

Chapter 1

An Overview of Private Sector Participation in the Global and US Water and Wastewater Sector

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1. INTRODUCTION: RISKS OVERSHADOW COMMERCIAL OPPORTUNITIES

The global water and wastewater sector has the distinction of being the infrastructure sector with greatest promise—steady long-term cash flows from what many describe as the “last monopoly utility business”—and the sector that has shown the least amount of progress in terms of attracting

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private investment. Year after year, figures are released indicating that both developing and developed countries require tremendous capital investment to meet the basic needs of their populations. Estimates from the World Bank put the capital “needs” for developing countries at \$60 billion over the next ten years. In the United States, the Environmental Protection Agency (EPA) estimates that \$275 billion is “needed” for investment in water and wastewater services over the next 20 years. And in the European Community, the figure is \$220 billion.

Yet despite the tremendous needs, the amount of private capital flowing to the sector has been limited, especially when compared to other infrastructure sectors. As indicated in Figure 1.1, investment in water and sanitation has trailed transport, energy, and telecom investment throughout the 1990s during the emerging markets infrastructure revolution. Of the nearly \$580 billion in total infrastructure investment directed to these sectors during this time, water and wastewater represented only \$30 billion, or about 5%.

Also noteworthy is the water industry’s slow metamorphosis to introduce competition and deregulate potential competitive segments of the sector’s value chain, changes already made in the gas, electric, and telecom industries. As a result of this restructuring, consumers in these industries are experiencing significant benefits in terms of lower prices, a broader array of services, and greater innovation.*

Why does the flow of private capital to the water and wastewater sector worldwide appear constrained relative to the tremendous needs for investment in new facilities, rehabilitation of leaking pipes, and system upgrades? The following five characteristics of the sector and their associated risks are a helpful starting place to answering this question:

- *Significant Interaction with Government.* Health, environmental, and monopoly concerns have meant that governments, often at multiple levels, have tended to be heavily involved in regulating water and wastewater services. This level of interaction with the government exposes the sector to significant regulatory and political uncertainty and risk.

*See the Crandall and Ellig study (1997), which provides estimates of the annual value of consumer benefits due to deregulation for the gas, long-distance telecom, airlines, trucking, and railroad industries.

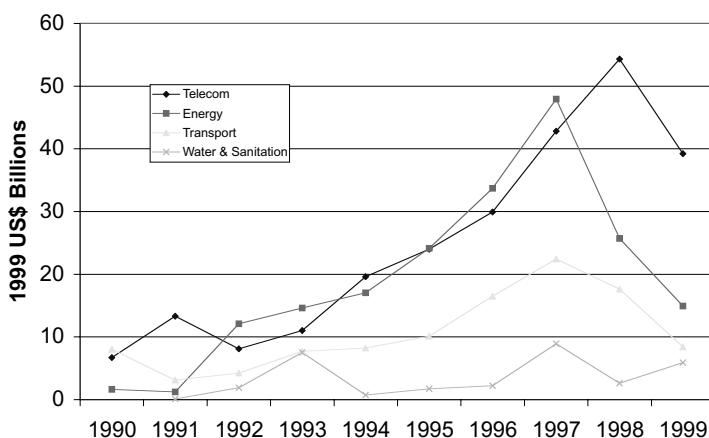


Figure 1.1 Investment in developing country infrastructure with private participation. *Source:* Izaguirre and Rao, 2000.

- *Local and Small Project Size.* Water supply and wastewater systems tend to be small and local, given the relatively low value of the service and high capital cost required for long-distance transmission. Consequently, financiers are relatively less attracted to the sector's fragmented structure, which, compared to gas, electric, and telecom, severely limits its ability to generate efficiencies from regional integration.
- *Political Risks.* As sunk, highly specific, and non-redeployable investments, private investors, especially in developing countries with limited independent regulatory and judicial frameworks, are often exposed to government opportunism and expropriation. These forms of political as well as regulatory risks are costly and difficult to cover.
- *Currency Risk.* Water and wastewater projects in countries with less developed capital markets depend on foreign capital for investment. The mismatch between the foreign currency and the domestic currency that consumers use to pay their bills means that international lenders are exposed to the risk that they may not receive back the full value of their investment because of fluctuations in the domestic currency.
- *Inadequate Tariffs.* Given the high level of capital investment and the history of government-subsidized services, full-cost pricing of

water and wastewater service has yet to take hold fully in many markets, even in the United States. The public perception in many countries is that water is “free,” which means that it remains broadly underpriced, which discourages private investment, or forces investors to rely on subsidies to obtain sufficiently attractive rates of return on invested capital.

