounding and use of ratio to compute matrix elements.

Supply Sources—Community Water Systems (CWS)

Groundwater supplies account for approximately 79.8 percent of the nation's primary supply sources of water for CWS, followed by surface water at 9.6 percent, with purchase water supplying 10.6 percent.[4] Larger companies tend to rely more heavily on surface supplies, while smaller companies increasingly look to ground water for their primary source of water. The EPA notes that this reliance on ground water supplies by smaller companies has continued, while larger population areas have relied more and more upon purchase and surface water supplies.

Investor Owned Community Water Systems

In the U.S. there are over 6,700 investor owned CWS. The National Association of Water Companies (NAWC) identified those CWS with operating revenues in excess of one million dollars in 1995. These companies are shown in Table 1-6 by the following categories: name, affiliation, region, size, ratio of net plant operating revenues, operating revenues, number of customers, sales volume (MG), revenues, and number of employees. Table 1-6 also shows customer classifications, i.e. residential, commercial, industrial, wholesale, government authority, fire prevention, other, and total.

Table 1-6. U.S. Investor Owned Water Companies With Annual Revenues in Excess of One Million Dollars

ID	Name	Group	Re-gion	Size	Net Plant/ Rev Ratio	#1 Oper Rev	Custom Res #89 No.	Custom Comm #90 No.	Custom Indust #91 No.	Custom Whise #91a No.	Custom Gvt Aut #91b No.	Custom Fire #92 No.	Custom Other #93 No.	Custom Total #94 No.	Sold Res #96 MG	Sold Comm #97 MG	Sold Indust #98 MG	Sold Whise #98a MG	Sold Gvt Aut #98b MG	Sold Fire #99 MG	Sold Other #100 MG	Sold Total #101 MG	Revs Res #103	Revs Comm #104	Revs Indust #105	Revs Whise #105a	Revs Gvt Aut #105b	Revs Fire #106	Revs Other #107	Revs Total #108	No. of Emp. #109
626	SALISBURY	AM	1	A-3	3.655	1670551	2623	203	2	2	10	33	0	2873	177	48	1	8	0	0	0	234	1143064	230634	4060	123964	10190	131016	27623	1670551	0
545	MARYLAND AMERICAN	AM	2	A-3	2.650	2290242	3929	478	1	1	39	61	40	4549	233.444	197.966	0.104	18	28	0	0	477.514	1164268	833731	635	80792	118248	89840	2728	2290242	12
536	PARADISE VALLEY	AM	5	A-3	2.230	2915464	4095	211	0	0	30	71	0	4407	1830	828	0	0	75	1	0	2734	2066417	730406	0	0	16760	355	101526	2915464	11
529	HAMPTON WATER CO	AM	1	A-3	3.623	3187232	6887	624	2	15	1	132	40	7701	417	218	0	0	2	0	13	650	1845817	734712	1911	0	53235	491014	60534	3187223	19
605	MASS AMERICAN	AM	1	A-2	3.321	5843241	14584	1524	29	0	299	152	0	16588	1076	304	302	0	2	0	39	1723	3731716	809392	389302	0	130462	778928	3441	5843241	39
537	NEW MEXICO AMERICAN	AM	5	A-2	2.666	5875700	12134	1455	0	0	137	49	0	13775	1513	384	0	164	0	0	0	2061	4476542	1006925	0	0	369714	9102	13417	5875700	28
565	NEW YORK AMERICAN	AM	1	A-2	1.972	9140179	8987	2129	25	0	50	236	28	11455	947	951	27	0	76	0	35	2036	4616087	3364288	78366	0	329285	750564	1589	9140179	0
548	OHIO AMERICAN	AM	4	A-1	1.955	16906228	35806	3481	140	1	226	332	8	39994	1967.96	751.935	783.59	630	0	106	319	4558.485	10091991	2930320	1974935	562976	1107201	183702	55103	16906228	102
550	IOWA AMERICAN	AM	4	A-1	2.863	17661941	49159	4339	99	0	275	477	0	54349	3241	1773	1184	0	228	0	5	6431	10816770	4005519	1810000	0	512250	424906	332964	17902409	83
563	CONNECTICUT AMERICAN	AM	1	A-1	3.396	18231912	23462	1983	30	1	164	573	0	26213	2772	1036	95	0	1444	0	3	5350	11907864	3338575	185329	1204235	368694	1211303	15912	18231912	91
549	MISSOURI AMERICAN	AM	4	A-1	3.671	23261470	79286	8134	200	27	550	504	0	88701	6240	2467	2128	1203	513	0	0	12551	14759688	4157923	2088966	738027	778322	347490	183053	23053469	135
547	VIRGINIA AMERICAN	AM	3	A-1	2.948	27551773	40631	4671	18	2	389	2	0	45713	2879	4189	5649	0	942	0	0	13659	10508261	9559549	5190757	200622	1595549	26466	470589	27551793	86
543	TENNESSEE AMERICAN	AM	3	A-1	2.864	28287448	59501	6696	6	0	484	875	0	67562	3558	2820	2898	340	999	0	0	10615	11468200	7495506	3990778	350108	1990071	2068607	924178	28287448	159
544	KENTUCKY AMERICAN	AM	3	A-1	4.336	32087387	75514	7202	17	0	0	1142	424	84299	5338.75	4120.172	980.929	0	0	0	1779.8	12219.6	15710513	9124696	1590812	422972	2790903	2114518	322964	32077378	140
551	INDIANA AMERICAN	AM	4	A-1	3.934	57214956	143656	16065	510	12	1000	1184	93	162520	10925	4901	4670	949	1598	0	0	23043	31784173	10145597	5972401	979448	2723047	5304182	306108	57214956	255
535	CALIF AMERICAN	AM	5	A-1	2.255	57686870	89223	9669	253	0	1354	1429	0	101928	11481	5474	630	0	1683	4	0	19272	36299463	14913713	1828892	0	4387944	541777	-284919	57686870	194
546	WEST VA AMERICAN	AM	3	A-1	3.264	57743410	118744	10195	149	9	981	878	0	130956	6356	3161	2649	743	876	0	0	13785	33733556	11895329	5752535	1590601	3059078	860506	851805	57743410	362
552	ILLINOIS AMERICAN	AM	4	A-1	2.938	59480193	128580	13508	328	24	680	1129	58	144307	8624	4813	5987	4460	1159	0	10	25053	32198985	9906843	6817750	6862394	1863233	3444393	83023	61176621	387
530	PENN AMERICAN	AM	2	A-1	3.845	180947927	351142	28146	611	32	1808	1799	79	383617	20995	9262	5284	775	2690	0	2	39008	115000000	33385581	13570169	2043288	8224865	5915160	2988450	180947927	820
564	NEW JERSEY AMERICAN	AM	2	A-1	3.152	184931394	275256	32024	462	34	1830	3360	900	313866	25713	13769	911	2958	1662	6	7	45026	96311573	46912946	3104914	6557245	6563902	11599160	13881654	184931394	596
748	NEW CANAAN	AQ	1	A-3	2.166	2143925	2982	240	0	0	30	0	0	3252	301.22	59.746	0	0	21.083	42.094	80.152	504.295	1405514	235351	0	0	81258	421496	306	2143925	0
627	STAMFORD WATER	AQ	1	A-1	2.729	13265426	16352	2477	77	1	233	466	1	19607	1907	2182	247	911	467	0	33	5747	4970926	4432319	466048	799607	816820	1660238	119469	13265427	45
580	BRIDGEPORT HYDRAULIC	AQ	1	A-1	3.287	62832587	97916	6407	62	7	835	1441	0	106668	9738	2293	1989	1402	570	0	0	15992	40256962	7805746	2947099	1264451	1666387	8871941	0	62832586	234
590	ARTESIAN WATER	AR	2	A-1	3.880	20720064	52740	3328	12	0	111	481	0	56672	3379	1965	46	24	201	1	0	5616	12562862	5236344	116493	83949	546324	1979613	194479	20720064	132
588	FLORIDA CITIES	AV	3	A-1	4.273	25248853	27049	4045	0	0	0	0	0	31094	1513	1843	0	0	0	0	0	3356	12698399	11645065	0	0	0	0	905389	25248853	134
632	CITIZENS UTIL / OH	CI	4	A-3	4.227	2380679	8064	226	0	0	0	0	0	8290	671	84	0	0	0	0	0	755	2145468	216917	0	0	0	18294	0	2380679	0
609	CITIZENS UTIL HOME	CI	2	A-3	8.025	2745563	5423	231	49	0	0	78	0	5781	413	43	149	0	0	0	0	605	2168157	154486	244548	0	0	161482	16890	2745563	11
613	SUN CITY WATER	CI	5	A-2	3.273	6365887	28314	831	0	0	0	91	124	29360	3295	630	0	0	0	0	448	4373	5095603	905330	0	0	0	8576	356378	6365887	0
610	CITIZENS UTIL / ILL	CI	4	A-1	4.570	12750774	33231	2516	0	0	0	0	0	35747	3126	569	0	0	0	0	0	3695	11034449	1516568	0	0	0	188213	11544	12750774	0
611	CITIZENS UTIL / CAL	CI	5	A-1	3.900	15755216	56323	0	0	0	0	550	0	56873	17373	0	0	0	0	0	0	17373	15525449	0	0	0	0	229767	0	15755216	70
538	NORTHERN ILLINOIS	CN	4	A-1	3.234	19731484	53322	3896	144	5	263	662	9	58301	4045	1349	1014	447	134	0	1522	8511	11354377	2465505	3058514	470325	253305	1735227	394231	19731484	140
711	NORTHWEST INDIANA	CN	4	A-1	2.985	20355167	51106	5310	30	7	364	612	0	57429	3877	2480	1772	2310	632	0	0	11071	11354377	4034479	1558566	1969158	827678	1442390	394231	21580879	180
578	LONG ISLAND	CN	1	A-1	1.258	34203800	67796	5387	40	0	0	671	3	73897	7507	2119	82	0	0	0	1	9709	25390218	5721775	189776	0	0	2718242	183789	34203800	152
553	ST LOUIS COUNTY	CN	4	A-1	3.692	88631582	279369	15375	209	7	531	2503	1074	299068	29020	7680	6918	3832	256	0	141	47847	58306531	13697369	6589197	3562506	470372	4933679	1071922	88631576	574
512	CONSUMERS PA-SUSQUE.	CS	2	A-3	3.034	1458344	4126	325	17	0	0	33	0	4501	232	150	16	0	0	0	0	398	1044188	303930	36808	0	0	71006	2412	1458344	12
717	CONSUMERS NEW HAMP	CS	1	A-2	5.777	5413286	7245	379	78	0	0	205	0	7907	522	108	50	0	0	0	0	680	3220075	664990	312615	0	0	1175090	40516	5413286	18
744	CONSUMERS MAINE	CS	1	A-2	3.868	7217560	12350	1516	60	0	49	330	0	14305	671	401	425	0	15	5	0	1517	3485122	1073401	503560	0	405683	1406258	343536	7217560	42
531	CONSUMERS PA-ROAR. CK	CS	2	A-2	4.474	7495767	16771	720	52	1	0	74	0	17618	732	127	409	1	0	0	0	1269	5402453	658483	1058998	8088	0	294870	72875	7495767	39
511	CONSUMERS PA-SHENANGO	CS	2	A-2	3.289	7498546	15881	1311	35	6	0	146	0	17379	906	433	605	1182	0	0	0	3126	3418407	1137882	979635	1604636	0	332286	25700	7498546	43
513	CONSUMERS NEW JERSEY	CS	2	A-1	4.388	11324192	28254	1256	47	0	123	224	0	29904	2647	384	126	0	108	0	0	3265	8329895	1082334	309362	0	202069	1378780	21752	11324192	53
515	CONSUMERS ILLINOIS	CS	4	A-1		16384845	46278	3219	144	5	0	342	0	49988	2734.51	1598.704	2021.74	187.089	0	0	0	6542.042	9328524	2860548	2342068	564519	0	1051537	237649	16384845	93
721	CONSUMERS OHIO	CS	4	A-1	3.653	28775554	67657	3927	253	0	0	697	269	72803	5050	1066	853	0	0	0	620	7589	21345836	3307272	1562604	270488	592582	683745	1013027	28775554	134
558	DOMINGUEZ WATER	DS	5	A-1	1.454	25267417	35295	0	173	0	0	977	294	36739	7743	0	3840	0	0	0	788	12371	10583849	0	13195891	0	0	0	1487677	25267417	78
567	MOUNT HOLLY	ET	2	A-3	4.773	2850084	11103	0	0	0	0	113	0	11216	1182	0	0	0	0	0	0	1182	2525787	0	0	0	0	316925	7372	2850084	14

ID	Name	Group	Region	Size	Net Plant/ Rev Ratio	#1 Oper Rev	Custom Res #89 No.	Custom Comm #90 No.	Custom Indust #91 No.	Custom Whlse #91a No.	Custom Gvt Aut #91b No.	Custom Fire #92 No.	Custom Other #93 No.	Custom Total #94 No.	Sold Res #96 MG	Sold Comm #97 MG	Sold Indust #98 MG	Sold Whlse #98a MG	Sold Gvt Aut #98b MG	Sold Fire #99 MG	Sold Other #100 MG	Sold Total #101 MG	Revs Res #103	Revs Comm #104	Revs Indust #105	Revs Whlse #105a	Revs Gvt Aut #105b	Revs Fire #106	Revs Other #107	Revs Total #108	No. of Emp. #109
568	ELIZABETH-TOWN	ET	2	A-1	3.730	105548021	178815	0	9	12	0	2565	0	181401	22798	0	3673	15568	0	0	0	42039	64949860	0	7947134	18720487	0	13926143	4397	105548021	382
639	ADELPHIA	IN	2	A-3	4.865	1206254	3189	19	0	0	1	19	0	3228	136	1	0	0	1	0	0	138	1144464	5809	0	0	3785	46306	5890	1206254	9
631	HARBOR WATER	IN	5	A-3	4.003	1720762	7538	0	0	0	0	0	0	7538	0	0	0	0	0	0	0	0	1680573	0	0	0	0	0	40189	1720762	22
747	ATLANTIC UTILITIES	IN	3	A-3	1.383	1795718	4630	138	0	0	0	16	0	4784	273	42	0	0	0	0	0	315	1587699	181004	0	0	0	4475	22540	1795718	3
602	AVON WATER	IN	1	A-3	4.786	1825489	3305	304	12	0	21	61	3	3706	308.962	91.522	13.948	0	12.786	0	0	427.218	1158248	273646	39235	0	37634	303340	13386	1825489	13
510	COLLEGE UTIL CORP	IN	3	A-3	4.799	1899579	1575	119	3	0	0	0	9	1706	163	47	13	0	0	0	2	225	1034231	320404	60806	0	0	421614	62524	1899579	10
581	TORRING #NAME?	IN	1	A-3	3.968	3299267	7538	655	63	0	86	118	1	8461	611.8	161.8	113	0	38	0	45.3	969.9	1413730	260836	117440	0	82211	521941	903109	3299267	14
624	NEWTOWN ARTESIAN	IN	2	A-3	6.521	3482249	7918	498	36	1	0	154	8	8615	538	136	59	77	0	0	12	822	2538456	432953	169895	127214	0	161290	52441	3482249	16
640	BIRMINGHAM	IN	1	A-3	2.607	4238075	7755	351	52	0	53	83	1	8295	728	125.7	56.4	59.5	23.2	0	0	992.8	2824544	389898	0	146711	83212	615563	13955	4073883	19
556	BECKLEY WATER CO	IN	3	A-2	4.087	5936414	15667	1171	1	12	97	143	0	17091	847.902	408.675	2.296	735.817	75.4	0.445	0	2070.535	3546722	1035846	5183	1036639	167827	55487	88710	5936414	50
587	SHORELANDS	IN	2	A-2	1.608	7921516	8867	600	54	2	0	173	3	9699	932	257	33	404	0	0	0	1626	4415077	1172606	146942	0	0	1210677	976214	7921516	30
574	YORK WATER CO	IN	1	A-1	4.697	15449296	38732	4711	295	0	0	617	0	44355	2354	1743	1602	0	0	3	146	5848	8895600	3520825	2000579	0	0	984830	47462	15449296	91
583	NEW YORK WATER SER	IN	1	A-1	1.816	18626574	44500	0	0	0	0	0	0	44500	4958.43	0	0	0	0	0	0	4958.428	17121680	0	0	0	0	1494462	10432	18626574	73
541	CONNECTICUT WATER SERV	IN	1	A-1	3.537	39350000	55526	3939	372	0	446	1012	2	61297	3988	915	446	0	228	0	18	5595	25305000	4761000	1868000	0	1090000	6129000	197000	39350000	163
572	SOUTHERN CALIFORNIA	IN	5	A-1	2.474	129812784	233920	0	326	0	0	2909	1807	238962	49641	0	801	0	10	131	4696	55279	106000000	0	1673818	0	891348	1210849	8665610	118921513	448
560	CALIFORNIA WATER CO	IN	5	A-1	2.538	165085765	319992	36808	710	5	3590	4941	282	366328	42833	17941	3885	35	5152	0	117	69963	121000000	28230294	5836272	86833	8148545	1423786	432065	165085765	630
532	INDIANAPOLIS	IWC	4	A-1	3.699	74621882	212027	16957	323	0	195	3066	0	232568	21422	12426	4789	0	713	5	121	39476	48156524	18114397	4109129	0	793900	1219308	2228624	74621882	373
630	SOUTHERN STATES	MP	3	A-1	4.884	30333497	102319	2818	0	0	4	129	218	105488	10989	1205	0	0	0	0	409	12603	24962120	2721157	0	0	16901	235528	2397791	30333497	487
638	TIDEWATER UTILITIES	MW	2	A-3	5.295	2008379	5690	127	4	0	0	14	0	5835	313	32	5	0	0	0	0	350	1512891	110624	14746	0	0	40092	330026	2008379	17
517	MIDDLESEX WATER CO	MW	2	A-1	2.856	35319819	50476	1687	295	7	0	613	0	53078	4340	1636	2823	6689	0	92	0	15580	13184491	4282067	6668525	6658351	0	4497690	28695	35319819	140
586	VALENCIA WATER CO	NH	5	A-2	5.026	8997205	14892	455	318	0	335	353	104	16457	2908	1080	406	0	830	0	150	5374	4919000	1410000	601000	0	1079000	245000	743000	8997000	27
566	PENNICHUCK	PE	1	A-1	3.729	10788740	19845	1253	113	0	0	597	94	21902	2620.93	632.223	1162.512	0	0	0	132.99	4548.656	5624828	1164643	1373945	0	0	302318	2323006	10788740	55
589	PHILA. SUBURBAN	PS	2	A-1	3.799	115873066	242179	11344	844	12	0	2789	769	257937	17610	7983	1919	335	0	51	124	28022	78082000	24016000	4990000	323000	0	7421000	1041000	115873000	526
503	SAN JOSE WATER CO	SJ	5	A-1	2.324	95634046	183066	19262	81	31	1550	2269	150	206409	24815	14096	418	169	2724	0	72	42294	58320596	29667613	816440	256382	5760433	514505	298077	95634046	290
577	NEW MEXICO UTILITIES	SW	5	A-3	6.203	2164990	3337	328	1	0	0	22	5	3693	593.743	515.448	22.906	0	0	0	199.96	1332.06	1180026	787441	30680	0	0	37366	129477	2164990	12
582	SUBURBAN WATER SYS	SW	5	A-1	1.949	26988555	62319	3400	36	0	0	264	0	66019	10535	2734	268	0	0	748	0	14285	20456141	5791562	363483	0	0	377369	0	26988555	101
518	SAN GABRIEL	UI	5	A-1	2.533	41463296	72521	697	263	0	626	1247	46	75400	15451	3864	1830	0	2225	0	36	23406	29277186	5551182	2523239	0	3252106	646202	213381	41463296	189
502	UNITED SOUTH GATE	UW	3	A-3	0.658	1753106	3887	324	0	0	6	9	0	4226	218.469	105.49	0	0	7.552	0	0	331.511	1183206	519451	0	0	45292	3816	1341	1753106	5
741	UNITED RHODE IS.	UW	1	A-3	3.299	2047563	5883	603	9	2	68	151	0	6716	386	171	24	260	17	0	0	858	1227405	397159	42963	172000	41128	166908	0	2047563	10
520	UNITED W LAFAYETTE	UW	4	A-3	3.273	2339473	5747	748	14	0	14	48	0	6571	586	534	23	0	48	0	0	1191	1318086	772192	27609	0	43497	162569	15520	2339473	17
527	UNITED ILLINOIS	UW	4	A-3	2.817	2703067	5143	612	9	0	51	38	0	5853	303	147	86	0	190	0	0	726	1294142	498914	201362	0	434912	231976	41761	2703067	13
634	UNITED CONN.	UW	1	A-3	3.612	2785135	3608	836	21	0	46	116	0	4627	222.323	180.648	43.976	0	21.744	0	0	468.691	1412155	855478	105275	0	106068	320668	-14509	2785135	12
523	UNITED MISSOURI	UW	4	A-3	2.356	3149529	8605	1479	14	0	38	97	0	10233	524	547	73	0	15	0	0	1159	1661241	1224443	113286	0	31707	75677	43175	3149529	27
748	UNITED INDIANA	UW	4	A-3	2.658	3273132	6787	1304	60	0	79	146	0	8376	439	362	584	0	74	0	1	1460	1571700	789416	496377	0	130856	261181	23602	3273132	26
622	UNITED ARKANSAS	UW	3	A-2	2.966	6308812	17125	2137	77	0	236	152	0	19727	1328	607	770	0	444	0	0	3149	3789702	1048726	698324	0	517364	73118	181578	6308812	47
570	UNITED FLORIDA	UW	3	A-2	5.494	6852515	23906	2454	0	0	0	0	205	26565	2118.17	2118.639	0	0	0	0	281.82	4518.622	3564006	2854294	0	0	0	0	434215	6852515	36
501	UNITED TOMS RIVER	UW	2	A-1	4.120	13051712	40172	1940	0	0	0	387	128	42627	2813	612	0	0	0	0	100	3525	9748338	2114997	0	0	0	800509	387868	13051712	49
522	UNITED DELAWARE	UW	2	A-1	4.266	14521115	28352	2206	69	1	0	291	59	30978	1965	1296	3128	779	0	0	0	7168	6345466	2330889	3763885	985691	0	1068407	26777	14521115	69
508	UNITED NEW ROCH.	UW	1	A-1	2.162	16967738	27278	2141	78	1	168	454	0	30120	3276	2261	185	117	105	0	0	5944	9438138	5200337	342623	168367	248136	1557412	12725	16967738	66
635	UNITED PENNA.	UW	2	A-1	3.521	18826931	39870	3901	74	0	0	427	156	44428	2312	1440	535	0	0	0	255	4542	11360717	4775797	1010264	0	0	567556	16241	17730575	104
743	UNITED IDAHO	UW	5	A-1	4.796	19938422	46560	6496	0	0	74	736	0	53866	7244	4362	0	0	66	36	0	11708	12589511	6190341	0	0	111498	306855	740217	19938422	97
740	UNITED NEW YORK	UW	2	A-1	2.694	39808235	57191	4594	167	0	0	0	0	61952	6100.35	1775.768	972.695	0	0	0	0	8848.809	27577592	7317999	2043848	0	0	2868796	0	39808235	95
739	UNITED NEW JERSEY	UW	2	A-1	3.174	119337713	155353	19694	1378	0	0	0	0	176425	21693	8424	1097	0	0	0	0	31214	73440960	36045672	4434670	0	0	5416411	0	119337713	429

Table includes Name, Organization, Region, Size, Net Plant/Revenue Ratio, Annual Revenues, Number of Customers by Classification, Water Sold by Customer Classification, Revenues by Customer Classification, and Number of Employees. From NAWC 1995 Data Base.

