



Private Capital in Water and Sanitation

DAVID HAARMEYER AND ASHOKA MODY

Governments are drawing on private initiative and capital to address the deficiencies of water and sewage systems and the need for new facilities.

What has their experience been and how can they encourage private investment?

IN DEVELOPING countries, the water and sewage sector is generally financially and operationally weak. A World Bank study of municipal water projects in these countries found that revenues collected by utility companies cover only 35 percent of the cost of water. Unaccounted-for water (UFW)—the difference between net production of water and paid consumption—is in the range of 40–60 percent for many developing country utilities, compared with 10–20 percent for efficiently managed utilities. High rates of UFW reflect leakage as well as inability to bill and collect payments. Public water systems also tend to be overstaffed, often with 10 to 20 employees per 1,000 connections, compared with 2 to 3 employees per 1,000 connections required for efficient operations.

The disregard for commercial pricing and operational principles in the water

sector has also prevented utilities from serving the poor. The rationale for continued subsidies has been undermined by findings that the poor often pay 10 times more for water than wealthier households because the poor do not have access to subsidized piped water and instead must rely on private vendors. The continued underpricing of water and wastewater services sends the wrong signals about the growing scarcity of water and the costs of meeting public health and environmental goals by investing in sewage collection and treatment.

The World Bank has estimated that developing countries' annual financial requirements for water supply and sanitation stand at \$60 billion over the next decade. Yet the sector's fundamental problem arises less from the shortage of financial capital than from the lack of accountability in managing financial and operational resources. Water enterprises generally face weak internal (organizational) and external (regulatory) incentives to perform. The great challenge governments face is to improve these incentives.

Private capital and initiative can help accomplish operational efficiency and investment objectives if two stringent requirements are met: (1) projects must generate revenues that cover operating costs and debt-service payments, and earn a competitive rate of return on equity, and (2) risks that are internal (for example, construction and operation) and external (for example, regulatory and foreign exchange) to a project must be identified and clearly

allocated to the parties that are in the best position to mitigate them. With their own capital at risk, lenders and investors have strong financial incentives to ensure that a project is built on time and within budget, and is operationally efficient. Uncovered political and regulatory risks require government attention—in particular, efforts to create and maintain a stable and predictable contractual environment—if projects are to attract private capital.

Is the water sector different?

Like other infrastructure sectors, water and sanitation is characterized by large, sunk investments with long payback periods. But in contrast with the telecommunications and power sectors, there is little or no scope for introducing direct competition in any of the main operational segments—treatment, transmission, or distribution. The sunk investments and natural monopoly characteristics make the water and sanitation sector vulnerable to political expropriation and contracting problems. Also, the mismatch between domestic-currency revenue and international borrowing can create serious foreign exchange risks. Water and sanitation assets have additional institutional and economic features that differentiate them from assets in other infrastructure sectors and pose obstacles to achieving economic feasibility and proper risk allocation. These include the following:

- Increasing demand for public health services and a cleaner environment imply

David Haarmeyer,
a US national, is a Consultant to the World Bank's Resource Mobilization and Cofinancing Vice Presidency.

Ashoka Mody,
an Indian national, is a Principal Financial Economist in the World Bank's Resource Mobilization and Cofinancing Vice Presidency.

the need for establishing new regulatory structures, increasing investments, and raising prices.

- A highly fragmented industry structure results in the establishment of many small facilities, which often are under the control of financially inexperienced and uncreditworthy local government entities.

- The value of existing underground assets is often uncertain; consequently, workable and credible renegotiation procedures for investment plans and tariffs are critically important.

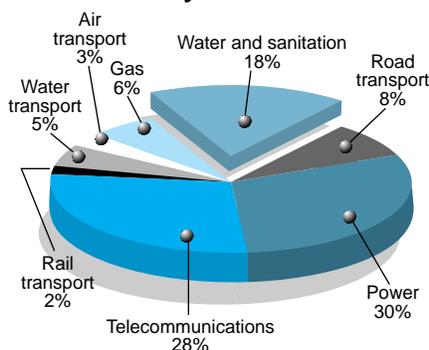
Largely as a result of these factors, contract and regulatory challenges have been widespread, and there have been fewer private projects in the water and sanitation sector than in the power or telecommunications sectors (see chart).

A variety of approaches

There is no one correct model for privatizing water and sanitation services, and there has been considerable diversity among countries' practices (Table 1). A private sponsor may take over an entire utility system (including the production, transmission, and distribution of the service). Alternatively, the utility's various segments can be split up (unbundled), with, for example, bulk water supply and water and wastewater treatment separated from the distribution to retail consumers.