Taken together, these unique features of the water industry indicate that, despite its potentially attractive cash profile in terms of offering investors steady long-term revenue streams, the sector as it is presently structured and regulated has a relatively unattractive risk profile. Indeed, to adequately address these risks—especially political and regulatory risks—most privately financed water and wastewater projects in developing countries have tended to require some form of political risk insurance or guarantee, and/or the participation of multilateral organizations, (such as the World Bank and the Inter-American Development Bank (Haarmeyer and Mody, 1997). Absent fundamental restructuring to better separate risks and open up the sector to more competition and more accurate market pricing, the monopoly integrated structure of the industry is likely to continue to discourage private capital flows, and thus restrict the improvements and innovations that it tends to bring.

As indicated in the following summaries on international and US developments, over the past several years there have been a number of noteworthy advances, as well as setbacks, in the water and wastewater sector’s ability to attract private capital and initiative. In some cases, it is clear that the accumulated experience that the public and private sector has in designing workable contracts and organizing competition can successfully overcome noncommercial risks. In the case of the United Kingdom, the combination of significant regulatory pressures, high capital investment needs, and highly transparent capital market participation is encouraging the industry to go beyond its present organizational and financial structure to consider alternatives such as splitting asset ownership from operations and injecting competition into the sector. Taken together, there are substantial lessons to be learned by governments and private participants in how to better mitigate risks and structure new organizations that properly reward investors and, at the same time, provide the incentive to increase the efficiency and affordability of water and wastewater services.

2. MAJOR INTERNATIONAL DEVELOPMENTS: THE TREND IN PRIVATE PARTICIPATION EXPANDS TO NEW COUNTRIES

2.1 England and Wales

More than a decade after the United Kingdom privatized its water sector by floating 10 English and Welsh water and sewerage companies, its experiment remains controversial as ever. In response to tight price controls and a push to inject competition into the sector, water companies and regulators are fundamentally rethinking the organization of their industry.

In the early years postprivatization, the high returns available through a combination of pricing and efficiencies enabled a number of UK private water companies to build up substantial nonregulated international businesses that today are successfully competing and spreading technology and management practices around the world. The international water business is attractive, both from the perspective of the size of the business opportunities it represents and from the fact that it allows for more growth than the domestic market.

By nearly every measure, there have been substantial improvements in water and wastewater quality, making the United Kingdom one of the leaders in meeting the European Union (EU) Directives. These improvements have been the result of significant capital investment within the allowed price-cap structure. Since then, however, the Office of Water Services (Ofwat), the industry regulator, has dramatically squeezed prices and returns. In its third price review, which determined prices for 2000–2005, Ofwat stipulated average cuts to consumer bills of 12.4%, driving projected returns down to about cost-of-capital levels. In response, water companies announced cuts in dividends and workforce, and equity investors fled the sector.

A more far-reaching response to regulatory pressures has been for water companies to fundamentally rethink their company's financial and organizational structure. In 2000, Kelda, the renamed holding company for Yorkshire Water, proposed the most novel approach, which involves spinning the water and wastewater assets into a nonprofit mutual company financed completely by debt. Equity investors would be left with Kelda's unregulated business, which would be transformed into a contract operation service company, and thus no longer exposed to undue regulatory risk.

Ofwat objected to the scheme on the grounds that a customer-owned company with a nonprofit structure would provide weak investment incentives and make it difficult for Ofwat to take enforcement actions.

In 2001, Ofwat did give the go-ahead to a similarly structured deal involving Glas Cymru, the renamed Welsh Water. The acquisition of the regulated water company is funded through a \$2.7 billion securitization and, as a result of the new capital structure, the utility's cost of capital fell to just over 4%, compared with 6.5% industry threshold set by the regulator (Metcalfe, 2001). Two key differences in the deals are: 1) there was strong political support in the Welsh Assembly for community ownership of the water business, which serves all of Wales, and 2) Glas Cymru created a company that is legally liable for the nonprofit company's debt, rather than customers holding this obligation. To reduce risks for lenders and provide discipline for efficient operations, two four-year contracts were put out to competition: one for operations and the other for customer billing. While it is not clear that this model can be replicated, it does offer an attractive way of financing assets with heavily regulated revenue streams and fairly predictable capital expenditures, while at the same time injecting competition into operations.

