THE PRIVATE SECTOR IN

Water

COMPETITION AND REGULATION

FINANCE, PRIVATE SECTOR, AND INFRASTRUCTURE NETWORK
Introduction

This selection of Notes shows the strength and diversity of a global trend to involve the private sector in the delivery of basic water services that until recently in most countries were the exclusive preserve of public sector providers. The selection also illustrates some of the hurdles in designing and implementing successful arrangements for private participation, suggests some lessons from early experience, and shows that much more needs to be learned.

Among the early lessons:

• Private participation can and must be tailored to meet the unique needs, goals, and constraints of each country and city. Countries at extreme ends of the income and risk spectrum have been successful in enlisting the private sector, but they could not possibly use the same blueprint.

• Private participation is no magic pill. Investors will not commit or perform their role in service delivery unless governments also commit and perform their vital role in building and maintaining a supportive regulatory environment, ensuring a transparent process, and clarifying roles, risk allocation, goals, and incentives.

• Designing and implementing a successful private participation scheme takes time, political will, and resources, including quality advisory inputs, extensive consultation with stakeholder groups, and early efforts to develop regulatory capacities.

We hope that this collection of Notes will be helpful to practitioners not as a set of models to copy but as food for their thought process. Private participation in water is recent, and new lessons continue to emerge and new questions to arise.

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Water and Sanitation Division
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In developing countries private sector participation in water and sewerage is a relatively recent phenomenon. Before 1990 almost all developing countries relied on government provision of water supply and sewerage services; private participation in the sector was rare. The potential for gains from private sector involvement, through greater efficiency and improved access to finance for new investments, was as great in water and sewerage as in other infrastructure sectors. But governments' willingness to take the steps to secure private participation was relatively limited. In many countries water continued to be treated as a social rather than an economic commodity. There was considerable political resistance to raising tariffs to cost recovery levels, increasing the risk of long-term investment in water and sewerage assets. In addition, many national governments in recent years decentralized responsibility for water and sewerage services to municipal or provincial governments, which often had little experience with private sector contracting and regulation and were thus relatively unlikely to initiate private transactions.

Between 1984 and 1990 developing countries awarded contracts for only eight water and sewerage projects to private companies. The private capital investment in these projects was US$297 million. Since 1990 private participation in the water sector in developing countries has accelerated (figures 1 and 2). The number of private water projects reaching financial closure increased more than tenfold between 1990 and 1997, though private involvement is still small relative to public provision in the water sector and to private participation in other infrastructure sectors (particularly energy).

The PPI Project Database covers private participation in infrastructure in developing countries. The database records details of all projects owned or managed by private companies in 1984–97 in the water, energy, transport, and telecommunications sectors. This Note focuses on private water and sewerage projects that reached financial closure between 1990 and 1997 and surveys regional trends, types of private participation, project sizes, and top sponsors and operators. See box 1 for an explanation of the PPI project criteria and database terminology.
By the end of 1997 private companies operating in developing countries had reached financial closure on US$25 billion of investment in water and sewerage projects. In total, ninety-seven projects had been implemented in thirty-five developing countries, ranging from management contracts to leases, concessions, divestitures, and greenfield build-operate-own (BOO) or build-operate-transfer (BOT) arrangements. This Note provides an overview of patterns and trends in these projects.

**Sector trends**

The PPI Project Database reveals the following trends in private participation in water and sewerage:

- A regional and national concentration of private water projects, reflecting varied government efforts to create conditions for sustainable private involvement through pricing, regulatory, and institutional reforms, but also a ripple effect from growing government familiarity with private involvement in the sector.

- A dominance of concession contracts compared with divestitures, BOT contracts, leases, and management contracts.

- A few international companies sponsoring and operating most major projects. But the number of companies involved in private contracts is growing, and it remains too early to tell whether other new entrants will increase their international presence.

**Latin America and East Asia dominate**

A regional breakdown of private sector involvement in the water and sewerage sector shows a concentration of projects in Latin America and the Caribbean and East Asia and the Pacific (table 1 and figure 3). This regional concentration is similar to that in energy and transport. The growth of the sector in these two regions coincides with the opening of markets and, particularly in Latin America, progress toward the establishment of credible legal and regulatory institutions. Latin American countries have awarded forty private contracts, which have brought investment commitments of US$8,225
BOX 1  PPI PROJECT DATABASE: PROJECT CRITERIA AND DATABASE TERMINOLOGY

Database coverage
- To be included, a project must have reached financial closure and directly or indirectly serve the general public.
- Sectors covered are energy, water, transport, and telecommunications.
- The water sector includes the following subsectors and segments: potable water treatment and distribution and sewage collection and treatment.
- Movable assets, incinerators and stand-alone solid waste projects, and small projects such as windmills are excluded.
- The period covered is 1984–97.
- The countries covered are developing countries, as defined and classified by the World Bank, in East Asia and the Pacific, Europe and Central Asia, Latin America and the Caribbean, the Middle East and North Africa, South Asia, and Sub-Saharan Africa.

Definition of financial closure. For greenfield projects and for operations and maintenance contracts with major capital expenditure financial closure is defined as the existence of a legally binding commitment of equity holders or debt financiers to provide or mobilize funding for the project. The funding must account for a significant part of the project cost, securing the construction of the facility. For operations and management projects a lease agreement or a contract authorizing the commencement of management service must exist. For divestitures the equity holders must have a legally binding commitment to acquire the assets of the facility.

Definition of private participation. The private company must assume operating risk during the operating period or assume development and operating risk during the contract period. In addition, the operator must consist of one or more corporate entities, with significant private equity participation, that are separate from any government agency.

Project types
- Operations and management contracts—The private entity takes over the management of a publicly owned enterprise for a given period. This category includes management contracts and leases.
- Operations and management contracts with major capital expenditure—These are concession contracts for existing facilities under which the private entity also assumes significant investment risk. This category includes build-transfer-operate, build-lease-transfer, and build-rehabilitate-operate-transfer contracts as applied to existing facilities.
- Greenfield projects—A private entity or a public-private joint venture builds and operates a new facility. This category includes build-operate-transfer and build-operate-own contracts.
- Divestitures—The state sells an equity stake to private entities; this may or may not involve private management. This category includes full and partial divestitures.

Sources
- Commercial databases.
- Developers and sponsors.
- Regulatory agencies.

Contact. The database is maintained by the Private Participation in Infrastructure Group of the World Bank. For more information contact Mina Salehi at 202 473 7157 or msalehi@worldbank.org.
Private Participation in the Water and Sewerage Sector—Recent Trends

Despite an early start in the region, private participation in Africa is progressing slowly. In the absence of strong commitments on tariffs and credible regulatory provisions, private companies have been unwilling to take investment risk in the region. In some cases they have taken on a degree of commercial risk under lease contracts. In other cases private participation has been limited to short-term management contracts. No country in South Asia has yet awarded a water or sewerage contract to the private sector, but a number of proposals are being considered (for example, in Tiripur, India, and Karachi, Pakistan).

A few countries lead the way

Similar to the trend in power and transport, in each region a few countries have awarded the majority of the water and sewerage contracts (tables 2 and 3). In East Asia, for example, China has awarded thirteen contracts and Malaysia six, together representing 63 percent of the East Asian total of thirty projects. A similar picture emerges in Latin America, with Mexico awarding twelve contracts, Brazil eight, and Argentina seven. This pattern is largely explained by the relative ease of implementing further projects once an initial project is in place, given the development of local private participation models and a degree of local experience with private transaction processes. In Argentina, for example, the availability of model contracts and regulatory documents is assisting smaller cities and provinces in working with the private sector.

The relationship between total investment and the number of projects awarded is not strong. The total investment in any country depends on how and where the projects have been implemented. The top three countries in terms of number of projects—China, Mexico, and Brazil—have awarded small contracts, and they account for only 7 percent of investment in developing countries in the water and sewerage sector. The top three countries as ranked by investment in private projects have awarded fewer contracts but of larger scale. Argentina, the Philippines, and Malaysia have awarded 16

Table 2: Top Five Developing Countries by Total Investment in Private Water and Sewerage Projects, 1990–97

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>6,183</td>
<td>7</td>
</tr>
<tr>
<td>Philippines</td>
<td>5,820</td>
<td>3</td>
</tr>
<tr>
<td>Malaysia</td>
<td>5,030</td>
<td>6</td>
</tr>
<tr>
<td>Turkey</td>
<td>1,230</td>
<td>2</td>
</tr>
<tr>
<td>Mexico</td>
<td>597</td>
<td>12</td>
</tr>
</tbody>
</table>

Source: PPI Project Database.

Table 3: Top Five Developing Countries by Number of Private Water and Sewerage Projects, 1990–97

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>503</td>
<td>13</td>
</tr>
<tr>
<td>Mexico</td>
<td>597</td>
<td>12</td>
</tr>
<tr>
<td>Brazil</td>
<td>583</td>
<td>8</td>
</tr>
<tr>
<td>Argentina</td>
<td>6,183</td>
<td>7</td>
</tr>
<tr>
<td>Malaysia</td>
<td>5,030</td>
<td>6*</td>
</tr>
</tbody>
</table>

a. The Czech Republic also implemented six projects between 1990 and 1997, with total investment of US$20 million.

Source: PPI Project Database.

Europe and Central Asia and the Middle East and North Africa have small but growing private involvement in the water sector, and recent projects are likely to encourage imitation. For example, the Moroccan government awarded a thirty-year concession contract for a powerhouse-sewerage operation in the Rabat and Sale regions, following a similar project implemented in Casablanca in 1997. Sub-Saharan Africa has almost no private investment, but has eight management and lease contracts.
percent of private projects, but they account for 69 percent of all private investment in water and sewerage.

**Projects differ vastly in size**

Project sizes also differ within countries. In Argentina, for example, one project, Aguas Argentinas, accounts for US$4,464 million (54 percent) of the planned private investment in Latin America, while the country as a whole accounts for US$6,183 million. Similarly, in East Asia three Philippine projects account for half the total investment commitments.

**Concessions are the most popular**

One striking feature of the water and sewerage sector is the dominance of concessions compared with other forms of private participation. Concessions are attractive to governments because they place full operational and investment responsibilities, and associated commercial and investment risk, with the private sector, maximizing potential benefits from efficiency gains and access to private sector financing. But they also require significant government commitment, and efforts to create a credible regulatory environment for private investment. Of ninety-seven contracts with the private sector, forty-eight are concession contracts, accounting for 50 percent of all water and sewerage projects and 80 percent of all private capital investment (table 4 and figure 4). By contrast, in the energy sector most private projects are greenfield projects or divestitures.

Differences in government objectives help explain differences in the contracts preferred in each sector. In the energy sector private involvement has been driven largely by an increasing demand for new capacity, requiring significant private sector investment. In the water sector most developing countries not only need to expand capacity and distribution networks, but also face high levels of unaccounted-for water and inefficient services. The creation of new capacity detached from the management of distribution networks can exacerbate system
inefficiencies. The construction of new water treatment plants, for example, increases the pressure of water going into the distribution network, increasing leaks. If, in addition, collections performance is poor, raising funds to meet take-or-pay commitments will be difficult. Greenfield contracts often do not give the private contractor an incentive to take these problems into account. By contrast, concessions can encourage improved management and maintenance of the whole network.

**Greenfield projects typically involve bulk water sales**

The thirty greenfield contracts account for 31 percent of all projects and US$4,037 million of private investment. Almost all greenfield projects take the form of BOT contracts, with ownership reverting to the government after the initial contract period. In public-private joint ventures ownership of the assets often remains with the public partner during the contract term. Some BOT contracts also give the private sponsor responsibility for management of the distribution network, making them more like concession contracts. There are only five projects in which the private company retains ownership of the facilities. All these BOO schemes are in Latin America and the Caribbean.

Most of the greenfield projects in the sector (twenty-five of thirty, with one project covering both water and sewerage) are for the construction and operation of water treatment plants in countries with an increasing demand for piped water. In these cases companies typically have a take-or-pay agreement with the municipal government for bulk water sales. All six greenfield projects in China, for example, are for water treatment plants. In the relatively high-income countries of Latin America governments have awarded greenfield contracts to meet the growing demand for sewage treatment plants.

**Divestitures are rare**

Divestiture of public water and sewerage assets is comparatively rare; six projects, all partial divestitures, account for 6 percent of all water projects and only 4 percent of private investment. This small share highlights the sectoral difference between water and energy in asset ownership: most water and sewerage assets remain in the public sector, and governments are resistant to giving them up. The availability of concession contracts as an alternative to divestiture has allowed governments to maintain ownership of sector assets while delegating substantial responsibility and risk to the private sector.

**Management and lease contracts are less risky**

Management contracts and leases are intended to improve the performance of loss-making public utilities while leaving the public sector primarily responsible for new investments. Funding for this investment often comes from development bank loans, and all investment risk is borne by the government. These types of contracts have therefore proved attractive in countries where the private sector perceives investment risk to be high. Management contracts attempt to improve efficiency through incentive pay-
ments based on measured performance and involve minimal transfer of risk to the private sector. Leases do transfer commercial risk to the private partner, thereby creating direct incentives to improve revenues and reduce costs. Together, management contracts and leases constitute 13 percent of all projects. Seven of the ten projects in Africa are management contracts or leases. Management and lease contracts account for all single-sector water projects in Africa; all three concessions for water services in Africa also involve electricity generation, transmission, and distribution.

Private participation is easier in water than in sewerage

A breakdown of private involvement by subsector (water treatment, water distribution, sewage collection, sewage treatment) highlights the greater prevalence of private sector involvement in water relative to sewerage (table 5). Government priorities have generally given greater emphasis to supplying water than to removing wastewater after use. Consumers are more willing to pay for water delivery service that yields immediate and direct benefits than for services such as sewage treatment, the benefits of which are more dispersed. In Asia contracts commonly focus solely on the water sector (the national concession for sewerage services in Malaysia is an exception, as are the Manila water and sewerage concessions in the Philippines). By contrast, concessions covering water treatment, water distribution, and sewerage services, as well as BOTs for sewage treatment, are relatively common in Latin American countries. In this region a well-developed water infrastructure is more often already in place, and increasing wealth allows municipal governments to extend concessions to sewerage.

### TABLE 6  TOP FIVE PRIVATE SPONSORS, BY NUMBER OF PROJECTS, 1990–97

<table>
<thead>
<tr>
<th>Sponsor</th>
<th>Projects</th>
<th>Total investment in projects with private participation (1997 US$ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suez Lyonnaise des Eaux</td>
<td>28</td>
<td>16,153</td>
</tr>
<tr>
<td>Vivendi (formerly CGE)</td>
<td>13</td>
<td>5,275</td>
</tr>
<tr>
<td>Aguas de Barcelona</td>
<td>6</td>
<td>9,072</td>
</tr>
<tr>
<td>Thames Water</td>
<td>6</td>
<td>1,375</td>
</tr>
<tr>
<td>SAUR International</td>
<td>5</td>
<td>38</td>
</tr>
</tbody>
</table>

Source: PPI Project Database.

### TABLE 7  TOP FIVE PRIVATE SPONSORS, BY REGION, 1990–97

<table>
<thead>
<tr>
<th>Sponsor</th>
<th>East Asia and Pacific</th>
<th>Europe and Central Asia</th>
<th>Latin America and Caribbean</th>
<th>Middle East and North Africa</th>
<th>Sub-Saharan Africa</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suez Lyonnaise des Eaux</td>
<td>11</td>
<td>7</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>28</td>
</tr>
<tr>
<td>Vivendi (formerly CGE)</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>Aguas de Barcelona</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Thames Water</td>
<td>4</td>
<td>1</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>SAUR International</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

Source: PPI Project Database.
Few major players so far

A few major companies dominate private participation in the water and sewerage sector in developing countries (see table 6 for the top five sponsors by number of projects in which they are involved). The top five sponsors are involved primarily in concessions and lease or management contracts, more rarely in divestitures and greenfield projects.

The small number of major players reveals the novelty of private contracts in the water sector compared with other sectors. Many contracts are awarded to consortia made up of local companies, often operating in other industries, and one or two experienced international companies. A breakdown of the major players by region highlights even more clearly how few major international players operate in developing countries (table 7). Only one of the top five sponsors operates in all five developing regions. There are signs, however, that the growth of the sector will bring an increase in the number of international players. Water and sewerage contracts increasingly are attracting bids from consortia of multisector utility and construction companies.

Conclusion

The water sector has a long history of tariffs below costs and political resistance to raising them. Considerable government commitment is required to raise tariffs to cover costs, and to build regulatory arrangements that give private companies confidence that they can make a fair rate of return on their investments. Even relatively low-risk contracts, such as management contracts and leases, still require governments to establish their credibility as good partners for the private sector. While many governments are contemplating reforms that will make private participation in water and sewerage possible, only thirty-five countries in the developing world have so far succeeded in implementing private transactions in the sector.

Private participation in the water sector is very new. The small number of projects and the dominance of a few major international players are characteristics of an industry in transition. Developing countries are opening their water and sewerage sectors to greater private participation and giving more private operators the opportunity to gain experience in the sector. As opportunities in developing countries increase, water sector projects are likely to attract companies with domestic experience as well as new companies. (We have recently witnessed Enron’s acquisition of a water company in England with the aim of expanding into the water sector overseas.) Companies already operating in developing countries are taking on additional projects as they acquire experience in the sector, but may face a constraint from managerial economies of scale. Expansion may therefore depend on new entrants to the sector.

1 All dollar amounts are in 1997 U.S. dollars.
2 Any impact of the East Asian financial crisis is likely to show in the next update of the water project database.
3 For details on concession contracts see Pierre Guislain and Miche Keef, “Concessions—The Way to Privatize Infrastructure Sector Monopolies” (Public Policy for the Private Sector, September 1995).
4 Claude Crampes and Antonio Estache, “Regulating Water Concessions in Argentina” (Public Policy for the Private Sector, September 1996), Penelope J. Brock Cowen, “The Private Sector in Water and Sanitation—How to Get Started” (page 21 in this volume), and Heler Naimlani, “Testing the Waters—A Phased Approach to a Water Concession in Trinidad and Tobago” (Public Policy for the Private Sector, December 1996).
Improving Water Services through Competition

Michael Webb and David Ehrhardt

Water sector reforms in recent years have concentrated on involving the private sector in the operation and management of monopoly water utilities. Much effort has gone into regulation to stop utilities from abusing their monopoly power, but relatively little into considering ways to reduce that monopoly power. This Note explains how to bring competitive pressures to bear in the water industry. It shows that while it can be difficult to implement conventional product market competition (in which two or more rival operators compete to sell water services to customers in one area), this option should not be ruled out. Better, cheaper water services can also be achieved by increasing the use of competition in purchasing inputs, relying on competitive bidding for the right to supply an area, and benchmarking rival utilities in different areas.

Scope for competing products

In principle there are four means of introducing product market competition: competing networks, private supply, retail competition, and common carriage competition (table 1). The high cost of installing competing networks makes it hard to envisage this as a serious option. But it should not be ruled out. Some utilities are so inefficient or provide such poor service that the construction of a competing network in some areas could be economic. Private supply occurs when one consumer (self-supply) or a group of consumers (cooperative supply) supply themselves rather than rely on the incumbent utility. But this is not an option where there are no suitable water sources close to customers. Retail competition occurs when an entrant takes over supply in an area while continuing to purchase bulk water from the incumbent utility. Another form of retail competition is reselling, in which an entrant exploits a price differential between bulk and retail supply but does not invest in distribution facilities. Common carriage competition can include competition between vertically integrated suppliers sharing access to a single network and competition between vertically disaggregated retailers that share access to a single network and purchase water from competing bulk suppliers.

Opportunities for competitive supply include providing improved service to areas willing to pay for it. Intermittent supply often forces businesses and hotels to install their own tanks and backup arrangements, at a higher cost than would be required to provide a secure piped system. Retail competition can help them cut costs by providing secure supply to an area. Another opportunity is providing supply to customers who are willing to pay the full cost but are currently unserved. Such customers could be in slum areas and urban peripheries, for example, where consumers often pay more than the cost of piped service to water vendors or for self-supply.