Privatization of the sector has been limited in some countries, such as Chile—which has been in the vanguard of privatization in other sectors—and the United States, where all other utility services are, for the most part, privately pro-

Private infrastructure projects, by sector



Source: World Bank, Private Infrastructure Project database.

vided. In contrast, certain African countries—Côte d'Ivoire and Guinea, for example—have long traditions of private participation in water and sanitation. Recently, Argentina and Malaysia have been at the forefront of developing countries in privatizing water services; in the developed world, the United Kingdom has led the way.

In some countries—Australia, Chile, and Thailand—governments have used corporatization strategies to transform water and sanitation systems into financially independent enterprises that operate along commercial lines. Especially in Chile, corporatization has been combined with short-term *service contracts* with private service providers—such contracts can be used to delegate responsibility to the private sector for providing a narrow service (for example, meter installation). Broader responsibil-

ity for the operations and maintenance (O&M) of a treatment facility or an entire water or sanitation system may be transferred to a private company with a fixed-fee *O&M contract*. With a *lease contract*, a private company is delegated responsibility for operations and tariff collection, but not capital financing.

Management and lease contracts have one major shortcoming: they do not assign full commercial risks to the operator—in particular, private capital investments are not at risk.

Long-term arrangements—build-own-operate (BOO) or build-operate-transfer (BOT) contracts for specific water supply/treatment projects (see box) and *full-utility concessions*—bring not only private management but also private investment. Projects under BOO/BOT contracts sell specific services to a municipal utility. In contrast, all facets of the system, especially distribution to consumers, become the private operator's responsibility under a full-utility concession. Assigning all the commercial risk to the private sector heightens performance incentives—but a predictable contractual environment is required to successfully attract private capital.

Case studies

Several examples illustrate how these alternative approaches work in practice, indicating both the potential for success and the nature of problems they encounter.

Guinea, a West African nation with a low per capita income, has achieved solid improvements in its water systems under a lease contract with a private operator. A subsidy arrangement was used to ease the transition to higher tariffs. Recently, however, coordination problems with the government have resulted from lack of clarity in the allocation of commercial risks. The high tariffs have also resulted in serious nonpayment problems.

Mexico City provides an example of an incremental approach. The government awarded 10-year management contracts for each quadrant of the city to four separate private companies. In three phases, the contractors are responsible for undertaking a census of the users and installing meters, billing and collecting tariffs, and rehabilitating the system. They are paid fixed fees by the government. Once the system is financially and operationally in order, the government is expected to award concessions. The devaluation of the peso in December 1994 caused serious financial strain—since operator fees and equipment

Table 1

Allocation of responsibilities in alternative approaches

	Management contract	Lease contract	BOT/BOO ¹ concession	Full-utility concession	Asset sale
Responsibilities allocated to					
Ownership	Public	Public	Public	Public	Private
Investment	Public	Public	Private	Private	Private
Operation	Private	Private	Private	Private	Private
Tariff collection	Public/private	Private	Public	Private	Private
Recent cases					
	Puerto Rico	Guinea	Johor, Malaysia	Buenos Aires,	England
	Mexico City	Gdansk,	Sydney,	Argentina,	and Wales
	Trinidad and	Poland	Australia	Malaysia	
	Tobago	North Bohemia,	Izmit, Turkey	Limeria, Brazil	
	Antalya,	Czech Republic	Chihuahua,	Côte d'Ivoire	
	Turkey		Mexico	Macao	

Source: David Haarmeyer and Ashoka Mody, "Private Capital in Water and Sanitation," World Bank Discussion Paper, forthcoming.

¹ The abbreviation BOT denotes build-operate-transfer; BOO denotes build-own-operate.

purchases were denominated in foreign currencies—and set the program back.

A few countries have taken the bigger step of awarding concessions for operating an entire utility system. In *Argentina*, the city of *Buenos Aires* delegated the management and investment responsibility for its water and sanitation systems to a private consortium.

Under the terms of the 30-year concession, the consortium will invest \$4 billion in upgrading, rehabilitating, and extending the systems. In three years, the private operator has brought dramatic operational and financial improvements through reduced UFW and higher bill-collection rates. This successful outcome can be traced to the significant steps the Argentine government took to ensure that the concession would be financially viable: raising tariffs prior to privatization, assuming the state water companies' liabilities, financing a voluntary retirement program, providing a guarantee that the concession company could cut off service to consumers for nonpayment, and creating an independent regulatory authority to prevent politicization of the concession. Soon after the award of the concession, however, tariffs had to be raised ahead of schedule because the government agreed with the operator's view that the physical state of the systems was worse than anticipated.