Another innovative approach to restructuring the UK water industry has involved the promotion of cross-boundary competition and common carriage. With an Ofwat-approved "inset appointment," water and sewerage companies are able to compete to supply large customers in each other's territory. Similar to the gas industry practice, common carriage in the water sector requires water companies to make their pipes available to competitors. Although proposed many years earlier, in March 2000, the UK Competition Act 1998 was implemented, which gives Ofwat and the Office of Fair Trading legal powers to remove barriers to competition in the water sector and to promote common carriage. In addition to cost savings and better service to customers, the success of these approaches to advancing competition may also serve to minimize the need for regulation.

2.2 Europe

The integration of the European Union (EU), the significant capital demands to meet EU environmental directives, and liberalization are together increasing the attractiveness of private sector participation in the water and wastewater sector. A recent Standard & Poors (S&P) report expects that more than 250 billion Euros (about US \$220 billion) will be required to meet EU environmental standards across Europe by 2005 (Stan-

dard & Poors, 2001). While the United Kingdom is the only country to privatize its water industry fully, the French and Spanish governments are relatively supportive of private sector participation compared to other European governments.

In France, under long-term contract, about 75% of water distribution, and 45% of wastewater treatment is provided by private companies. In Spain, almost 45% of the water supply is provided by private companies under long-term concession contracts. In Italy, the 1994 Galli Law is the main driver for making the sector more attractive to private investment by facilitating consolidation of the thousands of water utilities. As a result, international private companies, such as Severn Trent of the United Kingdom, have entered the market. In 1999, Portugal awarded its first major water and wastewater concession with a project financing structure. The Santa Maria da Feira Municipality granted Indaqua Feira a 35-year concession to operate and extend the town and outlying districts' water and wastewater systems (Swann, 2000).

The Netherlands and Germany have been less open to private sector participation, claiming, without substantiation, that involvement of private sector will compromise water quality. However, Nuon NV, the Netherlands' largest utility, is pushing for at least partial privatization within the next two years, in order to help fund its global expansion plans in the water and energy sectors. Germany, with a more mixed system than the Netherlands, has made some modest progress in opening up its industry to private investment. In 2000, Berlin sold a 49% stake in Berlin Water to a consortium that included the German energy and industrial conglomerate RWE and Vivendi.

In Eastern Europe, capital needs are significantly greater, as infrastructure is both less developed and less well maintained. An important obstacle for attracting investment is the absence of supportive and comprehensive legal and regulatory frameworks. Nevertheless, the goal of joining the EU is driving countries to raise their environmental standards in line with the EU, and thus look for near-term solutions to modernize their infrastructure. One of the strategies for making the greatest progress has been privatization.

In 1999, the municipality of Sofia in Bulgaria signed a 25-year concession for water and wastewater services with International Water. The concession serves 1.2 million customers and includes investment of \$150 million for upgrade and expansion over 15 years, which is expected to enable the municipality to meet EU standards. The concession is noteworthy not

only in that it is Bulgaria's first major municipal infrastructure project that is privately financed, but that the project includes no municipal subsidies or state guarantees (Temple, 2000). The European Bank for Reconstruction and Development (EBRD) is providing about \$42 million in debt and equity to the project.

The concession generated substantial competition, with eight international water companies seeking prequalification. The three prequalified firms submitted technical and financial proposals with the lowest proposed tariff submitted weighted as the key decision variable. With no independent regulatory authority in Bulgaria, the city will regulate the project company through the terms of the concession agreement, such as performance targets on coverage, leakage, water and wastewater quality, and other variables. A potential troublesome aspect of the concession, one that raises the potential for conflicts of interests, is the granting of the municipality a minority shareholding in the project company.

In March 2000, the city of Bucharest in Romania signed a 25-year concession with Vivendi Water for the operation of the city's water and wastewater services (D'Amato, 2000). The city faced significant problems: half of its water was lost in leakage, there were serious tariff collection problems, necessary maintenance and expansion required significant capital investment, and drinking and wastewater standards were below EU levels.