The main obstacle to such competitive service is that competition—and operations, such as private abstraction, that make competition possible—is prohibited by law in many countries. But for reasons explained below,
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Relevance to cities</th>
<th>Relevance to secondary towns</th>
<th>Conditions for success and government action required</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competing networks</td>
<td>Competing suppliers each establish their own distribution system</td>
<td>×</td>
<td>×</td>
<td>No ban on competition</td>
<td></td>
</tr>
<tr>
<td>Private supply</td>
<td>Customers supply themselves (and their neighbors)</td>
<td>✓</td>
<td>✓</td>
<td>No ban on private supply</td>
<td>Jamaica (on-site sanitation for hotels), Bahamas (on-site desalination), India (private wells), among many others</td>
</tr>
<tr>
<td>Retail competition*</td>
<td>An entrant purchases bulk water supply from the incumbent and constructs its own distribution network to customers without service or with poor service</td>
<td>✓</td>
<td></td>
<td>Bulk supply prices that neither disadvantage nor subsidize the entrant; sufficient bulk water to supply entrants</td>
<td>The United Kingdom and informally in many places, including Maputo, Mozambique</td>
</tr>
<tr>
<td>Common carriage competition</td>
<td>Several water utilities use a single network to supply customers, and customers can choose their water supplier</td>
<td>✓</td>
<td>×</td>
<td>Appropriate network access; technical parameters for water quality; possibly separation of network ownership from service provision; considerable information and administrative capacity May be inappropriate for deteriorated networks, and may be accompanied by development of a wholesale water market, to allow trading between water providers</td>
<td>U.S. and U.K. railways, U.S. telecommunications The United Kingdom is moving toward this kind of competition in the water sector</td>
</tr>
</tbody>
</table>

a. In all models of product market competition, social objectives need to be met through market-friendly mechanisms, not exclusive franchises and cross-subsidies. Environmental and health regulations need to be competitively neutral.
b. Unlikely to be economic.
c. Facilities-based with bulk supply.
d. Small towns probably cannot support competing providers.
governments should be reluctant to grant exclusive franchises or to otherwise place legal limits on competition. And sometimes it is desirable to go beyond allowing competition and actively promote it. For example, a new supplier could not set up a competing water supply network if there are no suitable water sources close to the potential customers. In such cases it may be efficient to require the incumbent utility to provide bulk water from its network to the new entrant. (This approach will work only where the incumbent has adequate water. Where that is not the case, the approach will work only if combined with other strategies to increase water supply, such as competitive procurement of build-own-operate water supply projects or of leakage reduction services.) An analogous situation arises in telecommunications, where phone companies are required to interconnect with one another.

It would also be possible to have several water utilities that compete for customers using a single set of pipes. The network owner would be required to allow other water suppliers to use the network for a cost-reflective, nondiscriminatory fee. This approach, known as common carriage, has been successfully used to introduce competition in gas and electricity in many countries (box 1).

The experience of England and Wales, where small, dynamic, innovative companies are setting up to compete in the water industry, provides an interesting example of how competition in water can develop (box 2).

**Promoting competition—regulating for bulk access and common carriage**

To promote competition, governments may have to develop an efficient bulk supply or network access regime. The most important part of such a regime is the price of bulk supply or network access. To ensure efficient competition, this price should reflect costs. But estimating the cost of providing access or bulk supply can be difficult for water utilities in developing countries, which often have limited information on their network. Many do not know exactly how much leakage is occurring, or even where their pipes are.

Other network industries faced similar (though generally less severe) problems in introducing competition. From their experiences have come many workable solutions, including:

- Requiring the parties to agree on a price and reserving the right of a regulator to intervene or arbitrate if they cannot.
- Setting a price that approximates marginal cost initially, and then refining it over time.
- Requiring an incumbent to charge an entrant the same cost that it charges itself. This may require accounting separation of the incumbent's business into bulk supply, distribution, and retail.

Differences in water quality are a serious issue for common carriage arrangements. Water from different sources may vary in chemical composition, bacteria levels, turbidity, color, and other parameters. But once it flows into the network, water from all sources is mixed, which can result in such problems as:

- Contamination. If one company puts water contaminated with fecal coliform into the system, customers of all the companies will get sick.
- Disruption in industrial users' processes. Food processors, breweries, and other water users calibrate their processes to the water's usual chemical composition. If this composition changes, product quality will be affected.
- Changes to the network. The inner walls of pipes reach a chemical equilibrium with the water flowing through them. Changing the composition of the water could cause faster corrosion, increased buildup of residue inside the pipe, or the release of previously accumulated residue into the water.

Water operators tend to argue that these problems are unique to water and that they rule out common carriage competition. Neither assertion is true. All network industries must ensure consistent minimum quality standards and technical compatibility in use of the
Improving Water Services through Competition

Each customer signs a contract, specifying the price of water, with one or more companies. Each company's retail arm is then responsible for reading its customers' meters, billing them, and collecting payment. While this kind of competition has not yet been tried in water, experience shows that it works in gas, electricity, and telecommunications.

To take the competition one step further, ownership of the sources could be separated from the retail functions. That would create a wholesale market between the water resource owners and the water retailers, a market structure that has worked well in other utility industries.

Costs versus benefits of competition

Social and environmental concerns are often the reason for limiting competition. These concerns are valid. For example, uncontrolled groundwater abstraction can lower the water table, causing subsidence (as in Bangkok and Mexico City) or saline intrusion. Similarly, uncontrolled on-site sanitation can pollute ground water. Package sewerage plants are often poorly operated, create smells, and discharge inadequately treated effluent into rivers or the...
sea. Cross-subsidization is often a deliberate social policy, used to provide services at below cost to households or to promote a uniform tariff throughout a town or country.

It is generally better to achieve environmental and social objectives through competitively neutral mechanisms, however. For example, an independent water resource or environmental agency should control all water abstraction and discharge, regardless of whether done by an incumbent water utility, a new entrant, or someone supplying themselves. Social objectives can be met through direct subsidies to low-income households or through the general tax-benefit system.

But common carriage and bulk supply arrangements demand skilled policymaking and well-developed regulatory capacity. Complex contracts and metering and payment systems are needed to control relationships between companies that compete while sharing a single network. Would the efficiency gains from competition in water outweigh the costs of these? The case for common carriage competition in water is less compelling than that in other network industries, for several reasons:

- The costs of introducing product market competition in water are likely to be as high as those in other industries—and they may even be higher as a result of the lack of information in the sector.
- Water is generally less valuable than the products or services provided by other network industries. For example, the combined turnover of the regional electricity companies in England and Wales last year was more than twice the turnover of the water companies serving the same area. So a given percentage gain in efficiency is worth less in water than in other industries.
- In water a greater share of costs is in the network (which will remain uncompetitive) than in the potentially competitive areas. This is the reverse of the situation in electricity, for example, where more than 50 percent of the costs are in the competitive generation and retail segments.

Still, the net gains from competition have been huge in many industries. If even a fraction of these gains could be realized in water, the costs could be worthwhile. As a general rule complex forms of competition involving common carriage arrangements are worth contemplating where:

- Administrative and regulatory capacity is high.
- Water is high cost.
- The incumbent's network is in reasonable shape.

<table>
<thead>
<tr>
<th>BOX 2</th>
<th>INSET APPOINTMENTS IN ENGLAND AND WALES</th>
</tr>
</thead>
<tbody>
<tr>
<td>During privatization of the water and sewerage sector in 1989 the U.K. government allowed limited competitive entry. &quot;Inset appointments&quot;—licenses issued by the regulator, the Office of Water Services (Ofwat), to new entrants to supply a defined area—were permitted for sites that were not already connected and that were more than 30 meters from the local water utility's distribution main or sewer. In 1992 the scope for competition was increased. The 30-meter rule was removed. And large customers at qualifying sites (sites not connected to a supplier's distribution main or sewer) taking 250 million liters or more a year were given the right to choose a new (inset) supplier. At the same time inset entrants were allowed to apply for bulk supply from the local water utility. The terms of this bulk supply would be decided by Ofwat if negotiations between the parties failed. Residential customers were also allowed to connect to a neighboring water utility, at their own expense. A 1995 review led to proposals to further increase competition. These included relaxing the definition of a qualifying site for inset appointments, removing the water utilities' monopoly on making connections to the water main, and allowing utilities to supply large customers in a competitor's interconnected system by paying a fee for using the system (common carriage). Only three cases of inset competition have occurred so far, but many applications for inset appointments have been made to Ofwat. In response to the threat of competition, twenty-two of the United Kingdom's twenty-eight water companies have lowered tariffs for large users, making cuts ranging from 1 percent to about 25 percent.</td>
<td></td>
</tr>
</tbody>
</table>
While rare, these conditions do exist in some places in Central and Eastern Europe and Latin America. And they are likely to arise in more and more places as a result of other reforms, such as introducing private sector participation. So it is a good idea to build in the potential for competition rather than locking in monopolies for thirty or so years, as often happens when concessions are granted today.

In most places it will be desirable to allow self-supply as well as competitive entry by suppliers that can meet a market need by providing both a source of water and a distribution system. This can be a simple and effective way to put pressure on incumbents to keep costs down and limit cross-subsidies. The main exceptions will be where, as a result of a severe lack of administrative capacity, pressing social needs can be met only through cross-subsidy, or effective control of abstraction of water or discharge of wastewater can be achieved only through an outright ban on small abstractors and dischargers.

It might also be argued that granting an exclusive concession is essential to attract the private sector. Exclusivity could reduce risk to private investors and provide a secure base to finance expansion of the system to new areas. Where these goals are important, it might be best to draw on experience in telecommunications, where it is now common to grant newly privatized incumbents exclusive rights for only a limited period, typically four to seven years.

**Competition to supply inputs**

There is a growing trend toward expanding the scope for competitive procurement to include larger and more important services. There are three main reasons why putting operations and maintenance functions out to tender can lower costs. First, independent providers of functions such as cleaning may reap economies of scale beyond the reach of individual water companies. Second, small specialist companies have lower overhead and adopt new technologies faster than large utilities. Third, public water companies often have high costs as a result of overstaffing and restrictive labor practices.

But competitive contracting can go beyond operations and maintenance. For example, services to reduce water losses can be contracted out to competing teams. If contracts with the teams are well defined, they can provide strong performance incentives. Toulon, France, for example, has awarded a five-year contract in which the contractor's only payment is a 50 percent share of the value of the water saved.

Expansion of supply capacity can also be contracted for competitively. Build-own-operate (BOO), build-operate-transfer (BOT), and build-own-operate-transfer (BOOT) projects for water supply and sewerage have been used in many countries.

Such approaches could be used more extensively as a way of increasing competition. Utilities wishing to increase water supply or sewage treatment capacity could be required to publish their needs and call for bids. That would allow bidders complete freedom to design any scheme that would achieve the objective. For example, a water utility might intend to expand water supply by building a pipeline to bring water from far outside the town. Calling for bids for bulk water supply (rather than for bids limited to the project the utility has in mind) opens the way to innovative solutions. One bidder might offer to provide the water by fixing leaks in part of the network. Another might offer to rehabilitate a pumping station to increase its capacity.

Network extensions can also be competitively procured by adapting BOOT ideas. For example, the contractor could be made responsible for designing and building the network and then maintaining it for a set number of years after construction, with penalties payable if leakage rises above the target.

Whether efficiency gains are realized depends on the monopolist's cost-consciousness. A private concession holder subject to an incentive-
compatible regulatory regime (such as a price cap) could be expected to contract out operations and maintenance functions if this lowered costs. Publicly owned utilities or those subject to cost-plus regulation could be required to procure many inputs competitively. Such rules would be beneficial as long as the utility has, or can develop, the ability to manage, coordinate, and enforce contracts.

**Competition for the market**

When the right to serve customers in an area is put out to competitive tender, the winner might be the company promising the lowest tariffs or the one requiring the lowest subsidy. Competition forces the bidders to reveal the minimum cost of providing water and sanitation, allowing efficiency gains to be realized and passed on to consumers. Many major water sector reforms in recent years have used competition for the market as an efficient way of introducing private sector participation, and the approach has delivered benefits to consumers. For example, in Guinea competition resulted in a tariff 30 percent lower than a benchmark price estimated by consultants, and in Manila the winning consortium for one of the concession areas offered a tariff reduction of 74 percent.

Drafting such contracts and holding a tender are expensive. For small towns the cost of preparing a tender is disproportionate to their size. Small towns are further disadvantaged because private operators may be unwilling to incur the substantial cost of making a bid when the contract is small. These problems can be overcome. Several small towns can join together and award a contract to supply all of them.

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**FIGURE 1 SIMPLE UNIT PERFORMANCE MEASURES**

```
\begin{tikzpicture}
  \node (total) {Total cost per unit of output};
  \node (operating) [below of=total, yshift=-1cm] {Operating cost per unit of output};
  \node (labor) [below of=operating, yshift=-1cm] {Labor cost per unit of output};
  \node (materials) [below of=operating, yshift=-1cm] {Materials cost per unit of output};
  \node (contractor) [below of=operating, yshift=-1cm] {Contractor cost per unit of output};
  \node (maintenance) [below of=operating, yshift=-1cm] {Maintenance cost per unit of output};
  \node (capital) [below of=total, yshift=-2cm] {Capital cost per unit of output};
  \node (commercial) [below of=total, yshift=-2cm] {Commercial and network efficiency};
  \node (nonrevenue) [below of=commercial, yshift=-1cm] {Nonrevenue water (water losses) (percent)};
  \node (average) [below of=commercial, yshift=-1cm] {Average age of receivables};
  \node (bills) [below of=commercial, yshift=-1cm] {Bills paid (percent)};
  \node (ccd) [below of=capital, yshift=-1cm] {CCD per unit of output};
  \node (interest) [below of=capital, yshift=-1cm] {Interest cost per unit of output};
  \node (return) [below of=capital, yshift=-1cm] {Return on capital per unit of output};

  \draw (total) -- (operating);
  \draw (operating) -- (labor);
  \draw (operating) -- (materials);
  \draw (operating) -- (contractor);
  \draw (operating) -- (maintenance);
  \draw (total) -- (capital);
  \draw (total) -- (commercial);
  \draw (commercial) -- (nonrevenue);
  \draw (commercial) -- (average);
  \draw (commercial) -- (bills);
  \draw (capital) -- (ccd);
  \draw (capital) -- (interest);
  \draw (capital) -- (return);
\end{tikzpicture}
```
Competition for the market can be combined with other forms of competition:

- While it is common practice to award bidders an exclusive franchise, allowing product market competition could increase competition.
- Requiring the concessionaire to contract out many services can keep up the pressure for efficiency during long-term contracts.
- Comparative competition between the concessionaire and other utilities can boost performance (see below).

### Comparative competition

Regulators and consumers can compare utilities to judge their performance. Several types of such comparative competition are possible, including:

- A "pure" version, in which the price a firm may charge is set by the costs of other firms in the industry. This means that firms can increase profits by reducing costs. If all firms lower their costs, a virtuous circle results in which all firms' costs and tariffs are driven downward.
- Regulatory benchmarking of companies against one another, to estimate efficiency and set price caps accordingly. Figure 1 shows a hierarchy of cost indicators that can be used in this approach. These indicators can be supplemented by sophisticated statistical techniques that take into account differences in companies' operating environments.
- Publication of comparisons of companies' performance in the media. This can be a simple but powerful tool.

Sophisticated benchmarking using statistical techniques to compare companies' efficiency has worked in England and Wales to some extent. In Brazil a national agency concerned with water sector reforms, the PMSS, has assembled consistent data on a full set of operating cost variables for almost 100 municipal areas. Comparative competition can also focus on quality. New Zealand grades potable water supplies from A to E. This system has stimulated debate on the cost-quality tradeoff in areas with low grades and put pressure on utilities to improve. Consumer groups in India have had success with a similar "report card" concept comparing utilities' performance in many aspects of service.

Comparative competition is a powerful tool for improving performance, and it can be introduced at relatively low cost in a wide variety of settings. To ensure that it is effective, governments introducing such competition should:

- Divide municipalities or regions into several zones, each served by a separate utility, where this can be done without sacrificing economies of scale. Manila and Mexico City have both adopted this approach.
- Set up systems to share information on utilities in different areas (as in Brazil, Colombia, the United Kingdom, and elsewhere).
- Link comparative performance to incentives. This can be done by linking pay or profitability to relative performance or making renewal or expansion of contracts contingent on good performance.

It is also worth developing international performance comparisons, as the Asian Development Bank, the World Bank, and other institutions have started to do. Since the United Kingdom has advanced furthest in comparative competition, the techniques and data definitions it has developed could provide a good basis for an international system.

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1 For details on concession contracts see Pierre Guislain and Michel Keef, "Concessions—The Way to Privatize Infrastructure Sector Monopolies" (Public Policy for the Private Sector, September 1995), Claude Grampes and Antonio Estache, "Regulating Water Concessions in Argentina" (Public Policy for the Private Sector, September 1996), Penelope J. Brook Cowen, "The Private Sector in Water and Sanitation—How to Get Started" (page 21 in this volume), and Helen Nankani, "Testing the Waters—A Phased Approach to a Water Concession in Trinidad and Tobago" (Public Policy for the Private Sector, December 1996).

Michael Webb (mikew@londecon.co.uk) and David Ehrbardt (david@cwjamaica.com), London Economics, United Kingdom.
The benefits from private participation in water and sanitation depend on the level of risk and responsibility the government hands over to the private sector. But strong government commitment and careful preparation are required if the private sector is to take on significant risks and responsibilities. A government about to enter into a concession contract for twenty-five or thirty years, for example, needs to be sure that it does not, in haste, gloss over details that will later land it in messy renegotiations, with loss of face to all concerned and reduced benefits to consumers. But governments often worry that detailed preparations take too much time. This Note, based on a set of World Bank toolkits compiled from experiences involving the private sector in water and sanitation, reviews the essential factors in choosing a privatization option and argues that preparation pays dividends (box 1).

What makes the business special?

The activities of urban water and sanitation utilities range from impounding and treating raw water, to distributing water and collecting sewage, to treating sewage. In many ways, decisions about how to involve the private sector in these operations resemble decisions about privatization in any other utility sector. All such privatizations, for example, require decisions on how to set up an independent regulator and how to set and enforce service standards. But water and sanitation have special features that governments must take into account in choosing and designing a contract and in designing a supporting policy framework:

- Water and sanitation systems are characterized by a high degree of natural monopoly. Although competition is feasible in such limited areas as building capacity and providing plumbing services, it is difficult to achieve in distribution and collection, core activities in water and sanitation (table 1). So governments wanting to involve the private sector have been able to rely little on competition to assure good outcomes for consumers and have instead had to devise regulatory systems for this purpose.

### BOX 1 TOOLKITS FOR PRIVATE SECTOR PARTICIPATION IN WATER AND SANITATION

The World Bank has published a set of toolkits to guide governments in designing and implementing private sector arrangements for water and sanitation. The toolkits focus on three sets of issues:

- How to choose a private sector participation option. What are the options? What might you have to do to make your preferred option practicable? What are the risks?
- How to design the process for refining and implementing the chosen option. What might a critical path look like? How do you set up a government unit to run the privatization process? What can you expect from legal, financial, economic, and engineering advisers—and how do you go about hiring them? How do you design a bidding process? What can you do to keep the contract on track once you’ve chosen a private partner?
- How to ensure that contracts cover all the issues. What should a concession, build-operate-transfer (BOT), or management contract cover? In writing or reviewing contractual documents for a concession, a BOT arrangement, or a management contract, how do you know if you’ve covered everything? What are your options for allocating and managing the many risks that go with the contract?

To order copies of the toolkits, contact the World Bank bookstore, tel: 202 477 1234, fax: 202 477 6391, or email: books@worldbank.org (quote stock number 14003).
Water is essential to life, and access to it must be ensured for all. Guaranteeing access for the poor will sometimes require designing subsidies or schemes for reducing the cost of delivering services to the very poor. A complicating factor for reformers is that existing systems for allocating scarce raw water resources among alternative uses—urban consumption, irrigation, industry—are often incompatible with efficient use. In India, for example, many cities go short of water while farmers continue to receive subsidized water for irrigation.

Water and sanitation are well suited to local management, and in many countries responsibility for service provision is decentralized to the provincial or municipal level. As a result complex interjurisdictional issues often need to be resolved before the private sector can be brought in.

Many of the assets of water and sanitation systems are buried, so obtaining accurate information about them is costly—increasing the cost of preparing for private sector participation, and the chance of surprises after the contract is signed.

Broad access to water and sanitation yields important public health and environmental benefits. Government interventions to promote these benefits are likely to remain after privatization.

None of these issues is a barrier to private sector participation—all arise under both public and private provision. But governments often systematically confront their implications only when they begin to contemplate private sector involvement. Failure to adequately address these issues increases the risk that a government will be unable to find a partner for its preferred form of private sector participation or that a private sector arrangement will fall short of its broad policy objectives.