Table 1-7 shows the main U.S. Parent Water Companies by name, state, listing, symbol, net income and number of subsidiaries.[5]

Table 1-7. U.S. Parent Water Companies

Name	State	Listing	Symbol	Net. Revenues (000)	No. Subs.
American Water Works (AM)	Interstate	NYSE	AWK	$98,061	21
Artesian Resources Corporation (AR)	Delaware	NASDAQ	ARTN & ARTNA		
Aquarion Company (AQ)	CT	NYSE	WTR		3
Avatar (AV)	FL	NASDAQ	AVTR		
California Water Services Company	California	NYSE	CWT	$165,000[6]	
Citizens Utility Company (CI)	Interstate	NYSE	CZNA & CZNB	$159,536	5
Continental Water Company (CN)	Interstate	Not Traded Publicly	Stock—Privately owned		
Consumers Water Company (CS)	Interstate	NASDAQ	CONW	N/A	8
Dominquez Service Corporation (DS)	CA	NASDAQ	DOMZ	$1,952	
E'Town Corp (ET)	NJ	NYSE	ETW	$15,295	2
IWC Resources Corporation (IW) Indianapolis water Company	IN	NASDAQ	IWCR	$12,192	
Middlesex Water Company (MW)	Interstate	NASDAQ	MSEX	$5,703	
Minnesota Power (MP)	Interstate	NYSE	MPL	$64,705	2
Newhall Land and Farming Co. (NH)	CA	NYSE	NHL		
Pennichuck Corporation	NH	NASDAQ	PNNW		
Philadelphia Suburban (PE)	PA	NYSE	PSC	$18,400	
San Jose Water Co. (SJ)	CA	AMEX	SJW	$11,535	
Southwest Water Company (SW)	Interstate	NASDAQ	SWWS	$1,439	2
United Water Resources (UW)	Interstate	NYSE	UWR	$17,343	18

Capital Intensity

The U.S. water industry is capital intensive, having an asset to revenue ratio of $10-$12 to $1. This compares with airlines 1:1, railroads 2:1, telephone companies 3:1, and electric utilities 3-4:1. However, this higher capital-revenue ratio must be considered in the context of state and federal health, safety, and environmental regulation. Water systems do exhibit economies of scale, in that the size of the system tends to diminish average cost per unit delivered.

In analyzing the ratio of asset values to revenues, both the denominator and numerator are often generated in a non-market environment and therefore do not correlate to market valuations. The argument has been made that the historical "under-pricing" of water resources has contributed to the high water/wastewater asset/revenue ratio. In addition, inter-industry accounting procedures, Generally Accepted Accounting Principles and Regulatory Accepted Accounting Principles (GAAP/RAAP), can lead to differences. Nevertheless, the data strongly suggest that water and wastewater utilities require large capital investments. Figure 1-1 is a comparative analysis of inter-industry ratios of capital (assets) investment to revenues.

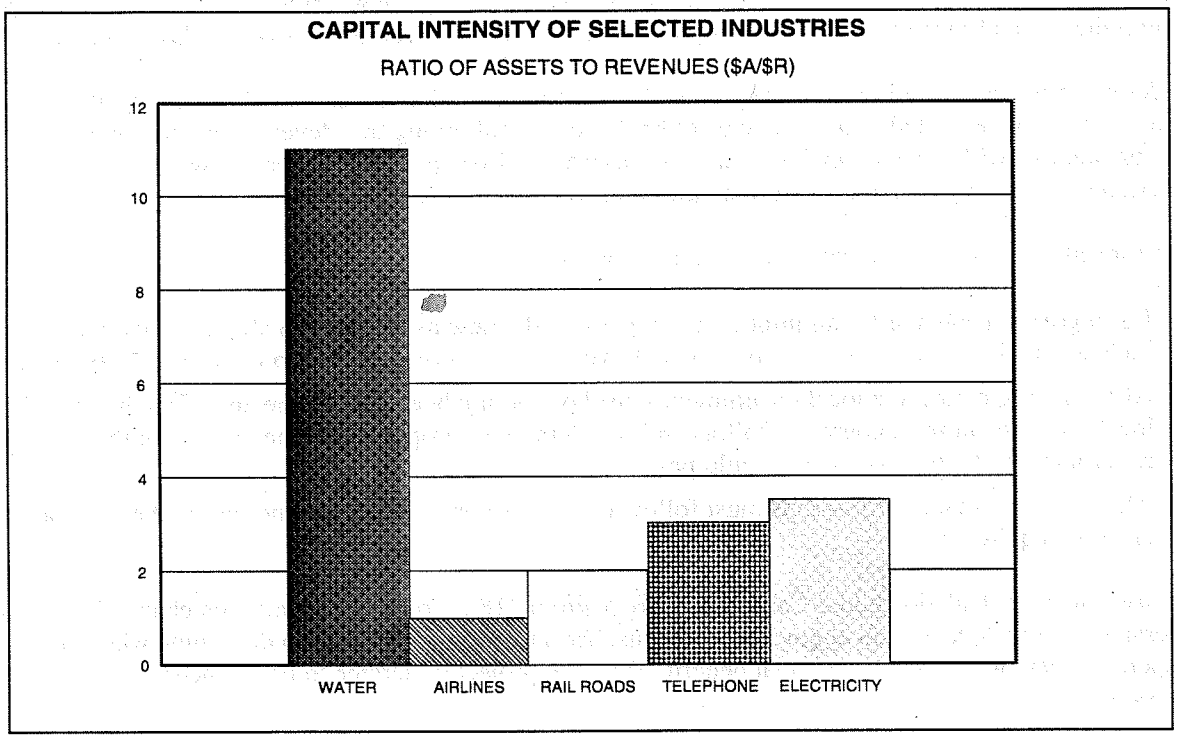


Figure 1-1. Industry Comparisons—Capital Intensity

A superficial analysis of Figure 1-1 would strongly suggest either water facilities are overbuilt or revenues are too low or both. Overbuilding could be due to design, development, and/or accounting procedures. Low revenues may be the result of a failure to reflect the societal value of water in rate-making. Figure 1-1 would suggest that market driven enterprises tend to generate lower ratios of capitalization as measured by the capital to revenue ratio. The higher ratio for non-market enterprises could well be sustained by barriers to entry and cross subsidization via fiat, political pricing, and cross subsidies.

Regulations

Complex federal and state regulations (in both the environmental and rate-making spheres) govern both public and investor owned utilities. In general, municipal or district water systems are self-regulating with regard to rates. Investor-owned water/wastewater utilities are usually regulated at the state level by public utility commissions. Governance of local utilities is a function of the interplay of local ordinances and federal and state statutes.

Administrative anomalies crop up among publicly owned water districts; their impact might retard privatization. For example, certain agricultural districts in California assign directorship voting rights on an acreage-held basis. This type of voting scheme, one-acre-one-vote (multi-acres = multi-votes), has been upheld by the U.S. Supreme Court. It might be argued that privatizing such districts would run counter to the entrenched interests of the larger landholders. Privatization by definition implies that a full cost recovery rate system must cover all explicit and implicit delivery costs. The acreage approach negates, in large part, efforts to fund water systems through taxation, government subsidies, tax exempt bond issuance, and severely constrained rate cross subsidization to varying customer-class valuations.

Under recently passed California Proposition 218, rate increases that are an "incident of property ownership" may be treated as assessments. Other states are following this development to see if Proposition 218 will be a nationwide trendsetter, as was California's Proposition 13, which severely constrained the taxing base for California cities and counties (districts).

Assessment election requirements under Proposition 218 are:

- Local governments must mail information regarding the new assessment to all property owners and include a mail-in ballot for property owners to vote their approval or disapproval of the assessment.
- After mailing notice, the local government must hold public hearings. At the end of the hearing the local government must count the ballots and weigh them in proportion to the amount of the assessment each property owner would pay.
- All new or increased assessments must follow the assessment calculation and these other special election requirements.

The assessment calculation under California's Proposition 218 represents a significant change in how assessments are allocated. Local governments must use a three-stage process to determine whether property owners will receive a "special benefit" from the project or service to be financed by the assessment.

a. The local government must determine if a project or service provides special benefits. Proposition 218 defines a special benefit as a particular benefit to land and buildings, not a general benefit to the public or increase in property values. If a project does not meet this definition, then it may be financed through an assessment.
b. The local government must secure a professional engineer's report estimating the amount of special benefit landowners would receive from a project or service, as well as the amount of general benefit derived from an assessment. The amount of general benefit must then be subtracted from the special benefit since Proposition 218 only allows local governments to charge assessments on special benefits derived from a project or service.
c. The local governments must set individual assessment charges so that property owners only pay their proportional share of the total cost of an assessment. This latter provision may cause local governments to set assessments on a parcel-by-parcel basis.

What actually constitutes an assessment and what items will be subject to the provisions of Proposition 218, will ultimately be resolved by the courts. However, the potential exists to revamp the current systems of water and wastewater rate-making for public water districts in California.

The water supply problem is aggravated by a growing population, constrained (i.e., balanced) budgets, an aged infrastructure system, as well as increased vulnerability of the watersheds, due to the by-products of agriculture, industrialization, and urbanization. The empirical data suggest that people have a relatively high (inelastic) demand for bottled water and hence, in general, would pay more to ensure that their current supplies of drinking water are non-health and life-threatening. The water and wastewater system,

more than any other infrastructure element, is necessary for urbanized human survival. Some analysts have argued that historically water has been under-valued and hence overused. In the absence of a pure market for such a commodity, only the future will tell how wisely we have husbanded this resource.

Wastewater Facilities

EPA—History and Funding

The Clean Water Act, originally passed by Congress in 1972 and last amended in 1987 (see CWAA–H.R. 961-1996), regulates discharges to waterways from wastewater (sewage) treatment facilities, which are officially called publicly owned treatment works (POTWs). There are approximately 16,000 such facilities in the U.S., which handle large volumes of industrial wastewater (also called trade effluent), as well as residential and commercial wastewater.

The federal government invested $56 billion in municipal sewerage treatment from 1972 to 1989. During the same period, total federal, state, and local expenditures amounted to $128 billion. In 1997 dollars (constant), this latter figure is estimated to be in excess of $200 billion (current). The percentage of the U.S. population served by wastewater treatment plants increased from 42 percent in 1970 to 74 percent in 1985. In 1985, plants providing enhanced secondary waste treatment reached 58 percent of the U.S. population. On the other hand, in 1988 public sewer systems serving 26.5 million people provided less-than-secondary treatment. One and one half million people had no treatment at all.

In 1973, U.S. industry spent $1.8 billion on water pollution controls. By 1986, this amount had jumped to $5.9 billion. In real dollar terms, the change in output expenditures are not as dramatic. U.S. EPA estimates that these investments have provided significant returns. U.S. EPA states that since 1972—under a Consent Decree between U.S. EPA and the National Resources Defense Council (NRDC)—selected "priority" toxic pollutant chemicals have been reduced by nearly 660,000 pounds, or 99 percent. On the other hand, it is estimated that industrial complexes release 200 million pounds of toxins into surface waters and another 450 million pounds into public sewers.

Under the CWA, each POTW must obtain a discharge consent or permit, which regulates the amount and content of effluent released into oceans, rivers, or other bodies of water. The permits require pre-treatment of industrial wastewater before it enters the municipal system. Since July 1988, plants are required to install secondary treatment systems which remove 85 percent or more of the pollutants from the water prior to discharge. At present, approximately 13 percent of the large wastewater plants are having difficulty in meeting the secondary treatment standards as required by the CWA for July 1988.

In October 1995, *Water Environment and Technology* noted that "EPA Approves the First Sales of a POTW: More Could Be on the Way?" Wheelabrator EOS, based in Hampton, New Hampshire, will pay $6.8 million for the Franklin, Ohio wastewater treatment plant. They will operate it for twenty years, guarantee environmental and regulatory compliance, and provide preventive maintenance. The three municipalities served (Franklin, Carlisle, and Germantown) will maintain control over fees, growth, and pre-treatment programs. Another immediate set of POTW candidates for similar acquisition could be cities and districts on both side of the U.S./Mexican border.

Table 1-8. Requirements Facing Municipal Wastewater Plants

Rule	Deadline
Secondary Sewage Treatment	1988
Storm Water/Sewer Overflows	1992
Sludge Treatment/Disposal	1993
Probable New Clean Water Act Rules	1995-96
Upgrades/Repairs	Perpetual
New/Expanded Plants	Based on population needs

While the EPA involvement in wastewater treatment funding goes back to 1956, the 1987 federal Water Pollution Control Act ("Clean Water Act") initiated a partnership between the federal government, the states, and local communities in the nationwide construction of wastewater treatment facilities and sewers. Currently, the federal government has between $57 and $65 billion invested in wastewater-sewage treatment facilities. However, in 1987, with the passage of the Water Quality Act (WQA), the federal government established the goal of returning the responsibility for financing wastewater treatment facilities to the states and municipalities via the State Revolving Funds (SRFs). The 1995 amendment (HR961), introduced by Republicans and conservative Democrats, appears to be designed to transfer more environmental power to state and local agencies. This specific legislation has not yet been enacted.

The three major components of the 1972 Act and its 1987 amendment are the regulatory schemes (1) to impose increasingly stringent requirements on industries and cities in order to abate pollution, (2) to meet the statutory goal of zero discharge of pollutants, and (3) to authorize federal assistance for municipal wastewater treatment construction. The 1995 Clean Water Act amendments (HR 961) reflect efforts to make the Clean Water Act more "flexible" and address a number of regulatory reform issues mainly in Titles III and VIII, the amendments pertaining to regulatory standards and wetlands.

Under the pre-1987 CWA, the federal government would pay up to 55 percent of construction costs to renovate an existing plant for secondary purpose wastewater treatment. The state or locality was expected to pay 45 percent of the cost. The 1987 amendment to the Clean Water Act shifted the financing of the treatment facilities from federal construction grants to state revolving funds or loans (SRFs). Congress allocated $18 billion through 1984, including $9.6 billion for existing projects and $8.4 billion to capitalize the revolving fund.

The federal government is switching its major wastewater/sewerage funding approach from outright grants to loans. It was estimated in the U.S. EPA "1990 Needs Survey to Congress" that the SRFs and other state funding programs will fall short by more than $80 billion in wastewater and conveyance requirements. It was in this environment that President Bush issued Executive Order Number 12803 (FR Doc. 92-10495: May 4, 1992) which aimed at encouraging and facilitating private investment in EPA funded municipal wastewater treatment facilities.

Private and Public Treatment Works—Definitions

The long involvement of the EPA in the nation's wastewater program has created a number of potential barriers to privatization. Under the current statutory and regulatory framework, a publicly owned treatment works (POTW) is a wastewater treatment facility owned by a state or local government or an Indian tribe. It usually treats domestic wastewater. There are more than 15,000 POTWs in the United States.

A privately owned treatment works is a facility which treats wastes from a facility whose operator is not the operator of the treatment works and is not a POTW. Federally owned treatment works, such as those on military bases, are included in the definition of privately owned treatment works.

The Clean Water Act provides no statutory definition of POTW. However, under Section 402 of the CWA the National Pollutant Discharge and Elimination System (NPDES), a publicly owned treatment works is defined as "any system used in the treatment (including recycling and reclamation) of municipal sewerage or liquid industrial wastes which is owned by a 'State' or 'municipality.'" The ambiguity in the CWA, as shown in the various regulations, does not address an issue critical to privatization; namely, "...to what extent a municipal wastewater treatment system might be privately owned and still be classified as a POTW." Therefore, the classification makes it difficult to turn a public POTW into a private POTW.

In the United States, there are approximately 64,000 point source discharges. A point source is defined as any discernible, confined, and discrete conveyance, such as a pipe from which pollutants are or may be discharged. Both private sewerage works and POTWs are regulated under NPDES, but are subject to different regulations, even if their output is identical. For example, if a publicly owned facility is privatized, its permit might have to be reissued. This could mean changing discharge limitations from secondary treatment to Best Practical Control Technology (BPT), Best Available Technology Economically Achievable (BAAT), or Best Conventional Pollutant Control Technology (BCT). The questions that would be asked in this context are: If the facility was not meeting private wastewater standards prior to privatization, what compliance/enforcement actions would be appropriate? How would this impact the rate structure?

Private ownership of POTWs creates potential problems for the pretreatment program. The pretreatment program depends upon a series of relationships among public and private entities. The public entities have police powers and are subject to public accountability. A privatized POTW would not have the legal authority to enforce and/or carry out pretreatment programs.

The EPA estimated in 1992 that $137.1 billion is needed for wastewater treatment over the next 20 years. To assist in generating this capital, the EPA established the Public-Private Partnership Initiative (now Partners Rebuilding America program). Reason Foundation, a conservative think tank in Southern California, sees this action as a "...move toward privatization...." Federal funding is by state revolving funds, which replaced the Construction Grant Program. States, territories and possessions of the U.S., including the District of Columbia, may use allotments under Title IV (EPA) for construction of municipal wastewater facilities. Indian tribes are eligible to receive capitalization grants. The grants for 1995, 1996, and 1997 are $1.2 billion, $2.1 billion, and $0.6 billion, respectively. The federal agency responsible for this program is The Office of Water, Environmental Protection Agency. The authorization comes from the Clean Water Act, Public Law 95-217, as amended, and the Water Quality Act of 1987, Sections 601 through 607, 605(m), Public Law 100-4.

Clearly, decreasing federal involvement and increasing needs portend a possible financial crisis for many water systems. This crisis may be the catalyst for attracting private capital to this industry.

Valuation

A further issue is how should the public investment in POTWs of approximately $60 billion be protected. What accounting concept would best value the public contribution—Generally Accepted Accounting Principles (GAAP) or Regulatory Accepted Accounting Principles (RAAP)? Proponents of privatization argue that some of this $60 billion in public funds was spent in ways that led to over-building and that a market valuation in the context of functional objectivity must be used.

Definition Clarification

Several suggestions have been made that would clarify this situation. These include, but are not limited to:

- Solicit an amendment to the CWA that would provide a statutory definition of POTW.[7]
- Develop agency flexibility in interpreting current law to apply to specific cases as they might impact full or partial privatization.
- Develop a functional definition of POTW, which focuses on use-purpose rather than ownership. This could extend the definition to private as well as public operations.
- BPT/BAAT/BCT could be defined in EPA guidance or regulations as secondary treatment for privately owned treatment works or for "public purpose" works. BPT/BAAT/BCT could then be used to impose stricter technology-based limitations on these treatment works.
- EPA may require that a private firm apply for a new NPDES permit if it becomes the owner of a former POTW.
- EPA could solicit changes to the CWA that would require a pretreatment program for any "public purpose" facility.
- Define a POTW broadly to allow unique and innovative public/private partnerships.
- Do not subject privatized wastewater facilities and services to PUC type regulation.

Financing

Traditionally infrastructure has been financed by all levels of government on a pay-as-you-go basis. An increasing source of public funding has been the private sector. The important feature of municipal securities is their tax-exempt status. Bond holders are not required to pay federal tax on their interest income and in many cases are exempt from state and local taxes.

There are two types of municipal securities—general obligation debts secured by the taxing power of the issuing entity; and revenue bonds, which are secured by user fees or service charges. In 1991, the total new issue tax-exempt federal debt was $164 billion, of which 65 percent was revenue bond debt. Tax exemptions represent a tax reduction, and hence diminution of the revenue base and cause a capital (resource) investment bias. The aggregate economic impact of such exemptions, especially in the context of budget balancing and pay-for-what-you-get economics, increasingly is coming under legislative scrutiny.

Recent tax reforms, including the 1982 Tax Equity and Financial Reform Act, the Deficit Reduction Act of 1984, and the 1986 Tax Reform Act, served to diminish the role of tax benefits in privatizing water and wastewater facilities. The 1986 Tax Reform Act specifically impacted private investment in wastewater plants by disallowing the use of accelerated depreciation accounts and severely limiting the use of redevelopment bonds. In constraining access to tax-exempt funding and investment tax credits, this legislation dampened private sector enthusiasm for privatization and longer-term contract operations. However, in January of 1997, the IRS instituted a program of safe harbors for investors who held tax-

exempt municipal instruments when the facility entered a long-term contract with private operators.[8] This change is relatively recent and analysts are keenly awaiting its specific application by the IRS.

Current Needs

The EPA, in its recent 1997 "Needs Survey," estimates that the nation's approximately 51,000 community water systems need $138.4 billion ($1992) over the next 20 years to "...install, upgrade, or replace infrastructure to ensure the provision of safe drinking water to their 243 million customers." The EPA also believes that $12.1 billion are needed now to meet the Safe Drinking Water Act (SDWA) requirements. This needs survey is used extensively to assist the federal government and states in program planning, policy evaluation, and program management.

Tables 1-9, 1-10, and 1-11 delineate the EPA needs categories by:

- System Size and Needs—Table 1-9
- System Type and Needs—Table 1-10
- Size Category Per-Household Needs—Table 1-11

One problem in using the term "needs" is that it may or may not reflect societal valuations of subjective criteria used to assess such figures. Needs are better understood by asking the question, "What is society willing to give up to acquire these facilities?" Without a market determination, the assessment of such figures, in the context of services required, represents a reasonable approximation.

Table 1-9. System Size and Needs

System Size	Total Needs ($billion)
Large Systems (serving more than 50,000 people)	$58.5
Medium System (serving 3,300 to 50,000 people)	$41.4
Small Systems (serving 3,300 and fewer people)	$37.2
American Indian and Native Alaska Systems	$1.3
TOTAL	$138.4

Table 1-10. System Type and Needs

Category	Percent Needs	Dollar Needs (Billion)
Transmission and Distribution	56%	$77.2
Treatment	26%	$36.2
Storage	9%	$12.1
Source	8%	$11.0
Other	1%	$ 1.9
TOTAL	100%	$138.4

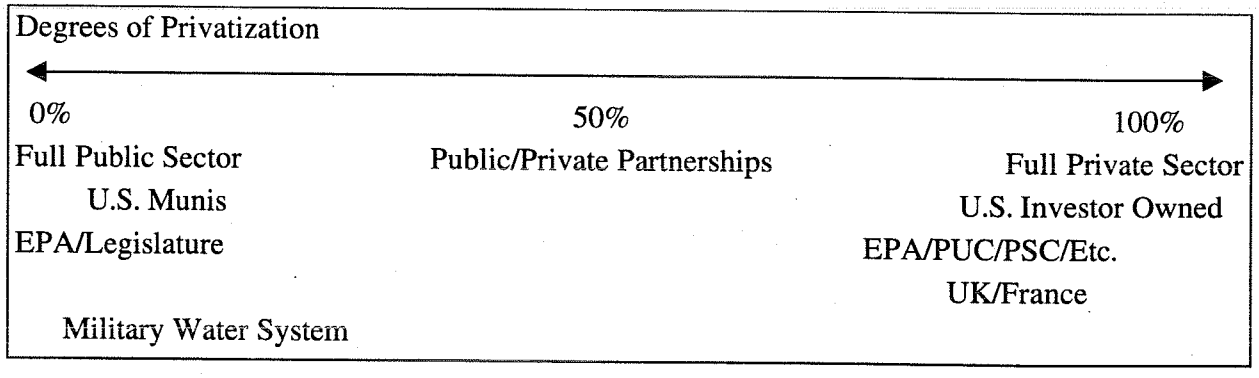
Table 1-11. Size Category Per-Household Needs

Category	Per-Household Need
Large	$ 970
Medium	$ 1,200
Small	$ 3,300
American Indian	$ 6,000
Alaska Native	$43,500

Privatization Update and Debate

Private companies with strong private property rights and no government regulation would have developed water and wastewater systems on a worldwide basis if left to themselves. Private enterprise would not have worked as well in countries with weak or limited private property rights. The social welfare functions of many countries have dictated against such private solutions. It was and is still believed in many areas, that water is a public good and must be equally accessible to all citizens. Government entities therefore often stepped in to ensure the viability and distribution equity of water supplies and of wastewater treatment. Water and wastewater systems do constitute the underpinnings of national infrastructure development and hence greatly influence macroeconomic goals.