To address potential concerns about corruption and endless debates about the fairness of the selection process, the municipality and the International Finance Corp. (IFC), which assisted the city, designed a novel bidding scheme. Instead of awarding the concession based on a technical and a price proposal, Bucharest's scheme was based solely on the lowest price bid by the three firms who met the rigorous prequalification procedure. Consequently, the selection process was highly transparent and could not be criticized by any party for being subjective. The result: the winning bidder submitted a tariff rate that required over the first five years an initial increase in real terms of about 15% on average over the existing tariff, but over the life of the concession, the tariff is expected to be 35% lower than the existing tariff in real terms.

2.3 Asia

Asia has been another market where significant demands for water and wastewater infrastructure have created opportunities to introduce private sector participation. What is noteworthy is the adoption of private sector

participation by governments, such as those in China, Vietnam, and South Korea, who do not have a long history of transferring responsibility for utility services to the private sector. Also noteworthy is the progress made in countries such as Thailand and the Philippines, which have been hit hard by the Asian currency crisis.

In August 1999, the Chengdu No. 6 water concession became the first official build, operate, and transfer (BOT) water project in China to reach financial close (Silk and Black, 2000). The consortia of Vivendi and Marubeni were awarded the concession under an open bidding system sponsored by the State Development and Planning Commission. The project cost is \$106 million and involves two sets of raw water intake facilities, a water treatment plant, and a transmission pipeline.

The project is unique in that the performance and financial obligations of the Chengdu city government, which is the local offtaker for the project (i.e., is contracted to buy bulk water from the project company), are not guaranteed by either the Provincial, or the Central Government. The commercial lenders take comfort in the fact that political and project risks will be covered in part by the Asian Development Bank and the European Investment Bank, which are participating in the project. Another BOT water project will be getting underway in the summer of 2001 when the winning bidder for the \$300-million Beijing No. 10 water treatment project is selected. The 20-year BOT concession involves building and operating a 500,000-cubic-meter capacity water treatment plant in Beijing.

In Vietnam, the Thu Duc water project marks the country's first BOT water project. Suez Lyonnaise des Eaux and Pilecon of Malaysia are the sponsors of the \$150-million, 25-year concession for a water treatment plant in Ho Chi Minh City. In addition to commercial lenders, debt finance is also provided by the Asian Development Bank and the Malaysian Export Import Bank. The Malaysia Export Credit Insurance Company is providing political risk cover. All the obligations of the city's water supply company, the offtaker, are guaranteed by the Ministry of Finance.

Another new emerging water market is South Korea, which, as a result of fundamental institutional and political changes, has shown a greater interest in private participation in water and wastewater. Suez Lyonnaise des Eaux teamed with Samsung Engineering to win the contract to manage the Municipality of Pusan's wastewater treatment installations under a 18-year BOT concession. With two water service contracts, Vivendi Water has also been successful in entering the South Korean market.

The two side-by-side concessions for the two halves of the Manila (the

Philippines) Metropolitan Water Works and Sewerage System (MWSS) service territory was the largest water privatization transaction in the last five years. Awarded in 1998, the concessions benefited from a transparent bid process and strong government commitment. Also pushing the process forward were a 60% rate of unaccounted for water (leakage and uncollected tariffs) and a significant need for rehabilitation. As a result of intense competition, the government received a range of bids, all under the existing tariff rate. Though not without problems, the two concessions have weathered the Asian financial crisis, which caused both project companies to suffer serious foreign exchange losses.

In September 2001, Thames Water and CH Karnchang of Thailand signed a 30-year build, own, operate, and transfer (BOOT) concession with the Thai Government. The project, which includes the construction of a 320 million liter per day water treatment plant, trunk mains, reservoirs, and local main distribution system in West Bangkok, may be the largest in Asia. Funded by domestic Thai banks, the project has a take-or-pay agreement with the Provincial Waterworks Authority of Thailand. The country has a number of other bulk water supply and treatment projects in the pipeline in addition to plans to fully privatize both the Metropolitan Waterworks Authority and Provincial Waterworks Authority (Lau, 2001).

A major, but not unanticipated, setback in Asia occurred in early 2000, when the Malaysian government took over the project company that was granted a concession for the country's entire sewerage services in 1993. The fundamental tariff collection and asset valuation problems encountered by the 30-year negotiated concession highlight the value of competition, particularly in countries with not fully developed regulatory institutions. With an open and competitive tender, there would have been a greater likelihood that a number of key project risks, such as the magnitude of the investment requirements, the unique tariff issues, and the financial strength of the prospective operators, would have been revealed (Haarmeyer and Mody, 1997).