The main private sector options—and who’s doing what

Different countries have adopted different options for private sector participation. Trinidad and Tobago is using a management contract for water and sewerage services and plans to replace it with a concession. Guinea has a lease arrangement for water treatment and supply in seventeen cities. Buenos Aires and several other Argentine provinces have concessions for water and sewerage. And England and Wales have divested their water and sanitation utilities.

The main options can be clearly distinguished by how they allocate responsibility for such functions as asset ownership and capital investment between the public and private sectors (table 2). The more risk and responsibility are passed to the private sector, the more powerful are its incentives to improve services. Service contracts, which confer little risk and responsibility on the private sector, offer commensurately small gains—and are simply not designed to address managerial inefficiency or chronic underinvestment. Concessions and divestitures are well suited to tackling these problems—but demand more from government in commitment and preparation.

In practice, private sector arrangements are often hybrids of these models. For example, leases may pass some responsibility for small-scale investment to the private sector, and management contracts may, like leases, have revenue-sharing provisions that pass on some commercial risk. Options can also be used in combination—for example, a build-operate-transfer contract for bulk water supply might
be combined with a management or lease contract for operating the distribution system.

**Key factors in choosing an option**

Governments seeking to involve the private sector in water and sanitation may have a range of objectives—introducing greater technical and managerial expertise and new technology, improving efficiency, constructing large-scale projects, cutting the cost of public subsidies or redirecting them to the poor, and making the sector more responsive to customers. All forms of private sector participation can be designed to improve technical and managerial capacity. But whether the other objectives can be met depends on which option is chosen and whether the government can do a good job on the enabling and regulatory environment. A poor job can lead to dissatisfied customers and difficult renegotiations with the private partner. Under the Guinea lease, for example, consumers have lost out because disputes over the division of responsibilities between the government and the operator have hampered new connections and service improvements. The Buenos Aires concession has led to better service, but there have been costly disputes over the definition of the regulator’s role (for example, in determining investment requirements) and the handling of adjustments in tariff levels and structure.

To determine which private sector options are feasible—or what must be done to make a preferred option possible—a government needs to undertake a range of analyses:

- **An analysis of the state of the utility**—looking at the current level and standard of service, the condition and serviceability of assets, the human resources, and the financial performance. Is information about the utility’s assets good enough to serve as a base for long-term contracts? If not, can better information be produced rapidly? Where information about the quality of underground pipes, for example, is partial or inaccurate, revelations about the true state of the system that come after a concession contract has been signed may lead to costly renegotiations.

- **An analysis of the existing regulatory framework**—both general laws that might affect private participation in the sector and sector-specific laws and institutions focusing on pricing and quality standards. Does the existing regulatory framework provide sufficient support for the private sector so that it will take on commercial risk? If not, can the necessary changes be made fairly easily? And if not, can

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**TABLE 2**  
**THE MAIN OPTIONS FOR PRIVATE SECTOR PARTICIPATION AND THEIR ALLOCATION OF RESPONSIBILITIES**

<table>
<thead>
<tr>
<th>Option</th>
<th>Asset ownership</th>
<th>Operations and maintenance</th>
<th>Capital investment</th>
<th>Commercial risk</th>
<th>Duration</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service contract</td>
<td>Public</td>
<td>Public and private</td>
<td>Public</td>
<td>Public</td>
<td>1-2 years</td>
<td>Chile (Santiago)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>India (Madras)</td>
</tr>
<tr>
<td>Management contract</td>
<td>Public</td>
<td>Private</td>
<td>Public</td>
<td>Public</td>
<td>3-5 years</td>
<td>Gaza</td>
</tr>
<tr>
<td>Lease</td>
<td>Public</td>
<td>Private</td>
<td>Public</td>
<td>Shared</td>
<td>8-15 years</td>
<td>Trinidad and Tobago</td>
</tr>
<tr>
<td>Build-operate-transfer</td>
<td>Private (bulk services)</td>
<td>Private</td>
<td>Private</td>
<td>Private</td>
<td>20-30 years</td>
<td>Guinea (17 cities)</td>
</tr>
<tr>
<td>Concession</td>
<td>Public</td>
<td>Private</td>
<td>Private</td>
<td>Private</td>
<td>25-30 years</td>
<td>Poland (Gdansk)</td>
</tr>
<tr>
<td>Divestiture</td>
<td>Private</td>
<td>Private</td>
<td>Private</td>
<td>Private</td>
<td>Indefinite</td>
<td>Argentina (Buenos Aires)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Côte d'Ivoire</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Philippines (Manila)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>England and Wales</td>
</tr>
</tbody>
</table>
parts of the regulatory function be simplified or contracted out in the short term? Where regulatory capacity is weak, for example, collection of information on the utility’s technical and financial performance could be contracted out to a private auditing company.

- An analysis of which stakeholders (employees, consumers, environmentalists, government agencies) support private participation and which oppose it. Can processes and policies be put in place to address stakeholder concerns? Can the risk of political interference be minimized? Often, a key factor in the success of a private sector project is identifying the concerns of employees early on and finding constructive ways of addressing them—rather than allowing those concerns to derail the reform process later.

- An analysis of the financial viability of alternative options. Do current tariffs cover costs? Can the private sector reasonably be expected to boost efficiency enough to meet the proposed service objectives without increasing tariffs? If not, will consumers be willing to pay higher tariffs? And if not, can grant finance (or subsidies to needy households) support service improvements? This kind of financial analysis can sometimes lead to redefinition of a private sector project—for example, rebalancing planned investment expenditures between new production capacity and the rehabilitation of existing distribution systems.

As table 3 shows, in a very simplified way, the results of these analyses can point the government to an appropriate choice of private sector option. If regulatory capacity is weak and political commitment is low, for example, a concession will be difficult to implement. Even with strong political commitment to a concession or divestiture, however, countries that lack a good business climate or a strong track record of successful private investment may not immediately be able to attract large-scale private financing for infrastructure projects. These countries may need to start out with a management contract and work up to options that demand more of the private sector.

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Regulating Water Companies

Michael Klein and Timothy Irwin

The water industry differs in two key respects from other network industries, such as gas, electricity, and telecommunications. First, there are fewer opportunities for introducing competition among suppliers, since the network of pipes is a major element of the total cost of water and can be operated efficiently only as a monopoly. Second, the quality of water is crucial, but hard for consumers to check. Together these problems mean that getting the best performance out of water companies requires regulation by the government of the price and quality of water.

To regulate well, however, the regulator needs to have an idea of how much it would cost an efficient company to supply high-quality water. One way of generating that information is to auction the right to supply water every twenty years or so. Firms state the price at which they would be willing to supply water of a specified quality, and the firm offering the lowest price wins the contract. In between auctions, however, regulators need to use other methods to adjust the price in response to changing circumstances. No method is perfect; the best may be to increase the price every year by the rate of inflation, perhaps with an adjustment for expected productivity changes, and review the price every three to five years to ensure that the water company's profits are reasonable. The importance of investments to maintain the quality of water means that regulators should be careful, when reviewing prices, to allow the firm to cover the costs of such investments.

Why regulate water companies?

When water is sold by street vendors, consumers have a choice of suppliers. As a result water sellers have an incentive to sell water at a price not much higher than its cost and to take steps to show that the water is safe to drink. But the arrival of piped water changes everything. It is much, much cheaper than water sold by vendors, as table 1 suggests. In the Asian cities in the table, these lower prices are due in part to government subsidies. But even when the subsidies are taken into account, piped water is still at least 50 percent, and usually 75 percent, cheaper. At the same time, however, consumers lose the choice of suppliers that they used to have.

In the nineteenth century water companies laid competing pipelines in towns in Canada, the United Kingdom, and elsewhere. But it is usually efficient to have just one network of pipes, and as a result of either free competition or municipal regulation, the competing networks

<table>
<thead>
<tr>
<th>City</th>
<th>Vended</th>
<th>Piped</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bandung</td>
<td>616</td>
<td>10</td>
</tr>
<tr>
<td>Jakarta</td>
<td>185</td>
<td>17</td>
</tr>
<tr>
<td>Manila</td>
<td>187</td>
<td>11</td>
</tr>
<tr>
<td>Karachi</td>
<td>175</td>
<td>8</td>
</tr>
<tr>
<td>Ho Chi Minh</td>
<td>151</td>
<td>8</td>
</tr>
</tbody>
</table>

*Source: Asian Development Bank, Water Utilities Data Book—Asian and Pacific Region (Manila, 1993).*
Regulating Water Companies

of the nineteenth century soon turned into monopolies. Technically, the water supply system is a natural monopoly: the cheapest way to supply water involves just one firm owning a network of pipes. Water monopolies, of course, can and do exploit their privileged position. In the worst case, they may even be able to charge as much for water as street vendors, in which case all the benefits of piped water accrue to the monopoly.

![Figure 1: Main Components of Water and Sewerage Systems](source: North West Water, "The Advanced Water Cycle" (1994)).

In some industries in which networks are important—gas, electricity, and telecommunications—governments have limited the scope of the natural monopoly problem by separating production from transmission through the network. Thus competing electricity generators, for example, can send power to consumers using one network. Theoretically, this is possible in water too.

Competing water “production” firms that own the bulk storage reservoirs and water treatment plants (figure 1) could sell water to a company that distributed it to consumers through one network of pipes. Although such a system has recently been proposed in Chile, no one has yet succeeded in implementing this sort of competition. The reason is probably that network-related costs are a larger proportion of total costs in the water industry than in gas, electricity, and telecommunications. The gains to be made from introducing competition in, say, water collection and water treatment are thus relatively small, and they have to be weighed against the coordination problems introduced by splitting up ownership of the system.

Competitive water supply may be efficient near the boundary of two water companies’ territories or in regions where water is very scarce and therefore the cost of the network is lower relative to the cost of the water. Competition is also possible for services peripheral to the main service, such as connecting new users to the system. But for the time being, most water will be supplied monopolistically, and society needs some way to encourage efficiency despite the monopoly.

The difficulty of regulating well

In villages, consumers can form cooperatives to run the water system themselves; since the producers are also the consumers in such a system, they have good reason not to charge too much for water or to be careless about its quality. But in larger regions, consumers need to delegate the problem of setting prices and quality standards to someone else. The traditional option is to delegate it to the government. Government ownership doesn’t automatically solve the problem, however. Monopoly suppliers of all types are tempted to charge high prices or to lower quality. And government ownership introduces its own problems, since the government, as an owner, usually exerts relatively weak pressure on firms to lower their costs.

Whether the water firm is publicly or privately owned, the key to achieving efficiency lies in the choice of a regulatory mechanism to over-
see the firm's performance. Good mechanisms protect consumers from high prices and low quality. But they also safeguard the legitimate interests of the water companies, since, if the companies are to invest, they need to believe that the regulators will let them earn enough revenue to make a reasonable profit.

If the regulator had enough information—in particular, if it knew what it would cost an efficient water company to produce water of different qualities—it could simply rule that the actual water company had to sell water of a certain quality for a price equal to the efficient firm's cost of production. That price would be just high enough to allow an efficient water company to make a reasonable profit, but no higher. Neither the company nor the consumer would be exploited. And as technology and demand changed, in this perfect system, the regulator would revise the price and the quality standard so that they were always at the right levels.

In fact, of course, the regulator cannot easily tell how much it would cost an efficient firm to produce water. At best, it can observe actual firms' costs, but these can be concealed by clever accountants. Moreover, an important part of a water firm's cost is the cost of the financial capital tied up in the firm. Estimating the cost of that capital requires an estimate of the riskiness of the investment, complicating the regulator's information problem yet further. With imprecise cost estimates, there is always a risk that the regulator will set the price too high, hurting consumers and unnecessarily discouraging water use, or too low, encouraging the wasteful use of water and discouraging investment by water companies.

In addition, because the regulator probably guesses what it would cost an efficient firm to produce water partly by observing the actual water company's costs, the water company no longer has such a strong incentive to produce efficiently. Since lower costs would lead the regulator to lower the price the company can charge, the company would not get all the benefits of cutting costs.

A big part of the regulatory problem, therefore, is to design rules that give the regulator access to better information about the appropriate price of water.

**How to generate good information**

Probably the best way of discovering the appropriate price is to establish a competitive system of tendering—or auctioning—the right to supply water. The regulator says, for example, that it wants a firm to provide water of a specified quality. It then asks firms to propose a price for supplying the water. The firm that proposes the lowest price wins the right to supply the district at that price (or perhaps at the price of the next-lowest bidder—the details of the auction can vary). In principle, the most efficient supplier of water will win the auction, and the resulting price will be appropriate.

Experience confirms the value of auctions. In Buenos Aires in 1993, for example, the winning bidder offered to deliver water at a price about 27 percent lower than the price under state ownership—although the price later increased. What's more, the new supplier agreed to invest US$200 million a year for the first five years, compared with annual investment of US$20 million to US$40 million in the preceding years. In another example, a small town in France managed to cut the price of water from 3.0 francs per cubic meter to 1.7 francs when it decided in 1994 to auction the right to supply water.

**A small town in France managed to cut the price of water from 3.0 francs per cubic meter to 1.7 francs when it decided in 1994 to auction the right to supply water.**
Yet auctions are no panacea. To keep up with changes in technology and demand would require repeating the auctions every couple of years—which is what happens, for example, with garbage collection in many cities. Water companies, however, must make investments with a life of decades that have little value in other uses. Pipes, once laid, will last for years, and digging them up later to move them to a new site is prohibitively costly. A water company that could easily lose its contract in an auction next year would therefore be justifiably cautious about long-term investments.

The problem is partially addressed by requiring a new winning firm to pay the old firm for the pipes and other immovable assets. But working out the price the new firm should pay is difficult. For one thing, the pipes are underground and their condition is hard to assess. To encourage valuable investments, then, auctions must be repeated only infrequently (every twenty years perhaps), or the incumbent must be given an advantage over other bidders. But either way some of the benefits of the auction are lost. First, an incumbent with a privileged position has weaker incentives to offer the lowest possible price at the next auction. Second, technology and demand—and therefore the appropriate water price—change during the term of a twenty-year contract. Between auctions, the regulator must again try to estimate how the right price has changed.

How to adjust prices between auctions

How should regulators adjust prices between auctions? Over three- to five-year periods, the best option is probably to adjust them in a mechanical way. Traditionally, regulators in the United States have adjusted prices so as to keep the company’s rate of return on capital at a constant level: if the company’s rate of return falls below that level, the regulator allows prices to rise. The problem with this method is that it gives the company little incentive to limit its costs and, when the target rate of return is higher than the cost of capital, it gives the company a strong incentive to invest more—in any thing at all.

More recently, therefore, the United Kingdom has chosen to change the price by means of a formula, known as RPI—X, that increases the water price by the increase in the retail price index adjusted by a factor, X, to account for expected productivity gains and other changes. Under this method the company has incentives to lower costs, since it keeps the resulting profits. The method can also be refined by choosing a price index that relates more specifically to the input price inflation experienced by water companies. Care needs to be taken, however, to avoid re-creating the problem of compensating the company for cost increases it could have avoided.

RPI—X price adjustments are probably better than rate-of-return price adjustments, but the difference between them is not as big as it might seem. RPI—X formulas need to be reviewed every three to five years or so, since the regulator does not know exactly how large X should be and, in reviewing whether X was set appropriately, will take into account the profits being made by the firm: for example, if they are very large, X is probably too small. In addition, the importance of quality means that regulators should allow firms to pass on the costs of reasonable investments that maintain water quality.

The undesirable incentive effects of both RPI—X and rate-of-return adjustments can be reduced by comparing the prices charged by other water companies in different but sufficiently similar locations, as happens in the United Kingdom. If comparable companies can profitably sell water at lower prices than the company under examination, the regulator may be justified in keeping prices low despite low profits.

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Getting the Private Sector Involved in Water—What to Do in the Poorest of Countries?

Penelope J. Brook Cowen

There is growing recognition that the private sector can do much to help meet infrastructure needs in developing countries. But the countries most in need of the private sector’s assistance—technical, managerial, and financial—are those least likely to be attractive to it. This problem is particularly acute in the water sector.

Water has historically been hugely underpriced in most developing countries. Though subsidized water tariffs generally do little to help the very poor (who often lack formal water connections), governments have clung to them in the belief that they are doing the socially appropriate thing, and proposed tariff increases tend to meet with vociferous opposition from the middle class and wealthy. Water systems are often poorly run, sustaining losses through physical leaks and poor collection systems. (Many developing country water utilities collect revenues on as little as a third of the water that they supply.) And with many of the assets underground, the actual state of systems is often unknown. Regulatory frameworks are often lacking, incomplete, or internally inconsistent, and the relevant skills thinly spread. Because of the political sensitivity of the sector, governments often have little credibility as regulators or contractual partners. There is little trust that they will maintain a favorable operating environment and a tariff yielding a reasonable rate of return.

This is not a setting conducive to the substantial, long-term, sunk investments needed to build or rehabilitate infrastructure. Nor is it a setting in which the private sector will happily take on commercial risk. All these problems occur to some extent even in relatively well-endowed developing countries—countries in which incomes are rising, there is an established, professional bureaucracy, and the government has some track record of fair dealing with the private sector. But they are particularly acute in the poorest countries. Some of the poorer countries of Central and Eastern Europe, for example, and Sub-Saharan African countries emerging from long periods of internal conflict suffer not only from very low incomes, but also from limited administrative capacity and a limited or unfavorable government track record.

While much stands in the way of private provision of water services in such countries, there are a number of ways to reduce the costs and increase the attractiveness of contracting. There is, of course, no magic formula that a country can apply to instantly transform itself into an attractive destination for large sunk investments. But the options below each target some aspect of the problem and, individually or in combination, may speed transformation.

Option 1: Taking a stepwise approach

Some countries are considering a stepwise approach to private sector involvement—beginning with a management contract and building up to a concession or divestiture. Trinidad and Tobago has implemented a management contract for water and sewerage services and plans to move to a contract involving greater private sector risk in three years’ time. And in 1989 Guinea entered into a lease contract for water services in seventeen cities and towns, with the hope of moving to a concession when the lease comes up for renewal in 1999.

The virtue of the stepwise approach is that it allows gains from private sector involvement while providing the government time to address
Getting the Private Sector Involved in Water—What to Do in the Poorest of Countries?

tariff, regulatory, or information problems in the sector. For example, the government may introduce gradual tariff increases over the life of the management contract, use the time to build up regulatory capacity and implement regulation, or require the contractor to build a database on the state of the water system. In each case, the effect will be to create an environment a little more conducive to private sector investment and risk taking.

But while stepwise approaches are an attractive way to secure at least some private sector involvement in risky countries, there is no guarantee that they will get beyond the first step. Because decisions about involving private companies in the water sector can be politically costly, governments may be unwilling to take the next step beyond a management contract, especially if they have not raised tariffs to cost recovery levels during the term of the contract. Governments may also be lulled into a false sense of security if the management contract provides just enough gains to keep key voter groups happy and feel that they need do no more—even if many people still lack adequate service. Management contracts can be good at improving services for those who already have connections, but typically do not do as much for those without connections, who are often less politically powerful. Transitional arrangements should therefore include incentives for the next steps, such as sunset clauses on government roles or triggers in the contract for reallocating risks between the parties once specified conditions have been met.

In stepwise processes that replace low-responsibility, low-risk contracts with high-responsibility, high-risk, and potentially high-return contracts, the question of rebidding necessarily arises. While there may be real competition in awarding the initial management contract, maintaining competitive pressures during the transition to a lease or concession is more difficult. The company that wins the management contract will naturally have an advantage in bidding for subsequent contracts, and seeing this, other potential bidders may stay away. But barring that company from bidding for the next phase may reduce interest in bidding for the management contract.

In either case, competition is likely to be limited or absent during the shift to a more complex contract. This raises the stakes in the bidding of the original contract. Ideally, the contract should be let with all the seriousness of a concession or divestiture. But the informational deficiencies justifying a stepwise process in the first place generally preclude such a sophisticated approach. Much work remain to be done in finding innovative solutions to this cluster of problems.

Thus, while stepwise approaches have many attractions—and may be the only viable option for poorly endowed countries—their design and implementation are not straightforward. Much attention must be given to creating incentive to take subsequent steps and mechanisms for maintaining competitive pressures on the initial contractual partner.

Option 2: Simplifying contracts

In countries with limited administrative capacity (even more than in countries that see themselves as administratively competent!), simplifying contracts can do much to simplify monitoring and reduce uncertainty. One of the attractions of management contracts is that, in principle, the need not require the kind of regulatory and monitoring infrastructure required by leases, concessions, or divestitures. But if a management contract is to yield real improvements in performance, a good system of incentives and monitoring is essential. There are two key requirements for a good system: clear and indisputable performance indicators and a monitoring agency or official with the skills and budget to do the job, and the strength, integrity, and autonomy to do it independently.