In *Malaysia*, the government signed a novel and ambitious 28-year concession with a private consortium to upgrade, rehabilitate, and extend the entire country's sewerage system. Although the estimated \$2.8 billion contract was awarded in 1993, progress has been slow, primarily because of significant public and commercial backlash from tariff collection and tariff increases. Malaysia's experience points to the unique risk allocation issues raised by private provision of retail sanitation services in instances where these services have never been centrally provided before, the legal right to cut off service for nonpayment is absent, and sewerage and water services are billed separately.

A step beyond concessions is the full privatization of utilities' assets, which brings with it both the benefits provided by the assumption of full commercial risk and the discipline exerted by capital markets. The \$5 billion public share offering of 10 regional water authorities in *England and Wales* in 1989 is the most prominent example of this approach. The British government's decision to sell these assets was influenced by a number of factors, including the \$40 billion investment program the

BOT/BOO projects: A step forward or a diversion?

Build-own-transfer (BOT) or build-own-operate (BOO) contracts shift the responsibility for financing, building, and operating discrete facilities, such as water or wastewater treatment plants, from the government to the private sector. These contracts are particularly attractive for countries with an urgent need to treat water or sewage but little capital to finance projects. Australia, Malaysia, Mexico, and, recently, China and Thailand have adopted this approach.

From the perspective of government officials, BOT/BOO contracts have two attractions: they are efficient mechanisms for rapidly organizing private capital and management to provide a narrow set of priority services, and they do so in a way that does not affect the overall utility system's organization and employees.

As this perspective suggests, the problem with BOT/BOO contracts is that they do not and cannot address a utility's fundamental operating deficiencies—leaks in the water distribution system, overstaffing, and poor tariff collection—and thus are not capable of transforming financially weak utilities into strong ones. Often because of these very same problems, many state-owned water utilities are not creditworthy, and consequently the implementation of BOT/BOO contracts requires a third party to provide credit support. Hence, by diverting attention from more fundamental problems, the use of BOT/BOO contracts may delay much-needed system-wide improvements.

water authorities needed to undertake to meet the EU's environmental standards; the confidence in the new independent regulatory structure, and the existence of highly developed local capital markets. While successful in many respects, the privatization in England and Wales has been criticized for leading to rapid and substantial increases in tariffs and an absence of metering. More gradual privatizations are going on elsewhere—in *Thailand*, the East Water Company is expected to be listed on the Bangkok stock exchange during 1997.

Financing private investment

Financing of BOT/BOO and full-utility concessions has followed the limited-recourse project finance model, which means that before providing debt finance, lenders appraise a project's ability to generate cash flow rather than the sponsor's balance sheet. The key mechanisms for attracting private capital are the underlying contracts and security agreements that identify a potentially secure revenue stream. The financial structure, sources of financing, and terms of lending for projects depend primarily on the risk and cash profiles of the project (Table 2).

BOT/BOO projects. As for traditional independent power projects, the cash flows for BOT projects are contractually predetermined, often with government backing. Though construction risk exists, the absence of market risk—and, hence, the relative certainty of payment—means that BOTs/BOOs can be financially attractive and structured with more debt than full-utility concessions, whose cash flows may be less predictable. Also, construction risks can be mitigated when a discrete facility

already generating cash flows is taken over for expansion by the private sector. This was the case of the 20-year BOT contract in *Johor, Malaysia* that covers responsibility for operating an existing treatment water plant and financing its expansion. As a result of the attractive cash flow profile of the project, the state government's strong commitment to privatization, and the availability of long-term local finance at reasonable rates, financing for the \$284 million project was raised in record time—three months after the concession was signed.

Full-utility concessions. Full-utility concessions can also be attractive to lenders, since existing revenue streams can be used immediately to service debt, thereby mitigating construction risk. In addition, over time, an established utility can benefit from both a steady flow of revenues from a diversified customer base and, if it integrates horizontally, from a diversified asset base. By creating a more robust balance sheet, these revenues may permit the utility to obtain financing internally as well as to use capital markets to sell long-term debt.