Each country has approached the problem of water and wastewater provision differently. There is no paradigm. The U.S. system is described above. The French and British systems are delineated in Chapter 4 of this report. The U.S. has a mixed system. Municipalities/districts, in general, regulate prices and are subject to state and federal environmental laws. The rates of investor owned utilities are generally regulated by Public Service/Utility Commissions and are subject to the same state and federal environmental laws. Below is a conceptual schematic overlay of degrees of "privatization" or "publicization." A complete private sector solution would exclude any financial regulation and be one hundred percent reliant on market forces. Likewise, a full public sector industry would have zero private sector involvement. In the U.S., at least, neither extreme model exists.



U.S. investor owned water companies have not been successful, in general, in acquiring non-U.S. private water companies.[9] Both the French (franchise) and British (privatized) have had success in foreign acquisitions. This phenomenon could be attributed to the domestic laws that regulate national water companies. For example, it is believed that the Connally Hot Oil Act of 1935, which set individual production quotas and thus raised U.S. oil prices above world market prices, stimulated U.S. oil companies to explore and invest overseas. The enabling legislation that privatized UK water had specific foreign investment incentives written into the statute. The French legislative environment stimulated large

water companies, which in turn, as with the district privatization in the UK, had the financial influence to penetrate foreign markets.

The French and British water companies have been more successful than U.S. water companies in penetrating foreign markets. Some of these early successes were a result of their earlier colonial outreach. However, in recent years, the British and French have formed alliances with local companies to enhance their probability of success. U.S. engineering and water companies are now forming beachheads, e. g., more effective alliances to gain foreign acquisitions or positions. A more detailed discussion of these alliances and the relative size of U.S. versus foreign companies appears in Chapter 4 of this study.

The Clean Water Act amendments, public awareness, and the drying up of public revenue sources have catalyzed interest in privatization. In California, with obvious nationwide implications, an interesting debate has been fueled by the incendiary emotions surrounding the word privatization in the U.S. The Reason Foundation (Policy Study No. 200-1996) in "Restructuring America's Water Industry: Comparing Investor-Owned and Government-Owned Water Systems" comes to the following conclusions:

- Investor-owned water companies provide comparable water services to consumers at the same price as government-owned water companies although they pay taxes and do not receive extra non-operating income.
- Government-owned water companies receive generous tax subsidies that otherwise could be used to lower taxes or fund other government projects with higher priorities.
- The net cost of capital is higher for government-owned water companies than for investor-owned water companies.
- The real water bill is higher for government-owned water companies than for investor-owned water companies.
- Investor-owned companies are substantially more efficient in their operation of water services than government-owned water companies.
- Government-owned water companies receive a substantial amount of non-operating income excess cash balances and investment.
- It is likely that government-owned water companies depend more on facilities than investor-owned water companies, although the data on this issue are not entirely conclusive.
- Water service (USA) is highly regulated whether it is operated by an investor-owned company or a government-owned company.
- Government can better regulate an investor-owned water company than a government-owned water company.

The basic conclusion of Reason is that rates are a wash, while the real loss is in public revenues due to varying types of subsidies. In a written editorial response to the Reason's study, James Laughlin, Editor of *Water World*, argued that the study "... isn't Reasonable." His points, in summary, were:

- The Reason Foundation lacked a basic understanding of the programs and services that public agencies are required to provide.
- "...comparing three large entities with 10 smaller ones could also lead to erroneous conclusions. Economy of scale works in water distribution just as it does in any business enterprise. Saying that three large systems are more efficient than 10 smaller ones would probably be true no matter who operates them."
- Opposes local private sector monopolies. Draws parallel with cable TV.
- Water utilities do not have to endure competition.

- Not convinced that private companies are more efficient than public companies.

In 1996, the Association of California Water Agencies (ACWA) issued a University of Southern California (USC) report, "USC Study Examines the Issue of Privatized Public Water Service." This article argues that private sector efficiencies are generated through competition. A public entity, through the competitive process, can become as efficient as a private firm. The authors then argue that "...[b]ecause monopolies (e.g. "natural") create efficiency in the private sector, private sector water service may lead to market failure." They then add that "the public sector is at its best when addressing market failures such as those that occur in monopolistic situations." The specific conclusions of the USC paper are:

- Private sector companies work well in competitive environments, but do not perform well when competition is absent, such as in industries where natural monopolies occur.
- Utility functions such as water service, are natural monopolies, where it is expensive and inefficient to have more than one provider in a given geographic area.
- The regulation of private sector companies operating in a natural monopoly can lead to inefficiencies.
- The public sector is often more sensitive to public needs such as the quality of life and the equity of service.

In summation, the USC article sees privatization as substituting one tenant (a public entity) for another (a private entity), while still operating in an environment whereby "...there is no market to impose price and quality sensitivity on a product. On the other hand, if the public sector provides these services, rates are set by elected officials who are accountable to the voters and the community. If they continue to hold office, they must respond to citizen interests, which includes access to information, low rates, and responsiveness." Proposition 218, at least in California, could change the rules on which the ACWA assumptions are based. The merit of these assumptions awaits a final court ruling as to how Proposition 218 will impact taxing authorities who provide water and wastewater services.

The USC report was critical of Great Britain's privatized (1989) water system. Reason has viewed the British privatization venture as "relatively successful." USC noted that the Wall Street Journal (WSJ) had termed the British experience "a disaster." The USC report stated: "Selling the water system to privately owned monopolies proved the hypothesis that market failure can result from such actions:

- "Prices have risen an average of 77 percent—much more in some cases.
- "Salaries of executives at newly privatized water companies. In some areas, private companies have not been able to meet demand during a drought. In other areas, rationing has been imposed not because of drought, but because as much as 37 percent of the water supply is lost through leaks in the system.
- "Companies have sent out bills more than two years in arrears, then illegally threatened to turn off the water to customers who fail to promptly pay."

The debate continues. In July 1997, Reason countered the ACWA report by stating:

- Drinking water quality in the UK has risen since the 1989 privatization.
- The percentage of British population at risk to waterborne diseases since privatization has decreased.
- There has been a significant influx of private capital ($50 billion) into the British system.
- Drought restrictions have decreased since privatization.
- OFWAT (regulatory body—"Office of Water Services") complaint compliance standards are being met on an increasing basis.

Reason Foundation also questioned the efficacy of the concept of natural monopoly, as used by CAWA/USC. In their July 1997 "Policy Brief," Adrian T. Moore of the Reason Foundation notes: "But the theory of ***natural monopoly*** is increasingly suspect. Until recently, electric utilities were considered natural monopolies, but deregulation is in progress, and soon competition will be a fact in the electric industry. Technical changes and new methods of making industries competitive means there is less reason than ever to tolerate monopoly provisions of such services."

---

[1] Tables 1-1 through 1-4 are developed from The January 1997 United States Environmental Protection Agency, Office of Water, EPA 815-R-97-001a, Community Water Systems Survey. Some rounding errors due to extrapolation.

[2] The 1996 Act updates the original law, first passed in 1974 and revised in 1986.

[3] $725 million has already been appropriated by Congress in prior fiscal years. The money was awaiting authorization of the SRF. However, as Congress failed to reauthorize the Act by August 1, 1996 (the date designated by the appropriators), the money reverted to the Clean Water Act Fund. The 7.5 billion is derived from the $1 billion appropriation between 1997 and 2003 and the consideration that Congress is considering appropriating between $450 and $550 million for the SRF in FY1997 (http://wwwcais.com/water/sbys/ss4.html). The White House overview of the SDWA Amendments of 1996 state: "Providing money that communities need to upgrade water systems: The legislation makes available loan funds that will help communities upgrade treatment systems to make tap water safer, and authorize additional loan funds in the future." (http://www1.whitehouse.gov/CEQ/Record/080696tp-plain.html).

[4] Environmental Protection Agency, "National Projections Summary," *Community Water System Survey: Volume 1, Overview*, (EPA 815 R-97-001a, January 1997), p. 6.

[5] National Association of Water Companies, *Financial and Operating Data 1995*, passim.

[6] This data comes from a different source. Treatment of net income may be different. California Water Services Company (CWT), http://www.yahoo.com.

[7] NAWC et al (conversations with Messrs. Good [CWS] and Jenny [NAWC] on 10/09/97), believe that when the next CWA Amendment passes Congress and is signed by the President that such a definitional change will be automatic.

[8] From Asset Guaranty—http://www.efsgroup.comefsgroup/ml04.html—"Demand for capital sources from water and sewer systems has grown after two landmark environmental acts were amended in the late 1980s: The Clean Water Act (1987) and The Safe Drinking Water Act (1986). Many utilities must now build new collection, filtration and treatment facilities as well as maintain sophisticated water quality testing programs.

As a result, total borrowings in the water and sewer sector grew dramatically over the last decade, from $4.7 billion in 1983 to $37.6 billion in 1993. As a proportion of all municipal volume, water and sewer borrowing doubled during the decade, from about 6% in 1983 to about 14% in 1993. This trend is likely to continue as we approach deadlines for improving water quality meeting the new effluent standards.

Reduced federal aid and limited state resources have placed additional demand for increased access to the capital markets by traditional municipal-owned systems. Federal and state cutbacks also serve as catalysts for the creation of new niche insurance programs for non-traditional borrowers. These programs will be driven by credit enhancers, such as Asset Guaranty, who are willing to consider insuring investment-grade credits that, for one reason or another, may not fit the criteria or purview of other credit enhancers. Non-traditional types of borrowers, who may be considered, include:

- Small Issuers
- Rural Systems
- Special Districts and Authorities
- Private For-Profit and Not-For-Profit Water and Sewer Companies
- Complex or Unusual Credits in the Traditional Sector of Municipally Owned Systems

A credit enhancer who is willing to consider these types of credits will most likely focus on the following key underwriting considerations in the water and sewer sector:

Rate-Making Structure
In addition to reviewing the legal covenants governing rates, the rate-making process itself is important. Typical underwriting questions include: Does the borrowing entity determine its own rates or is there oversight by a state utilities commission? Does the utility need to obtain approval from the City Council? Is the rate-making process controversial or relatively smooth?

Customer Base
A thorough examination of the nature of the customer base is critical to reviewing utility systems. Growth or stability in connections is important, as is lack of significant concentration of users. The service area's demographic profile and economic prospects are also essential to the credit analysis.

Capital Plan
In addition to the current project, future capital needs to meet mandates, serve growing areas or upgrade the system should be considered.

Debt Structure
Since water and sewer projects may be quite costly, it is important to assess the burden that the financing may place on the borrower. An engineering report and feasibility study are typical documents reviewed to determine whether the project and financing plan make sense. Projections of debt service coverage and future rate increases that incorporate additional capital needs should be components of a feasibility study.

Operating History
How well the utility has managed in the past is an important indicator of future performance. Questions an underwriter might ask include: Is the system in good condition? How aged are the facilities? Is the utility currently in compliance with the mandates? Are necessary permits in place? If not, what measures are being taken to remedy the situation?

Financial Operations
How well the system's managers have controlled expenses and collected revenues is central to a credit review. Reliance on one-time revenues (such as connection or tap fees) would likely be discounted in determining the system's ability to cover operating and debt expenses in the future.

Water and sewer systems provide an absolutely essential service, and payment is directly linked to the service provided. While rate increases are likely to impose a growing burden on customers as the new improvements are financed, most individuals and businesses appreciate the necessity of paying for these services. For these reasons, a AAA credit enhancer, willing to focus on the aforementioned criteria, can create value for non-traditional water and sewer borrows by allowing them to improve their market access and lower their borrowing costs."

[9] A major exception being the co-venture between American and Bechtel in trying to win the Sydney Water contracts.

Chapter 2 1997 Survey of Privatization and/or Condemnations in PUC/PSC Jurisdictions

Summary

The U.S. does not have a uniform approach to regulating its water and wastewater systems. As noted in Chapter 1, many investor owned water utilities (IOUs) are regulated by their state's public service or public utility commissions. Other states use different approaches. Some states encourage degrees of private sector involvement, others are neutral, and some discourage it. Additionally, some states could possibly benefit from degrees of privatization and others have systems that require no current change to their status.

Since 1993, Consulting Economist Brian Browne has conducted an annual survey of U.S. states and territories in order to ascertain whether there has been a significant movement toward either privatization or condemnation within any jurisdictional boundary. Herein are presented in summary form, the completed instruments of the 1997 survey. The delta, or change in responses since 1993, has not been overwhelming, except that year-by-year interest in answering the survey has increased.

The following format displays these answers. Table 2-1 summarizes all responses on a state-by-state basis. Lengthy textual responses are quoted in later in this chapter.

Methodology

The commissions/regulatory authorities were requested to answer eight questions:

1. Does your commission have a position pro or con regarding water and wastewater privatization?
2. Have there been any trends toward privatization / condemnations within your jurisdiction?
3. If so, how much?
4. Do you have defined steps that must be followed before a public district is permitted to privatize?
5. If so, do these steps vary as a function of the privatization format, e.g. contract operations vs. asset acquisition?
6. What steps are taken to ensure a competitive bid process for privatization?
7. What steps—in reverse (privatization) or condemnation hearings are taken to ensure capital equity is guaranteed to investors?
8. Please provide any suggestions you may have of additional areas in privatization/condemnation that should be considered.

Table 2-1. Summary of Responses to State-by-State Water Privatization Survey

State	1[i]-Pro/Con	2-Trends	3-Extent	4-Steps Required	5-Varying Formats	6-Competi-tiveness	7-Equity Guarantees	8-Suggestions
Alabama	No	No (1)[ii]		No				
Arizona	No	Opposite (2)	"A couple" (3)	No	No	None	None	(4)
California PUC	Pro	Yes	(5)	(6)	(7)	(8)	(9)	(10)
Colorado PUC	No	No		N/a[iii]	N/a	N/a	N/a	N/a
Connecticut	No (11)	No						
Florida	(12)	(13)	(13)	(14)	(15)	(16)	(17)	None
Hawaii	(18)							
Illinois	(19)	Yes	(20)	(21)	N/a	(22)	(23)	(24)
Iowa	(25)							
Louisiana	No	No		(26)	(27)	(28)	(29)	N/a
Maryland	No	Yes	(30)	Yes	(31)	(32)	(33)	
Mississippi PSC	No	No	N/a	No	No	N/a	None	
Montana PSC	No	No		N/a		N/a	N/a	
New Hampshire PUC	No(34)	(35)	(36)	(37)	(38)	(39)	(40)	
New Jersey BoPU	Yes but...(41)	(42)	N/a	(43)	See (4)	(44)	See (2)	(45)
New York	(46)	(47)	N/a	(48)	See (4)	See (4)	(49)	
Ohio PUC	No (50)	No (51)	(52)	No (53)	(54)	None (55)	None (56)	
Oklahoma CC	No (57)	(58)	N/a	(59)	N/a	N/a	N/a	N/a
Pennsylvania	(60)	(61)	(62)	(63)	(64)	(65)	(66)	(67)
Puerto Rico PSC								
South Dakota	N/a (68)	N/a	N/a	N/a	N/a	N/a	N/a	N/a
Texas NRCC	(69)	(70)	(71)	(72)	(73)	(74)	(75)	(76)
Virginia SCC	No (77)	No			No	No	None	
Washington	No	No		(78)				
Wisconsin PSCW	(79)	(80)	(81) see also (2)	(82)	(83)	(84)	(85)	(86)

[i] Questions 1 through 8 from the survey. They appear in the form of a key word for each question on this table.

[ii] Numbers in parentheses indicate a lengthy response. The text of those responses appears by state and by corresponding parenthetical numbers in the following section of this chapter.

[iii] "N/a" means "not applicable," and is used where this was the response to the survey questionnaire. Blanks in the table indicate that there was no response.

Results Summarized

The overall results are summarized in Table 2-1. In addition, the numbers in parentheses below correspond to the numbers in parentheses in the table and are followed by the full text of the lengthier responses to the questionnaire. To avoid repeating the questions, the answers are coded. For example A2 is the answer to question 2.

Alabama Public Service Commission

(1) A2. "Not to our knowledge."

Arizona Corporation Commission

(2) A2. "The trend has been in the opposite direction. City systems (such as the City of Phoenix) acquiring small water systems as they grow."

(3) A3. "In the last 12 1/2 years there have been a couple of privatizations. However, the ratio has been about 20:1 private-to-public to every public-to-private."

(4) A8. "Those considering privatization should study the results of privatization in the UK."

California Public Utilities Commission

(5) A3. "Many cities are considering privatization or contract operations."

(6) A4. "Yes, the municipal code, we do not regulate that."

(7) A5. "Yes, contract operations do not require a vote. Asset acquisition does."

(8) A6. "We don't really know. California has laws requiring competitive bidding in some areas, but we don't enforce them. The state Attorney General does."

(9) A7. "Appraisals are required and considered."

(10) A8. "Regionalization is an issue."

One additional question was put to the California PUC:

Q. What will the impact of Proposition 218 be on privatization of water and wastewater in California?

A. "It will make municipal corporations less attractive. It is changing the rate design already to be usage based."

Connecticut Department of Public Utility Control

(11) A1. "Connecticut does not have a position on wastewater privatization. There have been no trends toward privatization. There were reports this year that the city of New London was thinking of privatizing their wastewater plant, however I don't know the status of the rumor. Connecticut DPUC does not regulate municipalities. Most of Connecticut's larger cities, Waterbury being the exception, have private investor owned water companies." (Michael J. Kenney, Project manager, DPUC.)

Florida Public Service Commission

(12) A1. "Presently the Commission has no formal policy regarding privatization. To date we have not been faced with this situation. However, our present guidelines provide no obstacles to privatization and such a situation could be considered within the framework of our present rules regarding new utilities or utility ownership transfers."

(13) A2, A3. "In the past three years this Commission has approved 21 transfers of regulated utilities to governmental entities. A majority of these transfers involved small utilities whose customers could be better served by a larger utility. Pursuant to present legislation, the Commission approves these transfers as a matter of right. We are not aware of any recent privatization within the counties we regulate, however, such activity may occur in non-jurisdictional counties. You may want to contact the Florida League of Cities and the Association of Counties for further information on privatization initiatives."

Florida League of Cities
201 West Park Avenue
P. O. box 1757
Tallahassee, Florida 32302-1757
(904) 222-9684

Association of Counties
100 South Monroe Street
Tallahassee, Florida 32301
(904) 224-3148

(14) A4. "Since we do not have jurisdiction over publicly owned utilities, we are not involved in their decisions to privatize. However, should the assets of a publicly owned utility be transferred to private ownership, such action would create a jurisdictional utility. The owners would then seek approval of either a transfer or original certificate application from this Commission. These would be processed in the same manner as a transfer of one private utility to another."

(15) A5. "Pursuant to present legislation, any governmentally owned utility, regardless of any contractual operations, would be considered a public owned utility outside the jurisdiction of this Commission. Regarding asset transfers, please see the answer to the above question."

(16) A6. "This Commission would not be involved in this area."

(17) A7. "This Commission would not be involved in this area."

Hawaii Public Utilities Commission

(18) A1. "We have not had or see any future possibility of an existing public water or wastewater system being privatized. The normal process for new water and wastewater systems is to begin as private systems, built by a developer, and then turned over to a municipal government to own and operate. We do not see a trend of the municipal government not accepting any new water or wastewater system thereby, forcing the developer to operate the system as a private utility after obtaining a Certificate of Public Convenience and Necessity (CPCN) from the Commission."

Illinois Commerce Commission

(19) A1. "The Commission has not entered a formal position on privatization but has approved several recent petitions by utilities to purchase municipal operations and does support regionalization of water systems."

(20) A2, A3. "Recently several water utilities purchased municipal systems and several more have indicated that they are in serious discussions with municipal systems. In the past there were very few such purchases."

(21) A4. "We have no jurisdiction over municipal operations and have not defined steps. The purchasing utility must obtain a Certificate of Convenience and Necessity to serve a new area."

(22) A6. "We have no jurisdiction over municipal operations and therefore have no procedures regarding the sale of municipally-owned systems."

(23) A7. "The Commission does not set the price paid to a utility if its system is condemned by a municipality. The price in all condemnations is set by the Circuit Court."

(24) A8. "Method for determining the rate base upon which the regulated utility will earn a rate of return when purchasing a municipal system."

Iowa Utilities Board

(25) "We don't regulate water."

Louisiana Public Service Commission

(26) A4. "This Commission does not have jurisdiction over municipally operated utilities. The authority to privatize could come only after a majority vote of users in the area in question."

(27) A5. "Utilities that become jurisdictional to this Commission must seek approval of rates and rate base."

(28) A6. "Not jurisdictional to this Commission."

(29) A7. "Not jurisdictional to this Commission. If a municipality seeks to parallel or confiscate private utility property, any dispute must be resolved by a civil court."

Maryland Public Service Commission

(30) A2, A3. "Two. Both are currently ongoing. One involves the potential sale of physical assets by a government to the private sector and the other involves a possible condemnation of a private system by a municipality."

(31) A5. "Contract operations would not require prior Commission approval, however, an asset acquisition by a privately owned public service company that operates for a gain would require prior Commission approval."

(32) A6. "Public districts are not subject to the Commission's jurisdiction."

(33) A7. "Such hearings are outside of the Commission's jurisdiction. Maryland's investor owned systems would have to rely upon constitutional protections."

New Hampshire Public Utilities Commission

(34) A1. "The Commission does not have a specific pro or con position regarding privatization or condemnation but reviews proposals on a case by case basis to the extent they fall under our jurisdiction."

(35) A2. "There has been a fairly recent trend for experienced water companies to offer contract O & M services to municipalities, but this is primarily limited to the one or two largest utilities in the state. Wholesale privatization of public districts is rare. A recent case involved a community district that transferred its facilities in their entirety to a larger private utility that offered good service, low rates, elimination of supply concerns and the prospect of regional expansion.

"Condemnation proceedings are also rare, although a significant one is currently underway in which a town is attempting to take over the entirely portion of a privately owned water system lying within its boundaries. This involves roughly 60 percent of the system's customers, all of its storage and a significant portion of its other infrastructure. Final hearings are scheduled for the fall."

(36) A3. "See above."

(37) A4. "See below."

(38) A5. "Yes. Public districts have not been regulated by this Commission since the 1980's except when they serve outside their municipal boundaries and charge a different rate outside than in. As a result, only one municipal utility remains regulated, and efforts by the others to move toward contract operations would not fall under our jurisdiction.

"Contract operations offered by regulated (privately owned) utilities are normally conducted separately from utility operations, with the Commission's sole concern being that costs and records are indeed segregated.

"An asset acquisition by a privately owned utility would require the Commission to grant franchise approval to the acquiring utility. This typically involves a review of that utility's managerial, technical and financial capability to operate and maintain the acquired system."

(39) A6. "As explained above, competitive bids for contract operation of public districts do not fall under our jurisdiction. Asset sales from public districts to private are so rare that they are reviewed on a case by case basis and no set standards exist regarding competitive bids."

(40) A7. "Existing statutes spell out the specific steps involved but basically require the Commission to set the sale price and amount of damages through a hearing process if the two parties cannot reach agreement. Recovery of investment in existing plant is a factor the Commission would consider."

New Jersey Board of Public Utilities

(41) A1. "Yes. But first you need to be more specific regarding what you mean by privatization. We have and continue to support and, where appropriate, facilitate the acquisition of any system (public or private) that finds itself unable to meet the challenges facing these industries today.

"However, when we talk about water privatization in New Jersey, we generally refer to long term contracts for the operation and maintenance of public systems. In New Jersey, Governor Whitman signed into law in 1995 legislation that supplement existing statutes that allowed private entities to enter into long term contracts for the operation and maintenance of municipal water systems. We were the first state to have such legislation."

(42) A2. "No. As indicated above, the trend is toward the municipality retaining ownership of its assets and only privatizing the day to day operations. Also, there have been no cases where the public entity condemned the private operation and very few where they have acquired an investor owned system."

(43) A4. "Municipal law requires a number of actions on the part of the municipality if they sell assets. There needs to be a referendum as to the sale, after which a formal bidding process takes over, all subject to N. J. law. The Board of Public Utilities only needs to approve the municipal consent, issued by the municipality, to the private, regulated system that is acquiring the assets, in order for the company to serve in the municipality. The rate issues are reserved to the next filed rate case of the regulated company.