Management contracts often contain long laudry lists of performance indicators, providin for bonus payments when targets are met exceedeed. But finding indicators that offer
'air and indisputable basis for managerial incentives is difficult. Many of the conventional indicators of water utilities' performance—such as unaccounted-for water and staff productivity—depend on factors that may be only partially within the control of a management contractor. Success in reducing physical losses may depend in part on the government's investing in rehabilitating pipes. Success in improving collections may depend on the government's paying its own bills and supporting a policy of disconnection for nonpayment. Success in reducing operating costs may depend on the ability to lay off workers. Moreover, the measurement of some indicators can lead to disputes. Which definition of unaccounted-for water is to be used? If metering is incomplete or faulty—as it generally is—how are water losses to be measured?

There is no simple solution to these sorts of problems. Generally, though, there is a case for moderation in using indicators—sticking to those least likely to lead to measurement problems and disputes—and for adding more direct incentives, such as revenue sharing.

**Option 3: Contracting out parts of the regulatory function**

Many developing country governments have limited administrative capacity, little or no regulatory experience, and little tradition of creating independent regulatory agencies. As a result several countries have contracted out parts of the regulatory function—the collection and processing of data on company performance—or are considering doing so. The Gaza management contract has independent auditors carry out performance audits (see page 37). And Angola is considering this in the context of preparations for a management contract.

Contracting out the task of gathering and processing the detailed information necessary to carry out the regulatory function can significantly reduce the government's administrative burden. It can also increase the credibility of the regulatory process if the auditing company has a strong reputation for quality and integrity. Not all aspects of the regulatory function can be contracted out, however. No regulatory rule or contract for private participation, no matter how precisely written, can remove all discretion from regulatory decisions, and the exercise of this discretion cannot be contracted out. Contracting out parts of the regulatory function can, at best, cast greater light on the exercise of that discretion.

**Option 4: Increasing predictability in the use of discretion**

In poorly endowed countries, private investors perceive their risks as high in part because of concerns about how regulatory discretion will be used, including in revising and renegotiating contracts. Even if a contract were bid on the basis of perfect information about the current status of the water company's assets and about new investments needed, the future would hold uncertainties that could not be handled by contract. And an initial contract is usually based on highly incomplete information about such factors as the condition of underground assets and future investment requirements. Careful provisions must therefore be made to deal with unexpected events over the life of the contract.

Provisions must be carefully specified for renegotiating aspects of the contract and for adjusting contractual terms over time. Over the life of the partnership, these provisions can turn out to be even more important to success than the initial terms of the contract. Such provisions need to specify at least four elements:

- The conditions under which adjustment of terms or renegotiation may occur (including penalties to curb frivolous renegotiation).
- When and under what conditions a contract must be renegotiated—as opposed to when price or service adjustments are made by agreement or by regulatory discretion.
- The process for initiating and conducting renegotiation.
- The processes to be followed and the authorities to be appealed to in the event that the parties to the contract cannot agree on how to resolve an issue (arbitration provisions).
In countries with no history of regulatory or judicial independence, clearly specifying processes for articulating and resolving disputes is particularly critical. International arbitration is often advocated as a means of offering comfort that disputes can ultimately be resolved in a neutral forum. But such arbitration is costly, and for most disputes—and for many smaller contracts—it may not be feasible. In these cases there may need to be more reliance on the incentives for dispute resolution implicit in arbitration rules.

**The need for realism**

The main objective of projects to secure private sector participation in the water and sanitation sector is to get better services to consumers at lower cost. In most developing countries the poorest consumers face an appalling situation. Many lack access to potable water and any kind of sanitation. In many cities the wealthy receive piped water at below cost, while the poor must rely on unsafe water at very high cost. In Luanda (Angola), where recipients of piped water pay less than a cent per cubic meter, people without connections may pay as much as US$16 per cubic meter for untreated water delivered by tanker.

Involving a private sector partner in the delivery of water and sanitation services is often the only sustainable way of making a dent in these kinds of problems. But it is easy to lose sight of this (obvious) objective in the course of designing, implementing, and monitoring a private participation arrangement. Governments often start with a fear that the private partner will be a rapacious profit-taker. Considerable efforts will (rightly) be made during project preparation to guard against possible abuses of monopoly power.

But there is often a sharp difference between what private companies see as the minimal return necessary to go into business in a risky country and what governments view as an acceptable level of profit. (Advisers to developing country governments considering private participation in water will all be familiar with the gasps of disbelief and indignation when they first voice assumptions about expected returns on equity.) Governments that have happily (or at least blindly) tolerated high levels of rent seeking and wasteful behavior by public water company officials can become positively puritanical about relatively modest profit taking by a private company. This is not to say that private companies with a monopoly to supply water services should be allowed to take any level of profit that they choose. But governments should be realistic about the prospects that they should allow, recognizing the need of their private partners to earn a reasonable return and to be rewarded for the risks they shoulder.

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1. For definitions of different kinds of private sector participation, see Pierre Guislain and Michel Kerfi, "Concessions—The Way to Privatize Infrastructure Sector Monopolies" (Public Policy for the Private Sector, September 1995).

2. See Penelope J. Brook Cowen, "Lessons from the Guinea Water Lease" (page 45 in this volume).

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Competition in Water and Sanitation and the Role of Small-Scale Entrepreneurs

Tova Maria Solo

There has long been a belief that the water and sanitation sector has a high degree of natural monopoly. But competition is widespread in the low-income retail market in developing countries. There is no inherent monopoly in such small-scale activities as reselling water by the bucket. This Note explores the diversity of small-scale entrepreneurs supplying unserved niches of the water and sanitation market. Small enterprises often account for a larger share of the market than do incumbent utilities, and they are well placed to complement and even compete with trunk concessions and public companies in tailoring services to the poor. Thus governments should take account of existing or potential small providers when designing concessions or any long-term rules for the sector (box 1).

In most cities in developing countries, more than half the population gets basic water service from suppliers other than the incumbent official utility. Recent studies of water supply service in Ethiopia, Guatemala, Haiti, Mali, Mauritania, Paraguay, Senegal, and Yemen suggest that entrepreneurs in water and sanitation, responding to local conditions and competing for market niches, take a wide range of forms.

For example, when water utilities provide water through trunk lines but cannot justify investments in low-income neighborhoods, individuals with water connections sell water through standpipes or extensions to their neighbors and extended families. In Mali 25 percent of Bamako's water supply moves through residential resales. The households that resell water can recoup the costs of their connections while offering credit and personalized services to customers who cannot afford a connection or meet a monthly bill.

Where groundwater is available and extending pipelines is costly, bulk water supply systems bring water from private wells to secondary vendors. Such vendors account for more than

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**BOX 1 VENDORS, COMPETITION, AND CONCESSIONS**

While small-scale private suppliers are sometimes accused of monopoly pricing and poor water quality, this does not appear to be the general case. Recent studies of private water vendors in Guatemala and Paraguay show that competition holds prices down to a maximum of 2.5 times and 1.4 times the official utility price, far from the exorbitant rates commonly attributed to private water vendors. Yet myths abound—and sometimes have serious consequences, as in Argentina. When Aguas Argentinas moved to extend water services to the periurban neighborhoods of Buenos Aires, it relied on hearsay accounts of the practices of private water vendors. Believing that the vendors resold water at fifteen to fifty times its bulk price, Aguas Argentinas had every reason to expect low-income families to be eager to connect to its service. Although there were local reports of annual family expenditure on water and sanitation in periurban areas of less than US$150, about a tenth the size of the average Aguas Argentinas bill, the reports of the water vendors' high rates prevailed—right up until the low-income families refused to hook up to the aqueduct. Their resistance helped lead to the renegotiation of the Aguas Argentinas concession.
30 percent of supply in Tegucigalpa, Honduras, in Guatemala City, and in Lima, Peru, and a growing share in Turkmenistan and Uzbekistan. In addition, small-scale network infrastructure systems provide household connections. For example, aguateros cover more than 20 percent of Asunción, Paraguay, with some 200 aqueducts drawn from ground wells, and each system serving between 50 and 1,000 families (box 2). And in Malang, Indonesia, a small-bore developer put together a private sewerage system that ended up covering more than 1,000 families.

When utility companies lack means to extend their networks, contractors and suppliers of materials and equipment build water and sanitation systems and turn them over to user groups or to the utility. For more than forty years virtually all new secondary infrastructure in Latin America has been supplied by developers and paid for by home owners.

Private entrepreneurs also own or manage water points, kiosks, latrines, pipelines, storage tanks, and fillers. These suppliers make up the fastest growing category of water providers in Dhaka, Bangladesh; cover more than half of Nairobi, Kenya; and supply a third of families in Addis Ababa, Ethiopia.

**The relevance of the utility model**

Historically, utility companies emerged to take sole command of water supply in U.S. and European cities for two main reasons: to guarantee uniform water quality and to provide pressure points for fire prevention and control. As this model has been officially adopted in developing countries and promoted as a public or private monopoly, multiple small-scale providers have dropped out of the lexicon. Arguments based on economies of scale or natural monopolies in water provision have often meant small, informal suppliers were ignored or, worse, outlawed by policymakers or regarded as a stopgap and suboptimal.

Efficient, large-scale, monopolistic companies may be the best alternative in Europe and the United States, where everyone can pay for—and everyone wants—a standard metered water connection and a sewerage hookup. But it is hard to replicate such efficiencies in the utility companies of developing countries. Where needs and conditions differ from one neighborhood to the next, there is a case to be made for a range of services and providers.

Where utilities have monopoly rights and small entrepreneurs are illegal or, at best, irregular, the entrepreneurs tend to operate outside the law and there is little concrete information about them. The recent transfers of exclusivity from public utilities to private concessions have reinforced these entrepreneurs' nonstatus in countries undertaking water sector reform. Guarantees of exclusive sales and extraction rights to the major supplier, rigid technical standards, lifeline water rates, and subsidized prices can all wreak havoc for a small entrepreneur, as can the utilities attempts to organize and control parallel vendors. Moreover, because the alternative providers are small and mostly illegal, they do not qualify for financing from banks, which might have served as a repository for information about them. Myths about the extortionary or low-quality supply from small-scale private entrepreneurs have flourished often to justify loans made to the utility companies and the subsidies they apply.

**The case for entrepreneurs**

In reality small-scale operators tend to be customer-driven, financially viable, and ready to apply innovative technologies and marketing methods. They provide appropriate solutions in appropriate places, assume all investment risks and reach the poor. They charge market prices, cover costs, and respect willingness to pay.

**Efficiency**

The operational efficiency of small-scale operators compares well with that of large-scale suppliers. A study of Haiti and four West African countries reported virtually no water losses among the private providers and an employee-client ratio of 1 to 500, figures that any utility
company would envy. A study in Guatemala compared two small-scale private aqueduct and sanitation systems with the state water company and found that their investment costs per new customer were 20 percent and 60 percent lower, their operating costs 72 percent and 77 percent lower, and their administrative costs 92 percent and 95 percent lower. The ratio of income to expenses was 1.18 and 1.37 for the small-scale operators, compared with 1.47 for the public company.

Viability

Small private water and sanitation businesses are profitable, unlike most single-source utilities, which seem to need a critical mass of high-income clients to make a profit. The study of Haiti and four West African countries found that of twenty-five municipal water supply companies reviewed, only those in cities of more than 100,000 people were operating in the black. And while the official water companies enjoyed monopoly rights to serve in these cities, they reached no more than 65 percent of the population, leaving the private, small-scale sector to cover low-income families. All that leads to doubt about whether the utilities can make a profit and achieve universal coverage.

Small-scale operators can start up more quickly and cheaply than their bigger competition. Start-up costs for private operators can run anywhere from US$1 for a bucket to sell water by the cup in Senegal to US$15,000 to drill a well and lay pipes in Paraguay. Most of the cases reviewed in the studies have been entirely self-financed, through personal and family guarantees and, in rare cases, through business and vehicle loans, though never for more than eighteen months. The costliest item for water suppliers tends to be piping and its installation. In Paraguay the president of the Water Suppliers Association commented that he and his colleagues base their investments on a market study and a reasonable certainty that they can recover investment costs within three years, an approach similar to those used by some large international companies. But these Paraguayan water suppliers have

**BOX 2 PARAGUAY'S PRIVATE WATER PROVIDERS**

In many of the periurban communities that have grown around Paraguay’s biggest cities, water is produced and sold by small competing water companies—an estimated 500 of them. These *aguateros* rely on groundwater and on their own piping network. They set their prices through the market and finance investments on their own. Paraguay’s *aguateros* have flourished because of the open environment for private entrepreneurs. They offer an inspiring example for the rest of Latin America, where public and private monopolies are unable to keep up with urban populations.

A generation ago the private water sector in Paraguay consisted mostly of water truckers who delivered water to neighborhoods where the public company had no connections. The truckers eventually drilled wells to shorten their trips and then laid pipes directly to their customers. The first *aguateros* figured out the most cost-effective investments (small pipes and simple motors) by experimentation.

There are few *aguateros* that do not share several streets with at least one other *aguatero*. Residents of Asunción and Ciudad del Este generally have no trouble getting hooked up to water or switching suppliers. And even when there is no immediate competitor, the threat of new entry keeps prices down and service reliable. The *aguateros* compete not only with each other, but also with the government water company—a formidable rival because, like most municipal water companies, it offers subsidized prices, gets an income supplement from government allocations, and receives soft international loans.

Over the past twenty years the *aguateros* have invested US$30 million in pipes, pumps, and equipment to bring water to about 70,000 households. By contrast, the government has invested US$67 million over the past ten years to add 37,000 connections.

The model in Paraguay has developed thanks to several factors. The availability of good groundwater is clearly important. But so is the government’s policy of supporting small businesses and reducing bureaucratic obstacles for these entrepreneurs. The *aguateros* pay commercial taxes, corporate income taxes, and an extraction fee to the government, which tests their water quality every six months. Finally, the fact that the *aguateros* have developed a critical mass allows them to hold a professional status and has earned them respectability. They compete fiercely, but they also share information about technology, software, and customers.
adopted this approach in part because there is no credit available to them for longer than three years and in part because of the risk that the government could rescind the right of private operators to keep their businesses.

While large companies tend to be discouraged by the risks and costs implied by new technologies (and by the abandonment of existing ones), small-scale entrepreneurs, which have much less to lose, are more likely to adopt innovations. Small-bore sewerage systems, for example, were first introduced into Buenos Aires by a community-based provider in touch with a private entrepreneur from Colombia.

Thanks to their size and their consequent ability to get closer to clients, small-scale entrepreneurs have developed simpler, more appropriate charging mechanisms—from offering customers credit to charging on a daily basis, as the “water women” in Dakar, Senegal, do. In Guatemala City the first system of “paying as you go into your bank” was introduced by a community-owned and -operated water company, ACOVA, serving some 7,500 families.

**Flexibility**

Small-scale suppliers are basically independent of public water suppliers, although many work in partnership with state companies, purchasing water from them for distribution. And the public sector may depend on private distributors to reach some neighborhoods. In Port-au-Prince, Haiti, small-scale entrepreneurs produce about 10 percent of the urban water supplied, distribute about 20 percent of the city’s water, and reach some 70 percent of the households.

Independent water companies are not necessarily limited to places with groundwater (as in Guatemala and Paraguay). Almost all of Yemen’s urban population and about a quarter of Lima’s depend on small-scale private companies for water supply, despite the difficulties of finding groundwater. Nor are private water and sanitation systems limited to a particular income group. They regularly serve the rich as well as the poor. In Asunción, Dakar, Barranquilla (Colombia), and urban Yemen small providers reach middle-income families as well as households at the extreme ends of the income distribution scale.

**Conclusion**

Efforts to reform and regulate the water sector in developing countries have focused almost entirely on strengthening single large-scale suppliers and making them operate like a commercial business, either by carefully designing incentives or by bringing in private management. But the reforms have tended to reinforce the same monopoly model that has always dominated the sector.

Recognizing and understanding the role of small-scale providers could lead to a rethinking of the traditional model for the sector. It could mean switching from the usual regulatory mechanisms—focusing on price caps, subsidy issues, and quality control—to an approach in which competition, open entry, and open sharing of information replace control mechanisms. This flies in the face of some traditional public sector policies, as it would end guarantees and “breaks” for the monopoly utility and seek to level the playing field for entrepreneurs of all sizes. Yet at the same time it would oblige small entrepreneurs to live up to certain standards and to avoid tendencies toward collusion and monopolistic behavior.

World Bank–financed water sector projects under preparation in Colombia, Paraguay, and Senegal are exploring ways to support small-scale water entrepreneurs in the context of traditional, state managed projects. Eventually the World Bank or the International Finance Corporation might find a way to support small-scale entrepreneurs directly. But for now an official appreciation of how small-scale entrepreneurs can fill market niches and develop innovative technologies and marketing practices could nudge large-scale providers into admitting competition.

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In 1995, as the interim agreements between the Palestine Liberation Organization and the government of Israel were being finalized and signed, water and sanitation services in the Gaza Strip were in crisis. Gaza has an extremely dense population of about 2,500 people per square kilometer (the population is around 900,000). The thin strip of land's primary source of water, a shallow aquifer, was being mined at more than twice its estimated annual recharge rate, resulting in an increasing deterioration in quality. Responsibility for water services was fragmented among four municipal water departments, twelve village councils, and the United Nations Relief and Works Agency. There was no accurate accounting of water production or consumption, though estimates put daily per capita consumption at less than 70 liters, well below levels in countries with similar incomes. About half of the water supplied was unaccounted for—the result of system losses, illegal connections, and nonfunctioning meters.

**A stepwise approach to reform**

All stakeholders recognized that private sector involvement was the only way to rapidly improve the water supply system. But long-term arrangements posed significant risks to both the Palestinian Authority and potential private contractors. First among these was the risk resulting from the political and security situation in Gaza. Second, the Palestinian authorities had only just been empowered to manage water resources; it was unlikely that they would agree to divestment. Third, so little information was available on the existing system that there was almost no basis for establishing the terms or expectations of a concession contract or lease. Finally, tariffs were too low—between US$0.30 and US$0.40 a cubic meter—for a contract based on revenues to succeed.

Under these circumstances a management contract offered several advantages: it was highly flexible, of limited duration, and ensured that a range of options would be available at the end of the contract. In addition, the contract would allow both the Palestinian Authority and the general public to judge the advantages of private sector management without committing to a long-term relationship. The contract would also allow the private sector to judge the Palestinian Authority's commitment, particularly to cost recovery through tariffs. Finally, the terms of the contract included a number of tasks necessary to establishing a sound commercial approach (such as implementing a computerized administrative system, network mapping, and hydraulic modeling). By the time the contract ends the Palestinian Water Authority will be able to make an informed decision on future private participation in infrastructure and regulatory arrangements. At that point an alternative means of private sector involvement—such as a lease or a full performance management contract—is expected to be implemented.

So in mid-1996 Lyonnaise des Eaux/Khatib and Alami (LEKA) was awarded a four-year water services management contract to help local government service providers and the Palestinian Water Authority improve water service. The contract is the first of its kind in a World Bank-funded project in the Middle East. Since the contract became active, water quality has improved, water losses have fallen, and consumption and revenues have increased. Despite the improved performance, the management contract has illustrated some of the limitations of
this approach. The contract leaves the implementation of management decisions in the hands of the local authorities, limiting the benefits of improved management. For example, although LEKA has identified nearly 11,000 illegal connections, resolution is left to municipalities and the Palestinian Water Authority—and to date, action has been limited. And although LEKA has provided training to well operators on chlorine dosing and routine maintenance procedures, most failures in the dosing units are due to the reluctance or inability of municipal employees to carry out basic procedures.

**The contract design**

The contract fee is split between a fixed annual payment and an additional performance payment based on the achievement of performance targets.

The fixed-fee portion of the contract, which formed the basis for international competitive bidding for the contract, is about US$6 million over four years. In return, the operator provides full-time expatriate managers, full-time local technicians, administrative support, and short-term expatriate specialists to undertake specific tasks. The scope of work for the contract focuses on four objectives:

- Increasing the quantity of available water by improving the efficiency of the water supply distribution system and operating equipment.
- Improving the quality of the water supply and of wastewater effluent.
- Improving management of water and wastewater systems through better operations, revenue collections, and customer service.
- Strengthening water and wastewater institutions through long-term system planning and training.

An incentive payment was added to the contract to encourage the achievement of the contract's objectives. The total incentive payment for the four years is US$3 million, or an additional 50 percent of the fixed contract payment. The annual ceilings for incentive payments were set at one-quarter of the total, or US$750,000.