Managing project risks

The considerable uncertainty regarding the asset value and the costs of rehabilitation and expansion in the water sector indicates that the regulatory risks faced by lenders and investors can be significant. Where the contractual and payment responsibility falls on financially weak municipal governments rather than on sovereign governments, political and regulatory risks are accentuated, and credit risks are created. Also, because water and sanitation projects rarely generate foreign

Table 2
Cash flow and risk profiles of various approaches

	O&M ¹ contract	Lease contract	BOT ¹ concession	Full-utility concession	Asset sale
Time horizon	2–5 years	10 years	10–20 years	20–30 years	In perpetuity
Customer	Government	Retail customer	Government	Retail customer	Retail customer
Cash flow profile	Fixed-fee for service	Subject to market risk	Contracted payments due after construction	Subject to market risk	Subject to market risk
Construction risk	None	None	High	Low	Very low
Regulatory risk	None	Medium	Low	High	Very high

Source: David Haarmeyer and Ashoka Mody, "Private Capital in Water and Sanitation," World Bank Discussion Paper, forthcoming.

¹ The abbreviation O&M denotes operation-and-maintenance; BOT denotes build-operate-transfer.

exchange, financing projects with foreign-currency-denominated debt exposes lenders to foreign exchange risk—the risk that exchange rate depreciation may prevent the timely repayment of hard currency debt. Consequently, finding long-term debt at reasonable interest rates can be especially difficult for water and sanitation projects.

Project risks have been managed or mitigated in different ways. First, to address sovereign risks, debt for privately financed water projects has tended to originate from commercial banks, export credit agencies (ECAs), and multilateral institutions (for example, the IFC was a source of direct loans and syndicated lending in Buenos Aires) owing to their ability to assess and mitigate these types of risks. Investors participating in capital markets are generally not able to do this, although established sewer and water projects should soon be able to tap capital markets. Second, lenders, as well as the government, gain comfort from the fact that equity is provided by experienced operators.

Finally, third-party and sovereign government credit support has been used to address municipal nonpayment risks. In *Chihuahua* and *Puerto Vallarta, Mexico*, credit enhancement provided by the federal development bank BANOBRAS was instrumental in the successful financing of two BOT wastewater treatment plants. Similarly, in the \$800 million BOT project in *Izmit, Turkey*, the weak credit position of the city required the Turkish government to stand behind the local government's obligation to purchase water from the private bulk water producing company. And in Buenos Aires, the government of Argentina's guarantee to pay compensation if the concession should be terminated

early was the chief form of security for lenders.

Reducing risk

Sound due diligence, effective incentives, and credit enhancements are not sufficient. Ongoing mitigation of risk requires clear, predictable, and fair rules to secure long-term private capital at reasonable rates. For full-utility concessions and BOT/BOO contracts, the rules governing private participation are embedded in the concession agreement. This document acts as security for the significant amounts of capital and effort that project developers and lenders put at risk. Consequently, the credibility of this document—whether it can uphold the expectations of both parties—turns on the ability of a country's legal institutions to enforce contracts and arbitrate disputes fairly.

Three of the most important risks that concession agreements address are the timing and level of the investment program, how and when tariffs will be adjusted, and valuation of assets in case of early contract termination. Better information and smooth renegotiation and adjustment procedures are two important responses to these forms of uncertainty. Transparent and competitive bidding procedures have been shown to be efficient mechanisms for discovering information on appropriate performance targets, selecting qualified operators, and setting the right tariff levels.

The contractual and regulatory risk faced by private investors and operators increases as the level of involvement by private initiative and capital increases. Thus, the continuity and predictability of the contractual and regulatory framework is more critical for full-utility concessions than for BOTs (and for asset sales than for full-

utility concessions). Countries with more developed administrative capacity, such as Argentina and the United Kingdom, have established independent regulatory authorities to achieve these important objectives. While the long-term solution is greater transparency and adequate adjudication mechanisms, in the near term, addressing these risks may require continued participation of multilateral and bilateral organizations through their assistance with the design of policy and regulation, and their provision of debt finance and partial risk guarantees.

Conclusion

Successfully attracting and securing long-term private capital in developing countries' water and sanitation sectors depends on the simultaneous development of a number of institutions, including creditworthy local governments, independent regulatory agencies, and deeper and broader local capital markets. Nevertheless, depending on the political and economic realities facing a given water or sewage system, a variety of approaches are available to help it become an operationally efficient and financially self-sustaining commercial enterprise.

A few broad conclusions can be drawn from the limited but growing number of projects that have been structured with private capital:

- government political and financial commitment are essential;
- a contractual and regulatory structure that minimizes uncertainty and provides flexibility in renegotiation and operational autonomy is required;
- transparent competitive tendering is an important tool with which to generate information on asset values, tariff levels, and qualified operators;
- full-utility concessions and asset sales provide the broadest scope for operational and financial improvements; and
- where concessions and asset sales are not possible, utilities can be corporatized or operations and management contracts awarded to improve services and revenue streams in preparation for privatization.

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