"Where operation and maintenance agreements are the course of action, the municipality must comply with steps outlines in the 1995 legislation referred to above. The BPU has 60 days to approve the contract, and its has no continuing oversight over the contract."

(44) A6. "The procedures are set out in the legislation enacted in 1995, and in the statutes governing the conduct of municipalities."

(45) A8. "None. Condemnation is only used when the public entity is forced to take over a private system, after negotiations fail. We have not encountered such a situation in the water and wastewater industry. There have been agreements or contracts of sale voluntarily entered into."

New York Public Service Commission

(46) A1. "The New York Public Service Commission has not set forth a policy with regard to privatization of municipal water systems. (We do not regulate public or private wastewater systems.) Condemnations do not require our approval: municipal acquisitions of private systems do and, while we have no formal policy with regard to such

acquisitions, we routinely approve them finding that, overall, the economies of scale, improved quality of management and operations and the financing available to the municipality justify approval."

(47) A2. "We have not seen a trend toward privatization in New York state. It is rare that a system is condemned because in New York a utility's value in condemnation is set by the courts at 'reproduction cost new less depreciation,' [sic] which can make the cost of condemnation prohibitive. Negotiated acquisition is more the rule. Commission approval is required in such instances."

(48) A4. "Since we don't have jurisdiction over public water or wastewater systems, this question is not applicable."

(49) A7. "We take this question to read: "How do you ensure that an investor in a private utility is fairly compensated in a condemnation hearing?" As indicated earlier on, the value of the condemned system is set in the courts and it is up to the private utility to present through testimony its estimate of the value of the system."

Ohio Public Utilities Commission

(50) A1. "No. PUCO does discourage the development of non-viable systems and therefore encourages consolidation."

(51) A2. "Privatization—no. Investor owned utilities being purchased by public entities—yes."

(52) A3. "One investor owned utility has had 2 districts purchased from it (to avoid condemnation) by the local government and one is pending negotiation."

(53) A4. "PUCO has a certification process (Administrative Rules) that must be followed to become a PUCO regulated company. It doesn't matter whether the applicant is a public district or privately held company."

(54) A5. "The certification process is a function of asset acquisition."

(55) A6. "None. PUCO does not permit acquisition adjustments. Plant is recorded at original cost (date dedicated to public service)."

(56) A7. "None. If the private company is being purchased by a public entity, any profit or loss goes to the shareholders. PUCO has not jurisdiction over public entities, so PUCO tries to guarantee continuity of service."

Oklahoma Corporation Commission

(57) A1. "No. The Oklahoma Corporation Commission has jurisdiction to grant or deny certificates of public convenience and necessity to water transportation companies which serves the public. 17 O.S. 1991 §§ 159.11 et seq. However, issues concerning privatization and condemnations are rarely presented to the Commission, and to date, there has been no need to adopt a formal policy regarding water and wastewater privatization. The Commission only has jurisdiction over public water districts for limited purposes, and does not have jurisdiction over private entities carrying water for their use and not for sale to the public. See 17 O.S. 1991 § 159.22; 82 O.S. § 1324.23. Thus, the Commission would not have jurisdiction over an entity until it was already privatized and seeking to serve as a common carrier of water.

"Under the Oklahoma Rural Water, Sewer, Gas and Solid Waste Management Districts Act, authority over the creation and dissolution of a rural water district is given to the board of county commissioners of the county which has the greatest portion of the territory in which the water district is located. 82 O.S. § 1324.1, et seq. The Act contains the numerous provisions relating to the organization, dissolution, sale of facilities, consolidation, etc. of rural water districts. However, the Commission is not involved in any of these activities."

(58) A2. "There does not appear to be any such trend in causes coming before the Commission at this time. Matters have been brought to the Commission's attention involving rural water districts taking over small, private systems, but nothing would indicate a trend."

(59) A4. "The Oklahoma Statutes address provision of utility service and condemnations by cities and towns. 11 O.S. 1991 § 22-104 and § 37-208. Under the Oklahoma Rural Water, Sewer, Gas and Solid Waste Management Districts Act, 82 O.S. § 1324.1, et seq., there are numerous requirements relating to the organization, dissolution, sale of facilities, consolidation, etc. of rural water districts. However, the Commission is not involved in any of these activities."

Pennsylvania Public Utilities Commission

(60) A1. "The PA PUC encourages large privately owned water utilities to buy small troubled water and wastewater utilities. Similarly, it has been the PUC's position to urge municipalities to buy or absorb troubled or potentially troubled privately owned water and wastewater companies. The primary concern of the PUC is to alleviate problems before they occur if at all possible."

(61) A2. "The PUC encourages small water and wastewater utilities to apply their own initiative in selling a troubled or potentially troubled company. The PUC has vigorously encouraged takeover of troubled companies. This trend has increased over the last several years."

(62) A3. "It is not possible to quantify the trend toward privatization. The takeover trend has been larger private companies buying small troubled private companies and/or municipalities absorbing small private companies."

(63) A4. "Yes, the Application process must be rigidly adhered to whenever any utility under this jurisdiction acquires another service providing entity."

(64) A5. "Contract operations must have an Affiliated Interest Agreement approval to conduct this type of operation. This type of Agreement sets forth, among other things, the charges for specific services and the nature of the services to be provided. Stock and asset transfer [sic] are handled via the Application process. This process examines the reasonableness of these types of transactions."

(65) A6. "The competitive bidding process regarding privatization is examined during the Affiliated Interest analysis. This documentation must be provided to the Commission upon request. Construction costs, service fees, and other charges must also be subject to competitive bidding or reasons why such are not practicable or applicable."

(66) A7. "A forced takeover process of a severely troubled company would provide for a hearing and fair level of compensation. This is not a common occurrence within this jurisdiction."

(67) A8. "The purchase price is not a major concern since the allowable return for ratemaking is based on depreciated original cost. However, acquisition adjustments are considered in various instances."

South Dakota Public Service Commission

(68) "The South Dakota Public Service Commission... does not regulate public water or wastewater systems."

Texas Natural Resource Conservation Commission

(69) A1. **Water.** "TNRCC does not have a stated position regarding privatization. The Commission focuses on outcomes (high quality, reasonably priced services) rather than ownership type."

Wastewater. "Wastewater privatization is not a matter where I am familiar with any position. However, the Commission and the state have a legislative policy of preferring regional systems for the collection, treatment, and disposal of wastewater."

(70) A2. **Water.** "Yes, a large number of districts already use contract operators and a number of municipalities are seriously considering contract operators. But there has been very limited interest in selling or leasing government owned assets."

Wastewater. "It seems to be matter of much discussion in the state. A few utilities, such as the Lower Colorado River Authority (Austin and Central Texas area) are active and expanding into the operational and ownership control of POTWs."

(71) A3. **Water.** "Our data management systems do not currently track this type of information in such a way that we can easily identify trends."

Wastewater. "There is no good mechanism for gauging any trend."

(72) A4. **Water.** "State law and agency regulations specify procedures for notification to TNRCC and administrative steps for transferring ownership to a new entity. These mechanisms are necessary whether the transfer is between private or public entities. However, conversion to contract operators does not require TNRCC authorization."

Wastewater. " State law and agency regulations specify procedures for notification to TNRCC and administrative steps for transferring ownership to a new entity. These mechanisms are necessary whether the transfer is between private or public entities."

(73) A5. **Water.** "Yes. See Answer to Question 4."

Wastewater. "Yes."

(74) A6. **Water.** "TNRCC is not directly involved in the bidding processes of governmental entities. There are, however, state laws which require competitive bidding for sales of governmental assets and contracts for services which exceed specified dollar amounts."

Wastewater. "TNRCC is not involved in any bidding processes. The agency only receives notice of the entities requesting the wastewater permit transfer."

(75) A7. **Water.** "Condemnation proceedings are conducted in District Court so TNRCC is not directly involved. There are provision in Chapter 13 of the Water Code which address the compensation for certain types of forced asset transfers (copy of 13.254 and 13.255 attached."

Wastewater. "N/A—No TNRCC involvement.

(76) A8. **Water and Wastewater.** "No suggestions."

Virginia State Corporation Commission

(77) A1. "No, please note that the VA Commission has no regulatory authority with respect to public systems."

Washington Utilities and Transportation Commission

(78) A4. "Not sure—would be in statute for public utilities which is not our jurisdiction."

Wisconsin—Public Service Commission of Wisconsin

(79) A1. "The Public Service Commission Wisconsin (PSC) does not have a formal position on privatization. The PSC is interested in the consolidation of water and sewer utilities, where feasible, to prevent the proliferation of new utilities. Currently the PSC regulates some 580 municipal water utilities and 9 private water utilities. Approximately 46 of the municipal water utilities have joint sewer utility operations regulated by the PSC."

(80) A2. "No, there has been no trend toward privatization in Wisconsin. In the past there has [sic] been a few isolated instances where a municipality took over a private system. In general, Wisconsin municipal utilities are well managed, have reasonably priced water and have good access to a water supply. A major reason in some states for the privatization of a municipal water supply is that the municipality would have a new source of revenues, that being taxes paid by a private utility. However, in Wisconsin, municipal water utilities already pay a property tax equivalent to the municipality, so the municipality would not gain anything in the way of taxes that it does not already receive."

(81) A3. "See answer to number 2 above."

(82) A4. "Yes, there are statutory requirements that mandate that the current utility would have to obtain PSC approval to abandon its obligation to provide service and the new entity to receive approval to provide service."

(83) A5. "Yes, asset acquisition would be governed by statute as noted above in the answer to number 4. There are no statute requirements regarding utility management decisions contracting out some of its operations, e.g. billing or meter reading services."

(84) A6. "Not applicable."

(85) A7. "As noted in the answer to number 1 there are only 9 private water utilities in Wisconsin. Of these 9, only 3 have 1,000 or more customers. In a disputed condemnation hearing, the PSC would establish a reasonable price for the value of the utility being taken over. There would be no guarantee to any investor that they would recover their investment in a takeover."

(86) A8. "Given the current situation, it is doubtful if there would be much interest in privatization (asset acquisition) of the municipal water utilities in Wisconsin. However, there are currently about 20 municipal water utilities that are contracting out a portion of their utility operations, such as meter reading, billing and management of treatment plants. In the future, the area of contract operations for a part of the municipal water utility operations would seem to be more viable then asset acquisition."

Chapter 3 Water and Wastewater Infrastructure Values

Introduction

This chapter presents an overview of some of the important concepts used in determining value in the water and wastewater infrastructure sectors. The U.S. has a mixed system, part public (85% water—95% wastewater), and part private. In general, public entities are self-regulating with respect to rate-making—while private investor owned utilities have their rates set by commissions. As noted in this chapter, there are exceptions to these generalizations. The mixed nature of ownership and rate-making presents some difficulties in valuation. Price signals can be subject to both judicial and political pressures.

Is there a better system for the U.S.? There is no simple answer to this question. The UK in 1989 voted in privatization. Australia is in the process of privatizing large segments of its public infrastructure, including water. California is restructuring electric utilities, touting this change as a move toward a competitive environment. Numerous other states are considering a like move. France has long had a system of leasing (*affermage*) its water systems to private companies. To make their system more competitive, the French have implemented a competitive bid process. Developing countries are inviting western companies to bid on water systems, in order to have water available for their emerging economic systems. Yet pivotal to all of these developments remains the problem of resource allocation—or value.

In this chapter, some of the essential determinants in value are reviewed. It is not meant to be a definitive work on the subject of value, but an adjunct chapter to this study that will complement the ongoing monitoring of the dynamics of the water and wastewater industry. Value is derivative of industry structure (open/closed sectors—regulated/non-regulated), the macro-economy, capital markets, complementary infrastructure sectors, regulations, taxing patterns, economic cross-subsidizations, and pricing regimes. In broad scope, this chapter addresses some of these time-derived impacts on value and hence on resource flows.

Rate-making and value are directly related. Government regulation of the price (rate) system affects value. A significant amount of economic activity in the U.S. is subject to economic regulation. Historically, regulation (government intervention) has been used in agriculture, energy, and in all of the traditional public utility sectors. Most constitutional issues raised in regard to government regulation have been resolved in the government's favor. Economists have generally argued that regulation is only feasible in the presence of a natural monopoly. The concept of natural monopoly appears no longer sacred or well defined—technology has challenged many of the early premises, which made this concept viable. Once regulation of markets is decided on, for whatever reasons, the government must generally engage in rate-making. These fiat rates require that a firm both be efficient and also cover all explicit and implicit costs. This is not an easy task.

Finally, valuation of acquisition, contract operations, and condemnations presents a difficult set of problems. They must be addressed on a case-by-case basis with regard to the economic and social preferences of the micro- and macro-economies in which these facilities operate.

Theory

Capitalized Value

The concept of capitalized value is well illustrated by the British Consul (BC). This financial instrument pays five pounds sterling a year in perpetuity. Each year, the owner of a BC presents it to the Bank of England and receives five-pounds sterling (£). Yet, this financial instrument has a value well in excess of £5 annually. The value of a perpetual series, like a BC, is derived by dividing the coupon value by the

discount rate. If the discount rate is 10 percent, then a BC will have a value of £50 (£5/.10). Other net income streams produce capitalized (present worth) values, through a similar, discounting stream, based on their longevity and the discount rate(s) used. To illustrate the discount rate's importance clearly—a decrease in the discount rate from 10 percent to 5 percent would double the value of the BC to £100 (£5/.05).

In essence, the value of any net income stream producing entity is its present worth. Present worth calculations—by discrete or continuous methods—are well understood. It is not the simplicity of calculation that is the problem, but the method by which income streams are generated. Degrees of competitiveness and government involvement in the income stream process will impact the capital value through changes to both the numerator (net income) and denominator (discount rate). Capital valuation and the projected market environment cannot be separated. To see how this process works, one has no need to look beyond the roller coaster rides of the stock for California investor-owned electric utilities during the debate and implementation of industry restructuring and unbundling (California AB 1890). The speculative buying and selling that accompanied the pre and post (1996-1997) passage of California AB 1890 are atypical for the normally conservative utility (electric) industry.

Monopoly

Theory

The Dictionary of Economics and Business defines monopoly as "[i]n a general sense, the market situation in which one person or a group has such control of the supply of a commodity to be able to regulate its price." Alchian and Allen, *University Economics*, see monopolists as price searchers. They note: "Reducing the number of sellers down to one gives us a 'monopoly'." They see two types of price seekers (monopolists) as those who face competition in open markets (open monopolists) and those who operate behind fiat created barriers to entry (closed monopolists). Milton Friedman suggests that open monopolies do not deny society its productive optimum in resource exchange. However, he sees closed monopolies as producing less than maximum resource exchanges. In other words, society is less well off because of the barriers to entry.

Natural Monopoly

Strickland, in *Government Regulation and Business,* defines a natural monopoly as follows: "A monopoly is considered to be 'natural' when it is the inevitable end result of the market process. Competition eliminates all the firms in the market except one, the natural monopolists." Strickland also points out that the "...traditional argument for economic regulation is the presence of a 'natural' monopoly." Strickland believes that for a natural single monopoly to exist, average cost must decline with each increase in output. He summarizes the impact on society of a natural monopoly: "Although society thus benefits from the single producer, economic regulation is necessary if the monopolist is to be prevented from exploiting its unique position."

Relevance of Natural Monopoly Concept in Regulations in the New Millennium

Infrastructure companies (gas, electricity, water, sewerage, communications) have traditionally fallen under the umbrella of the natural monopoly concept. However, recent changes in electric markets (e.g. Australia and California) suggest that this definition might require revisiting (narrowing) in the context of lower information and transaction costs that have derived from the technological revolution. While many U.S. states are considering electricity restructuring on the California and Australian type electric industry models, as noted in Chapter 2, water restructuring does not appear imminent or at least as fundamental in its potential.

Advances in water and wastewater metering and point of entry/point of use technologies may erode the traditional "natural utility" model as applied to water. The availability of competitively priced substitutes—bottled water, filtration/cleansing units, etc.—could well impact the water industry so that a

more market driven pricing regime as in electricity will be implemented. This pricing structure could meter, via a less regulated environment—the societal value that is placed on certain marginal supplies.

Rate-making

Rate-making is the administrative process by which prices are established in regulated industries. Rates are predicated on a firm's ability to generate a sufficient level of revenues to cover allowable (as defined by the regulators) explicit and implicit costs. The allowable costs are the regulated firm's rate base. Over-valuation of this base causes a wealth transfer from the consumers to the utility. Under-valuation is akin to a confiscation of the firm's assets.

Market Rate

Alchian and Allen note in *University Economics*, "An equilibrium (market clearing) price in the market is one at which all possible mutually beneficial exchanges can occur." They suggest that so-called "administered prices," as set by large firms operating in an open market, are basically search points, as the firm tries to maximize profits/wealth. Regulatory agencies, setting administered prices (rates), are also cognizant of the impact on demand and therefore on rate base and investor returns, although the response is not as quickly transmitted as via the market process. Markets and regulators both search for those prices (exchange ratios) that maximize their objectives. Entities search for prices that maximize wealth and/or net discounted "accounting profits" over time. Regulators, as noted in Chapter 2, often try to maximize a number of financial and community objectives within the constraints of their rate-making activities. However, private or public, a business entity maximizes according to its objective function as it defines such.

Elasticities

Elasticity is an important concept in rate-making (e.g. price searching), in that it refers to sensitivity to price changes. Supply and demand are price sensitive and/or have an elasticity measure. Specifically, to quote from M.I. Friedman[1]: "...elasticity of demand is the ratio of the percentage change in quantity demanded to the percentage change in price that is responsible for this change in quantity demanded when 'other things' are given and the change in price approaches zero." Friedman goes on to add: "One of the most important reasons for employing the elasticity concept when dealing with demand curves is that it provides a very convenient way of indicating the behavior of total receipts." These relationships are summarized in Table 3-1.

Table 3-1. Elasticities

Price Change	Revenues Increase	Revenues Unchanged	Revenues Decrease
Increase	Inelastic	Unitary	Elastic
Decrease	Elastic	Unitary	Inelastic

During the period of the Civil Aviation Board (CAB), 1938-1978, Brian Browne postulated that major interstate carrier demand functions were elastic, and that traffic flows could benefit from decreases in prices. Under the formula driven CAB rate-making procedures (see below—Revenue Requirements), a more innovative pricing regime was not possible. However, the California Public Utilities Commission (CPUC) implemented a more creative pricing structure (off-peak/on-peak—generally lower passenger yield rates) with regard to their large intrastate airline, PSA. As a result, PSA, with its highly traveled city-pair route, San Francisco-Los Angeles (SFO-LAX), had load factors in excess of CAB regulated routes. Browne also advised the Australian government (Two Airline Policy) that his empirical testing

showed that their airlines were operating in the elastic section of their demand curves. He recommended more competition and a more creative pricing regime. The elasticity statistic is an excellent decision tool for pricing decisions.

Since the dismantling of the CAB, U.S. airlines and regulated utilities, especially electric utilities, have used multipart or discriminatory pricing. Multipart pricing is a strategy to maximize wealth by pricing different amounts at different prices—e.g. off-peak/on-peak. Multipart pricing, although simple in concept, is difficult to achieve in open markets. To achieve multipart pricing, buyers must be prevented from reselling to each other. It will be interesting to see how the California and the Australian electric restructuring impact multipart pricing. This is not a trivial question in the framework of evaluating asset value based on net income streams. Airlines in the U.S. (and worldwide) perform multipart pricing by a complex array of demand variables, such as time of booking, directness of route, age, season, etc.—a far cry from the formula driven CAB rate-making days.

Seasonal water rates and peak and off-peak electric pricing are examples of multipart pricing. Airlines, after the demise of rate regulation, have raised multipart pricing to an art.

Supply (marginal cost) elasticities are important also. The static elasticity measure (as in the demand computation) assumes a *cetebus paribus* approach to planning horizons (time), rate, and volume. Changes in any of these parameters will impact the elasticity—volume changes are positive in the first instance and negative in the second. That is, costs increase, but at a decreasing rate. Rate of production change is positive in the first- and second-instance; costs increase at an increasing rate. Production costs (as reflected in changing supply elasticities) can also impact valuation.

An understanding of the integral role of elasticities is important for decision-makers, planners, and regulators. All these participants are in essence price seekers trying to maximize a set of goals. Hearings before regulatory entities represent the search process in a judicial climate. Price changes by private entrepreneurs represent the same search process. "Errors" in pricing (responsiveness/demand metering, etc.) and the period that such errors remain in place do impact the value of an enterprise and ultimately the entire community.

Revenue Requirements

U.S. Regulatory Approach

Janis Beecher in her "Survey on Commission Ratemaking Practices for Water Utilities" (1992), estimates that approximately two-thirds of state public utility commissions regulating water utilities require cost-of-service studies. (See Chapter 2, above.) As noted above, revenues must cover cost. The determination of allowable costs is integral to rate-making. The concept, as applied, varies from state to state. The consensus appears to be to that society will have a resource use equal to what would be achieved in alternative economic pursuits.

Without perfect information and in a world of positive transaction costs, reaching this "optimal" goal is difficult, if not impossible. The cost of contaminated water (see Chapter 1) can be incredibly high from a societal viewpoint. Moreover, the cost of perfectly pristine water for all uses could imply resource transfers from more productive alternative uses. Commissions in rate-making appear to play a balancing act.

The basic revenue requirements, American Water Works Association, Revenue Requirements (1991), establish the following algebraic relationships for basic revenue requirements (after Beecher/AWWA):

$$R = O + D + T + rB$$

Where:

B = Rate base (V - d)
V = Rate base valuation
d = Accumulated depreciation
R = Revenue requirements"
O = Operations and maintenance expenses
D = Annual depreciation charges
T = Taxes
r = Permitted rate of return (cost of capital)

The permitted rate-of-return "r" equals the weighted sum of the cost of debt capital and cost of equity capital:

$$r = k(E/C) + i(I/C)$$

Where:

k = Cost of equity capital
E = Total equity capital
i = Cost of debt capital (a weighted average)
I = Total debt capital
C = Total equity and debt capital

Beecher/AWWA notes that the structure for self-regulating publicly owned utilities is:

$$R = O + T + D + C$$

Where:

R = Revenue requirements
O = Operations and maintenance expenses
T = Tax equivalents
D = Debt-service payments (interest charges and principal)
C = Capital expenditures not financed by debt

The rates needed to generate R must be designed so that the sum revenues from all customer classes (household, commercial, and industrial) equal the cost components. As noted in The Reason—ACWA discussion (cf. Chapter 1, above), rate-making and economic cost allocation (alternatives foregone), in a world of subsidies and varying social objectives, is no easy target. Changes in macro-economic variables, subsidies, taxes, environmental rules, and technologies all impact the rate-making process.

Price Cap Rates

Price capping is another way to regulate natural monopolies. Price capping is achieved by taking some escalation factor (CPI/GDPD/PPI/etc.) and applying this increase to an existing rate structure. This is done in the UK (England and Wales—Scottish systems are still public), but their status is being reviewed. The utility must then operate within the escalated revenue generated by the allowable price increases. The

U.S. experimented with a similar system during the 1970s and 1980s—with oil and gas. The results from the U.S. consumers' perspective were less than satisfactory.

Theoretically, revenue requirements and price cap systems use a similar calculus. Under the revenue requirements method, the rates are set to cover the (allowable) costs. The idea of "allowable" assumes that all economic costs are subsumed in the cost assignment. This approach is consistent with attracting competitive resources to that industry. In setting a simple escalation factor for rates, the administrative process is decreased, and it is up to the regulated utility to achieve efficiencies commensurate with allowable rates.