The performance payment is calculated according to thirty-one performance targets grouped under the four contract objectives. Each of the performance targets—ranging from the number of meters repaired or replaced, to reductions in unaccounted-for water, to the completion of tasks such as the development and implementation of maintenance and materials management systems—was given indicator values that quantify the annual achievement of the target. In addition, all performance targets were weighted to reflect the priority of the target. Critical targets were given much higher weightings—for example, reducing unaccounted-for water is weighted the highest of any target. The indicator weightings emphasize the importance placed on increasing the quantity of available water. A composite performance score determines the incentive payment. If the composite score does not meet a threshold level the operator is disqualified from any incentive payment.

The rating system provides for exclusion of work performed by contractors hired by other agencies or authorities. In addition, LEKA and the Palestinian Water Authority are allowed to invoke a force majeure clause of the contract for any event beyond their control that makes it impossible to fulfill their obligations. Such events include strikes, lockouts, and other industrial actions (except where such events can be prevented by the party invoking force majeure) as well as confiscation or any other action by government agencies. Many such events have occurred over the life of the contract because of border closures and other disruptions. As a result a one-time agreement was negotiated to carry over to the second year the balance of the first year's performance payment, less a 10 percent penalty, in return for withdrawing all force majeure claims.

No significant changes have been made to the performance targets. Though some criteria were not sufficiently challenging (metering, system disinfection), on the whole targets have been challenging but achievable. At the same time, performance targets for institutional and procedural development objectives have generally not
been met—either because of different interpretations of actions taken or the operator’s prioritization of other benchmarks. Different weightings in the original contract, or some other mechanism for ensuring equal attention to institutional development, might have addressed this issue from the start. In more recent performance-based management contracts for Amman, Jordan, and for the Bethlehem and Hebron areas of the West Bank fewer and better-defined indicators have been used.

**Contracting out regulation**

Some tension between a private operator and an oversight body is to be expected. In Gaza no regulatory capacity existed before the management contract went into effect, and the Palestinian Authority, with no experience with a private operator, feared being taken advantage of. The solution agreed on was to hire a reputable auditing firm (Deloitte and Touche, Norway) to perform an annual audit of the operator’s technical and financial performance. At the end of each six-month period of the contract, the operator prepares a performance report detailing its progress against the performance indicators, including evidence necessary for substantiation. As part of this exercise the operator calculates its own performance score. The operator also reports its activities in each of Gaza’s sixteen municipalities and villages. In addition, the Palestinian Water Authority prepares progress reports.

At the end of each contract year the auditor reviews the performance reports, confirms their accuracy by visiting sites and examining records and inventories, and verifies the performance score. The incentive payment is then calculated on the basis of the performance score. The auditor also reports to the Palestinian Water Authority on the operator’s financial statements and any issues arising from them.

This approach has worked well. At the end of the first year of the contract, LEKA’s assessment of its performance yielded an incentive fee payment of US$498,000 (64 percent of the total possible payment). The auditor downgraded four of the performance indicators—in three cases LEKA claimed full compliance whereas the auditor found that compliance was poor. The auditor’s score was ultimately used to calculate the incentive payment of US$444,000. Performance in the second year was assessed close to US$800,000 (due to the carryover from the first year).

**Funding**

The Gaza management contract is not funded by revenue from water and sanitation services. Rather, it is funded entirely by a US$25 million credit from the World Bank to the Palestine Liberation Organization for the benefit of the Palestinian Authority. In most cases it should not, however, be necessary to guarantee an external source of funds. Sector reforms should raise revenues enough to cover all or most of the costs of a management contract, thereby increasing private sector interest in such arrangements. In Gaza, however, political and security concerns would likely have dissuaded operators from taking on such a large assignment without the support of the Bank credit.

The Bank also contributed to another crucial aspect of sector improvement, establishing a US$12 million fund to invest in the operational capacity of water and sanitation infrastructure. The fund gives the operator the means to make improvements in the system in much the same way a lessee would, based on needs identified by management. The operator has considerable flexibility in determining immediate investment needs and can procure (using World Bank guidelines) goods and services as needed.

**Lessons**

More than two years after the award of the contract the water supply system is much improved. In the first half of 1998 unaccounted-for water was around 35 percent lower than in 1995. Water consumption for the same period was almost 16 million cubic meters, nearly 50 percent more than in 1995. Total revenue collected in 1997
was almost twice that in 1996. In addition, water delivered in the Gaza Strip is now reliably chlorinated, more than 11,000 illegal connections have been identified, more than 2,000 leaks have been repaired, a complete database of service connections has been prepared (with almost 10,000 connections replaced), 80 percent of the system has been mapped, and more than 7,000 meters have been repaired and 8,000 replaced.

Experience with the management contract in Gaza suggests that conferring higher degrees of management responsibility to an operator could expedite improvements. As successful as the operator has been in meeting the requirements under its direct authority, local authorities have not been consistent in supporting those improvements. This remains the weakest link of the contract.

One essential feature of the contract was its use of independent technical and financial auditors to audit the achievement of the annual performance targets, calculate the incentive fee, and provide a comfort letter for payment of the incentive fee. But although the contract established clear benchmarks and a performance rating system, it allowed the operator to focus on benchmarks that would generate a higher performance payment. As a result less attention was given to benchmarks that were perceived as being harder to achieve or worth too little in terms of their weighted worth (for example, training and public relations). Structuring the contract so that some objectives are simple contractual requirements, within either the base fee or the incentive fee, would overcome this problem.

For several reasons multilateral financing was essential in such a high-risk environment as Gaza. This financing covered the fixed fees of the operator, easing concerns that low revenue and other risks would prevent payment by the Palestinian Water Authority or the municipalities. It financed the operating investment fund, without which the operator could not commit to meeting service targets. And it provided assurances on the policy reforms supported by the donors.

Overall, the Gaza experience suggests that management contracts are most likely to work under four conditions:

1. The primary objective is to rapidly enhance the technical capacity and efficiency of services.
2. Government faces obstacles to committing to a long-term arrangement for private participation in infrastructure or to inducing the private sector to undertake capital investment or take on commercial or political risk.
3. Tariffs are too low to support a long-term arrangement for private participation in infrastructure.
4. Government faces difficulties in securing agreements to allow the long-term involvement of the private sector or the regulatory framework is incompatible with a long-term arrangement for private participation in infrastructure.

Where the above conditions apply (as in Gaza), a management contract provides a window of opportunity in which trust can be developed between the public and private sectors. Such contracts also allow the authorities to devote attention to creating an appropriate regulatory framework, adjusting tariffs and subsidies, and creating an environment more conducive to private risk taking.

1 While within the range of many other tariffs in the region, this rate could not begin to cover realistic provisioning for the major capital investments that are needed. In contrast, water supplied by Jerusalem Water Undertaking costs between US$1 and US$1.50 a cubic meter.
2 Many donors are helping the Palestinian Authority rehabilitate and extend infrastructure and services. The rating system discounts these contributions to the operator's achievement of performance targets.
3 The auditor's work is funded by a bilateral donor.

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Management Contracts and Water Utilities
The case of Monagas state in Venezuela

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The management contract for water and sanitation services in the Venezuelan state of Monagas, awarded in early 1997 to a Spanish firm, is one of very few signed and active management contracts in the water sector. Management contracts pose design challenges. Their built-in incentives do not include equity at risk, so surrogate incentives must be designed, such as a performance bonus. Deciding how to award these contracts is also a challenge, because they lie somewhere between technical assistance (which should be awarded on the basis of skill and experience) and a lease (which should be awarded on the basis of price). It is too early to say whether management contracts can evolve into a more high-powered form of private participation like a concession. But the early operational results are very positive, and the experience sheds light on when a management contract is the right choice, how it should be designed to introduce the right incentives for the contractor and the public representatives, and what steps to take in awarding it.

Why a management contract?

In 1994 the Venezuelan government, which at the time ran the country’s water and sanitation service, decided to pilot water sector reform in Monagas. Water service coverage in the state was high (95 percent urban, 80 percent rural), but service was intermittent, water quality low, and the collection effort poor. The water operator charged for about 30 percent of the water produced, billed roughly 30 percent of the customers, and collected only 15 percent of the amount billed. To stay afloat, the Monagas operation depended on transfers from the central government, went into arrears with contractors and suppliers, and delayed investments in infrastructure.

The goal of the reform was to improve cash flow, creditworthiness, and service by introducing good commercial and operational management through private sector involvement and rehabilitating the infrastructure (with funding from a World Bank loan). These changes would eventually enable the service to raise investment funds on its own and attract further private sector involvement. Several factors had led the government to conclude that arrangements other than a management contract would entail too much risk for private sector participants: the difficult water sector context stemming from a failed decentralization effort in 1990, exchange rate controls (removed in 1996), the failed attempt to concession the Caracas water and sanitation system in 1992, the small size of the Monagas service, the extremely limited information on its physical and financial condition, and the country’s limited experience with private provision of public services.

Early steps

The pilot reform immediately decentralized service from the central government to twelve municipalities and the state government through a new company, Aguas de Monagas (AdM). Together the three levels of government designed an incentive-based management contract to be awarded under competitive bidding (box 1). To get the contract off to a good start, agreements between the World Bank and the government also called for reducing the staff of the regional water and sanitation entity before staff were transferred to AdM. That freed the private operator from having to begin its contract with large, politically unappealing staff dismissals. The authorities also put AdM on a sounder financial footing by raising tariffs twice, from 17 bolivares
The selection process had two phases, a request for expressions of interest to produce a shortlist of firms, and a request for proposals.

Preparing the shortlist. To prepare the shortlist, AdM requested expressions of interest from firms that had experience with production, water distribution, effluent collection, or treatment plants in urban systems comparable to that eventually expected of AdM. Companies with experience managing only potable water services were excluded.

Evaluating the bids. Bids were evaluated by points scored for the firm's experience and financial strength and the quality of the proposed management approach and personnel. Bids with the minimum points required in the technical evaluation were ranked using a formula that combined the technical score and the proposed fixed and variable payments.

Outcome. Eleven consortia submitted expressions of interest, and six were selected for the shortlist (two British, one U.S., one Spanish, one French, and one German). Of the three bids received, two were judged to be a match for the technical requirements and objectives of the contract. The management contract was awarded to the highest evaluated bidder, FDS of Spain, for a fixed fee for the four years of about US$4 million—estimated to account for less than 10 percent of AdM's total billings.

Fee structure and targets

The management contract gives the private operator responsibility for managing the entire company, with direct authority over commercial policies and practices, human resources, services contracting, and investment planning and execution. AdM's board of directors includes representatives from the state and municipal government shareholders and is chaired by an independent president. Under the terms of the management contract the private operator is responsible for the structure below the president, in a traditional general manager-type arrangement.

The board performs the regulatory function for the management contract, the service contract, and the Contrato Plan. It must approve tariff increases and adjustments to reflect cost changes proposed by the operator. An international consultant financed by the World Bank loan provides support to the board in its regulatory role and will issue an independent assessment of the operator's compliance with the performance targets. The baseline conditions for this assessment were established through an initial technical and financial audit by an external auditor.
The operator has full control over resources for small capital works, such as repairs, metering, and improvement of the distribution network (pumps and valves) and the commercial system.

The contract links the payment of the private operator to its achievement of the performance targets set in the Contrato Plan. The payment has two parts: a fixed monthly payment, financed by the World Bank loan, and a variable incentive payment, financed by AdM's cash flow, contingent on the operator's surpassing the annual targets for unaccounted-for water and collection efficiency. The contract also includes penalties for failing to meet these targets and to take specific actions set out in the contract (such as setting up a water quality laboratory and a cost management system).

The variable payment is based on the idea of short-run sharing of the benefits from the activities of the operator and is limited to 50 percent of these benefits. The performance indicators used to calculate the payment—unaccounted-for water and collection efficiency—add a physical and financial dimension to the evaluation of the operator's effect on efficiency. The unaccounted-for water index (water billed, metered, or used in the flat billing as a percentage of water produced) creates an incentive to increase metering and billing, which are key to controlling demand. The collection efficiency index addresses a critical problem, the lack of progress toward cost recovery. Although other indicators were considered, the choice was limited to these two to simplify the remuneration and because most other indicators are directly related to them.

Another key performance incentive for the operator is reputation effect. Monagas is the first of possibly many projects in Venezuela involving the private sector in the management of a water utility, and the project's success or failure could affect the operator's chances for entering other projects.

**Initial results**

The contract started with difficulties because more than a year elapsed between preparation of the bid and the arrival of the private operator. While awaiting new management, AdM postponed important decisions and the company's finances deteriorated. As a result, when the private operator arrived, it found a far different company from that described in the bid documents. On top of all that, partway into the contract the government changed the labor laws in a way that dramatically increased the cost of labor.

Nevertheless, after a year and a half of operation under the management contract, AdM has made significant improvements. For the first time it has a reliable accounting and cost control system that gives a clear picture of its financial situation. Six months after the operator took over, it completed a detailed cadastre of users that increased registered connections from 48,000 to 81,000, out of a total of 110,000 urban users in Monagas. As a result of the new cadastre and monthly tariff adjustments to compensate for cost increases, billings almost doubled in real terms between January and December 1997 (figure 2). Collections have tripled. And AdM has reined in both personnel costs and total costs.
The private operator has taken several actions to reduce costs, setting the conditions for a rapid improvement in the company's financial situation: it restructured the operation of urban systems; reformulated or terminated expensive and ineffective third-party contracts for operating parts of the system; evaluated AdM's staff and reorganized them into work teams according to skills, renegotiated the labor contract, and dismissed unsuitable staff, financing redundancy payments from AdM's improved cash flow; and introduced a new organizational structure. These actions have produced improvements in both operations and service quality—water supply, for example, is up from twelve to twenty-two hours a day on average—garnering a positive response from consumers and local authorities.

The Contrato Plan has played a key part in the regulatory framework and in monitoring the performance of AdM and the private operator. It is similar in concept to contract plans that have been used by public entities in many other countries but which have had a mixed or poor record of success. The Monagas plan may be more successful because it forms part of the contractual obligations of the private operator under the management contract, and of AdM under the World Bank loan.

The relationship between the board and the private operator has proved to be critical to the success of the contract. The management structure has made it hard to separate the roles of regulator and operator, and the board has had a tendency to intervene in day-to-day business decisions. In addition, hindsight suggests that the performance indicators for the first year should have given more weight to actions that build institutional capacity (such as developing systems, a cadastre and personnel) than to detailed numerical targets for unaccounted-for water and collection. Such an emphasis would have encouraged the operator and the board to develop knowledge of the company's true situation with more urgency.

**Conclusion**

The management contract has allowed the private operator, under circumstances of controlled risk, to learn about the condition of the water utility, to initiate the most urgent actions for its recovery, and to develop working relationships with the public authorities. The approach appears to be fostering greater private sector participation in three ways: It is expected to lead to a full concession. It has encouraged private sector participation in other water and sanitation systems in the country. And it has stimulated interest in private sector management of other public services in Monagas.

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Lessons from the Guinea Water Lease

Penelope J. Brook Cowen

Until the late 1980s Guinea had one of the least developed urban water supply sectors in West Africa. Less than 40 percent of urban dwellers had access to piped water through either connections or standpipes. Where connections existed, service was often interrupted and water treatment inadequate. To improve this situation, the government of Guinea in 1989 entered into a lease arrangement for private sector operation of water services in the capital city, Conakry, and sixteen other cities and towns.¹

Two organizations are central to the lease arrangement: a state-owned national water authority, Société Nationale des Eaux de Guinée (SONEG), and a water management company, Société d'Exploitation des Eaux de Guinée (SEEG). SONEG owns the water supply facilities in the cities and towns covered by the lease. It is responsible for sector development, including planning and implementing new investments, and for servicing sector debt. SONEG also has responsibility for setting tariffs. SEEG is jointly owned by the state (49 percent) and a foreign private consortium (51 percent). SEEG holds a ten-year lease contract with SONEG under which it is responsible for operating and maintaining urban water supply facilities, billing customers, and collecting charges. The private partner provides management services to SEEG through a separate management contract. At the start of the lease the consumer tariff was raised from US$0.12 to US$0.25 per cubic meter. This tariff was still too low to cover operating and debt servicing costs, so in the initial years of the lease the difference between tariff revenues and costs was funded by an International Development Association (IDA) credit. This subsidy has declined stepwise as tariffs have increased.²

By 1996 connections had increased from about 12,000 to more than 23,000. Metering has increased from about 5 percent to 98 percent for private customers, and to 100 percent for government customers. Investments in new supply capacity (external to the lease), combined with rehabilitation and maintenance, have brought about a substantial increase in the population with access to safe water, from 38 percent in 1989 to 47 percent in 1996. And with progressive tariff increases, the average tariff (US$0.85 per cubic meter in 1997) now more than covers costs. SEEG's water revenues (excluding the subsidy) rose tenfold between 1989 and 1996. In an environment in which earlier attempts to secure reliable access to safe water had foundered, and in which financial sustainability had seemed unreachable, these achievements are truly impressive.

Ongoing issues and problems

Despite these gains, two broad concerns arise about the performance of Guinea's lease contract. First, the water supply system, particularly in Conakry, has not improved and expanded as fast as had been hoped. Unaccounted-for water remains high, at about 47 percent. New connections to the system have been added slowly—though the lease did not specify targets. Second, the relationship between SONEG and SEEG has not been smooth, lessening the efficacy of SONEG's monitoring and regulation.

Physical progress

Both SEEG and SONEG have some capability to influence the rate of new connections and of reduction in unaccounted-for water. But each tends to blame slow progress on failures by
the other. For example, SONEG attributes the slow pace of new connections to SEEG's reluctance to make connections from existing extensions to the network, while SEEG argues that much of the demand for new connections is in areas where SONEG has yet to invest in network extensions. For unaccounted-for water, SONEG's slowness in procuring rehabilitation works is probably a factor, but SEEG's incentives to reduce losses have almost certainly been weakened by its low production costs. Commercial losses are rising as tariff increases lead to more defaults on bills and stronger incentives for illegal connections. In 1996 58 percent of private bills went unpaid. Non-payment by government departments has also been a major problem, particularly in the early years of the contract. (At the beginning of the contract the government accounted for more than 50 percent of all billings. By 1996 this share had dropped to 30 percent, but government arrears remained a significant issue.)

Attempts to improve coordination between SEEG and SONEG are unlikely to resolve concerns about unaccounted-for water and new connections. The coordination of new investment with operations and maintenance will remain problematic as long as commercial risks are shared between the two entities and SONEG remains the principal financier of works that contribute to SEEG's effectiveness as an operator. The problem is further aggravated by a lack of clear separation between SEEG's activities as an operator, for which it theoretically bears some commercial risk, and its activities as a service contractor to SONEG for rehabilitation and extension works, which are performed on a cost-plus basis.

Institutional efficacy

Lease contracts require a high level of administrative capacity, and solid political will to enforce their letter and spirit. They are not necessarily easier to administer and regulate than contracts for more fully fledged private sector involvement, such as concessions. A lease may be simpler to administer than a concession because the administrator does not need to define or monitor investments by the lessee. But lease require coordination and the allocation of commercial risk between the government, as investor, and the private sector, as operator.

In Guinea the government has had limited success in bringing clear commercial incentive to bear on the private company in its operational and maintenance roles. Weakness in SONEG's monitoring of SEEG could have broad repercussions. For example, without adequate reporting and monitoring, SONEG will have difficulty assessing the soundness of SEEG's requests for increases in the overall tariff and in its share. To the extent that SONEG responds passively to proposals from SEEG for tariff increases, SEEG's commercial risk is lessened.

At the limit, if the tariff is set on a cost-plus basis, the lease will approximate a management contract (and one without specific performance targets and enforcement mechanisms) and commercial risk will be borne exclusively by the government. (In practice, tariffs have risen steadily. Average tariffs are now high by the standards not only of developing countries but also of industrial countries.)

A second cost of weak monitoring and enforcement is a reduced capacity to enforce separation between SEEG's extension and rehabilitation activities and its operational activities. For example, where monitoring is weak, financial transfers between activities putatively subject to commercial risk and those performed on cost-plus basis might go undetected. Again, the result could be a reduced capacity by SONEG to control its commercial risk.