2.4 Latin America

Argentina is the undisputed leader in water privatization in Latin America. The country's program started in 1993 with the award of a 30-year concession for operation and expansion of the Buenos Aires water and wastewater systems to a consortium led by Suez Lyonnaise. The success

of this contract provided support for similar concessions in the cities of Santa Fe and Cordoba, and the provinces of Mendoza, Buenos Aires, Corrientes, Formosa, and others. By one estimate, private companies today provide 70% of the population with drinking water (Abadie, 2001).

The only major setback in Argentina was in the province of Tucuman. After the concession was awarded in 1992, water tariffs doubled and a new provincial government was voted into office. Following a dispute over the quality of water supplied by the concessionaire, the provincial executive took control of the water regulatory body and revoked the concession.

Another instance demonstrating the highly political and high-risk nature of water infrastructure occurred in the Bolivian city of Cochabamba. In April 2000, after a concession for the city's water system was awarded, a violent riot broke out when the government approved a 35% rate increase. The riot resulted in six deaths, temporary imposition of a nationwide emergency, and the private concession company's removal from the \$200 million, 40-year project.

While Brazil, Mexico, and Bolivia have been successful in attracting private capital and management to their water and wastewater sectors, after Argentina, Chile's program stands out for putting in place the proper legislation and process to make privatization work. Like Argentina, Chile has had a strong privatization program in its other infrastructure sectors including energy, telecom, and ports. Over the past four years, Chile has sold interests in a number of its water and wastewater utilities including: ESVAL, provider of wastewater services for Valparaiso; ESSAL, supplier of water to Puerto Montt; EMOS, supplier of water to Santiago; and ESS-BIO, a utility for Concepcion.

3. NORTH AMERICAN HIGHLIGHTS: CONSOLIDATION INTEGRATES A FRAGMENTED MARKETPLACE

As is true around the world, the North American water industry is being driven by large capital spending requirements. Various industry and government estimates indicate that close to \$1 trillion will be needed in the United States over the next 20 years to upgrade, expand, and replace aging municipal water and wastewater infrastructure ("Water Infrastructure Now," 2001). While such estimates are imprecise, there is little doubt that water supply is a capital-intensive and rising cost industry. In addition to the steady rise of basic replacement costs, tighter environmental

standards and advances in water treatment technology—such as membrane filtration and ultraviolet (UV) disinfection—are increasing the complexity and cost of operating these systems.

The issue of how to obtain the money needed to meet these needs across a still fragmented industry has begun to move into more prominence on the agenda of the US Congress, which has not addressed water infrastructure funding since it established a federal grants program in the 1970s. Because of their fears of politically unpopular rate increases, municipal officials have pushed for another large dose of federal assistance—recommending a new program of more than \$50 billion in water grant funding over five years.

While Congress will likely consider some additional funding for water systems, though not \$50 billion, the private sector water industry opposes a broad subsidy program. Water and sewer rates remain low in the United States relative to other utility services, typically in the range of \$15 to \$30 per household per month, leaving room for prices to rise significantly without undue economic impact for most consumers. Economies of scale resulting from consolidation should also help to mitigate the need for rate increases (Beecher, 1999).

Executives of investor-owned water utilities consider infrastructure replacement a routine cost of doing business, one that can be efficiently managed within the existing capital and rate-making structures without federal intervention. Privately funded investment by the largest investor-owned water utilities has resulted in up-to-date infrastructure and an average net utility plant per customer over the life of the system of about \$2,000 (Coy and Uspenski, 2001). While comparable figures for municipal utility investment are not available, they are likely much lower in most areas. As a result, rates for investor-owned utilities are at the higher end of the range noted above, but are still widely affordable.

With only about 15% of the US population receiving water from private sector providers, and less than 5% in the wastewater segment, there appears to be significant scope for expanding the private sector market as municipalities look for economic solutions to their water infrastructure spending needs. However, opposition from local utility workers and some politicians has continued to limit growth in the private sector market.

As the sale of utility water and wastewater assets remains politically controversial at the local level and, in the view of some municipalities, also less economically attractive, given the availability of low-cost tax-exempt

financing received by municipally owned systems, much of the growth in private participation in the United States has been focused on the market for contract operations. The 17 largest firms competing in the utility outsourcing services market reported 2000 revenues of \$1.68 billion, 16% higher than in 1999 (Public Works Financing, 2001a). This market includes government and industrial market operations and maintenance (O&M) revenues, as well as the newer design-build contracting market. However, the market share for private vendors is still estimated at less than 5% of the more than \$35 billion spent by government authorities for water and wastewater services, excluding capital costs. The level of outsourcing in the industrial market thus far is even smaller.