Since 1989 privatization, England and Wales have used a price cap system for water. Rate changes are set and administered by OFWAT (Office of Water Services), which also regulates other "...unfair industry practices." However, it should be noted that only 8 percent of households in England and Wales have meters. *Which?*, a trade magazine of the UK Consumers Association, notes that two-thirds of UK water companies favor implementing a metering system. Interestingly enough, *Which?* opposes meters on the following basis: "The cost of water does not reflect the true cost of the system—most goes to maintenance or improvements. And metering is expensive." *Which?* adds "...in most regions, you have to pay for the first water meter." *Which?* estimates that metering would cost consumers £263 million a year (approximately 0.5 billion $U.S. (7/04/96)[2]).

Under OFWAT, according to *Which?*, average-metered prices have fallen by 2 percent in constant dollars since 1989, but non-metered water rates have increased by 39 percent. The Consumers Association opposes additional metering, stating: "Water metering is likely to encourage those on low incomes to use less water. People should not be encouraged to get by without water—the health hazards are too great."

It is interesting to compare (contrast) this statement with the definition of a market clearing price as defined by Alchian and Allen. "An equilibrium (market clearing) price in the market is one at which all possible mutually beneficial exchanges can occur." To Alchian and Allen—and to most economists—a metering system would be pivotal for market signal transmissions from the producer to the consumer and back. However, the surfacing of such concerns as health hazards underscores the entire discussion on what objectives infrastructure investments should achieve and in essence, who should pay and how much?

Price Cap in a Long-Term (20 year) Contract

North West Water Australia was recently awarded a contract by the South Australian government to build and operate 10 private wholesale water plants along the Murray River in South Australia. These plants will supply water to 100 communities. One major term in the contract is that North West Water guarantee a fixed contractual price throughout the entire contract period. North West Water developed a pricing forecast model to ensure that guaranteed price. That model, according to discussions with North West Water officials, appears to be a level annualized capital model with labor, power, and replacement expenditures (timing) and inflationary assumptions factored in.

Forecast models using level annualized initial capital charges and escalated operation and maintenance charges are fundamental to regulatory/contractual rate-making—whether ***ex ante*** (as in the U.S.) or ***ex post*** (as in the UK—OFWAT approach). The success or failure of a contract, which must be internalized by either the ratepayers or stockholders, depends upon the accuracy and timing of capital charges, interest rates, tax structures, regulatory changes, inflation, elasticities, and so on.

The mathematics for computing revenues/rates is straight-forward. It is the independent, future variables that significantly impact outcomes. The alternative is to let the markets prevail as being planned in California and as happening in Australia. There, spot and derivative markets will bear the risk and ensure

the outcomes for both the present and future. Many believe that the water and wastewater industry is not a likely candidate for such a solution. The future will tell.

Acquisition/Contract Valuation

How does a government entity value a public resource when privatizing? How does a government entity reimburse a private entity for condemnation purposes? As noted above, the simple method would be to take the net income flow, plus the present worth of salvage value. However, economists and their theories and the judicial process do not always mirror each other. Some valuation methods are suggested below.

Historical Costs/Replacement Costs

One method would be to take the actual historical costs and sell/condemn at that price. However, that approach might overstate or understate the value based on numerous factors including methods of acquisition (eminent domain), tax subsidies, government subsidies (especially water and wastewater), technologies (obsolescence), and so forth. For example, old railroad tracks no longer serving any purpose due to changing demands and alternate technologies caused the Interstate Commerce Commission (ICC) serious concerns in terms of valuation. The basic value of such facilities was only the right-of-way value. The track was often an impediment to future use.

Condemnation hearings present a similar situation. For example, some water systems in Florida subject to condemnation have been paid multiples up to 3 times based on book value.

Accounting Principles

Regulatory acceptable accounting practices (RAAP) and generally acceptable accounting practices (GAAP) may lead to different asset valuations. Moreover, accountants, following established formulas, have problems identifying the allocation of costs. Economists see a joint-product with common costs, e.g. a sheep which produces both mutton and wool, as having output maximized when the marginal cost of maintaining the sheep is equal to the marginal revenue from the sale of its wool or the sale of mutton. Accountants have long agonized over how to allocate a sheep's cost between mutton and wool production. Likewise, applying the various accounting procedures to asset valuation can cloud the issue and cause either over- or under- valuation. Certainly, commingling both economic and accounting principles will lead to a more accurate evaluative process.

Asset Sale—Victorian Model (electricity)

The Victorian model in Australia was basically an auction. In Victoria, the assets initially belonged to the government. Under the 1995 National Competition Policy and Related Reforms Act the neutrality section pertaining to government ownership catalyzed the sale. The generating plants were acquired by a mixture of local, U.S., and UK companies. In the U.S., the process, as noted by the various regulatory responses in Chapter 2, would require a multi-governmental level review. The Australian states and territories, in conjunction with the federal government, passed similar legislation relating to restructuring and asset sales. This joint action permitted restructuring and therefore avoided the peril of a high court challenges under the constitution.

In July 1997, the Australian Labor Party (ALP), formed a committee to evaluate the sale of the state's electricity, subject to Labor Party criteria, which included impact on jobs, prices, and the environment. It is estimated that an outright sale of these facilities—which include three generation companies, six distribution companies, the high-voltage Transgrid network and the state's 58 percent share of the Snowy Mountains hydroelectric scheme—would produce a sale price of $U.S. 17 ($A22) billion. Interestingly enough, the amount of $17 billion was arrived at by the merchant bank Deutsche Morgan Grenfell.

Critics in New South Wales (NSW) say that this amount will not offset "...the subsequent social and economic distress" that will follow, as it did, according to these critics, in Victoria. On the other hand, if the state does not privatize, proponents of privatization note that the state's budget sector debt ($A13.4 billion) will remain a burden, industry in NSW will be at a pricing disadvantage regarding electricity purchases, and other vital state capital works projects will not be served.

The current ongoing debate in NSW mirrors privatization debates around the world. However, this debate, unlike California's electricity restructuring debate, involves the sale of an entire public asset. It has brought into clear focus the social and economic issues that characterize these situations. Dr. Peter Botsman, who wrote Labor's submission to the Hogg Inquiry (privatization of the state's electricity), noted (*Sydney Morning Herald*—August 25, 1997): "...perhaps the most important debate in the postwar history of the party. If we don't win this debate, then we will spend the next 10 ALP (Australian Labor Party) conferences fighting the privatization of health, fighting the privatization of law and order, fighting the privatization of everything that in a decent society is owned by the people and managed on their behalf."

Contract Operations—Ownership Format

Contract operations are purchased, as are assets acquisitions, based on projected net income streams. Ownership type and format is irrelevant in the context of resources being rewarded at their market rate. If economic efficiency is pursued and factors are paid according to their highest alternative use, the legal nuances of ownership disappear from a social wealth maximizing perspective.

Planning Discount Rates—Allocating a Resource Over Time

Each entity has a unique subjective discount rate appropriate to its project. This rate, in tandem with net income, determines the value of the project to a company and or public entity. Each project is unique and the discount rates are highly subjective and biased by the assumed risk. A project in a developing country would not produce the same valuation as a similar project with the same income stream in the U.S., because of the need to imbed a risk premium in the discount factor and hence decrease the capitalized value derived from that income stream.

Writing in 1967, in regard to California's immense Feather River Project, Alchian and Allen wrote: "....For example, advocates of the California Feather River Project water project, an immense state-financed endeavor to supply additional water to Southern California, held it to be an excellent investment—as it may be at interest rates of about 2 percent. But if the rate of interest is higher, as it is, the resources would be more valuable if used for other things..." The project was built. The relationship between capitalized (present worth) value, planning, and societal outcomes cannot be separated from the mechanism by which society allocates resources over time. Alchian and Allen believed that this water project should have been deferred for at least 20 years.

Valuation Issues in U.S. Water and Wastewater Privatization Transactions KPMG[3]

At the 1996 EPRI conference on Water and Wastewater Privatization, held in San Francisco, California, Messrs. Michael Graham and Michael Blum, two senior KPMG consultants, presented an operational approach to valuation. Blum and Graham identified types of privatizing transactions:

- Re-municipalizing
- "Managed Competition"
- Operating Contracts
- Concessions
- New Facility BOOTs/BOTs
- Asset Sales
- Mergers and Competition

In this valuation search process they clearly identified the need for both seller and buyer data:

Table 3-2. Uses for Valuation Data

Seller	Buyer
Feasibility Analysis	Process Management
Selection of Privatizing Vehicle	Optimization of Alternatives
Bid Assessment	Pricing Bid or Rates
	Market Sounding/Acquisition Price

The key valuation issue from the seller's perspective was identification of market value. This element equals fair market value of contract offered and fair market value of hard assets. The former attribute was further broken down into (a) current cash to operate with, (b) current operating cash revenue, and (c) hidden costs. The realization of value, as defined by Blum and Graham, was assessed by looking at (a) cash flow comparison to alternatives, (b) understanding buyer's valuation criteria, and (c) fair market rate of return. The value of deal required is defined in terms of (a) market valuations and fair market rate of return, (b) understanding seller's valuation criteria, and (c) sensitivity analysis.

These two consultants defined the market approach to value as follows: "The market approach involves valuing a company based on the market valuations of similar publicly held companies." Their approach to valuation was summarized by acknowledging the cost element, the comparable (opportunity cost—alternative foregone) element, what the market has paid, and finally the value of the projected income stream. Both consultants recognized that market valuations are driven by the discount rates and the overriding idea that sunk costs are irrelevant costs—it's what values the market assigns. The market, according to the consultants, is the final arbiter of value.

From a buyer's perspective, Graham and Blum dichotomized the key valuation issues into (1) value of deal offered and (2) value of deal required. They noted that the value of the deal offered had three component parts: (a) fair market value of hard asset (purchase of acquisition), (b) fair market value of contract offered (budgeting) and (c) opportunities for cost savings/synergies.

Table 3-3, as presented by Messrs. Blum and Graham, summarizes their "Market Approach to Value."

Table 3-3. The Market Approach to Value

Selected Multiple	2.73	7.69	10.21
Representative Measure	100,000	27,670	23,240
Indicated Value of Total Capitalization	**$273,091**	**$212,873**	**$237,228**
Relative Weighting	30%	40%	30%
Weighted Values	$81,927	$85,149	$71,168
Weighted Average Value	$238,245		
Less: Total Interest-Bearing Debt	156,636		
Indicated Value	81,609		
Control Premium 20%	16,322		
Equity Value on Controlling, Marketable Basis	**97,930**		

The income approach to value used by Blum and Graham is consistent with that discussed above having either continuous or discrete discounting. They present two balanced definitions:

- "The fair market value of an ongoing business is the present worth of its expected cash flows."
- "The value of an asset is the expected present value of the expected returns from an asset during the holding period."

To augment this definition, the following equations (based on the Capital Asset Pricing Model (CAPM)[1]) are presented to show the derivation Cost of Equity (COE) and Weighted Average Cost of Capital (WACC) factors.

Cost of Equity Calculation

$Cost\ of\ Equity\ Capital = Rf_c + Beta \times (Rm - Rf) + Rs_1 + Rs_2$

Where:

Beta = 0.48
Current Risk Free Return $(Rf)_c$ = 8.00%[2]
Long Horizon Equity Risk Premium $(Rm - Rf)$ = 7.40%[3]
Company Specific Premium $(Rs)_2$ = 0.00%[4]
Cost of Equity = 11.58%

Weighted Average Cost of Capital (WACC) Calculation

$WACC = Cost\ of\ Debt \times Amount\ of\ Debt + Cost\ of\ Equity \times Amount\ of\ Equity$

Where:

Selected Debt to Equity Ratio = 101.00%
% Debt = 50.25%
% Equity = 49.75%
Cost of Debt (BBB Bond Yield) = 10.33%[4]
After Tax Cost of Debt = 6.24%
Cost of Equity = 11.58%
WACC = 8.90%

Using the above calculations, as shown in Table 3-4, KPMG calculates the present worth of the debt free cash flows as follows:

Table 3-4. The Income Approach to Value

DEBIT	23,240	25,285	24,110	25,115	23,868	22,584	23,262
Provision for income tax 40%	9,205	10,015	9,550	9,948	9,454	8,946	9,214
Net income	**$14,035**	**$15,270**	**$14,560**	**$15,167**	**$14,414**	**$13,639**	**$14,048**
Cash Adjustments							
Add: Depreciation	4,430	3,215	5,245	5,121	7,275	9,493	9,493
(Less): Change in Working Capital	450	450	464	477	492	506	522
(Less): Capital expenditures		10,000	10,300	10,609	10,927	11,255	9,493
Debt Free Cash Flow		8,035	9,042	9,201	10,270	11,370	13,526
Present value factor 9%		0.9578	0.8787	0.8062	0.7396	0.6785	0.6785
Present value period		0.5	1.5	2.5	3.5	4.5	4.5
Residual value							270,524
Present value of DFCF		7,696	7,945	7,418	7,596	7,715	183,563

The final step in the derivation of value, using the net income approach, is illustrated by Table 3-5 (from the KPMG presentation).

Table 3-5. Derivation of Value

Sum of Cash Flows	$38,370
Residual Value	183,563
Sum of Present Values	221,933
(less) Total Interest Bearing Debt	140,000
Equity Value on Controlling, Marketable Basis	**81,933**

Notes and Relevant Data Sources

Armen A. Alchian and William R. Allen, *University Economics*, Second Edition, 1964-67, Wadsworth Press, Belmont California.

Armen A. Alchian and William R. Allen, *Exchange & Production, Competition, Coordination, & Control*, Third Edition, Wadsworth Press, Belmont, California 1977.

American Telephone and Telegraph Company, *Engineering Economy*, Third Edition, McGraw-Hill Book Company, 1977.

Brian Browne, Various Academic and Consulting Studies.

Milton I. Friedman, A Preliminary Price Theory Text—University of Chicago Press.

The National Regulatory Research Institute, "Meeting Water Utility Revenue Requirements: Financing and Ratemaking Alternatives," November 1993.

Proceedings: Water and Wastewater Privatization, MWW, EPRI Water and Wastewater Program, Report CR-107892, October 1996.

Allyn D. Strickland, *Government Regulation and Business*, Houghton Mifflin Company, Boston, MA. 1980.

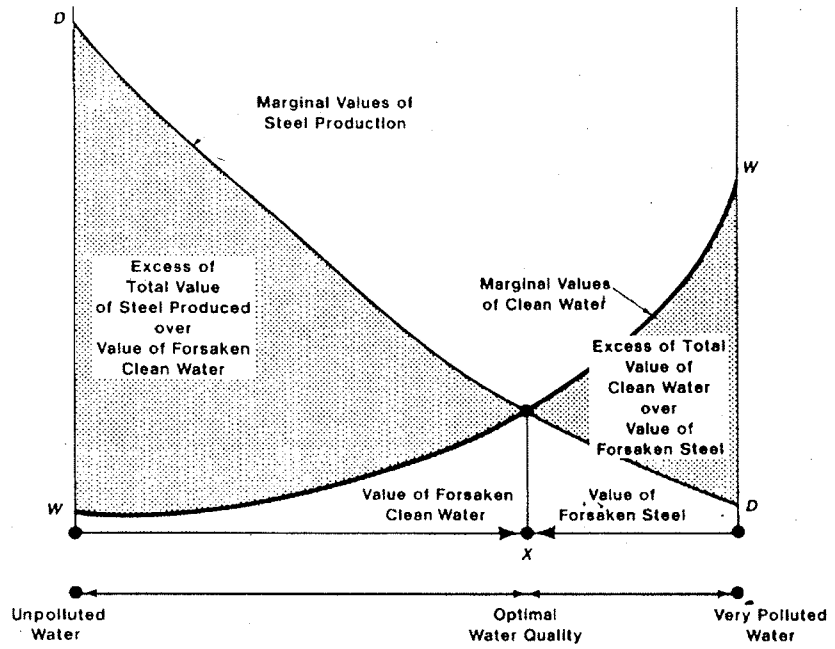


Figure 3-1. Economics of Pollution, Clean Water, and Industrial Output (Steel)

Figure 3-1 (above) diagrams the economics of pollution, clean water, and industrial output (steel) as postulated by Armen Alchian and William Allen. It is reproduced from the Alchian and Allen text (Chapter 5, pages 93-95—Figure 5-1 [page 94])—Exchange & Production, Competition, Coordination, & Control, Third Edition, Wadsworth Press, Belmont, California 1977.

Alchian and Allen use two demand curves—one for steel—decreasing from the left vertical axis and one for water—decreasing from the right vertical axis—to explain how possible misallocation (under or over pricing) in water use can impact other outputs.

The authors note: "The total use value to consumers of the steel is indicated by the area under the whole demand curve for steel DD, out to whatever is the amount being produced, whereas, the total use value to consumers of cleaner water is the area under the demand curve for water, WW, reading from right to left." They define the point where the marginal value of steel is equal to the marginal value of water as the point where society maximizes total output value ("X") at that trade-off ratio. They argue that if for some reason (e.g. government intervention) water prices are too high, less steel will be produced and visa versa (pricing errors). A productive optimum for society will not be achieved. Friedman in his earlier text "A Provisional Price Theory" makes the same assertion, however, as discussed in the above text, he puts it in the context of society being taken off its production possibility curve.

---

[1] Friedman, Preliminary Price Theory Text.

[2] *Which?* ONLINE—http://www.which.net/nonsub/pr/july/which/watchdog.html

[3] Pursuant to contractor's instruction, the KPMG presentation of 1996 as an explanatory vehicle in this chapter. Any transcription errors are those of the author and should not be ascribed to KPMG.

Chapter 4 Restructuring

Summary

The U.S., the UK,[1] and French water systems are discussed below, with a view to the possibility of the U.S. adopting some sort of similar water system. It is, however, unlikely that the U.S. will fully privatize along UK lines. The U.S. already has taken a step toward outsourcing operating and maintenance functions. It is unlikely that there will be a major sale of publicly owned water and wastewater assets in the U.S. Rather, greater reliance will be placed on public-private sector cooperation, with ownership remaining with the public. The French use of competitive leasing does suggest a possible direction for U.S. privatization. However, the solution will be uniquely American, because of the highly fragmented nature of the U.S. water and wastewater industry. In the U.S. there is no centralized oversight body, such as in England, Wales and France, that sets national water standards for rate-making and asset transfers.

USA

Tax Structure

The Tax Reform Act (TRA) of 1986 discouraged privatization of water and wastewater facilities. The 1986 TRA required that an investor owned utility, which acquired a utility property from a developer, pass the tax advantages back to the developer. This disadvantage was erased by the Small Business Job Protection Act of 1996. However, in the interim, investor owned utilities, saw this TRA as giving non-tax-paying municipalities an additional comparative advantage in production costs, in that municipalities do not pay taxes.[2]

Moreover, in 1993, the IRS started to require that issuers of tax-exempt bonds comply with the private activity bond restrictions for the full term of the bonds. This measure meant that a municipality, in entering a long-term private operation contract for a public facility funded by tax exempt bonds, could endanger the "safe harbor" of the bondholders. Thereby the bondholders' tax-exempt income status might be revoked and the revocation could be imposed back to the date the bonds were first issued.[3]

However, on January 10, 1997, the IRS released final private activity bond regulations and revenue procedures that will permit local governments to sign long-term contracts with private operators and not have to give up benefits of tax-exempt financing. With the tax rules more amenable to privatization, it is believed that the cost of privatizing will be reduced. The new rules for privatizing now permit:

- 10-year management contracts if at least 80 percent of the compensation is a period fixed fee.
- 15-year contracts if at least 95 percent of the compensation is a is a periodic fixed fee.[4]

Michael Rapaport remarks on this new scheme: "Further, while the IRS did not go as far as some commentators suggested, in the case of 'public utility property,' the rules permit contracts with terms of up to 20 years if at least 80% of the annual compensation is a periodic fixed fee (and if 20 years does not exceed 80% of the expected useful life of the property)."[5]

California

Proposition 218

A *wild card* has appeared on the U.S. water scene regarding potential privatization. In November 1996, Proposition 218 was approved as a constitutional initiative by the California electorate. Proposition 218 restricts rates which are imposed "as an incident of property ownership." There is no consensus as to what "as an incident of property ownership" means. This issue is important and will probably be decided by the legislature or courts. However, the drafters of Proposition 218 assert that the term refers to most fees commonly collected on monthly bills to property owners, such as water, garbage services, sewer service, and storm water management. In effect, if implemented as many understand it, municipal rate increases for such services would be subject to voter approval—not on a one person-one vote system, but rather with the number of votes based on the extent of property ownership.[6]

A fuller understanding of Proposition 218 is available from a December 18, 1996 Legislative Analysts Office (LAO) report entitled "Understanding Proposition 218." The assessment is that new taxes are most at risk. The report may be summarized as follows:

- "Local governments could suffer as much as a five percent annual decrease in the $50 billion that they collect annually from taxes, assessments, and fees. This could mean a potential loss of $2.5 billion annually.
- "Jurisdictions that are highly dependent on fees and/or assessments, such as some special districts, may lose more than the estimated 5 percent.
- "Proposition 218 requires the immediate reduction or elimination of certain existing fees and assessments. The assessments most likely to be eliminated are for fire protection, ambulance service, lighting and landscaping, and parks and recreation. These actions may cause a reduction of at least $100 million in 1997-98.
- "Proposition 218 requires governments to place certain existing assessments and taxes before the voters. Depending on the outcome of these elections, local governments may lose additional revenue, potentially exceeding $100 million.
- "Many local governments, especially counties, have limited ability to reduce costs because many of the services they provide are mandated by state law. Consequently, even small revenue losses associated with Proposition 218 could trigger large reductions in discretionary programs.
- "Many local governments will have to pay assessments imposed by other governmental entities, further reducing their revenue base.
- "Local governments will probably seek assistance from state and federal governments in order to mitigate the impact of Proposition 218. These attempts will produce few results given the fiscal and political landscapes in Sacramento and Washington, DC.
- "Limitations on property-based taxes, assessments, and fees will cause local governments to turn to 'non-property' sources of revenues. Local governments' ability to rely on this type of revenue will depend on how broadly the legislature or the courts define the term 'non-property.'"[7]

The current law requires that most new taxes levied by local governments in California must receive voter approval. The state Constitution requires that special taxes, defined as those levied by local governments to fund particular activities or programs, be approved by a two-thirds vote of the electorate. In 1986, voters approved Proposition 62, a statutory initiative requiring a majority vote by voters regarding new general taxes. A number of legal battles followed. In 1995, the state Supreme Court affirmed Proposition 62. However, it remains unclear if this proposition applies to the state's 89 charter cities, since the California Constitution grants charter authority over municipal affairs. However,

Proposition 218, as a Constitutional initiative, may extend the arm of Proposition 62 to all California cities.

The nationwide ramifications recall California's landmark Proposition 13 (a so- called "tax payer revolt" measure), which significantly constrained the property tax base. Similar approaches were adopted in many other parts of the U.S. Some analysts have written that other states with self-regulating municipalities could again follow California's lead and that such an electoral constraint on rate increases could provide the impetus for additional privatization.

Two-Thirds Electoral Approval Required for Asset Transfer[8]

Another constraint on privatization in California is that the law requires a two-thirds vote of approval by the electorate for an asset transfer. California Water discovered this obstacle when they tried to acquire the City of Hawthorne's water system. Hawthorne wished to sell its water system to raise funds capital to fund police and fire services. California Water leased the facility for 15 years for a one-time payment of $6.5 million dollars to the city. During this period, California water will not have to pay Hawthorne for capital improvements. It is estimated that California Water will receive annual revenues of $4 million from operating this facility. The City of Hawthorne will receive an annual payment of $100,000 from California Water during the term of the contract.[9]

Current Trends in the U.S.

The U.S. water and wastewater systems remain largely public. However, increasingly water and wastewater utilities are turning toward contract operations. Currently, according to a Special Report issued in the January 1997 issue of PWFinancing, over 1,000 U.S. water and wastewater facilities employ some form of contract operations and maintenance management services. The article identifies the types of contract operations available:[10]

- Design, building, and operation of new facility upgrades.
- Design, building, operation, and financing the facility with private capital.
- Sale or lease of public plants, pipes, pumps and other facilities to an operator who then provides contract O&M and capital replacement under a long-term contract.
- Expanded contract O&M, including management functions such as billing and collection, meter installation and reading, customer services, monitoring and sampling for pre-treatment programs, site engineering and pipeline maintenance.