Lessons

The Guinea lease represents an innovative broadly successful attempt to draw on the strengths of the private sector to improve water services. It would be unfair and inappropriate to use hindsight to criticize arrangements that are major advance over earlier attempts to improve water service delivery in low-income countries and that have produced real gains for consumers.
ers. But hindsight can provide guidance for ongoing improvements in Guinea and for future projects in other countries. Many low-income countries, from the transition economies of Central Europe to African nations such as Angola and Mozambique, share Guinea's problems in improving water services. Improving and expanding service requires large investments. The government's capacity to undertake the required investments directly or to oversee their implementation is limited. Passing as much investment responsibility to the private sector as possible—as soon as possible—is thus highly desirable.

Private companies, however, have been assumed to be unwilling to make large investment commitments in the water sector in very poor developing economies. Water sector assets amortize over long periods and have little or no resale value. Where capital markets are underdeveloped, investors who want to sell out may have limited ability to dispose of their shares. On top of this, the water sector is prone to government intervention. In this kind of environment the credibility of the government as a long-term contractual partner, regulator, or both is critical to the willingness of private companies to invest in the sector, and to the price tag that the private sector will, one way or another, place on its involvement.

Guinea sought to resolve these problems by introducing private sector involvement and commercializing the water business in a gradual, stepwise manner. Using a lease arrangement, rather than a full-fledged concession or asset sale, meant that the private sector was not required to commit any investment funds. Using IDA credit to smooth the process of tariff increases meant that the operating business could function on a quasi-commercial basis from the beginning. The government's minority share in the operating company presumably gave assurances that there would be some local sharing in the benefits of commercialization, beyond the benefits from improved services. The expected benefits were twofold: early and lasting gains in the availability of services and the efficiency of service delivery and, in the medium term, the creation of an environment more attractive to private investment and risk taking.

The Guinean approach, while producing important gains, has not worked out exactly as planned. The risk sharing implied by a stepwise process has proved difficult to implement and enforce, with the result that gains to consumers have been less than hoped for and much suspicion remains between the public and private sectors. The question then arises as to what other countries might do to replicate the gains of the Guinean approach while avoiding some of its shortcomings. Two broad options present themselves: privatization by less ambitious steps than were attempted in Guinea, or an altogether bolder, larger step toward privatization.

**Privatization in small steps**

The key to an effective gradual move to private participation is a realistic and enforceable allocation of functions and risks between the parties at each stage in the process. This allocation should accord with the parties' comparative advantages in performing the functions and managing the risks. For example, if exposure to commercial risk is the primary source of performance incentives for a private partner, that risk should be borne by the private partner. If the private partner is unwilling to take on any substantial commercial risk, a lease or a concession should be abandoned in favor of a management contract with a few, largely indisputable, performance targets (as is proposed, for example, for Angola).

If government agencies lack the capacity to monitor and enforce contracts with the private sector, the factors to be monitored should be as simple as possible. This again favors a management contract over a lease. Industrial country blueprints for regulatory structures and functions should be avoided in favor of careful analysis of the minimum administrative and regulatory functions required, and of the comparative advantage of different agencies in performing these functions without undue political interference. One option is to contract out parts of the monitoring function to private sector auditors.
If investment needs are substantial and require some contribution of government (or multilateral) funds, the contractual arrangement chosen should be cognizant of the tradeoff between the costs of relatively inefficient government administration of investments and the risks of contracting with the private sector to administer investments it does not fund. If investment responsibility is passed to the private sector, relatively sophisticated monitoring may be required to control profit transfers between investment and operational activities and to minimize gold-plating. Realistically, the private partner must be expected to take some rents. Monitoring will not eliminate these rents, but it can help keep them within socially acceptable bounds.

Is a big jump better—or even possible?

Two arguments might be made for a stepwise approach to private sector participation. First, a stepwise process may be necessary in poor developing countries if no reputable private company is willing to invest in the water sector. Second, a stepwise process may improve the terms of private sector involvement from the perspective of consumers.

The first argument can be put to a market test. A likely result in many low-income countries is that no experienced private water company will take on full operational and investment responsibilities unless it is paid to do so, because of the high risk. Such a payment may well be politically infeasible. Still, the need to subsidize entry does not in itself mean that a stepwise process would be objectively better than a “big jump.” A negative valuation of a water company by private bidders might reflect a compound of expectations and risk assessments—about the relationship between the tariffs that the government would likely allow and the costs of establishing a reasonable level of service, about the uncertainty over the government’s future regulatory behavior, and about the salability of the private company’s stake. Thus, to secure a positive price, the government might need to take actions ranging from intensive information gathering on the state of existing assets, to the establishment of a credible regulatory authority, to the development of passable liquid domestic debt and equity markets. The question that then must be asked is whether the benefits of these actions exceed their combined costs and the costs imposed by delays in mobilizing the incentives for the private sector to improve efficiency. Welfare might be increased more by immediate, full privatization even if that requires a subsidy, than by postponing privatization while using various government instruments to make things better. Full private involvement is likely to bring larger and more immediate welfare gains, for example, if the private partner is in a better position than the government to rapidly improve and use information about the utility’s physical and commercial status or to develop risk management programs. Such an approach may never be politically attractive, but it is an alternative that should be recognized whenever gradualism is advocated.

In arguments for gradualism in involving the private sector in water, there is an implicit tendency to gamble more on the likely benefits of government initiatives than on the likely benefits of private ones. Policy advisers have traditionally been more concerned about privatization at the expense of customers than about the costs, failures, or rent-seeking activities of government utilities. In practice, the most feasible and least risky strategy is rarely that which relies least on the private sector. Market testing of the kinds of deals that the private sector is prepared to take on, an of their price, is essential in continuing to identify the best options for the neediest countries:

1 Lease arrangements are discussed by Pierre Guislain and Michel Kerf in “Concessions—The Way to Privatize Infrastructure Secr Monopolies” (Public Policy for the Private Sector, September 1997).

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Expanding Water and Sanitation Services to Low-Income Households

The case of the La Paz–El Alto concession

Kristin Komives and Penelope J. Brook Cowen

Bolivia is one of a growing number of developing countries turning to the private sector to improve urban water and sanitation services. The country's first major contract in the sector, a twenty-five-year concession for the neighboring cities of La Paz and El Alto, was implemented in August 1997.

The public utility in La Paz–El Alto provided center city residents with in-house water and sewer connections but did not serve lower-income residents in outlying areas. Unserved households relied on alternative water and sanitation services—often at high cost. A primary objective in moving to a private concession was to turn this situation around—expanding services to low-income households while holding down costs by increasing efficiency. It is not a foregone conclusion that the new concessionaire will do a better job of expanding service; much will depend on how well the contract and sector regulation have been designed. But because the La Paz–El Alto concession was explicitly designed to expand service to the poor, this concession is a good case study for evaluating how different provisions in the contract and the sector regulation may help or hinder service expansion.

Most water and sanitation concessions in developing countries have followed a broadly similar model. The contracts are typically long term—twenty-five to thirty years—and offer the concessionaire an exclusive right to provide services in a defined area, paired with obligations to achieve certain coverage and quality targets. Concerns about service access for low-income households are usually addressed through universal service obligations and a "social" tariff for low levels of consumption. Though it contains a number of innovations, the La Paz–El Alto concession follows this general approach. But the criteria used to select a private concessionaire in La Paz–El Alto marked a departure from earlier concession awards in the region, in which bidders were asked to specify the tariff they would require to meet prespecified investment and service obligations. Bidders for the La Paz–El Alto concession, by contrast, identified the number of water connections they would make in exchange for a prespecified tariff. (The tariff and sewer expansion requirements were fixed in the bidding documents.)

Contract obligations

At the time the contract was awarded coverage was 87 percent for in-house water connections and 48 percent for sewer connections. The winning bidder—the Suez Lyonnaise des Eaux consortium Aguas del Illimani—committed to achieve 100 percent water coverage in La Paz and to install 71,752 new water connections in the El Alto subsystem (the poorest in the metropolitan area) by December 2001. By some estimates the new connections will achieve 100 percent water coverage in El Alto. The concessionaire also committed to 90 percent sewer coverage in El Alto and 95 percent coverage in La Paz by 2021.

The concession contract specifies that all new water and sewer connections must be in-house connections. The contract also sets out requirements for service quality (including water quality, continuity of service, water pressure and flow, and customer service). The contract is largely silent on the inputs to be used to achieve these outcomes.
The concession is regulated by a relatively independent national body, Superintendencia de Aguas, established in 1994 to grant and regulate concessions for municipal water and sanitation services. The regulator monitors and enforces compliance with the expansion and quality obligations but not the specific investments made by the concessionaire. The regulator also must approve all tariff revisions over the life of the contract. An increasing block tariff structure and an average 38.5 percent tariff increase were introduced just before the concession began. The tariff, based on water consumption, is for both water and sewerage services, and for low-income consumers is well below cost. The first tariff review is scheduled to take place five years into the contract; in the interim, tariffs are indexed to the U.S. dollar. The contract also sets maximum connection fees: US$155 for a water connection and US$180 for a sewerage connection.

Help or hindrance?

Using the La Paz–El Alto concession to illustrate, the remainder of this Note looks at whether service area boundaries and exclusivity provisions, expansion mandates, technical specifications, and tariff structure and connection fees help or hinder service expansion.

Service areas and exclusivity

Most concession contracts define the service areas where the concessionaire is expected to operate. Water and sanitation concessionaires are almost always given an exclusive right to provide service in these areas for the life of the contract. Service area boundaries and exclusivity rights shape the service options available to low-income households. For example, a concessionaire can offer connections to households within the service area but is not required to connect—and may be prohibited from connecting—households outside that area.

The La Paz–El Alto concession creates a third group of households by dividing the service area in two. The concessionaire is not required to provide service in the fringes of the service area (called the area no servida) unless neighborhoods in this area meet certain criteria. Today this area is not highly populated, but it is an important area of settlement for new rural immigrants.

Exclusivity within the service area has traditionally been justified on the basis that it reduces revenue risk—and thus increases the financeability of projects with high capital costs and long amortization periods. It is also sometimes advocated as a way to protect the revenues of concessionaires that are required to cross-subsidize some groups of consumers. But exclusivity can have a major downside, especially for low-income areas that lack formal connections. Exclusivity illegalizes and suppresses the emergence of alternative service providers, even in areas that the concessionaire may not serve for some time. There may be other ways of increasing the attractiveness of a concession that are less harmful than exclusivity, such as improving the stability and credibility of the regulatory regime and eliminating unduly costly investment obligations.

The La Paz–El Alto contract does not explicitly state whether Aguas del Illimani has exclusivity over its service area, but the contract and Bolivia’s water regulations protect the concessionaire from competition. The regulations, for example, prohibit the sale of water by connected households and allow the concessionaire to charge a fee for private groundwater extraction within its service area. The contract requires that the concessionaire eliminate all communal standpipes, but these standpipes are inexpensive alternatives to in-house connections for many households. Restricting the options available to poor households will likely do more harm than good in areas (such as the area no servida) where the concessionaire is not obligated to provide in-house connections in the foreseeable future.

Thus exclusivity is actively harmful when it restricts service options that households might otherwise choose. Service area boundaries are generally neutral but potentially harmful if they exclude households best served by the utility.
Expansion mandates

Connection requirements like those in the La Paz–El Alto concession are a direct way to include expansion goals in private contracts. If such requirements are enforced, they can induce utilities to expand services to customers they might otherwise be unwilling to serve. Expansion mandates may be:

• **Mandates on the number of new connections to be added.** These mandates are reasonably straightforward to monitor and enforce provided that what counts as a connection is clearly defined and the mandates are backed up with incentives for compliance. In La Paz–El Alto all connections must be in-house connections. Failure to make all required connections within a specified period results in a fine and, for major lapses, an increase in the expansion mandate for the following period.

• **Mandates on percentage coverage.** The long-term sewerage coverage mandates in the La Paz–El Alto concession take this form. Such mandates may be difficult to monitor and enforce. In La Paz–El Alto, for example, no one knows how many houses are in each subsystem, somandating, say, 50 percent coverage is difficult. In an attempt to address this problem, the concession requires the regulator to translate the contract’s percentage coverage requirements into a mandated number of connections at the beginning of each five-year period.

• **Mandates to connect all households or neighborhoods meeting certain criteria.** The La Paz–El Alto contract subjects expansion in the area no servida to this type of mandate. The concessionaire must connect neighborhoods in this area if they meet density criteria and if doing so would not significantly increase costs. This mandate is potentially quite weak because whether a neighborhood meets the criteria is subject to debate.

The basic idea behind expansion mandates is that they can encourage concessionaires to do things that they might otherwise be unwilling to do. An unwillingness to expand service might have several causes. Concessionaires may be adverse to sinking large investments early in the life of a contract—for example, if there is uncertainty about the independence and sustainability of regulatory arrangements. Some neighborhoods may be more costly or risky to invest in—for reasons as varied as location, density, obstructive local officials, neighborhood violence, or delays in legalizing land tenure. Expansion mandates do not directly address any of these problems. And a concessionaire may, depending on the regime, be able to argue that it is impossible to comply with its mandates given the magnitude of such problems. In this situation expansion mandates may at best open a dialogue on how these problems can be addressed. On the whole, though, expansion mandates can be neutral to positive.

Technical specifications

Most concession contracts say something about how water and sanitation services must be delivered. They may specify outputs (type of service, number of connections, minimum service quality) or inputs (technical and materials standards, required construction techniques, procedural requirements). In general, mandating outputs and not inputs—as is generally the case in the La Paz–El Alto contract—is preferable because it allows the concessionaire to choose the most efficient way to provide the desired outputs.

Output requirements are not without their problems, however. By requiring in-house connections and mandating service quality standards, the La Paz–El Alto contract greatly restricts the flexibility of the concessionaire’s service offerings. The regulator recognizes that the mandated service levels are expensive and could jeopardize expansion efforts. Thus efforts have been made to lower costs. For example, while maintaining the requirement for in-house connections, the regulator has sanctioned a pilot project in which the concessionaire is installing condominial water and sewerage systems in some El Alto neighborhoods. (Condominial systems reduce costs by using smaller pipes, installed in relatively...
shallow trenches, often under households’ yards rather than under roads.)

Output requirements are generally preferable to input requirements, which risk raising costs and making procedures unduly burdensome. But output requirements can also be harmful if, by restricting a concessionaire’s service offerings, they make service expansion too costly for the concessionaire or out of line with household preferences.

**Tariff structure and connection fees**

Whatever the cost of service, a concessionaire must be able to cover its costs if the desired expansion plan is to be sustainable. Cost recovery over the life of the contract will be affected by such factors as the tariff structure, the ability to disconnect customers for nonpayment, regulatory rules for adjusting the overall tariff level, and the soundness and independence of arrangements for applying those rules. Here we concentrate on the tariff structure.

Concessionaires will have an incentive to focus service expansion efforts on areas where capital expenditure costs are relatively low or quickly recoverable and where tariffs cover or exceed operating costs. In La Paz–El Alto there are at least three possible disconnects between the tariff structure and the contract’s service expansion objectives:

- **The social tariff.** Households are charged a unit tariff that falls well below costs for the first 30 cubic meters of water they use each month. The sale of water to low-consumption households is thus a loss-making proposition, and a concessionaire might be expected to prefer not to serve such households. Most of El Alto (the focus of the contract’s expansion efforts) is a low-consumption area, with the average household consuming about 10 cubic meters a month.
- **The unified water and sewerage tariff.** Under the unified tariff a household with a water connection but no sewerage connection will have the same monthly bill as a household with a sewerage connection and the same level of water consumption. This setup will likely discourage the concessionaire from providing sewerage connections.
- **Connection fees.** The La Paz–El Alto contract sets maximum connection fees for water and sewerage that do not vary with the true cost of connection. The same connection fee applies for in-fill connections on existing lines and for connections in areas with no existing network. In this situation the concessionaire is likely to prefer making in-fill connections, where profit margins may be greater. The concession contract seeks to counteract this inclination by mandating that in-fill connections can account for no more than half of all new connections.

Tariff structures can have a positive effect if they facilitate serving the poor by ensuring that revenues cover the cost of these connections. Otherwise they can have a potentially negative effect if they create disincentives for service expansion—possibly blocking expansion of service to households that are willing to pay more for access to better water and sanitation services.

**Prospects and problems**

To date the La Paz–El Alto concessionaire has met its service expansion obligations. But certain features of the contract could make it unnecessarily difficult to achieve the broad objective of universal service—as well as unnecessarily painful for some households. For example, the contract mandates a uniform and costly level of service, the tariff provides disincentives to meet expansion goals, and exclusivity provisions have the potential to restrict water and sanitation options before in-house connections become available.

1 After the first five years of the contract the concessionaire is required to propose separate water and sewerage tariffs, which may help remedy this problem.

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Bidding for Concessions—
The Impact of Contract Design

Michael Klein

Infrastructure concession contracts set out the performance obligations and rights of
concessionaires and the incentives and risks under which they operate, including pricing
arrangements. The clarity with which these terms are defined determines whether there is likely
to be renegotiation after contract award, which may undermine the significance of the initial
auction. The design of incentives and risk allocation will affect first the intensity of competition
and then the sustainability of the original contract. This Note examines these issues.

The definition of what is being auctioned
should cover all the specifications and in­
centives that govern a concession, whether they
are included in the concession contract or in
laws, regulations, or elsewhere. Where con­
cessions are new, concession contracts may run
to hundreds of pages and several volumes, as
in the case of the Buenos Aires water conces­
sion. In France, by contrast, a long tradition
with concessions has led to short documents
that set concession-specific terms. Many other
rules governing concessions are found in more
general laws or the precedents developed by
more than a hundred years of relevant
jurisprudence.

Performance specifications

A key goal in drafting contracts is to ensure
that they are as clear and comprehensive as
possible so as to reduce the likelihood of re­
negotiation. At the same time contracts need
to give the concessionaire the freedom to come
up with efficient and innovative solutions.

Some argue that in the ideal arrangement a con­
ceding authority would define clear and unambig­
uous performance targets for service delivery
by the concessionaire, but not make rules on
how to achieve them. That sounds right in prin­
ciple for concessions governed by some form
of price regulation. Where prices are regulated,
some regulation of service quality is also
needed to prevent the concessionaire from
reaping excess profits by skimping on quality.

Governments tend to be nervous about pro­
viding only general performance obligations,
fearing that the concessionaire will do less than
they deem necessary. An example in the United
Kingdom helps show why. In the competition
for a build-operate-transfer (BOT) contract for
a prison, granted under the country’s private
finance initiative, it turned out that the win­
ing company’s bid was based on a plan to
house several prisoners in each cell. The
government had wanted single occupancy, but
had forgotten to specify this in the tender
documents.

Governments often prefer to specify the
concessionaire’s obligations not only in terms
of the type of service to be delivered, but also
in terms of the investments to be carried out in
support of these objectives. This carries obvi­
ous risks. When the Argentine government
privatized freight railways, it set investment tar­
gets for them. But because the market did not
develop as expected, the investments were ren­
dered superfluous.¹
Contract renegotiation has often been necessary in cases like these. But it could have been avoided with greater care in contract design. Extensive consultations about specifications with technical experts and clarification meetings with bidders are often helpful in arriving at sound contracts.

But in some cases contracts may need to specify input requirements, not just performance targets. For example, where service quality cannot be adequately measured, technical solutions might have to be prescribed to ensure minimum standards. For some coal-fired power plants where emissions could not be monitored effectively, the installation of scrubbers for sulfur extraction has been required to meet environmental standards. The issue is in principle the same with any health, safety, or environmental regulation governing any type of business.

Investment obligations also appear in concession-type contracts where there is no price regulation. Oil exploration leases often prescribe work programs; if lease holders fail to actively explore for fuels, they are required to relinquish the right to explore all or part of a particular area. And governments may require holders of radio spectrum licenses to either use them or return them. Such provisions appear to be aimed at preventing private parties from bidding for concessions so as to restrict supply or hold up development of an integrated system and thus exercise market power.

Careful drafting is essential to create contracts that are resistant to renegotiation and can adjust to changing circumstances without undermining the original terms of the contract award. Unsurprisingly, defining specifications is one of the most problematic, contentious, and time-consuming tasks in preparing many concession contracts. Even with the greatest care those drafting a contract may forget aspects of a problem. And complete consideration of all possibilities (including genuine innovation by bidders) may simply be too cumbersome and costly—not least in lawyers’ time. Contracts are thus unlikely to cover all contingencies.

**Incentive schemes**

Incentive systems under concession contracts include cost sharing and pricing arrangements, penalties or incentive payments linked to performance standards, bonding devices (such as performance bonds), and insurance arrangements. The incentives should be set and aligned so that the concessionaire manages the risk and opportunities it faces in a way that is in the interests of the conceding authority.