Table 1.1 highlights a number of the long-term contracts for larger-sized cities and the extent of cost savings offered through competitive contracting. The \$400+ million Atlanta water privatization contract, which was signed in 1998, was fiercely competed given the high profile and large size of the contract. The 20-year O&M contract was won by Suez–United Water after the company dropped its final bid price by 21% in an open auction, with resulting estimated cost savings for the city of \$400 million over the term of the contract, 45% below the city’s operating budget. A reflection of the intense competition for contracts (“buyers market”) has been a push by some municipal owners to have private contractors accept unlimited liability clauses. Fortunately, as a result of the growing experience, local governments and private contractors appear to be gradually getting more comfortable with contract structures that will be mutually beneficial. By the summer of 2001, a number of large new privatization deals were in various stages of evaluation and bidding in various cities, including Phoenix, AZ; Tampa, FL; Stockton, CA; and New Orleans, LA; among others.

The shift toward the design-build method of project delivery in the US civil infrastructure market is also beginning to have a significant effect on the water and wastewater industry. The Design-Build Institute of America (DBIA) is tracking over \$4 billion worth of water-related design-build projects in the US municipal market scheduled for completion in 2001 and in the future. This compares to less than \$1 billion worth of design-build projects in the DBIA database from 1999–2000 (Design-Build Institute of America, 2001).

The historic approach of using different vendors for design and construction is increasingly shifting to an integrated approach, with a single entity taking responsibility for the contract, as municipal owners are seeing the

Table 1.1 Water Privatization Scorecard: Notable Long-Term Public-Private Partnerships

<i>City</i>	<i>System Type</i>	<i>Plant Size (MGD)^a</i>	<i>Contract Term (years)</i>	<i>Winner, Year Won</i>	<i>Estimated Cost Savings for Customer</i>
Atlanta, GA	Water	100	20	Suez, 1998	\$400 million (45%)
Augusta, GA	Wastewater	46	10	OMI, 1999	\$5 million
Cranston, RI	DBO ^b wastewater	23	25	Poseidon/US Filter, 1996	\$35 million
Evansville, IN	Water	60	10	American Water Works, 1997	\$8.1 million
Franklin, OH	BOT water	5	20	Earth Tech, 1997	20%
Fulton Co., GA	Wastewater	24	10	OMI, 2000	\$4 million
Indianapolis, IN	Wastewater	250	14	Suez, 1994	\$250 million +
Milwaukee, WI	Wastewater	550	10	Suez, 1998	\$145 million (30%)
New Haven, CT	Wastewater	45	15	OMI, 1997	\$53 million (30%)
Newport, RI	Wastewater	10	20	Earth Tech, 2000	\$22 million (24%)
Rahway, NJ	Water	6	20	Suez, 1999	\$32 million
Seattle, WA	DBO water	120	25	CDM/Azurix, 1997	\$70 million (40%)
Springfield, MA	Wastewater	67	20	US Water, 2000	10%
Tampa, FL	DBO water	66	15	US Filter, 2000	\$85 million (21%)
Tampa, FL	BOT desalination	25	30	Poseidon/Ogden, 1999	50%
Taunton, MA	Wastewater	8.3	20	US Filter, 1998	\$62 million
Wilmington, DE	Wastewater	105	20	US Filter, 1997	\$60 million
Woonsocket, RI	DBO wastewater	16	20	US Filter, 1999	\$45 million

Source: Public Works Financing, 2000, 2001b.

^aMGD = million gallons per day.

^bDBO = design, build, operate.

increased speed of delivery and cost savings that can result. Taking the process a step further, some cities are beginning to add a long-term operations component to the design-build contract, hence the DBO designation.

One of the most prominent DBO contracts was the Tolt River water filtration plant contract awarded by Seattle Public Utilities to a consortium led by Camp Dresser McKee and Azurix in 1997. With a capital cost of about \$65 million and a 15-year operating contract, plus two five-year renewal periods, the utility expects to save about \$70 million in life cycle costs, about 40% below its benchmark estimate.