Adrian Moore[11] of The Reason Foundation, notes there are some critical difference between BOT (build-operate-transfer), BOOT (build-own-operate-transfer), and BOO (build-own-operate) schemes. Moore delineates these differences:

> BOT is Build-Operate-Transfer. Meaning the private firm will build the facility, ownership transfers to the public sector on completion (though technically, ownership lays in the public hands from the start), and then the firm operates the privately built and publicly owned facility. BOOT is a build-own-operate-transfer. The private firm builds the facility, then at some point specified by law or contract, transfers ownership of the facility to the government. Usually various degrees of regulatory control remain in place while the private firm owns and operates the facility (e.g. rate controls, etc.). BOO is pure private sector.[12]

In *Competition for City Services: Has the Time Arrived? Privatization in Illinois Municipalities* (December 1996), Robin A. Johnson and Norman Walzer note that 18.3 percent of Illinois municipalities stated that they planned to increase privatization and few noted any decrease in this activity. These authors also note that 40 percent of Illinois larger cities (5000 inhabitants or more) plan to increase contracting in the future because such cities offer more services than smaller communities.

In their survey of Illinois municipalities, Johnson and Walzer note: "Most municipalities compare costs between public and private services. Larger cities are more likely to compare costs than smaller towns. While approximately one-fourth of respondents said privatization did not result in cost savings, 54.6 percent reported cost savings in some instances and 17.9 percent achieved savings in most cases."

The authors report on the impact on the labor force by stating: "Employees were not adversely affected by privatization to the degree many opponents claim. Nearly two-thirds of reporting cities say there was no effect on employees due to contracting and only 3.0 percent say employees were laid off. Implementing strategies designed to ease employee concerns is the key to privatization.[13]

Forms of Privatization

Privatization can be in the form of asset acquisition or contract operations. As noted by Greg Orrill in *Washington Analysis*, a publication of Hong Kong Shanghai Bank, "[f]or decades private companies—notably American Water— have been buying the assets of existing systems. But increasingly, private companies—notably United Water—are simply contracting to take over management of municipally owned water systems. Both industry leaders have used both methods."[14] Donald L. Correll, CEO and president of United Water, according to *The New York Times* article of August 26, notes "[t]here are many municipalities that have well run water systems that may not need the assistance of the private sector, and have adequate access to capital and an efficient work force." Economic theory suggests that if all factors minimize shirking, encourage production so that marginal cost equals marginal value, and are paid according to their marginal value in use, then the ownership construct is unimportant.

U.S. Foreign Business Relationships

The transatlantic links between U.S. and European water companies are summarized in Table 4-1.

Table 4-1. Transatlantic Links

U.S. Company	Foreign Partner
American Water Works	Anglian Water (UK)
United Water Resources	Suez Lyonnaise des Eaux (France)
Air Water Technologies	Generale des Eaux (France)
Bechtel/U.S. Water	North West Water [United Utilities-UK]
ST Environmental	Severn Trent (UK)

The Competitors in the U.S. Water/Wastewater Markets

HKSB *Washington Analysis*, cited above, identifies the key players in the emerging field of U.S. competitive water. Table 4-2 is reproduced from the BSBC Analysis report of December 1996.

Table 4-2. Key Players in the U.S. Competitive Water Industry

Company	Description
Air & Water Technologies /Generale des Eaux	AWT is the market leader in municipal O&M contracts with 20% share; prefers development of long-term concession market rather than asset purchases.
American Water Works / Anglian Water	AWK is the largest U.S. water utility; prefers to buy U.S. utilities and can afford major acquisitions, but will pursue O&M contracts opportunistically (e.g., Evansville, IN). American-Anglian JV formed in 1995 to pursue the wastewater market.
Camp Dresser & McKee/ Phillip Utilities Management Corp.	Engineering and consulting firm CDM is pursuing vertical integration into DBO water markets; PUMC is subsidiary of Canadian firm, Philip Environmental. Team recently surprised industry with win on major DBO contract in Seattle.
CH2M Hill (OMI Services)	OMI is a top five company in O&M contracts market; partners with parent company to provide turnkey services; expanding capability to include financing.
Earth Technologies / Tyco	Tyco purchase of Earth Technologies in early 1996 target expansion of regional operator into a full-service provider in design/build/operate market; recent contract wins in Ohio, Michigan and Nebraska.
Ogden Corp./ Yorkshire Water	JV formed in 1994 to pursue U.S. business, but downsized in 1996 due to perceived lack of attractive projects; team still looks at select long-term deals (e.g., Hartford, CT).
Severn Trent / ST Environmental	One of the first UK water companies to enter the U.S. market through acquisition of regional companies; has been less visible in major contract bids.
United Water Resources / Lyonnaise des Eaux / Montgomery Watson (JMM Operational Services)	With Lyonnaise and JMM, UWR is more aggressively diversifying into O&M contracts and international markets; especially strong in New Jersey market.
U.S. Filter	New entrant into municipal O & M business through purchase of Wheelabrator EOS subsidiary. Will emphasize integration of equipment sales and services.
U.S. Water (U.S. subsidiary of United Utilities) / Bechtel	JV between Bechtel and North West Water (which became part of United Utilities) formed in 1995; recent 20-year concession closed in N. Brunswick, NJ.

Restructuring—the Electricity Analogue

In a 1993 report to EPRI, Brian Browne raised the possibility that U.S. water companies could benefit from an economic alliance with electric utilities. Browne suggested that U.S. electric utilities with large depreciation accounts, declining core market, similar business operations, correlative data base management, and experience with regulatory authorities could benefit from acquisition of water and wastewater companies. This had already occurred when Minnesota Power and Northern Indiana Public Service Company (NIPSCO) acquired, respectively, Southern States Utilities (Florida Water Systems) and Indianapolis Water. More and more analysts (Barons, Hart's Energy Markets, etc.) are now coming to a similar conclusion.

Steve Hall of the 420-member Association of California Water Agencies (ACWA) does not see a parallel between the restructuring of the electric industry and of the water industry. The California electricity industry will be effectively restructured as of January 1, 1998. What Hall and others see is the opportunity for water companies, which are high consumers of electricity, to acquire power from competitive marginal suppliers. Lower power costs, if realized, should mitigate public budgetary constraints and defer rate increases. In California, this deferral of rate increases might not be inconsequential, with the specter of Proposition 218.

The deregulation of infrastructure around the world has challenged the concept underpinning of rate and monopoly regulation—the concept of the natural monopoly. Browne believes that such a challenge was inevitable in a period of fast technological growth, which has resulted in lower information and transaction costs.[15]

Restructuring of the water industry might take a completely different form than that of electricity. For one thing, there will probably be a movement away from master metering toward full implantation of individual metering. For another thing, not all water sold need be of the same quality. A qualitative difference could lead to a market for individual incoming water filtration and outgoing sewerage purification. In essence, private users would be charged for the type water they consume and the level of pollution that they discharge. For yet another thing, increasing industry consolidation—of functions and supply—will appear. As Richard Nemee notes in Hart's Energy: "Already the [water] industry has consolidated to the point that about 3,000 water systems serve 75 percent of the U.S. population and 600 of those serve more than 50 percent of the population."[16]

The National Competition Policy (NCP) of Australia (discussed in more detail in Chapter 5) provides interesting insights into the pros and cons associated with privatization. Privatization advocates in Australia point with enthusiasm to the A$ 1,550 million received for sale of Victoria's united energy system. This amount, they point out, was well in excess of prior sale projections. The Australian Labor Party notes that most of this sale was financed with borrowed money. They believe that this high debt/equity ratio could impact the stability of the industry.

Further, they believe it could negatively impact the financial markets and generate a long-term need for electricity providers to set higher rates in order to cover their initial capital investment. Parenthetically, as of this writing, electric rates have decreased in Victoria. Additionally, much of the debt burden is carried by non-Australian financial institutions and there have been no business failures.

Another fear of the Australian Labor Party is that the various buyers of Victoria's electric system will consolidate into large monopolies with power to set monopolistic prices. With open entry and interstate electric trading, this fear, however, may provide groundless.

The Australian Labor Party of New South Wales, fearing the sale of the state's electricity system for an estimated $22 billion, believe that one debt is being retired for the loss of a significant revenue earner in terms of the power system. They also believe that sufficient concern will not be paid to the environmental trade-offs between profitability and the ambient quality of the state's ecological system. They cite the Sacramento Municipal Utility District as presenting a viable government alternative. "A model for aggressive investment in solar energy is SMUD, the Sacramento Municipal Utility district, a publicly owned U.S. utility."[17]

United Kingdom (UK)

In 1989, the public water companies of Wales and England privatized. Scottish water companies remain in the public sector. However, other ownership forms for Scotland are currently being considered, including privatization and the formation of cooperatives. The 1989 privatization in the UK was analogous to the fall of communism—it happened quickly. Many water analysts feel the jury is still out as to the efficacy of the UK system. In 1996, in the House of Commons, it was estimated,[18] that the investment on retrofitting all UK water systems (including customers) from lead piping to less environmentally hazardous systems was $20 billion.

Background

Environment

The UK rivers are generally in good shape.[19] Most of the serious pollution in the UK comes from farm runoff. Seventeen percent of UK sewerage is dumped into the ocean. Twenty-four percent of UK beaches report water contamination below EC standards. The aggregate Water and Waste Pollution statistics are:

Table 4-3. UK Water and Wastewater Statistics

Water	
Renewable Supply (cubic miles)	28.8
Total Use (cubic miles)	6.8
Agriculture (%)	3.0%
Industry	77.0%
Homes and Cities	20.0%
Waste and Pollution	
Urban Solid Wastes (millions tons)	22.0
Per capita	0.43
Hazardous Wastes (000 tons)	2,424.4
Sewerage Treatment Plants	84.0%
SO_x Emissions	422.9
NO_x Emissions	2,964.4

History of the Water Industry in England and Wales

Prior to 1974, local water boards and local authorities provided wastewater services. In 1974, ten regional water authorities were created and an effort was made to integrate water supply with river basin management. The same water authorities also took on wastewater responsibilities. In 1989, privatization of the UK water industry occurred. 10 regional water/wastewater companies were established, as well as 21 smaller, water-only companies. The pollution control function of the prior water authorities was transferred to a new government agency: the National Rivers Authority. The New South Wales (Australia) Socialists critically characterizes this process of privatization as follows:

> Privatization of the water industry in the UK in 1989 was the culmination of a period of internal restructuring which focused on cost cutting. The result was the deterioration of the infrastructure, an increase in pollution incidents and a drastic deterioration in water quality and service standards. The government's method of dealing with the problems it had created was privatization. Investment targets were agreed to but have not been met, while prices have risen and service quality has fallen.[20]

The following financing mechanism was used to transfer ownership of water/wastewater facilities from public to private control. The UK government took over all district debts and created companies. Shares in these companies were sold to institutions and individuals for the U.S. (equivalent) $3.66/ share.[21] Licenses were granted to these private companies for 25 years. Company failure to comply with established criteria, as delineated in the privatization provisions, however, might result in a government appointed administrator being appointed to run the organization. Such a prospect would supposedly negatively impact shareholder value and theoretically act as an incentive for effective privatization.

The license is an instrument of appointment by the UK Secretary of State and specifies conditions relating to charges, codes of practice for customers, preparation of asset management plans and provision of information for Director General of Water Services (DG). The Secretary of State must give a company 10 years' notice prior to terminating their license.

The UK legal structure calls for the license to be held by a core operating service company with clearly defined customer responsibilities. This core company is owned by a Public Limited Company (Plc), the British equivalent of an American corporation whose shares are all publicly traded. This structure allows the holding company to expand into other commercial enterprises, without any effect on the core utility business. Provisions are made, at the time of privatization, to prevent cross subsidization between the core business and non-core activities. Apparently, at the time of privatization, the legislators envisioned this type of commercial expansion by the newly privatized UK water companies.

Regulatory Structure

In contrast to the highly centralized British regulatory system, the U.S. has a highly complex state-by-state system. In the U.S., federal (EPA), state (EPA), and local authorities (ordinances) administer environmental controls. However, municipal/district water companies generally have full authority to set their own prices.[22] Private water companies in the U.S. generally must seek regulatory approval for price (rate) changes. The U.S. water distribution system is dominated by municipal/local water companies. Only 15 percent of U.S. water is supplied by private investor owned companies.[23]

The UK regulatory system has a rate-making oversight body called OFWAT (Office of Water Services). The responsibilities of OFWAT are:

Primary Functions

- To ensure that water and wastewater functions are effectively carried out throughout England and Wales.
- To ensure that UK companies can properly finance their functions.

Secondary Functions

- To promote economic efficiency by water and wastewater companies.
- To facilitate competition.

The allowable rate increases are a function[24] of capital charges, operating and maintaining new and existing plants, and dividends paid to investors as related to capital invested. This formula is supposed to balance investor risks with consumer needs. However, there is a price ceiling in place. This ceiling is set at inflation plus an additional factor allowed by OFWAT, as averaged over a ten year period. [25]

Regulatory Tools (OFWAT)

- The license (control over entry and exit)
- Monitoring reports
- Interim determinations—Cost pass-through
- Periodic review of price limits[26]

Statistics of Main UK Water Systems[27]

Companies

Table 4-4 summarizes the major UK water sector companies by name, area served, water customers, and wastewater customer.

Table 4-4. Statistics of Main UK Water Systems[28]

Company	Area Served km^2	Population (million) Water	Population (million) Sewerage
Anglian	27,500	4.0	5.3
Dwr Cymru	21,300	2.8	2.9
Northumbrian	9,400	2.5	2.6
North West	14,445	6.8	6.8
Severn Trent	21,650	7.3	8.3
Southern	10,450	2.2	4.2
South West	10,800	1.5	1.4
Thames	13,750	7.4	11.6
Yorkshire	13,600	4.5	4.8
Total	142,895	39.0	47.9

Finances

Table 4-5 delineates sales, operating costs, operating profits, and profits after taxes for the entire UK water sector. These data may be compared with individual U.S. companies, but not the entire U.S. water industry because of the mixture of public-private ownership formats in the U.S.

Table 4-5. Financial Performance UK Water Companies ($million)[29]

Turnover (sales)	$8126.2
Operating Costs	($5770.1)
Operating Profit	$2725.5
Profit After Tax	$2313.1

Performance Attributes

The Water Services Company (trade association) of England and Wales has identified the following key environmental and qualitative attributes of UK water:

- 99.5% of drinking water samples meet the stringent European and British quality standards.
- 96% of all wastewater treatment works in England and Wales meet discharge consents set by the Environmental Agency (EA).
- 89% of 433 designated bathing waters in England and Wales meet European bathing quality standards.
- 91% of rivers and canals in England and Wales are designated by EA as of good or fair quality.
- 992,000 dry tonnes[30] of sewerage sludge are processed every year: 52 percent is recycled to land, 10 percent is disposed of as landfill, 17 percent to sea (which will cease in 1998), 8 percent is incinerated and 13 percent goes to other outlets.
- Since 1989, the new water service companies have invested £17 billion. A further £12 billion is planned for investment up to the end of the century, and another £10 billion for the five years thereafter. In total, £39 billion of capital investment will be spent in the first 15 years after privatization. This compares with £16 billion in the 15 years before privatization.

According to this industry group, the money spent in recent years has been spread across every part of the industry:

- 33% on wastewater treatment—improving the quality of discharges from treatment works to rivers, estuaries and the sea.
- 16% on sewerage—mains, sewers, storm overflows and sea outfalls.
- 23% on water distribution—mains, water towers and pumping stations.
- 25% on water quality—to comply with stringent health requirements as well as improving the aspects that every customer appreciates: color, taste and smell.
- 3% on water resources—reservoirs, boreholes etc.

As a result of this investment:

- 166 new service reservoirs have been commissioned.
- Nearly 900,000 communications pipes connecting water mains to customers'[1] pipes have been replaced. 700,000 of those replaced were made of lead.
- 18,000 km of water mains have been relined or renewed, with another 9,000 km added to the system.
- 34 new outfalls have been commissioned and 127 old ones have been abandoned.
- More than 400 new wastewater treatment works have been commissioned and nearly 400 old ones have been taken out of service.

However, in contrast to the rosy statistics set forth above, the Australian socialists (left members of New South Wales Labor Party) note:

> The basic statistics of the water companies since privatization are not pleasant: disconnection because customers cannot pay their bills are up 50%, charges up 65%, profits up 125%, chairmen's pay up 130%. Also up are river pollution and the water companies' contributions to Tory party funds.[31]

Household Bills

The average UK household bills are delineated below for the period 1996-1997. As noted below, unmetered bills are higher than metered bills.

Average Household Bills (1996/97)		£
Water services	(metered)	99
	(unmetered)	102
Sewerage services	(metered)	112
	(unmetered)	117

(Note: weighted industry average)

Customer Service

According to industry commentators, today the UK water industry is characterized by:

- Codes of practice.
- Guaranteed standards of service providing compensation for customers experiencing below-standard service.
- Special needs registers for elderly and disabled customers.
- A range of payment options to help customers budget.
- Free or low-cost phone services for customers.
- Customer service committees associated with the regulator rather than the companies.

Major Assets

Reservoirs	311
Boreholes	958
River abstractions	229
Service reservoirs/water towers	3,776
Water treatment works	1,124
Total length of water mains (km)	244,578
Sewage treatment works	6,065
Total length of sewers (km)	280,493
Storm overflows	15,464
Outfalls	610

Statistical Facts

- A person uses an average of 160 liters per day.
- Only 3% of domestic water use is for drinking and cooking.
- Toilet flushing accounts for around a third of domestic consumption.
- A shower uses 35 liters but a power shower can use as much as 80 liters.
- A washing machine can use up 80 liters per cycle; a dishwasher can use 22 liters.
- A sprinkler can use over 1,000 liters per hour—enough to fill 12 baths.
- The average cost of a liter of tap water is only 0.07p.
- The average household bill is less than 60p per day for both water and sewerage services.
- Customers use significantly more water today than they did 30 years ago. In some areas, demand has doubled.
- For every £ the customer pays, twice as much investment is required as was needed 10 years ago.

Case Study—Anglian Water, United Kingdom[32]

Overview

Anglian Water Services (AWS) is one of ten privatized water companies serving Wales and England. AWS is part of the Anglian Water Group (AW), valued at $2.3 billion[33] on the UK Stock Exchange. AWS is geographically the largest water service company in the UK, providing drinking water to over 4 million people and wastewater services to 5 million. It operates in the southeast part of the UK, which is considered the driest part of England. AWS supplies 303,000,000 gallons of water daily, operates 155 water treatment plants, maintains 20,000 miles of water and sewer pipes, and maintains over 1,000 wastewater treatment facilities. The total investments since 1989 by AWS have amounted to $2.44 billion.

Anglian Water International (AWI) is also part of AW and generated $0.1 billion revenues in 1994. AWI specializes in:

- Concession services to water and wastewater utilities.
- Operation and maintenance of water and wastewater systems.
- The design, manufacture and installation of a wide range of water industry and proprietary products.
- Technological and process solution.

Anglian Water Service, the core operating company of Anglian Water, invested $1.8 billion from April 1990 through March 1994. In 1989, the annual per residence charge was $238. By 1994, it was $378. This increase in charges amounted to an annual upswing of approximately 10 percent.[34]

Subsidiaries

Anglian Water divides its subsidiary companies into three "types":

1. Operations Companies
2. Process Companies
3. Product Companies

The names of their subsidiaries are:

(1) *Operations Companies*

- Anglian Water International Ltd.—UK
- Anglian Water International—Lund, Sweden
- Anglian Water (Far East) SDN BHD—Kuala Lumpur, Malaysia
- American-Anglian Environmental Technologies—NJ, USA
- Anglian Water Pacific Pty. Ltd.—NSW, Australia
- AWI—Wellington, New Zealand

(2) *Process Companies*

- Purac AB—Lund, Sweden
- Purac GMBH—Merseburg, Germany
- Purac/Armton—Bronby, Denmark
- Purac Water—Poland
- Purac China—Beijing, China
- Purac Rosewater—UK
- Purac Engineering, Inc.—NJ, USA

(3) *Product Companies*

- Nordic Water Products AB—Sweden
- ARS (Aquafine Engineering Services) Ltd.—UK
- Fluid Systems Corporation Inc.—San Diego, USA

Rate Structure of Anglian Water

Anglian Water's domestic rate structure is compared with the U.S. rate structure in Table 4-6. These are aggregate figures and illustrate that a slightly higher water rate is in effect in the UK, at least in the Anglian service area. The rate structure used for the U.S. was the "average" rate structure for all U.S. water districts. The U.S. water data were divided into high, average, and low.

Table 4-6. Rate Comparison of Anglian and U.S. Average[35]

	1992	1993	1994
Anglian	$321	$344	$378
U.S. Average	$313	$334	$358

Revenue Sources for Anglian Water

Table 4-7 summarizes in pounds sterling and USD the sources by class and geographic location the revenue centers for Anglian.

Table 4-7. Anglian Revenues Millions of Pounds Sterling per Year

	1995	1994	% Change
By Customer Class:			
Water supply and Wastewater Services	629.7	594.5	5.9%
Process Engineering	98.4	97	1.4%
International	1.8	0.4	350.0%
Other		5.	
Intersegment trading	-9.8	-9.0	8.9%
Total	**720.1**	**687.9**	
By Geographical Origin:			
United Kingdom	658.5	640	
Europe	43.9	45.6	
Other	17.7	2.3	
Total	**720.1**	**687.9**	
Percent by Geographical Origin:			
United Kingdom	91.4%	93.0%	
Europe	6.1%	6.6%	
Other	2.5%	0.3%	
Total	**100.0%**	**100.0%**	

International Currency Fluctuations

Figure 4-1 summarizes the currency fluctuations associated with international trading with specific regard to four currencies: USD, Australian dollar, New Zealand dollar, and the French franc. This table does not include all market exchanges that Anglian is involved in, as noted in the section above. It does, however, indicate the complexities associated with international business. Hedging contracts are used to shield expected profits, but a downside of such an approach is the possibility of profit appreciation associated with favorable currency appreciation.

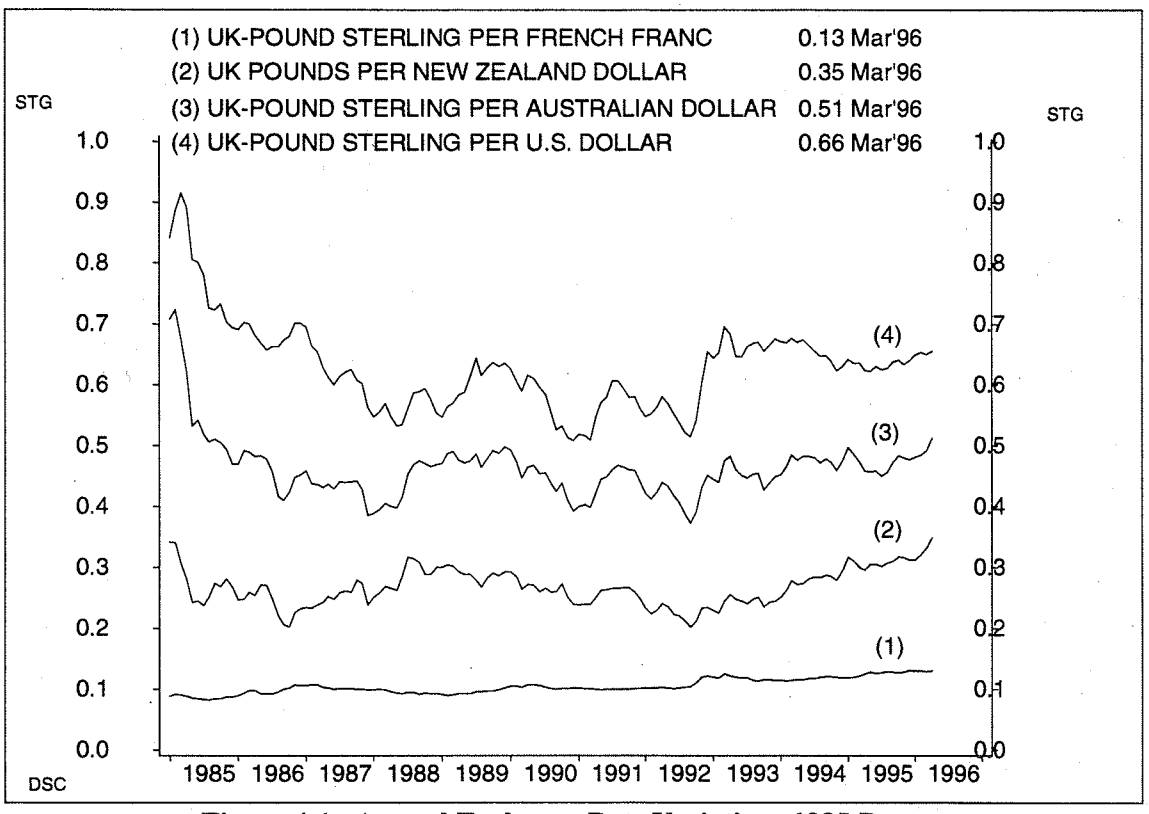


Figure 4-1. Annual Exchange Rate Variations 1985-Present

AWI—A Case Study of a Subsidiary (Moa Point—Wellington, New Zealand)

In March 1995, AWI contracted to design, build, and operate an extensive new wastewater treatment system to serve 300,000 people in Wellington, New Zealand's capital city.