**Risks outside the concessionaire’s control**

Risks that the concessionaire can control or assess less effectively than its customers generally should not be shifted to the concessionaire. When the concessionaire and customer have a similar ability (or inability) to control or assess a risk, the decision on who will assume it should depend on who can bear the risk at a lower cost. Shifting risks that the concessionaire cannot control to customers does not increase their net costs (assuming equal costs of risk bearing for consumers and investors) and it reduces the likelihood of contract renegotiation. The cost of purchases over which the concessionaire has no control, for example, are generally passed through to customer through price adjustment formulas.

This principle for distributing risks is widely accepted, though the determination of what risks can or cannot be meaningfully controlled...
by the concessionaire can give rise to intensive negotiation. In practice, hybrid approaches are often used. Consider the risk of general price inflation. This risk is sometimes passed to consumers, which makes sense when it is unclear to what extent the concessionaire can control costs. By passing through a general benchmark for cost increases, the concession maintains the incentive for the concessionaire to beat the benchmark by controlling costs, in contrast to a concession in which remuneration is set by a rate of return applied to the concessionaire's cost base (rate base). At the same time the concessionaire need not ask for the excessive risk premiums that would be required if all cost risks were shifted to it under a fixed price scheme.

In an application of the general principle, Engel, Fischer, and Galetovic (1996) argue that where demand risk cannot be controlled or assessed by concessionaires, they should not be exposed to it. This could apply, for example, to traffic demand for toll roads or to power demand when the concessionaire supplies a monopoly that has its own, competing power generation (as is the case for many independent power projects or BOTs). Thus an optimal scheme would auction off the road or the power plant not on the basis of the lowest toll or price of power but on the basis of the least present value of revenue. The concession would end when the concessionaire reached that level of revenue. If contract renegotiation ever became necessary, it should be easy to determine what revenues the concessionaire had not yet earned. This amount would determine the optimal compensation payments, limiting the ability of negotiating partners to extract excessive payments during renegotiations. This scheme is being applied to the Chilean road concession program. A similar scheme has been used for the Dartford tunnel in the United Kingdom.

Cost sharing and bidding intensity

There is a tension between pricing or cost sharing rules and the intensity of expected competition (McAfee and McMillan 1988). At one extreme pure cost-plus rules render competition meaningless. If concessionaires face no possible exposure to cost increases, they would all bid low and later claim cost increases. But if concessionaires have to share even a little in cost increases, the most efficient firm would be selected in a competitive auction because it could make the lowest bid.

When much of the cost is shared with consumers, even inefficient firms can make fairly low bids, putting pressure on the most efficient firm, and risk-averse firms will consider bidding. Consider a project in which the costs (including desired profit) of the high-cost firm would be 200 and the costs of the low-cost firm 100. Under a fixed price bid the low-cost firm could win with a bid of 199, just beating the high-cost firm's bid of 200. If consumers were to share costs 50-50, the winning bid would be 99, with the low-cost firm just beating the high-cost firm's offer of 100 (half of 200). Consumers would pay half the cost of the winning firm, 50, plus the bid price of 99, for a total payment to the concessionaire of 149. Without cost sharing, the payment to the concessionaire would be 199.

Thus greater cost sharing increases the intensity of competition and benefits the conceding authority, the customers, or both. But these gains need to be balanced against the weaker incentives for the concessionaire to control costs. Consequently, fairly generous cost sharing would be advocated for high-risk, complex projects, and fixed price arrangements for "standard" ventures. For example, Eurotunnel issued the main construction tender with cost sharing, while natural gas-fired independent power plants might be bid on the basis of the lowest present value of revenue.

In practice, companies tend to favor more cost sharing than conceding authorities, which tend to favor arrangements close to fixed price contracts. These preferences can be largely explained by firms' desire to shift costs to others and by authorities' concerns about weak incentives for cost control. Governments rarely
consider the effect on bidding intensity. And among companies, low-cost firms can be expected to argue for approaches closer to fixed price rules, and high-cost companies for approaches closer to cost-plus rules.

**Postaward contract adjustments and bonding mechanisms**

Even the best-designed long-term concession contracts usually have to be adjusted at some time during their lives, and sound contracts contain mechanisms to deal with such adjustments. They may specify the conditions under which renegotiation may take place and the principles on which it may be based. For example, contracts for French water concessions stipulate that prices may be renegotiated if unforeseen events occur or at certain intervals, such as every five years. In this respect concession contracts are no different from utility regulation more broadly. Utilities in the United Kingdom may see prices adjusted through interim assessments following unforeseen shocks or during planned price reviews, say, every five years.

Renegotiation occurs in a quasi-bilateral monopoly setting. Concessionaires can negotiate only with the government, and governments may find it difficult to turn to alternative concessionaires. Governments are often reluctant to terminate a concessionaire because they are afraid that basic services, such as water supply, may be interrupted. To deal with such concerns, the concessionaire can be obligated to continue providing service until a new concessionaire has been chosen. In Colombia this obligation is imposed by a general law governing concessions.

But governments still worry that concessionaires will not fulfill their obligations. Performance bonds are one way to prevent partners from walking away from a contract. They also limit bargaining options after contract award. In a water concession in Latin America several partners in a consortium walked away from the concession when a dispute with the conceding authorities became unbearable. But key players stayed and tried to make the concession work not least because of the risk that a large performance bond would be called.

Concessionaires, on their part, try to bind conceding authorities by requiring them to commit to international arbitration under conventions which make arbitral awards enforceable. They might also ask for special payment or performance guarantees to ensure that counterparties can meet their payment obligations.

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1. Governments also sometimes prescribe technical solutions. In an Argentine gas pipeline BOT project in the early 1980s, COGASCC the government required a certain method for extracting propa, butane, and other gas liquids from the gas stream. The private concessionaire found a more efficient way to extract liquids. For this and other reasons it was later accused of breach of contract.
2. Of course, an oil field may go unexploited for a time not because the company wanted to gain monopoly power, but because it simply wanted an option to explore later. Nevertheless, the notion of hold-up problems is central to an understanding of concessions. Many transactions must occur in a bilateral monopoly setting, where there is only one buyer and one seller, or in settings that approximate this situation. Such transactions may be held up by parties trying to extract maximum rent, particularly when comparator prices from functioning markets are lacking. To prevent or reduce such wasteful bargaining, it may be socially useful to impose limits on the bargaining—at the extreme, the option of expropriation.
3. Transaction costs for concession-type projects—for development activity, negotiations, and the like—tend to be high. Where concession arrangements are reasonably well understood, transaction cost may be 3 to 5 percent of total project value. In countries where the concept is new, initial transaction costs exceed 10 percent of project cost (Klein, So, and Shin 1995).
4. At the beginning of the twentieth century many concessions had no inflation indexation. When prices began to rise in many countries, the result was often nationalization as private concessionaires, unable to meet costs at the contracted prices, went bankrupt.
5. The properties of pricing arrangements ranging from cost-plus prior to fixed price contracts have been extensively discussed in the literature on regulated industries (see Armstrong, Cowan, and Vickers 1994 and Laffont and Tirole 1993).

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**References**


Rebidding for Concessions

Michael Klein

The longer a concession lasts, the less effect the initial rounds of bidding will have on the terms of the concession over its full life. Much more influential will be periodic renegotiations or price reviews, which under standard concessions are hard to settle by competition (Williamson 1976). It has been suggested that competition could be brought to bear by periodically reauctioning a concession, which would limit the potential for exercise of market power by concessionaires. If contracts can be well written and rebidding is practical, periodic reauctioning offers an effective solution to the natural monopoly problem. Price regulation may no longer be necessary, and rebidding may help with contract adjustment.

Edwin Chadwick proposed this solution to the natural monopoly problem in 1859, and Harold Demsetz resurrected the notion in 1968. Rebidding for concession-type arrangements is therefore sometimes called a Chadwick-Demsetz auction. This Note examines the case for rebidding.

Rebidding is a practical option when assets are not specific to the concession. For example, garbage collection franchises can be reauctioned periodically because if the incumbent loses, it can simply transfer assets (such as trucks) to another purpose or sell them. Bus routes also could be auctioned repeatedly. Studies suggest that auctioning short garbage collection concessions is more economical than either free entry (with garbage trucks chasing the same consumers) or long-lasting monopoly arrangements (Bartone and others 1991).

Problems arise when the concessionaire’s assets are specific to the concession and are understood better by the incumbent than by the challengers. For example, water pipes normally cannot be dug out and used elsewhere economically. In such cases special incentive problems arise that complicate rebidding.

Valuing the incumbent’s assets

A new entrant could always underbid the incumbent if the entrant could buy up the incumbent’s assets cheaply. If the incumbent were forced to sell to the new entrant after losing the concession, that would tend to result in a “fire sale,” undermining the long-run viability of the bidding process. But if the incumbent and new entrants were obliged to agree before the bidding on the price at which assets would change hands, the system might work. One way to force an agreement is to oblige a winning entrant to supply the service at the bid price for the service, regardless of whether it buys the incumbent’s assets, or to pay a sizable penalty—guaranteed by a bid bond. In most cases this would lead efficient new entrants to agree on an asset price higher than the discounted cash flow expected by the less efficient incumbent.
The problem with any such rebidding scheme is that the prices demanded by the incumbent may systematically exceed the valuations of new entrants when new entrants cannot observe the quality of the assets, such as water pipelines in the ground. Just as in the market for used cars, the buyer may assume that prices offered by the seller are too high and refuse to enter into a contract. After all, the buyer knows that the incumbent has an incentive to skimp on investment and maintenance, precisely because of the possibility of losing the concession in rebidding.

Arguably, however, the seller’s information advantage is shrinking as improved electronic measurement systems allow such assets as phone or electricity systems to be assessed quickly, cheaply, and comprehensively. Toll roads should also be auctionable—as should road systems, once pervasive road pricing creates road utilities. With underground pipes the hardest to inspect, water systems will remain the toughest challenge.

Special schemes may be needed to deal with incentives to skimp on investment and maintenance in cases where the quality of assets is hard to assess. Concession-specific assets may either be transferred to the winner of a rebidding (physical infrastructure) or stay with the incumbent (managerial know-how about the concession). When assets are transferable, any investment or improvement by the incumbent would benefit the new winner, reducing the incumbent’s interest in investing in or maintaining the assets. But when assets are not transferable, the incumbent has an absolute advantage during the rebidding. Thus in the first case the rebidding arrangements should give preference to the incumbent, and in the second they should establish a bias against the incumbent. How these effects balance is an empirical matter (Laffont and Tirole 1993).

In practice, most assets can be transferred. New winners routinely employ key staff of the incumbent and thus appropriate much of the human capital specific to the concession as well as the physical assets. It might therefore be argued that a bias in favor of the incumbent is generally advisable. In the rebidding of complex concessions such biases do indeed occur. In France concessions have traditionally been awarded at the complete discretion of the conceeding authority. That has usually meant that concessions are reawarded to the incumbent.

In Argentina rebidding is mandatory for the Buenos Aires ninety-nine-year electricity distribution concessions after the first fifteen years and then every ten years. Bidding is on the value of the concession assets, while the price remains as reviewed by the regulator. This system gives an infinite preference to the incumbent. The incumbent can always retain the concession by bidding an outrageous amount, which it pays to itself. More likely, of course, the incumbent will bid the amount it views as justified, and if another bidder wants to pay it more for quitting, so much the better. The benefits of the new winner’s greater willingness to pay are all appropriated by the incumbent, not by the consumers, unless regulators decide to pass on some of the benefits to them.

A market for corporate control of concessions

In a sense the Argentine electricity concession rebidding scheme makes takeover bids mandatory every ten years. Takeover bids would extract greater value for shareholders under the right pricing policy. They would also benefit consumers if regulators took the successful bid as evidence that prices could be lowered more. That, of course, might dampen the enthusiasm of potential bidders. Nevertheless, the successful rebid can provide extra information to the regulator. Even requiring the concessionaire to quote some shares on the capital market might help (Mayer and Jenkinsen 1997). Some evidence in this regard is provided by the dispute about retail power prices in the United Kingdom in 1995. The electricity regulator, Stephen Littlechild, changed his opinion on future prices after a hostile takeover bid prompted a defense by an electricity distributor revealing that it had a stronger financial position than the regulator had been made to believe.
If the benefits of rebidding can also be obtained by requiring concessions to be listed on the stock exchange and by allowing takeover bids, it is hard to see how mandatory periodic rebidding schemes like the Argentine scheme could improve on this. They may be justified when there are no effective takeover mechanisms.

Rebidding as a means to reduce regulatory discretion

Yet there may still be ways in which rebidding can help pass the benefits of greater efficiency to consumers. After all, one reason for allowing or requiring challenges to the ownership of a concession is to provide regulators with better information for price setting. But if regulators have the discretion to use such information to adjust prices, firms might be reluctant to stage takeovers. When they do make bids, they would figure in a discount anticipating regulatory reaction to the bid, including a risk premium to take into account the regulator’s degree of discretion. Little can be done to prevent firms from taking into account the regulator’s likely responses. In fact, it is good that they do so, because they should be satisfied with the business even if the regulator passes part of the efficiency gains to the consumers.

A formal system of rebidding might reduce the risk premium for regulatory discretion, however. Such a system could work as follows. To ensure that creditor and investor interests are adequately taken into account, the company would be valued on the basis of its debt and stock market capitalization. Bidding would first be on the net worth of the firm. If more than one bid exceeds some predetermined price, the bidding would switch to the lowest price to consumers. A bias would be provided in favor of the incumbent, but not an infinite or discretionary one. It could be, for example, a 10 percent preference, so that another bidder wins only if it can underbid the incumbent by more than 10 percent. This scheme would eliminate much of the discretion by regulators. Such preference systems are used in bidding for traditional contracts for equipment and civil works and have also been used in radio spectrum auctions in the United States. A scheme of this type has also been discussed as an option for the Chilean water system.

Rebidding to strengthen reputational mechanisms and limit government discretion

Termination and rebidding options should be designed so as to create the strongest possible incentives for firms to develop and maintain reputation. Governments or regulators should allow bids only from reputable companies, such as by requiring some form of prequalification. That gives companies intending to bid for concessions in the future an interest in maintaining a good reputation. Interest in reputation seems to be effective in reducing companies’ incentives to capriciously renegotiate concessions. In a study of 3,000 cable television franchises in the United States Zupan (1989) found that opportunistic renegotiation appeared to have taken place in only 60 cases.

The assessment of a company’s reputation is often subjective. When tasks are contracted out by firms operating in competitive markets, the firm choosing the “concessionaire” has a strong interest in judging reputation efficiently. But when governments or regulated industries issue concessions, such discipline may be absent. That raises the question of whether government agencies should be allowed to assess reputations. The procurement rules governing the U.S. Department of Defense make it almost impossible to take reputation into account, while French mayors have almost unlimited discretion to evaluate concessionaires. What is required is a mechanism for taking “soft” information into account, as rating agencies do when they evaluate capital market participants.

Rebidding and elections

Voters, of course, use a rebidding mechanism that takes soft information into account when they choose political leaders in elections. They are willing to live with the obvious incentive...
problems generated when politicians face re-election every four years or so. Voters can use any piece of information in making their choice. It could even be argued that incumbency gives politicians an advantage in elections like that recommended by the theory of rebidding. The widespread practice of term limits imposed in political systems where mistrust in politicians is high is also consistent with advocacy of rebidding.

In political elections voters award the monopoly of government power for a period—a concession of sorts. Should voters similarly be allowed to pick their favorite monopolist for a limited period? The issues are not more complex than those in many other elections. It is clearly practical to vote on many detailed issues, as demonstrated in California and Switzerland. The costs of conducting such elections are likely to fall in a world where electronic forms of information and voting are becoming cheap and ubiquitous.

Elections might favor price structures that benefit “median voters” at the expense of poor or remote customers. After all, the incentives for voters are similar to those they face in choosing legislators who impose taxes. To the extent that cross-subsidies can be maintained in the infrastructure system, they would presumably tend to favor customers who consume at similar times and locations.

A future for rebidding

The argument that concessions should be awarded competitively rather than by negotiation applies just as much to their reaward, particularly to limit discretion by governments. The real issue is whether there should be a reaward. The possibility of reaward is, of course, the very essence of concessions as property rights with special termination options for government. The threat of termination should ideally be used to strengthen the concessionaire’s incentives to behave well so that it need never be exercised. Rebidding raises a host of complex issues. However, reaward is unavoidable in the longer run. Many current water privatizations, for example, are really reawards. In current privatizations the asset valuation problem often is not confronted, as existing assets are provided free to the new concessionaire. But that does not reflect sound policy so much as desperation with the performance of public firms and the absence of private shareholdings in the incumbent firm. Rebidding is probably still the least imperfect system of reaward. It deserves to be tried more systematically.

References


Financing Water and Sanitation Projects—
The Unique Risks

David Haarmeyer and Ashoka Mody

A project finance structure allows water projects with attractive cash flows and risk profiles to secure long-term private capital. This structure provides a direct link between a project’s cash flow and its funding to give project sponsors, investors, and lenders strong incentives to ensure that projects are structured and operated to generate stable revenue streams. But even in industrial countries the credit strength of off-taking municipal governments and the sector’s traditional monopoly structure expose lenders to potentially significant credit, regulatory, and political risks. These risks, combined with the sunk, highly specific, and nonredeployable nature of water investments, mean that lenders and investors are vulnerable to government opportunism and expropriation. Reviewing some recent innovative projects, this Note shows that private participation on a limited recourse or nonrecourse basis has required support from multilateral and federal government agencies to absorb noncommercial risks.

Private sector participation in water and sanitation has often taken the form of special-purpose build-operate-transfer (BOT) projects following the project finance or limited recourse model. These are self-contained projects that address the need for more water and sanitation. Although these bulk suppliers can alleviate immediate shortages, they have virtually no effect on systemwide revenue problems (for example, leakage and tax collection) or labor cost problems. These long-term problems are sometimes tackled incrementally through leases and management contracts. An increasing number of countries have gone further by awarding operating concessions for entire systems, which require investment commitments from the concessionaire. Beyond such concessions lies full privatization of assets, which facilitates financing by creating collateral.

The promise of steady—if not growing—long-term future cash flows is the basis of the private sector’s interest in financing these ventures. As one of the last monopoly utility sectors, water and sanitation can be especially attractive to long-term private investors. But financing water and sanitation projects has been a special challenge because of their unique risks:

- Expensive to transport but cheap to store, water is essentially a local service and subject to control by local government, which can be more politicized and have weaker credit than state or federal government.
- With most of the assets underground, their condition is hard to assess. That makes investment planning difficult, posing risks for contract renegotiations.
- Inadequate provision is associated with health and environmental risks, so government has a strong interest in extending access to service, regardless of ability to pay.
- Significant currency risk arises because customers pay in domestic currency that does not match the currency of international debt and equity financing.
There has so far been little scope to introduce direct competition in treatment, transmission, and distribution.

The risk profile of a project is also influenced by its type and by its stage of development. Greenfield projects with a BOT or build-own-operate (BOO) structure, because they involve a period of construction before revenues are generated, generally expose lenders to greater credit, political, and regulatory risks than concessions for infrastructure services that are up and running. Similarly, older and more efficiently run systems with longer operating histories tend to have more secure and predictable cash flows and mature investment profiles, and thus expose lenders and investors to fewer risks.

The water and sanitation sector's exposure to risks that are often difficult and costly to cover has two important ramifications:

- Fewer projects have been successfully financed with private capital than in other infrastructure sectors, such as power and telecommunications.
- Projects financed with private capital have tended to involve direct financial or credit support from government or third parties such as bilateral, multilateral, and export credit agencies.

Case studies in finance

The experience of six water and sanitation projects and one set of utilities in accessing and structuring private finance illustrates the level of government or third-party support (table 1). All the projects follow the standard project finance structure except for the more mature English and Welsh water companies, which rely on corporate finance.

Only the BOT project in Johor, Malaysia, was financed on a nonrecourse basis with no sponsor or third-party support to cover risk of nonpayment. All the other projects were financed on a limited recourse basis. The recourse was generally provided by payment guarantees to the parties off-taking the service (buying bulk water or wastewater services), such as a local government entity in a BOT or BOO project. For the BOT in Chihuahua, Mexico, for example, Banobras, the domestic development bank, provided credit support to the local government entity. In Izmit the Turkish government stands behind the local government's water purchase agreement. In Sydney, Australia, the state government guarantees the payment of the city water utility (Sydney Water Corp.) to the private project company even though the utility's debt is rated AAA by Standard & Poor's. In Buenos Aires the Argentine government's guarantee to pay compensation if the concession is terminated early provides the chief form of security for lenders.