Consolidation remains a theme in the water sector, as US companies look to broaden their base of service capabilities and international firms look to enter the US market. After a booming \$15 billion in acquisitions of US water companies announced in 1999, 2000 and early 2001 were relatively quiet. (Table 1.2 details transactions in the regulated utility sector, excluding the purchases of large equipment and services firms such as US Filter and Nalco Chemical.) In the past 18 months, the leading French water companies, Vivendi and Suez, have been busy integrating and digesting the earlier deals.

Suez's US operations include Nalco Chemical, United Water, and its equipment subsidiary Degremont, which are now being integrated under the ONDEO organization, while Vivendi has already integrated all of its US water operations under the US Filter umbrella, except for its minority ownership in Philadelphia Suburban. Vivendi Environnement, including waste, energy, and transport operations as well as water, completed its initial public offering (IPO) spin-off from parent Vivendi Universal in July 2000, and it is now planning a US share listing for the fall of 2001. Thames Water, the third largest global player, was itself acquired by German multiutility RWE in 2000, just before it closed on its own acquisition of the small New Jersey water utility E'town Corp., adding to its established presence in operations and water treatment equipment in North America.

While the industry at large remains fragmented, with some 54,000 municipal utilities and hundreds of local equipment and services providers, the top-tier private sector participants have grown both in size and breadth and now are capable of offering a wide range of products and services for municipal, industrial, and residential customers. As a result, the lines between traditionally separate segments in the water industry—regulated utilities, operating services, engineering and design, equipment and systems manufacturing, bottled water, and wholesale water management—have become increasingly blurred as the largest firms have moved to in-

Table 1.2 Major Water Utility Merger and Acquisition Transactions

<i>Target</i>	<i>Status</i>	<i>Acquirer</i>	<i>Total Consideration</i>	<i>Number of Customers</i>	<i>Price per Customer</i>
Dominguez NEI	Completed	CWT	\$66.4 million	40,000	\$1,660
Aquarion	Completed	AWK	\$700 million	513,000	\$1,364
United Water	Completed	Kelda (UK)	\$600 million	141,000	\$4,248
Citizens Water	Completed	Suez Lyonnaise (France)	\$2.2 billion	605,000	\$3,580
San Jose Water	Pending	AWK ^a	\$835 million	305,000	N/A
E'town Corp.	Cancelled	AWK	\$480 million	216,000	\$2,222
Utilities Inc.	Completed	Thames (UK)	\$957 million	238,000	\$4,021
	Pending	Nuon NV (Netherlands)	About \$400 million	230,000 (est.)	\$1,739

Sources: Company data and Schwab Capital Markets L.P. estimates.

^aAWK assumed no liabilities with the Citizens' assets, and the valuations are based on its assumptions of equivalent fair value; AWK estimates equivalent fair value at \$550 million.

tegrate their service offerings to take advantage of cross-selling opportunities.

The newest segment to see some emerging private sector involvement is management of the water resource itself, offering the potential for commodity trading in the water business. While ownership and trading of water rights has established legal roots in the arid American West, pending water shortages and the need for better allocation and management of existing resources is generating more investor interest. Enron's Azurix subsidiary was the most well-known company to try a start-up water trading operation—an effort since abandoned—but many others are exploring the possibilities, and a viable market could develop in the next five years. Smaller firms, such as Cadiz Inc. in Southern California, are developing public-private partnerships in water storage and sales, and this segment should become more visible for investors in coming years.

4. CONCLUSION: THE FUTURE DIRECTION OF INDUSTRY TRENDS

Significant progress has been made worldwide in attracting private capital and management initiative to the water and wastewater sector. This progress has been made despite the serious political and regulatory risks associated with the sector. A highly competitive local and global industry of private developers, operators, and financiers has evolved that is capable of providing a range of services for projects of all sizes. The existence of multiple service providers ensures that, when governments organize open and transparent tenders for new greenfield facilities, or for the operation of existing facilities, they will attract highly qualified bidders. By facilitating risk identification and allocation, competition and strong contractual performance agreements have provided a solid foundation for achieving operations improvements, cost savings, and new infrastructure investment.