The contract involves two elements:

(1) Designing and building two sewage treatment plants, a sludge de-watering plant, and a 1.125-mile sea outfall.

(2) Agreeing to operate the plant for 21 years following completion of construction.

The construction will cost $78.7 million. Anglian Water will receive $3.93 million a year, at constant 1995 prices, for operating the plant.[36]

France

Economic and Environmental Statistics[37]

Table 4-8 presents a summary of the French environmental system. This section of Chapter 4 presents a review of the French water and wastewater system and an analysis of some of the major private companies involved in this field.

Table 4-8. French Environmental System

Area	212,934 square miles
Population	56,965,000
GDP	$1,167,749,000,000 (4th Globally)
Population served by wastewater treatment plants	52%
Urban Waste	18,700,000
Hazardous Waste	3,306,000
Population Served by Private Water Companies	43,000,000
Percent Total	78%
Two Main Private Investment Formats	
- Concessions	
- Leasing ("*affermage*")	

Water Services Structure

In France, approximately 78 percent of water services are provided by the private sector. Private companies in France operate under four basic types of arrangements, which depend on the individual district or municipal contract.

- Concession—A private company builds and finances a distribution network, which it then operates. The rates are negotiated with the relevant public authority. Escalation or indexation clauses are written into most contracts. The distribution company is responsible for O&M and specified construction extensions during the contract tenure. Concessions run from twenty to thirty years. At the end of the contract, the water facility reverts back to the public authority.
- Franchise ("*Affermage*")—In this case, the facility is initially financed by the private operator who in turn is paid by the local authority to run the plant. O&M costs and agreed-on capital improvements are made by the private company.
- Management ("*Gerance*")—Under this arrangement, the public authority appoints the private company to operate and maintain the network. The public authority maintains ownership of the facility. Payment to the private operator is based on volume, number of hook-ups, and work performed.

- Operating Contract ("*Regie interessé*")—The private operator makes no financial contribution to construction, extension or renovation. Payment from the relevant authority varies according to volume and plant productivity.

The theoretical differences blur in practice. For example, with the two main methods of concessions and leasing (*affermage*), the private contractor is in charge of the day-to-day functions of the facility. In France the private operator is rarely the owner of the water system, in contrast to the UK and the U.S.

Market Share

Current domestic market share for water distribution in France is:

- Municipalities 25%
- Sault Cise 7%
- Suez Lyonnaise des Eaux 25%
- Generale des Eaux 43%

Current domestic market share for wastewater treatment in France is:

- Municipalities 59%
- Sault Cise 5%
- Suez Lyonnaise des Eaux 11%
- Generale des Eaux 25%

Flag Fall—Initiation Fee

Concessionaire rights are obtained in France by payment to the local authority for a right-to-operate permit. The initiation fees paid by General des Eaux and Suez Lyonnaise des Eaux for new acquisitions, were, at 5.5 Francs/Dollar:

Table 4-9. Initiation Fees

$ m	1990	1991	1992	1993	1994
General des Eaux	138	152	254	146	45
Suez Lyonnaise des Eaux	128	196	266	200	236

In 1995, this practice was abolished by statute (the "*Loi Bernier*"), in order to decrease the incentive for additional privatization without competitive bidding. It was thought that the "flag fall" scheme grandfathered in existing relationships and was anti-competitive.[38] Public tender offers are now obligatory for all increases over 5 percent and the duration of contracts has been reduced to twenty years. The French system is decentralized, unlike the OFWAT in the United Kingdom. The U.S. water/wastewater system, as noted above is decentralized and is mainly concerned with rate-making. U.S. investor-owned utilities are not subject to renegotiation of contract terms, but under certain egregious conditions an investor-owned utility may be condemned (de-privatized).

The Hong Kong Shanghai Bank/James Capel Europe's *Utilities Report* notes, in regard to rate changes:

> Private operators have lost popularity as public perception has become swayed by the seemingly incontrovertible evidence that customers supplied via private operators pay more than those supplied

Table 4-13 quantifies the earnings of the two largest French water companies that are from domestic sales of water. All numbers are expressed in French francs.

Table 4-13. Water Distribution Domestic French Earnings Estimates 1994-2000 (inside of France)

FFm	1994	1995	1996	1997	1998	1999	2000
General des Eaux							
Turnover	23807	25320	26820	28390	30040	31760	33560
Cash Flow	2760	2800	2870	2940	3015	3090	3170
Net profit	**901**	**970**	**940**	**970**	**1000**	**1050**	**1100**
Suez Lyonnaise des Eaux (in France)							
Turnover	12144	12675	13300	13930	14575	15230	15900
Cash Flow	1545	1620	1700	1785	1875	1970	2070
Net profit	**266**	**300**	**350**	**390**	**450**	**500**	**550**

Table 4-14 summarizes the total revenues, foreign and domestic, by both General des Eaux and Suez Lyonnaise des Eaux. These numbers are expressed in $USD at a 5.5 franc per USD exchange rate. However, the average exchange rate for each year is shown on this table along with the exchange rate dispersion factor emanating from the static 5.5FF/USD$1 used in the calculations. Exchange rate movements are important in conducting international business, but their exact impact, on the margin, in comparing world wide and domestic sales is not known explicitly.

Table 4-14. Total Revenues ($USD)

Foreign and Domestic Revenues—General des Eaux							
$U.S./5.5FF/$USD	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**
General des Eaux							
Turnover	9376	10209	10829	11456	12105	12809	13545
Cash Flow	1122	1164	1209	1246	1285	1329	1376
Net profit	420	453	445	478	496	527	562
Foreign and Domestic Revenues—Suez Lyonnaise des Eaux							
Turnover	5334	5592	6418	6782	7118	7455	7804
Cash Flow	770	812	771	968	1045	1114	1258
Net profit	170	189	291	320	353	377	405
Actual FF/$	5.55206	4.99083	5.02845	5.02845	5.02845	5.02845	5.02845
Factor	1.009465	0.907424	0.914264	0.914264	0.914264	0.914264	0.914264

Table 4-15 aggregates total sales for both major French water companies and compares them with the combined sales of the largest 96 U.S. investor-owned water utilities. Many of the U.S. water companies are subsidiaries of larger holding companies. However, only 15-20 percent of U.S. water services are supplied by investor-owned utilities. On this table, a ratio of total revenues of the two largest French companies to total revenues of the combined 96 largest U.S. investor-owned utilities is presented. This ratio would be lower, however, if non-domestic French sales were excluded. Again, a constant FF/$USD ratio is assumed. However, the annual exchange rates—past and forecast—are presented.

U.S. sales were forecast by extrapolating, from historical observation, U.S. investor owned sales. With increasing privatization, the margin of error in these sales figures could be off by a large factor. Exchange rate variations were assumed based on current economic conditions. However, to guard against error, the 5.5 factor was used for all calculations, with the exchange rate dispersion shown to impute analytical variations.

Table 4-15. Total Revenues Two Largest French Companies to Total Revenues of Largest U.S. Investor-owned Water Utilities

	1994	1995	1996	1997	1998	1999	2000
Revenues/Turnover							
96 Major U.S. Cos.	2,524	2,647	2,777	2,913	3,055	3,205	3,362
Two Major French Cos.	14710	15801	17247	18238	19224	20264	21349
Ratio 2 French/U.S. Agg.	5.827979	5.968263	6.210714	6.261204	6.291687	6.322724	6.350698
Exchange Rate Adj. Ratio	5.773331	6.577152	6.793133	6.848358	6.881699	6.915646	6.946243

Forecast Assumption: France—James Capel Europe: Utilities, Jan. 1996—U.S. Extrapolated Historical Exchange Ratios—DSC—Annual

Table 4-16. International Customer Base Generale des Eaux and Suez Lyonnaise des Eaux

Country	Generale des Eaux	Suez Lyonnaise des Eaux
UK	3	4.2
USA	3.6	1
Spain	2.6	2.2
South America	1	2.5
Australia	2.2	3.1

James Capel Report January 1996

Table 4-17. General des Eaux and Suez Lyonnaise des Eaux UK Involvement

Company	Revenues $USD (m)	Number of Customers	Market Share
Lyonnaise des Eaux	$250	3,000,000	6.00
Northumbrian	$493	3,700,000	7.40
General des Eaux	$254	3,000,000	6.00

($USD 5.5FF/USD)

James Capel Report January 1996

Table 4-18. French Subsidiaries in the U.S.

	Revenues $USD (m)	Number of Customers	Percent Share (%)	Customer Share $USD	Share of Revenue $USD (m)
Suez Lyonnaise Des Eaux					
UWR	$29	2,000,000	26	500,000	$75
JMM	$37	1,500,000	31.5	500,000	$12
General des Eaux					
AWT	$522	3,600,000	42	0	$219
Philadelphia	$108	800,000	15	100,000	$16
Consumers	$93	800,000	20	200,000	$19
Polmetrics	$63	N/A	N/A	N/A	$63
TOTAL	**$852**	**8,700,000**	**100**	**1,300,000**	**$404**

(FF5.5/$USD1)

Rate Increase—Rate Tax

Approximately half of all rates collected in France are forwarded to an environmental entity, *Fonds National d'Adduction d'Eau*, for the preservation of French rivers. In 1994, Generale des Eaux paid 54.2 percent of its collected revenues, while Suez Lyonnaise des Eaux paid 61.4 percent. The EU directive toward higher wastewater standards has significantly impacted the overall rate structure for French water services. Wastewater costs have risen on average over 12 percent a year, while water costs have risen approximately 5 percent a year. "Rate rebellion" surfaces from time to time. The imposition of higher qualitative standards in conjunction with a tax have a dual impact on the rate structure.

Foreign Investments by French Water Companies

The argument could be made that these taxes and higher environmental standards act as an inducement for French companies to seek overseas profit relief. For example, in 1935, when Texas passed the Connally Hot Oil Act on state oil production, U.S. firms did intensify their search for foreign oil, especially in the Arabian Peninsula.

Case Study—Suez Lyonnaise des Eaux Group

Suez Lyonnaise is involved in numerous commercial activities in France and around the world. They include:

- Water Services, Holding Company
- Water Treatment (see Case Study—Degremont)
- Waste Management
- Energy Technologies
- Mortuary Services
- Construction—Public Works
- Road Building
- Property Development
- Concessionary Operations
- Offshore
- Engineering
- Industrial Installation and Maintenance
- Electrical Contracting
- Groupe Dumez

Case Study—Sydney Water, Lyonnaise—Public Private Partnerships—Australian Water Services[41]

In 1993, Sydney Water[42] and Australian Water Services (AWS) signed a contract to build-own-operate (BOO) the Prospect Water filtration plant. This plant, with an initial capacity of 780 mgd (3,000 ml/d),[43] will be one of the largest in the world. The $200 million capital expenditure contract makes AWS responsible for building, owning and operating the Prospect Filtration Plant for 25 years.

The consortium making up AWS comprises P&O Australia and Lend-Lease Corporation of Australia. P&O Australia specializes in maritime transportation and various industrial service activities. Lend-Lease Corporation of Australia performs construction and project management through its subsidiary, Civil and Civic. Also, Lend-Lease is active in the financial services industry via its relationship with MLC Insurance Company and Westpac. Eighty percent of the capital was raised through financial intermediaries and twenty percent was provided by the partners.

Seventeen international groups expressed interest in the project. Seven actually made presentations to Sydney Water. Only five companies were short-listed. Compagnie Generale des Eaux of France and Bechtel/American Water Works Company of the USA were serious contenders.

Case Study—Degremont ("The Group")—Subsidiary of Suez Lyonnaise des Eaux Group[44]
Degremont is an international engineering group specializing in the design, construction and operation of water treatment plants.

Degremont is a subsidiary of the Suez Lyonnaise des Eaux Group. Degremont employs approximately 3,300 people, more than 60 percent of whom work outside of France. Since it was established in 1939, Degremont has had a strong international presence. Today, it has a global network comprising 33 subsidiaries and 17 offices or representatives in over seventy countries. To date, the Group has equipped more than 25,000 facilities in some 65 capital cities. Locations of the most recent projects include Paris, Budapest, Bucharest, Beijing and Buenos Aires. Degremont Group is the world 's largest water treatment group.

Municipal Water
Degremont designs and builds production plants and facilities to treat the wastewater produced by local communities of any size, from the smallest town to the largest city, e.g., Bordeaux in France, Rostock in Germany, Grafham in Britain and Lima in Peru.

Industrial Water
Degremont designs and builds plants to produce process water or to treat the wastewater produced by a wide variety of industrial sectors: petrochemicals, food, pharmaceuticals, paper, etc.

Post-development Services
The Degremont Group also supplies a range of service activities, such as plant operation and an after-sales service covering assistance in plant operation and the sale of spare parts. Degremont is currently operating 40 facilities in France.

Water Conditioning—Chemical
Degremont is among the top European leaders in water conditioning, *i.e.*, the sale and manufacture of chemicals to treat water. Through specialized subsidiaries, Degremont has developed a strong European network and is expanding its business around the world. Degremont has an expertise covering boiler and cooling systems, wastewater, paper indating and process industries.

Research and Development
For more than 55 years research and development studies have been the focus of constant effort. The Group generates 90 percent of sales from its own processes and techniques, a situation that makes it unique in this sector. Maximizing the Group's potential for developing processes and products requires a multi-disciplinary approach to research. This is the function of the Degremont Research Center, which also works in liaison with the Suez Lyonnaise des Eaux Group (the International Center of Water and the Environmental Research) and with several universities in France and other countries.

Sales
In 1994, Degremont sales were $920 million. Sixty percent of sales were generated outside of France. Fifteen percent of sales occurred in Asia, which is Degremont's fastest growing market. Degremont's net profits in 1974 were $27.8 million, up 14.2 percent from the previous year.

[1] Excluding Scotland, where all water systems remain public.

[2] See Small Business Job Protection Act Affects.... At http://www.gt.com/gtonline/constr/fall96e.html. Comments by James Good, CWS, on October 9, 1997 (review of draft document).

[3] "Final IRS Bond Regulations—Open Long-term Window for Service Contracts" by William H. Rapaport, *PW Financing*, February 1997, pp. 1-5.

[4] For example—From Rapaport "As in the above example, City sells for $6 million of cash its wastewater treatment facility that had been financed with $10 million of tax-exempt bonds. The City expects to use the $6 million within two years to build roads and will use any excess money to redeem or defease its bonds. The bonds easily satisfy the change-of-use rules. This remedial action would not be available if the City had instead of selling the facility for cash, taken a note from the purchaser or leased the facility to a private entity."

[5] Rapaport.

[6] See December 18, 1997 Legislative Analysts Office (LAO) report entitled "Understanding Proposition 218." Also Telephone conversation with CPUC—August 1997.

[7] See January 3, 1997 Quick Facts—Summary and Impact of its Provisions. http://www.cbp.org/qhits/qhits/qh970103.html v" See above as to CPUC interpretation. See http://www.wef org/wwwboard/hottopic/messages/291.htm].

[8] There are other outright transfer constraints, as noted in Chapter 1, *et al* including but not limited to IRS treatment of facilities funded with tax exempt bonds and also for those facilities which were built (e.g. wastewater/EPA) with government grants.

[9] *Environmental Business Journal*, June/July 1997, page 6.

[10] *PWFinancing*, January 1997, pp. 24-28.

[11] January 3, 1997—Quick Facts—Summary and Impact of Provisions http://www.cbp.org/qhits/qhhits/qh970103.html and http://www.wef.org/board/hottopic/messages/291.html.

[12] Ibid.

[13] *Competition for City Services: Has the Time Arrived?—Privatization in Illinois Municipalities*, by Robin A. Johnson and Norman Walzer. State of Illinois, Comptroller, Illinois Institute for Rural Affairs, December 1996. In 1966, Brian Browne in "Dieselization of the New South Wales Government Railways" surveyed NSW Labor leaders, found employment and skill downgrading to be a major concern. In addition, he determined that the burden of the change was born unevenly between age categories.

[14] *The New York Times.*

[15] Browne believes that in a fully Coasian world of near zero information and transaction costs (cf. R. Coase, Nobel Prize Laureate—Economics—Theory of the Firm, ***et al***. Founder of the field—Law and Economics), there would exist no basis for such a theory. However, Browne concedes that in such a world the ownership format would be irrelevant. Societal and private wealth maximizing behavior would be coterminous.

[16] Richard Nemee—West Coast editor for Hart's Energy.

[17] *ALP [Australian Labor Party] Taskforce Submission to the Committee of Inquiry into the Sale of Electricity Assets*, p. 8.

[18] Rate-making in the UK is largely by estimation. Only 8% of UK customers are metered.

[19] The *Information Please Almanac*, Compiled by World Resources Institute, (1994), pp. 588-589.

[20] "The evidence of what micro economic reform means in practice: service quality," *Making a Different Future: The Costs of And Alternatives to Micro Economic Reform, the Left's Response*, p. 9.

[21] 2.4 pounds sterling.

[22] See Chapter 2, "State Survey," above.

[23] French Water Utilities, James Capel, January 1996, page 20. See also http://www.hooked.net/users/bb2/water.html and stat1.html and stat2.html (all sites accessible from http://www.hooked.nets/users/bb2/)—Brian Browne 1994-1996.

[24] Not unlike a U.S. rate recovery formula. (Cf. Chapter 3, above.)

[25] A similar approach was used in the U.S., in the 1998 Natural Gas Policy Act (NGPA), whereby certain gas companies were allowed to increase their rates at the rate of inflation (CPI) plus add-on factors.

[26] Alan Smith, Managing Director, Anglian Water, commented on the process, known as K Reviews, in saying that the new price limit of 4 percent (inflation plus 4 percent) would be more difficult to meet.

[27] Much of the statistical information presented regarding the UK attributes was generated from the trade-association Water Services Company. It was available from their website http://www.water-services.co.uk/facts/index.html.

[28] Water Services Facts—http://www.water-services.co.uk/facts/index.html 1997.

[29] April 1996 DSC Data Base exchange rate equal of 0.655320.

[30] Tonnes are metric tons.

[31] "The evidence of what micro economic reform means in practice: service quality," *Making a Different Future: The Costs of And Alternatives to Micro Economic Reform, the Left's Response*, p. 9.

[32] Based on information/Annual Reports/etc. received from Anglian Water—April 1996.

[33] DSC Data Base, April 1996, dollar/pound ratio of 0.655320 used.

[34] Note same exchange rate was used for intra-year calculations—which is spurious and meaningless except that it establishes in UK pounds a working reference point.

[35] Ernst and Young (combined water and wastewater for average U.S. customer). Used exchange rate of dollar/pound of .655320(DSC). Rates of change of rates is correct. U.S. rates for 1993 are estimated on 1994 and 1992, from available data.

[36] Exchange rates used to convert pounds sterling to USD was DSC estimate of average 1995 rate of 0.6356 pounds per USD.

[37] The 1994 *Information Please - Environmental Almanac*—France pp. 558-559.

[38] With all future net incomes discounted in a zero transaction/information cost capital market, entry costs (under a flag-fall scheme) would not necessarily be a barrier to entry. However, capital "lumpiness" does exist in real world debt markets and thus becomes a factor in deterring entry or more open competition.

[39] See 1993/4 work by Brian Browne Workbook Water and Wastewater Privatization—Table 4-2 and 4-3, p. 14.

[40] As predicted by James Capel/Hong Kong Shanghai Bank.

[41] Summarized from the April 1996 Journal of the American Water Works Association—Sydney Water's Public-Private Partnership by Pierre M.J.Alla (Lyonnaise) and David Manzi. This article is found on pages 108-118.

[42] Formerly, the Sydney Water Board.

[43] To be expanded to 1,090 mgd (4,200 ml/d).

[44] This paper was developed from Group—Degremont URL (and links): http://www.degremont.fr/group/group_nf.html.

Chapter 5 Australia's Experience Under the National Competition Policy

Introduction

This chapter compares the U.S. and Australian economic systems as they pertain to regulation of infrastructure assets, with emphasis on water and wastewater. This presentation is intended to explore the institutional similarities and differences between the U.S. and Australia in allowing competitive access to infrastructure assets.

USA/Australia—Some Comparative Notes

In August 1995, Australia passed the Competition Policy Reform Act of 1995 to implement "microeconomic" reforms. Moreover, the Australian Trade Practices Act (1974) was amended to allow "...third party access to nationally significant essential facilities." This legislative package, in tandem with concomitant state legislation, comprises the National Competition Policy (NCP), which has significant implications for ownership and operation of Australia's infrastructure assets.

The resulting changes in ownership and operational responsibilities for supplying and distributing Australia's water and wastewater services are already underway. Several of these changes are noted in the text of this chapter. However, the most significant change that has taken place is the ongoing implementation of a national policy, backed by legislation and intergovernmental agreements[1], designed to improve economic efficiency (e.g., "microeconomic reforms[2]").

To ensure national adherence to the NCP, an Australian Competition and Consumer Commission (ACCC) was established with enforcement powers. An incentive payment scheme from the federal government to the states was established to encourage and monitor implementation of the NCP. The National Competition Council (NCC) was given oversight powers to evaluate whether or not the various states and territories were complying with the three underpinning tenets of the NCP and should be awarded the scheduled "Tranche Issues" (incentive payments).[3]

In the U.S., there is existing anti-trust legislation. However, overall, there exists no centralized anti-competitive enforcement group analogous to the ACCC[4] to push access to the infrastructure and to ensure that government activities are corporatized and made competitive on a level playing field ("neutral"). In the U.S. water industries, the only national policy announcement regarding privatization was President Bush's 1992 Executive Order Number 12803, aimed at encouraging and facilitating private investment in EPA-funded municipal wastewater treatment facilities.

As highlighted in the state-by-state survey presented in Chapter 2 of this report, there are nearly as many water and wastewater policies in the U.S. as there are jurisdictional districts. In the federal array of agencies[5] only the EPA (Environmental Protection Agency) and the FERC (Federal Energy Regulatory Commission) really address issues pertaining specifically to infrastructure. These agencies exist to regulate economic activity, not to promote it, as does the ACCC. However, the ACCC does have some antitrust function that mirrors those of the U.S. regulatory agency jurisdictions. The big difference appears to be that the ACCC can restrict government anticompetitive activity, an avenue not as apparently open to U.S. agencies vested with regulating economic activity.