Sources of debt

In countries with weak sovereign credit ratings financing has been provided by multilateral and export credit agencies. These agencies are generally in the best position to shoulder political and regulatory risk and thus provide long-term finance at reasonable rates. The US$9 million Chase Manhattan Bank loan to the Chihuahua BOT project, which received no multilateral or bilateral funding but did receive grant and credit support from Banobras, is a rare case of commercial bank participation. In a similar BOT project in Puerto Vallarta, Mexico, the International Finance Corporation provided debt finance backed by a revolving and irrevocable letter of credit from Banobras.

In countries with high sovereign credit ratings projects have been financed by domestic commercial bank loans. The BOT project in Johor and the BOO project in Sydney were financed by commercial debt. As a result of the project structure (existing cash flows) and Malaysia's highly developed capital market and relatively low interest rates, the Johor project was financed entirely with local debt. The Sydney project had both local and offshore financing.

The limited capital market financing of water and sanitation indicates that individual investors are not in a position to accurately evaluate and mitigate the risks. But as the experience of the English and Welsh water companies shows,
projects can be expected to access capital markets as their cash flows to support debt service become more stable and certain and independent regulatory agencies are established.

The English and Welsh companies have drawn on a variety of financing sources, including the bond markets. Anglian Water, one of the ten privatized water companies, reflects the low risk profile of more mature water utilities. In 1990 the company floated a twenty-four-year bond issue priced at just fifty-three basis points over U.K. Treasury gilts due November 2006. Standard & Poor’s based its AA rating of the £150 million Eurobond on Anglian’s “robust financial profile and stable operating environment,” which “should provide the company with a fair degree of insulation from the impact of key regulatory and political risks going forward.” The English and Welsh companies have also taken advantage of low-cost loans from the quasi-governmental European Investment Bank.
Equity financing

Although debt is generally cheaper than equity, a long-term equity stake by the sponsor (which is sometimes also the operator) ensures that management has a long-term interest in the project and that cash flow growth leads to capital appreciation. Equity also reduces the debt service burden on the cash flow, which can be especially important in a project's early development phase.

Equity has been provided largely by sponsors. For large projects especially, equity, like debt, is often sourced from multiple consortium members, both international developers and local investors. The Buenos Aires concession, for example, has four international shareholders and four local shareholders (including the utility's employees).

Lenders like to see sponsors achieve a reasonable return on their investment, to ensure that sponsors have adequate incentive to maintain support for the project, at least through the life of the loans. Equity holders partially shield lenders because the lower priority of their claims on a project's revenues means that they will absorb unexpected shortfalls in revenue. In full concessions and privately owned utility companies internal cash generation can provide an important source of equity for financing investment.

Although information on the return on equity for project sponsors is not widely available, the return can be expected to vary with project risk and cash flow profiles. In two of the cases discussed here returns to investors are regulated:

- The Malaysian government has guaranteed returns of 14 to 18 percent on investment in the national sewerage project; actual returns are currently at 12 percent because the concessionaire failed to achieve a 90 percent tariff collection rate.
- For the English and Welsh water companies the returns on regulatory capital (the assets of the core business) were 11.5 percent in 1995–96 and 12 percent in 1994–95. According to Ofwat, the U.K. water company regulator, these returns are expected to fall as the water companies become more established and capital expenditures decline.

To compensate for the greater country and political risks, required returns in most developing country projects are likely to be significantly higher and closer to those in other infrastructure sectors. For a sample of power projects in Asia and Latin America Baughman and Buresch (1994) estimated the equity return at between 18 and 25 percent. And for privately financed toll roads Fishbein and Babbar (1996) found that investors expect annual returns to range between 15 and 30 percent.

Conclusion

The challenge for the future is in mitigating the noncommercial risks that characterize the sector and moving beyond the limited capacity of third parties. Part of the solution lies in generating better information about these risks so that they are more transparent and their costs are more fully recognized by parties that can mitigate them. Two tracks to achieve this end are independent regulatory agencies and competition—for the market and for rights to supply individual customers, as in England and Wales.

References


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Sydney's Water—A Suitable Case for Private Treatment?

Ross Chapman and Sandy Cuthbertson

Until recently Sydney's water was captured, stored, treated, and reticulated by Sydney Water, a state-owned corporation. Sydney Water had been a statutory authority, the Sydney Water Board, until it was corporatized in 1995. The water supply system, designed in the nineteenth century and restructured in the mid-twentieth, drew on raw water that was of good quality by world standards, and until 1989 treatment went little further than screening, disinfection, and fluoridation. But water quality guidelines were becoming more stringent, and Sydney's raw water was coming under increasing stress.

After establishing that consumers were willing to pay for maintaining the quality, the board decided to contract for a privately built, owned, and operated (BOO) system for water treatment. Responsibility for harvesting and storing raw water and delivering treated water would remain with the board (and later, Sydney Water). Several factors persuaded the board to adopt the BOO system for water treatment. It faced major capital outlays to upgrade and expand waste-water treatment capacity. There was a growing likelihood that it would be corporatized, making a "delegated service" approach involving the private sector and providing access to a full range of international technology attractive. And the subsequent involvement of seventeen consortia in the "tournament" for the market revealed a level of competition likely to produce outcomes that the board, relatively inexperienced with filtration systems, would find difficult to match.

In 1993 the board contracted with two consortia—Australian Water Systems and North-West Transfield—for two water treatment plants. A third contract, for two more plants, went to another consortium, Wyuna Water, in 1994. Today these plants treat all the drinking water consumed in Sydney except for small quantities treated in several small facilities owned and operated by Sydney Water.

The private sector's involvement in treating Sydney's water came under increased scrutiny after widely publicized water quality alerts were issued in 1998. Tests of water treated at the largest plant showed apparently dangerous levels of the parasites cryptosporidium and giardia (which can cause human intestinal illnesses), and the Department of Health issued three separate "boil water" alerts, in July, August, and September 1998. The government later initiated a wide-ranging inquiry into the contamination (the McClellan inquiry). This inquiry led to changes that will affect Sydney Water's relations with the treatment companies.

This analysis of the Sydney experience through the bidding process and into the operations phase may provide insights for other agencies contemplating private provision of water treatment services. And these insights may be sharpened by what has been learned through the inquiry.

Choosing the operator

Once the decision had been made to involve the private sector in providing treatment systems, important questions arose about how many contracts should be awarded and what restrictions should be placed on successful tenderers. The board determined that three contracts would be awarded for the four proposed treatment systems, combining the two smallest systems under a single contract. The successful bidder for the largest project would be ineligible to tender for the other two. Under the protocol
for accepting bids, only bidders that had not successfully bid for one of the other contracts, and that met the minimum acceptable technical standards, would be considered.

The initial allocation of bargaining power under these procedures partly determined the basis for any negotiations required during the life of a contract. For example, if it became necessary to expand plant capacity during a contract, the water treatment company would need to renegotiate water tariffs to recover its expansion costs. By opting for several operators, the board gained access to information from each that can be used as a benchmark in assessing the performance of the others and in negotiating tariff adjustments. It also gained access to a wider range of water treatment technologies, strengthening its hand in future expansions and upgrading.

This approach has costs, however. For example, the successful bidders for the second and third contracts may not have been the lowest-cost bidders meeting the board’s minimum technical specifications. And if firms could win all three contracts, they might offer more attractive bids, reflecting size economies and any expected benefits in subsequent bargaining. The board minimized the cost to the system of this exclusionary protocol by awarding the largest of the three contracts first.

The winning bidder for the largest plant, the Prospect plant, was the lowest cost by a substantial margin. But the selection process gave no extra weight to tenderers that could offer superior quality. The overriding consideration appears to have been the capacity to meet Sydney Water’s specified requirements at the minimum price. This emphasis on price over quality has been one source of the recriminations that followed the contamination.

Two other factors affected the selection process. The board prepared its own reports and design plans, giving it a fallback option should the BOO approach have to be abandoned for some reason. The detailed process specification in these studies, later provided to the tenderers, yielded important time and cost savings to those that were successful. The board also established a capability to assess bids and negotiate the final terms of water treatment agreements, incurring substantial costs in setting up a new legal and commercial “infrastructure.” The board wanted to be able to deal with the risk-sharing implications of the BOC path, and the board’s legal advisers had recommended that it cover contingencies in great detail and anticipate a wide variety of specific events that could affect its risks.

Despite this effort, at least one influential official review (the state auditor general’s 199F annual report) has suggested that at least for the largest plants, the resulting contract leaves substantial residual risk with Sydney Water and its owner, the state government.

The water treatment tariff structure

Details of the water treatment tariffs under the contracts have not been fully revealed, but the tariff structures for all plants are understood to be similar. The tariff structure agreed for the Prospect plant has two parts. First, an availability charge is fixed, independent of the volume treated, to cover about 80 percent of the financing, establishment, and fixed costs incurred by the water treatment company in the timely construction and operation of the plant. Penalties are charged in the event of breakdown. Second, a usage charge is set as a megaliter rate that declines with quantity. The agreed tariffs are subject to change if the treated water falls short of the quality specified in the contract or if the raw water supplied for treatment either exceeds or falls below the range of quality established over the previous twenty-five years. This tariff structure has important implications for risk sharing.

Risk sharing

The board put the tariff structure in the benchmark tenders to provide what it considered adequate protection for the financiers against the financial risks associated with the projects’ large fixed costs, while leaving the consortia
to bear risks relating to volume-related operating costs. It priced treatment at cost at the margin to protect consumer interests. And as the following paragraphs show, the board structured the water treatment agreements according to the principle that risks should reside with the parties best able to assess and manage them.

Completion and commissioning risks

The water treatment company was responsible for completing the project on time and to specifications that met agreed acceptance tests demonstrating that the plant was ready for continued use at the required capacity. The water treatment agreement assigned the completion and commissioning risks to the water treatment company through the availability part of the tariff (set at US$38,240 a day for the Prospect plant), which was based on the fixed costs expected under timely completion of construction.

Market risks

Although the fixed availability charge in the tariff partly insures the water treatment company against plant usage that falls short of the designed capacity, the company otherwise bears the risks of fluctuating demand from Sydney Water by agreeing to meet all demand. The contract specified that Sydney Water must assist the water treatment company in designing capacity to meet demand by providing information on its demand management strategy, including demand projections for the next two, five, and ten years. This requirement is supported by the exclusive right conferred on the treatment company to supply treated water to existing service areas.

Granting exclusive rights to treat water for a designated market involves tradeoffs. The government—through the board—has tied its hands with respect to competition for the contract-winning treatment plants, including competition from recycled water for nonpotable uses that Sydney Water might have otherwise supplied to some users. But the contracts should reflect this exclusivity in the terms offered by the treatment companies. Because the full terms of the contract are not public, however, the effects of the exclusivity cannot be assessed.

If the board’s demand projections miss the mark in future years and capacity increases are called for, the contract provides for tariff adjustments to shift the risk arising from inadequate projections away from the water treatment company. Shortfalls in projected growth in water sales will leave the treatment company’s net revenues at risk.

Performance quality and quantity risks

Risks relating to quality and quantity performance lie with the water treatment company as long as they do not involve plant expansion, in which case the risks would be shared through a renegotiated tariff. If the water treatment company fails to meet quality standards or required volumes, Sydney Water has recourse to three measures: tariff reduction or nonpayment, step-in rights, and termination of the contract. Monitoring provisions give Sydney Water the right to satisfy itself that the water treatment company is operating and maintaining the plant in accordance with the water treatment agreement. If Sydney Water finds that the company is failing to do so, it will notify the company, which must respond with an action plan to be agreed upon. The company will carry out approved quality tests whose results will be subject to audit, and Sydney Water will have the right to conduct its own tests. Disputes over results will be settled by a third party.

These aspects of the contract came under the spotlight in 1998, with inconclusive results from water quality testing at the heart of the contamination crisis that embroiled Sydney Water and the Prospect plant.

Upstream risks

Initially Sydney Water was responsible for operating and maintaining assets “upstream” of the treatment process. These included the catchment, the river systems within it, and any canals, pipelines, dams, and reservoirs used in storing
and reticulating the raw water. In announcing its catchment management policy during the bidding process, the board committed itself to a set of environmental standards to reduce uncertainty for tenderers. As explained below, the 1998 contamination scare led to reassignment of the catchment management responsibilities—to a newly constituted Sydney Catchment Authority, separate from both Sydney Water and the treatment companies. The creation of this new player will add another layer of contractual responsibilities and regulatory requirements, as Sydney Water will purchase its raw water from the Catchment Authority and have it treated by the private treatment companies.

**Raw water supply risks**

While the risks relating to the output (clean bulk water) reside entirely with the water treatment company, risks relating to the variable quality of the input (raw water) are shared by Sydney Water and the company. The quality of the raw water harvested in Sydney's catchments is only partly controllable because of storms and floods and an outer catchment that is not fully protected and is only partly developed. The water treatment agreement accounts for this partial control by specifying that, to avoid a penalty tariff under the terms of the contract, Sydney Water must provide raw water whose quality does not fall below the range established over the past twenty-five years. As originally conceived, this provision gave Sydney Water an incentive to manage its catchments so that raw water quality was at least maintained in that range. With the creation of the Catchment Authority, Sydney Water will need to shift the risks associated with raw water quality back to the Catchment Authority, where the control lies. How this will be done through a raw water tariff structure for sales from the Catchment Authority to Sydney Water remains to be determined.

**Operations and maintenance risks**

The risks of operating and maintaining the plant—functions that include providing staff, skills, chemical supplies, power, process control, and disposal—reside with the water treatment company. This accords with the company's full autonomy in daily operations under the water treatment agreement. The operators expect that contracts will be renewed at the end of the contract period. This expectation and a provision allowing Sydney Water to buy the plant assets at a price based on its own evaluation provide incentives for the operators to avoid running down the assets toward the end of the contract period.

**Financing and economic risks**

The water treatment company carries the risks of changes in interest or inflation rates during the construction period. But once the plant is commissioned, an indexing formula will take effect that will allocate the risks of inflation and changes in operating costs between the company and Sydney Water. Few details have been revealed about this important aspect of risk sharing.

**Technology risks**

The water treatment company bears the responsibility for technology, which must be proven and must meet required standards and specifications. But the contract specifies that changes in water quality requirements that call for new technology will trigger a renegotiation of the tariff, thereby sharing the risks of unforeseen changes in the standards agreed to in the water treatment agreement.

The water treatment agreement specifies contractual terms for technology transfer to Sydney Water and serves as the basis for a collaborative and cooperative relationship between Sydney Water and the water treatment company. The water treatment company is expected to keep abreast of technology, perform on-site research, and share findings with Sydney Water. This expectation is formalized by a component in the negotiated tariff to cover research and development costs of the water treatment company.
**Natural disasters**

In an emergency, whether or not caused by natural disaster, Sydney Water has the right to take whatever action it deems necessary to safeguard the system's security and maintain supply, including bypassing the treatment plants. In such events Sydney Water will compensate the water treatment company, reimbursing access fees and treatment costs.

**An independent assessment of risk sharing**

In 1996 the state's auditor general drew attention in his annual report to what he saw as unbalanced risk sharing implied by the water treatment tariffs for the Prospect plant. Pointing to the high coverage of the water treatment company's fixed costs in the availability charge paid by Sydney Water, including provision for a return on capital, the auditor general concluded that Sydney Water was the de facto owner because it faced nearly all the residual risk and that it should recognize this on its balance sheets. Sydney Water challenged this view. It pointed to the substantial uncovered construction and precommissioning risks borne by the consortium that needed to be factored into the availability charge. Some clarification of risk burdens can be expected as the costs of the 1998 contamination crisis are assigned.

**Regulated pricing and the BOOs**

The Government Pricing Tribunal of New South Wales was established in 1992 to review and set prices for services considered government monopolies, including those of the Sydney Water Board. The tribunal (now the Independent Pricing and Regulatory Tribunal) regulates Sydney Water's prices through an incentive-based approach by capping its revenues and setting access and usage charges. Its approach to the BOO treatment plants has been cautious. The tribunal stated that it will not automatically pass on cost increases to customers and that it will pass on only increases that can be justified on economic or environmental grounds. Nevertheless, the tribunal has sanctioned progressive usage price increases for customers based on filtration contract costs.

In 1996 the price regulator determined a medium-term (four-year) path for Sydney Water's prices to its customers. It conducted a mid-term review of these prices in 1998. It has passed on the full costs of the treatment tariffs to customers so far, and has identified them as a separate item in statements of Sydney Water's revenue requirements. The increase in the per-kiloliter tariff will raise prices by about 28 percent over five years.

**Environmental regulation and the contamination crisis**

Critics have argued that the treatment plants reduce the incentives to improve catchment management and that better catchment management is an alternative to more intensive treatment. The tariff structure in the water treatment agreement, however, recognizes that abnormally low raw water quality will raise treatment costs for a given standard. By shifting the risk associated with poor catchment management back to Sydney Water, the tariff structure was designed to provide an incentive for Sydney Water to manage the catchment well. The agreement also provides for a discount in the tariff for raw water of exceptionally high quality. If Sydney Water had built and operated the treatment plants itself, there would also have been incentives to find efficient combinations of treating water and improving catchment management.

Since construction and commissioning of the Prospect plant and the three smaller plants, Sydney has lost confidence in the capacity of its treatment plants to deliver water of acceptably safe quality. The detection of giardia and cryptosporidium—in some cases at extremely high levels—in monitoring and testing by Sydney Water closely followed unusual climatic conditions in the catchment supplying the Prospect plant. The contract does not explicitly refer to the removal of these pathogens, relying instead on a turbidity requirement. There is little understanding of what causes a high incidence
of cryptosporidium, although both it and giardia are thought to be related to turbidity. This limited understanding appears to be reflected in the treatment contracts and is certainly emphasized in the reviews of the 1998 incidents.

The extensive inquiry that followed the contamination crisis leaves some key matters unresolved. The reasons for the high levels of pathogens found in the distribution system during the first event have not yet been satisfactorily explained, according to the inquiry report. They remain a matter of dispute between the Prospect plant treatment company, which claims the high levels were misidentified by Sydney Water’s testing arm, and Sydney Water. Because of the extreme turbidity of the raw water that had to be treated at the time of the second and third events, it seems that pathogens were washed through the treatment plant. But the extreme conditions have made it impossible to establish whether the plant continued to operate efficiently and according to its design specifications.

Interestingly, no increased incidence of attributable illnesses followed the events, raising important questions about the consistency of the water quality testing procedures over time and the appropriateness and adequacy of current testing procedures.

Nevertheless, these episodes and the following analysis caused the inquiry to recommend a suite of measures:

- Separating catchment responsibilities from Sydney Water while leaving it as a distribution operator contractually tied to the treatment company.
- Revising monitoring procedures and introducing independent testing.
- Revising Sydney Water’s operating license, and issuing an operating license for the new Catchment Authority with explicit health and environmental responsibilities.
- Revamping the licensing powers and responsibilities of the license regulator.
- Releasing all details of the treatment contracts other than those that would clearly damage the commercial interests of the contracting parties.

The inquiry did not recommend the costly option of augmenting the treatment plants “at this stage.” Nor did it specify operating standards that set limits for giardia and cryptosporidium

**Conclusion**

The BOO option adopted by Sydney Water for its new treatment plants has already received much scrutiny. Soon after the plants came online, the minister responsible for Sydney Water’s operating licenses advised its price regulator of his satisfaction with the plants’ compliance with most operating requirements, including national water quality standards. The price regulator established a medium-term price path that reflects the increased costs of treatment, but without committing to an automatic cost pass-through. But the fallout from the 1998 contamination scare, the cross-claims between Sydney Water and the Prospect plant treatment company, an the contract provision for a treatment tariff sensitive to the quality of raw water will all put the contractual relationship to the test. Sydney Water, as the treated water retailer, faces large compensation payments to customers. How the cost will be shared with the treatment company and future consumers is yet to be resolved.

What were essentially bilateral monopolies created by the contracts, with Sydney Water buying treatment services and selling to customers at regulated price, will now be further complicated by the creation of a separate statutory authority selling raw water to Sydney Water at a price to be regulated.

These events, along with earlier official expressions of concern about risk sharing, have led to a call for greater transparency in the contractual arrangements already in place. An future concession contracts in the Australia water sector will surely be more open to public scrutiny. Sydney Water, now a corporatized and commercially focused operator—though
still state owned—may face increased ministerial interference, despite the revision of its operating license. Whether these changes together will precipitate a renegotiation of the water treatment contracts remains to be seen.

This Note is based on a longer article by the authors: “Privatising Sydney’s Water Treatment,” Agenda: A Journal of Policy Analysis and Reform 3(1): 45-58 (1996).

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