As significant as this progress has been, there is still tremendous work to be done in providing basic water and wastewater infrastructure where there is none and in putting existing operations on a commercial and sustainable basis. A major obstacle to achieving these ends more rapidly and comprehensively is the industry's high capital investment needs, generally low or subsidized tariffs, integrated monopoly structure, and significant exposure to regulatory and political risks. Together, these have limited private sector participation, competition, and innovation, all which could result in

significant improvements in the level, quality, and price of the sectors services. Consequently, further and significant progress in the sector will likely come with the adoption of innovative options that restructure the sector and more efficiently allocate risks and expose the sector to greater competition. Current efforts in the United Kingdom to split up asset ownership from operations and to promote cross-boundary competition as well as common carriage are important beginnings of this industry transformation.

In addition to the potential for fundamental structural changes, the water and wastewater sector will continue to be impacted by a number of ongoing technological, competitive, regulatory, organizational, strategic, and financial trends. Indeed, these may all serve to push industry structural changes. Two of these—technology and corporate strategy trends—are worth raising as important signposts to the industry's future.

Like other industries, the water sector has been looking at the potential for harnessing the power of the Internet to lower procurement costs and increase the transfer of knowledge between buyers and sellers of products and services. Although still at the experimentation stage, the promise is significant, as e-commerce has the potential to lower transaction costs, bring more efficient pricing, and consolidate the equipment and services vendors market. Moreover, particularly in the western United States, the Internet is already helping to broaden and deepen the market for water rights, and thus provide water users and sellers with better information and more options (Fillion, 2000; see also Chapter 22 in this volume).

The other important area where technology is beginning to have a visible impact on the sector, and will likely continue to do so, is desalination—converting salt or brackish water to fresh water. Already a key supply source in many wealthy water-scarce areas around the world, primarily the Middle East and Caribbean, desalination is likely to become an increasingly affordable option for areas like the South and Western regions of the United States, which suffer from growing scarcity of water supplies. Significant advances in membrane technology and companies competing for tenders to provide desalination equipment and operations have pushed down the price of desalted water to \$2–3 per thousand gallons, compared with \$4–7 only a few years ago. A growing market should provide for even greater opportunity for innovation and cost reduction.

Company strategy provides a good indicator of industry trends, given that companies will want to have the right strategy, structure, and service offerings that best match the direction of the industry. Presently, two broad models can be discerned across the worldwide water and waste-

water market. Under the first model, which is practiced primarily by European utility companies such as Vivendi, Suez Lyonnaise, RWE, Electricidad de Portugal, Endesa (Spain), and Enel (Italy), firms provide services across multiple utility sectors—water, gas, electric, waste, and telecom. Often referred to as the multiutility model, this approach appears to be especially attractive in developing country markets (e.g., there are a number of multiutility concessions in Africa that bundle water, gas, and electric) and in markets where these utility sectors have not been fully opened up to competition. In addition, these firms are beginning to have success in offering multiutility outsourcing services to industrial customers. The relatively faster, and potentially more profitable, development of industrial utility outsourcing contracts compared to municipal contracts is helping to draw more competition and expertise into the overall market.

In the other model, which is more prevalent in the United States, and to some extent in the United Kingdom, the strategy of companies is to focus on one utility sector and either focus on one segment of the value chain or provide an integrated suite of services within that sector. Driving this strategy is the fact that, in these two countries, the gas, electric, and telecom sectors are deregulated and competition is forcing companies to specialize and focus on core businesses where they have a competitive advantage. Shareholder pressures are also pushing this trend, as investors reward “purer plays” whose business they can better understand, and discount conglomerate-type companies whose “sum of the parts” often exceed the market value of the company.

The evolving structure of the US power market and the breakup of the integrated utility structure is one example of how market forces can reshape an industry (Haarmeyer, 2000). The company transformation of Vivendi provides an important example of restructuring within the water industry. Earlier in its corporate life, the company, named *Compagnie General des Eaux*, focused on providing infrastructure services, primarily in water. After a troubled expansion into and exit from the real estate and construction markets in the 1980s and 1990s, today, many acquisitions later, the renamed Vivendi Universal is the third largest media company in the world. The company’s subsidiary, Vivendi Environnement, remains the leader in the global water industry, though it is now much larger, with \$12 billion in sales and the broadest portfolio of products and services in the water industry. The parent company, Vivendi Universal, has recently spun off 28% of Vivendi Environnement and is expected to further reduce its stake given the limited synergies between the infrastructure and the

media businesses. Thus, the leading water service provider appears to be transforming itself into a more focused and less conglomerate-like company. This structure should become particularly advantageous as the utility industry worldwide continues down the path of greater exposure to competitive forces.

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