The "invisible hand" guiding U.S. electric restructuring, especially in California, has been greatly aided by the presence of the Federal Energy Regulatory Commission (FERC). The CPUC[6] required that Pacific Gas & Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company

file proposals with FERC, in order to establish both an independent system operator (ISO) and a power exchange (PX), that will soon oversee the operation of the state's entire high voltage electricity transmission system.[7]

The important role of having a centralized agency such as the FERC involved in California's electric restructuring is noted by the CPUC[8]:

> One potential impediment to the timely implementation of Electric Restructuring comes from the unprecedented need to fund work that must be engaged in now in order for the yet uncreated ISO and PX to be able to begin operations by January 1, 1998. Although many of these needs can be financed and funded through FERC set rates after the ISO and PX exist and are providing service, during the time preceding the ISO and PX operation and rate setting, no mechanism exists for developmental work. This work raises novel issues of federal rate-making coordination that require speedy resolution. This ruling begins by outlining the key objectives of any solution the Commission may authorize, and ends by requesting the three investor owned utilities named above (IOUs) file for very specifically tailored rate treatment with a specific procedural scheme for review.[9]

In contrast to the Australian water industry, the U.S. water industry has no such centralized rate-making and oversight body to help create a national policy of privatization. Moreover, in Australia, all existing water (utility) entities (assets) were initially owned by the government. In the U.S., there is a mixture of public and private entities. A sale of public entities could leave private entities at a comparative disadvantage. Under the U.S. revenue requirements concept of rate-making, many U.S. utilities would have stranded costs associated with approved regulatory expenditures.

California is wrestling with an analogous situation in setting competition transmission costs (CTC) to help the electric IOUs recover prior Commission approved (mandated) investments in what will now be non-competitive assets (e.g., PG&E Diablo Canyon Power Plant).

Australia

In 1991, the Australian federal, state, and territorial governments agreed to examine economy-wide restructuring that could make the Australian economy more competitive. In 1992, Professor Fred Hilmer of the Australian School of Management, chaired a committee to examine "microeconomic reforms." This committee submitted a final report in August, 1993.

Immediate History Prior to Adoption of NCP

Extensive negotiations between the various Australian governments ensued regarding the recommendations of the Hilmer report.[10] These negotiations were complemented by considerable public input, resulting in the August passage of Competition Policy Reform Act 1995.

Main Elements of Reform

The reform principles underlying the new 1995 policy included:

- **Competitive neutrality:** a business should not be subjected to competitive advantage or disadvantage by virtue of government ownership.
- **Legislative review:** government will review and, where appropriate, reform legislation with anti-competitive elements.
- **Prices oversight:** government will establish independent sources of prices oversight for government owned business.

- **Structural reform of public monopolies:** Prior to introducing competition, government will review issues such as regulation, separation of competitive and monopolistic elements, and community service obligations.

In application, these principles resulted in the adoption of the following three main elements of reform:

- The Trade Practices Act was amended so that anti-competitive behavior, as delineated in Part IV, could be applied to all businesses in Australia. This nationwide anti-competitive policy is made possible through concurrent adoption of State and Territory legislation that universally prohibits anti-competitive actions by any entity—private or public. In Australian terms, government protection is called the "shield of the crown," which was one of the processes the NCP was designed to remove.
- A new Part IIIA was added to the Trade Practices Act establishing a mode for accessing certain essential infrastructure facilities. For utility infrastructure assets, this Part is the lynchpin in the open access chain.
- The Australian Competition and Consumer Commission (ACCC) was established to administer all legislation regulating competition, including the Trade Practices Act of 1974 and the Prices Surveillance Act of 1974, as well as the 1995 reform legislation.

Regulatory Oversight

The Commission (ACCC) administers both the Trade Practices Act of 1974 and the Prices Surveillance Act of 1983. In addition, the ACCC, under the national competition policy reform program (NCP), is the watchdog agency against anti-competitive practices. The broad pro-competitive sweep of the 1995 legislation was intended to include nearly every business in Australia.

In broad terms, the Act covers anti-competitive and unfair market practices, mergers or acquisitions of companies, product safety/liability and third party access to facilities of national significance. The Commission is the only national agency dealing generally with competition matters and the only agency with responsibility for enforcement of the Trade Practices Act, as well as the associated State/Territory application legislation.

The Commission (ACCC) is part of the Australian Department of the Treasury. The Treasurer is the national Minister responsible for policing restrictive trade practices and monitoring prices. For consumer affairs, the responsible Minister is the Minister for Small Business and Consumer Affairs. The Commission's consumer protection work complements that of State and Territory consumer affairs agencies.

The Trade Practices Act

The objective of the Trade Practices Act, as set out in the legislation, is to enhance the welfare of Australians through the promotion of competition and fair-trading, and by provision for consumer protection. The Act consists of five major parts:

- Part IIIA—third party access to nationally significant essential facilities.
- Part IV—anti-competitive practices.
- Part IVA—unconscionable conduct.
- Part V—unfair practices; product safety and information; conditions and warranties.
- Part VA—product liability.

In practice, under these provisions, the owner of a nationally significant asset, such as a major dam or pipeline, can be required to allow negotiated access by a third party. An arbitration process is available if the parties are unable to come to an agreement on the cost of access.

Prices Surveillance Act

Under the Prices Surveillance Act of 1983, the Commission has three pricing functions: (1) to vet the proposed price increases of any business organization placed under price surveillance; (2) to hold inquiries into pricing practices and related matters and to report its findings to the responsible Commonwealth Minister; and (3) to monitor prices, costs and profits of an industry or business and to report the results to the Minister.

Legislative and Intergovernmental Agreements

Economist Pat Ranald summarizes the Legislation and Intergovernmental Agreements as follows:[11]

- **"Extension of the Trade Practices Act (TPA) to apply competition to state owned businesses.** State owned businesses are no longer exempt from the provision of the TPA, and intergovernmental principles outline an agreed framework for the application of legislation and competition principles, although governments have considerable discretion in implementing these (Competition Policy Reform Bill, Intergovernmental Agreements 1995:14-16).
- **"Structural Reform of Public Monopolies.** Each government may determine its own agenda within an agreed set of principles which could include that all public monopolies should be structured as commercial operations and subject to competition. Governments should conduct reviews before introduction of competition or privatization, but (contrary to Hilmer recommendations) they do not have to be public. Commercial functions should also be separated non-commercial functions. Any regulatory functions should be separated from non-commercial functions and established as independent entities. Community service obligations should be defined and appropriate means of funding determined (Competition Policy Reform Bill, Intergovernmental Agreement 1995:15-16).
- **"Competitive Neutrality: no net advantages from public ownership**. Competitive neutrality principles should be applied to all public business activities, so they operate on the same basis as private competitors. Again, governments can determine their own agendas. This applies to areas like payment of taxes and charges, and conformity with legislative requirements. The agreement does not formally oblige governments to end cross subsidies; however, these cross subsidies run counter to the competitive neutrality principles which include full cost pricing.

  "Following lobbying, the agreement was amended to clarify that public bodies can conform to government policy in areas like EEO, OH&S, employment conditions, environmental standards or other areas where policy might mean higher standards than the private sector. However, there is no protection of employment conditions for employees transferred to the private sector (Competition Policy Reform Bill, Intergovernmental Agreement 1995:14-15).
- **"Application to business activities which are part of other government agencies.** Competitive principles do not apply to the "non-business, non-profit activities" of public agencies, but can apply "where appropriate" to any "significant" commercial activity by any other government agency, e.g. sale of publications, school canteens or hospital pharmacies sector (Competition Policy Reform Bill, Intergovernmental Agreement 1995:14).
- **"Access to public infrastructure in cases of natural monopoly, where it cannot be duplicated.** The agreement establishes rules of access to infrastructure of national significance which cannot be feasibly duplicated. Competitors may negotiate access to publicly owned essential infrastructure and have access to arbitration if parties cannot agree on terms. In theory, this would apply to privately owned essential infrastructure. Access rules are intended to be national policy, but can vary within

agreed guidelines at state level (Competition Policy Reform Bill, Intergovernmental Agreement 1995:17-18).

- **"Prices surveillance monitoring.** The legislation provides for a more nationally consistent system of price monitoring through application of the Commonwealth Prices Surveillance powers to state bodies or through the establishment of state pricing authorities operating on consistent principles sector (Competition Policy Reform Bill, Intergovernmental Agreement 1995:12-13).
- **"Legislative Review in support of competition principles.** Reviews of all Commonwealth and State legislation are to be conducted against the criterion of whether they can restrict competition. Restrictions of competition should only be permitted if it can be demonstrated that benefits outweigh costs and the objectives cannot be achieved by other means (Competition Policy Reform Bill, Intergovernmental Agreement 1995:16-17).
- **"Establishment of National Competition Council and Australian Competition Committee.** These are the bodies that will administer the legislation and agreements. Initially those appointed to these bodies were not required to have consumer or public interest expertise. As a result, lobbying appointments will now include one person on each body with consumer rights expertise, but following agreement of all governments. These bodies will incorporate the current functions of the Trade Practices Commission and of the Prices Surveillance Authority (PSA) in surveillance and monitoring prices of national companies in both public and private sectors.
- **"Compensation to be paid from Commonwealth to states in return for implementation of the policy.** The states argued that they would suffer revenue losses from GBEs (government business enterprises) as a result of the policy, and that the Commonwealth would gain revenues. Payments were required to secure the intergovernmental agreements. Payments of $A4.3 billion are to be made in 1997-1998, $A585 million and $A2.6 billion in 2000-2 for specific stages of policy implementation.

Ongoing Privatization in Australia's Water and Wastewater Sectors

The current state of Australian water and wastewater privatization, as of July 1997, is partially summarized below[12]. Other interesting developments have also occurred in Australia. For example, Sydney Water Corporation (SWC)[13] has formed its own privatized (corporatized) technology subsidiary, Australian Water Technologies (AWT). This non-regulated offshoot of SWC is traded publicly and, interestingly enough, in the context of public-private partnerships, AWT advertises "[i]t gives the market the best of both worlds—private sector acumen and government ownership."[14]

As in the U.S., Australian companies (e.g., Australian Water Services) are forming business liaisons with successful French (e.g., Suez Lyonnaise Des Eaux and Compagne Generale des Eaux) and British (e.g., United Utilities/North West Water) companies to ensure technical expertise, capitalization, and market entry. American Water Services Company teamed with Bechtel to bid, albeit unsuccessfully, on the lucrative Sydney wastewater contract. U.S. water companies have not replicated the success of their electric industry counterparts in Australia's emerging competitive environment.

Table 5-1. Partial List of Privatized Water and Wastewater Projects in Australia[15] BOO/Ts[16]

Project	Company
Water	
PWFP (Prospect Water Filtration Plant)	AWS
Yan Yean (Melbourne)	NWW/Transfield
McArthur (Sydney)	NWW/Transfield
Illawara (Sydney)	CGE/Kimbills
Wononora (Sydney)	CGE/Kimbills
Wastewater	
Noosa	AWS
Concessions	
Murray River Wholesalers	NWW

Comment

The Australian practice of using the Council of Australian Governments (COAG) to arrange the necessary meetings to hammer out agreements that would be constitutional is unknown in the U.S. At first blush, it appears to be another form of federalism.[17] However, upon analyzing the above NCP implementation and, in particular, Section C. 6—Legislative and Intergovernmental Agreements, it appears that considerable latitude has been given the various Australian states for implementation policies. While federal payments might be an incentive, it appears that this market process has imploded back into the political arena. It appears too early to tell how effectively these "microeconomic reforms" will work. Certainly, the New South Wales government, an Australian Labor Party (ALP) Administration, is having considerable difficulty in convincing its more leftist members that sale of the state's electricity assets will be in the best interest of the state.

As noted in other parts of this study, many members of the party fear that privatization will deprive the state of valuable revenues, be done below market value[18] and leave the state extremely vulnerable to the pre-emptive taxing powers of the Commonwealth. Unlike the U.S., where virtually no taxing base is preempted by the federal government, the Australian states must live with a narrow base and depend on Loan Council grants.[19]

---

[1] The National Competition Policy was derivative from the Hilmer Report of 1993—The main policy principles of the Hilmer report are:

- No participant in the market should be able to engage in anti-competitive conduct against the public interests.
- As far as possible, universal and uniformly applied rules of market conduct should apply to all participants regardless of the form of ownership.
- Conduct with anti-competitive potential said to be in the public interest should be assessed by an appropriate transparent assessment process, with provisions for review, to demonstrate the nature and incident of public costs and benefits claimed.
- Any change in the coverage or nature of competition policy should be consistent with, and support, the general thrust of reforms.
- To develop an open, integrated domestic market for goods and services by removing unnecessary barriers to trade and competition.
- In recognition of the increasing national operation of markets, to reduce the complexity and administrative duplication.

(Hilmer, 1993: xviii-xix as delineated in National Competition Policy, Pat Renald, Journal of Australian Political Economy, No. 36, December 1995.

The main body for obtaining nationwide consensus on issues of common legislative concern in Australia is the Council of Australian Government (COAG). COAG's importance surfaced when the Australian High Court rejected unilateral federal legislation establishing a Securities Exchange Commission (Denis Rice, Howard Rice, Attorneys at Law 1997).

[2] Many economists—see Browne in Dieselization of the New South Wales Government Railways 1955-1960 (UCLA), and in Experience Under the Natural Gas Policy Act 1978 (http://www.hooked.net/users/bb2)—believe that dichotomizing economics into macro and micro is akin to saying that orthodox theory is not consistent over all levels of aggregation. Browne believes that such a division could lead to inconsistent policy recommendations.

[3] National Competition Council: Assessment of State and Territory Progress with Implementing National Competition Policy and Related Reforms (June 30, 1997), passim. The incentive payment scheme for NCP implementation is rooted in the Australian taxing situation. As noted by Daniel Nevin, Western Australian Water, on June 16, 1997 (Email correspondence) "The Commonwealth Government collects income and company taxes, while the States have only limited taxing powers."

[4] The NCP has led to an entire universe of acronyms:

Abbreviations and Definitions

ACCC	Australian Competition and Consumer Commission
ACTEW	ACTEW Corporation, the government owned electricity and water distribution corporation in ACT (Australian Capital Territory)
ACTION	The Government owned public transport authority in the ACT
ACTTAB	ACT Totalizer Agency Board, a Government owned corporation
AGL	Australian Gas Light Company
ANZMEC	Australian and New Zealand Minerals and Energy Council
COAG	Council of Australian Governments
CSO	Community Service Obligation
DBNGP	Dampier to Bunbury Natural Gas Pipeline in Western Australia (WA)
ETSA	Electricity Transmission South Australia, the Government owned power distribution and retail corporation in South Australia.
FPF	Financial Management Framework in New South Wales (NSW)
GASCOR	Government owned gas distribution and retail corporation in Victoria trading as Gas and Fuel
GBD	Government Business Division, government business enterprise or activity under the Northern Territory *Financial Management Act 1995*
GBE	Government Business Enterprise
GOC	Government Owned Corporation, as under the Government Owned Corporations Act in Queensland
GPOC	Government Prices Oversight Commission in Tasmania
GRIC	Gas Reform Implementation Group
GTC	Gas Transmission Corporation in Victoria
GTSO	Gas Transmission System Operator, wholesale gas market manager in Victoria
HEC	Hydro-electric Corporation in Tasmania
IPART	Independent Prices and regulatory Tribunal in New South Wales
MCRT	Ministerial Council on Road Transport
MNC	Multiple Network Corporation
NCP	National Competition Policy
NECA	National Electricity Code Administrator
NEM	National Energy Market
NEM!	National Energy Market phase 1
NEM2	National Electricity Market phase 2
NEMMCO	National Electricity Market management Company
NGMC	National Grid Council
NRTC	National Road Transport Commission
OFM	Office of Financial Management, an element of the ACT's Chief Minister's Department
PASA	Pipeline Authority of South Australia

PAWA	Power and Water Authority of Northern Territory
PFE	Public Financial Enterprise, a classification of government budget activity by the Australian Bureau of Statistics for the purpose of preparing the government financial statistics
PGT	Pacific Gas Transmission
QCA	Queensland Competition Authority
QLDTAB	Queensland Totalizer Agency Board
QMI	Queensland Manufacturing Institute
QR	Queensland Rail
QTSC	Queensland Transmission and Supply Corporation
RTCS	Road Transport Construction Service
SAGASCO	South Australian Gas Corporation (now defunct)
ASGC	South Australian Generation Corporation
SECV	State Electricity Commission of Victoria
SECWA	State Electricity Commission of Western Australia
SMA	Statutory Marketing Arrangements
TER	Tax Equivalent Regime
VPX	Victoria Power Exchange
WAMA	Western Australia Municipal Association

[5] Some of the important U.S. regulatory agencies and their responsibilities are shown below.

Agency	Primary Responsibility
Interstate Commerce Commission (1887)	Interstate surface transportation
Antitrust Division (1903)	Antitrust
Federal Trade Commission (1914)	Antitrust and consumer protection
Food and Drug Administration	Food, drugs, and cosmetics
Federal Communication Commission (1934)	Interstate communications
Civil Aeronautics Board (1938)	Civil aviation
Federal Railroad Administration (1966)	Railroad safety
Federal Aviation Administration (1967)	Airline safety
Consumer Product Safety Commission (1970)	Consumer products
Environmental Protection Agency (1970)	Physical environment
National Highway Traffic Safety Administration (1970)	Auto safety, fuel economy, and emission
Occupational Safety and health Administration (1970)	Worker safety and health
Nuclear Regulatory Commission (1975)	Civilian nuclear reactors
Federal Energy Regulatory Commission (1977)	Oil, natural gas, and wholesale electric power

[6] D.95-12-063 (as modified by D. 96-01-009) California Public Utility Commission (CPUC).

[7] D.95-12-063, pp. 218-219.

[8] http://www.cpuc.ca.gov/electric_restructuring/iso_px/acr_iso.html.

[9] http://www.cpuc.ca.gov/electric_restructuring/iso_px/acr_iso.html—Daniel W. Fessler, Coordinating Commissioner, May 1, 1996.

[10] The Hilmer report recommendations are as follows:

- No participant in the market should be able to engage in anticompetitive conduct against the public interest.
- As far as possible, universal and uniformly applied rules of market conduct should apply to all market participants regardless of the form of business ownership.
- Conduct with anti-competitive potential said to be in the public interest should be assessed by an appropriate transparent assessment process, with provision for review, to demonstrate the nature and incidence of public costs and benefits claimed.
- Any changes in the coverage or nature of competition policy should be consistent with, and support, the general thrust of reforms.
- To develop an open, integrated domestic market for goods and services by removing unnecessary barriers to trade and competition.

- In recognition of the increasingly national operation of markets, to reduce complexity and administrative duplication.

Ranald, Pat: "National Competition of Policy," *Journal of Australian Political Economy*, No. 36, December 1995, pp. 2-3.

[11] "National Competition Policy," December 1995, *Journal of Australian Political Economy*, pp. 1-23.

[12] For a definitive assessment of Australian progress toward implementing the NCP, see "Assessment of State and Territory Progress with Implementing National Competition and Related Reforms," National Competition Council, June 30, 1997. This document is a detailed work on the history, the present, and in some ways the future of the NCP. It is hoped that in the follow-up to this work that more detailed information will be culled from the aforementioned "Assessment."

[13] Formerly the Sydney Water Board—a new South Wales Government entity.

[14] http://www.tcol.co.uk/orgs/awt/awt.html.

[15] Approximately six additional contracts are anticipated by next years.

[16] Mr. David Michel, Australian Water Services, July 1997.

[17] It appears to be a superimposed layer of another government entity to ensure constitutional approval, a government to anticipate High Court reaction.

[18] According to Les Carr, Senior Communications Officer, Public Service Association of New South Wales, in an email to the author dated 23 September 1997: "There never was an Arthur Andersen Report. The figure of $22 billion comes from a Percy Allen letter to NSW (New South Wales) Treasurer, Michael Egan urging him to sell the electricity agencies now. Percy Allen works for Andersen. He is a former Secretary (i.e. Departmental CEO) of NSW Treasury."

[19] See Daniel Nevin, Western Australian Water, in email of 16 June 1997: "The Commonwealth Government has agreed to make payments to States which implement competition policy reforms. The Commonwealth Government collects income and company taxes, while the States have only limited taxing powers."

Chapter 6 Conclusion

Short-term

In the U.S., there will be an increase in operations and maintenance (O&M) outsourcing contracts. Counter-balancing this phenomenon, public sector entities will become more competitive. There will be negligible ownership or asset transfers. Public interest and the fragmented political process, in which the U.S. water system operates, will effectively curtail ownership transfers.

The market forces, as reflected in outsourcing and an increased efficiency of publicly-owned facilities, will drive the U.S. water industry toward a greater level of cost effectiveness. The end result will be for a significantly increased public-private sharing of production, transmission and distribution functions. Ownership *per se* is irrelevant in a model where resource use optimization is being pursued.

A public-private convergence model, as described above, and one which is evolving in the U.S. will serve a magnet for capital investments. Electric utilities, financial institutions, and a wide array of investors will find U.S. water an increasingly fertile field for investment.

Long-term

It is unlikely that the U.S. will ever privatize along the UK lines of 1989. However, over time, the process of public-private risk and management sharing will blur. The result will be quite indistinguishable from a private sector model with public ownership. This process could be helped by a tax code with additional incentives, further federal and state budgetary constraints, and the development of a national policy that would implement privatization.

Industrial & Agricultural Business Area

Agricultural Technology Alliance
43158 Parkers Ridge Drive
Leesburg, VA 20176

Center for Electronics Manufacturing
2706 Montopolis Drive
Austin, TX 78741-6499

Center for Materials Fabrication
929 Harrison Avenue, Suite 201
Columbus, OH 43215

Center for Materials Production
700 Technology Drive, Suite 3210
P.O. Box 2950, CMRI
Pittsburgh, PA 15230-2950

Chemicals, Petroleum, and Natural Gas Center
1800 St. James Place, Suite 303
Houston, TX 77056

Community Environmental Center
Municipal Water & Wastewater
Washington University
Campus Box 1150
Cupples II, Room 11
One Brookings Drive
St. Louis, MO 63130-4899

Fiber, Apparel, Carpet & Textile Office
NCSU College of Textiles
Partners I Bldg, Suite 3100
1017 Main Campus Drive
Raleigh, NC 27606

Food Technology Alliance Office
1700 North Westwood Avenue, Suite 2286
Toledo, OH 43607

Food Technology Alliance Office
1390 Eckles Avenue, Suite 219
St. Paul, MN 55108

Foundry Office
2340 South Arlington Heights Road
Arlington Heights, IL 60005-4509

Healthcare Initiative
50 Main Street, Suite 1260
White Plains, NY 10606

Mining Office
2281 Augusta Drive
P.O. Box 2740
Evergreen, CO 80437

Pulp, Paper & Forest Products Office
Institute of Paper, Science and Technology
500 Tenth Street NW
Atlanta, GA 30318

Printed with soya inks on recycled paper (50% recycled fiber, including 10% postconsumer waste) in the United States of America.

About EPRI

Electricity is increasingly recognized as a key to societal progress throughout the world, driving economic prosperity and improving the quality of life. EPRI delivers the science and technology to make the generation, delivery, and use of electricity affordable, efficient, and environmentally sound.

EPRI manages a collaborative research and development program on behalf of the electricity industry, its customers, and society. Created in 1973, EPRI now has more than 700 members worldwide and an annual budget of $500 million. Membership is open to qualifying organizations involved in power generation, power delivery, energy sales, or related services.

EPRI. *POWERING PROGRESS*

EPRI
3412 Hillview Avenue
P.O. Box 10412
Palo Alto, CA 94303
U.S.A.

About the Industrial & Agricultural Business Area

Responding to the needs of EPRI members and their customers, activities focus on being the Business Partner of our members by delivering products and services that provide competitive advantages in the marketplace.

- Supporting Customer Retention and Competitiveness
- Growing Electricity Market Share
- Offering New Business Opportunities
- Increasing Customer Value of Electricity
- Providing Customers with Energy Solutions

EPRI Customer Service
1-800-313-3774
E-mail: ASKEPRI@epri.com
Fax: 972-556-6521