

# GRID LINES

Sharing knowledge, experiences, and innovations in public-private partnerships in infrastructure

## Using management and lease-affermage contracts for water supply

### How effective are they in improving service delivery?

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**A**s governments in developing countries seek to expand access to water supply and improve the quality of service, they are considering a range of options for public-private partnerships. Yet proposals to involve the private sector have often met with concerns—about tariff hikes, staff cutbacks, and ability to reduce inefficiency and expand access to service among the poor. And experience with the more than 300 contracts bringing private operators into water supply in 1990–2004 has been mixed. How have water utilities performed under management and lease-affermage contracts? Eight case studies across developing regions show that performance has generally improved—across a range of measures.

Widespread problems in the urban water sectors of developing countries impose big burdens on households and businesses. Poorly served customers are driven to invest in costly alternative sources of supply. Poor households are often excluded from public service and have to resort to unsafe and ultimately much costlier alternatives—if they can afford them at all.

In the early 1990s many governments launched reforms of their urban water sector aimed at improving service. Publicly owned and managed utilities undertook a range of institutional, operational, and governance reforms. But improvements were limited and often unsustainable. Some governments therefore turned to the private sector.

In 1990–2004, about 340 contracts involving public-private partnerships in water supply were closed in developing countries.<sup>1</sup> About a fifth were management and lease-affermage contracts.

Of these, 52 percent were in Eastern Europe and Central Asia, 17 percent in Africa, and 13 percent in Latin America and the Caribbean.

Medium-term management and lease-affermage contracts best match the current risk-averse stance of private operators, no longer willing to assume the high financial and foreign exchange risks of long-term concessions. Under management contracts the financial risks to private operators are rather low because their fees are usually financed by government budgets or loans from international financial institutions. Under lease and affermage contracts the private operators bear a substantial commercial risk because they have to generate an operating surplus sufficient to cover their remuneration. (Lease and affermage contracts differ mostly in the way the commercial risk is shared between the operator and the owner of the contract.)

How well have management and lease-affermage contracts performed? A recent study addressed that question using empirical data. The study collected information on 11 contracts selected on the basis of geographic coverage, a population coverage of more than half a million, and a duration of at least four years. The data were gathered through desk research of secondary sources, supplemented by limited primary data collected from owners and operators through a questionnaire.

The analysis centers on the eight cases for which comprehensive data were available—two each from Africa, Eastern Europe, Latin America, and

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**TABLE 1**

**Contracts and span of data assessed**

| Type of contract and location       | Period studied <sup>a</sup> |
|-------------------------------------|-----------------------------|
| <b>Management</b>                   |                             |
| Amman (Jordan)                      | 2000–05                     |
| Gaza (West Bank and Gaza)           | 1995–2005                   |
| Zambia mining townships             | 2000–04                     |
| <b>Affermage</b>                    |                             |
| Antalya (Turkey)                    | 1996–2001                   |
| Gdansk (Poland)                     | 1992–2005                   |
| Senegal (55 cities including Dakar) | 1996–2005                   |
| <b>Lease-affermage</b>              |                             |
| Barranquilla (Colombia)             | 1990–2005                   |
| Cartagena (Colombia)                | 1995–2005                   |

a. The first year in the range is the year before the contract took effect ("before"); the second, the last year for which data were assessed ("after").

the Middle East (Table 1). Most contracts were signed with private operators in the late 1990s. Five contracts are ongoing, and three have been or soon will be concluded.

The study computed indicators of performance in five areas for the year before the private operator started operations and for either the last year of the contract (for contracts that have lapsed) or the most recent year available (for ongoing contracts):

- *Service coverage* (including for poor households where this information was available).
- *Quality of service* (hours of water supply a day, share of drinking water samples testing negative for pathogens).
- *Operating efficiency* (share of nonrevenue water, share of customers metered).
- *Employee productivity* (employees per 1,000 water connections).
- *Sustainability of service* (working ratio).

The review finds that while performance varies, the eight case studies show positive trends in the extent and quality of water service and the efficiency and sustainability of operations.

## More people with access to water

Access to piped water increased under the contracts. The share of households with water connections rose in five cases, fell slightly in Gaza, and remained at 100 percent in Gdansk

and Zambia (Table 2). The growth in access to water supply was substantial in Barranquilla, Cartagena, and Senegal, where it was supported by strong incentives for private operators and adequate investments funded by public sector utility owners.

Access to piped water also grew among the poor. In Senegal the connection rate for poor households rose from 22 percent in 1996 to 60 percent in 2005. Driving this big increase were a social connection fund offering direct connections to low-income customers at a highly subsidized price (funded in part through a surcharge on customer tariffs) and regular extensions of the distribution network. In Cartagena, where water customers are classified by the value of their property (land and house), the connection rate in the poorest areas is estimated to have risen from 35 percent in 1995 to 60 percent in 2005.

Even where poor households are not explicitly classified, increasing the overall connection rate disproportionately favors these households because they usually are the last to be connected to piped water.

## More water—and better quality

Water supply also improved. Initially all cases except Gdansk had less than 24 hours of water supply a day. During the contract period supply increased by about 5–7 hours a day, and in Antalya, Barranquilla, Cartagena, and Senegal it increased to nearly 24 hours a day.

Compliance with water quality standards, already good in all the cases analyzed, improved further, though by marginal amounts. But the data generally refer to the quality of water at production sites, and pollution occurs mostly in distribution networks when empty pipes create a vacuum. So it is likely that the increase in hours of water supply reduced water contamination in the distribution networks.

## Gains in efficiency

Under private management and operation, water utilities achieved greater commercial and operational efficiency. Nonrevenue water declined in all eight cases as a result of a combination of measures adopted by the private operators—including bulk and individual metering, leak detection, and repair and maintenance. Gains ranged from a mere 3 percentage points for Gdansk—reflecting the increasing difficulty of further reducing already low levels of nonrevenue water—to 31 percentage points for Cartagena (Figure 1).

**Private operators expanded access to water—including among the poor**

TABLE 2

## Access to and hours of water supply before and after the contract

| Case         | Households with piped water connections (percent) |       | Hours of supply per day |       |
|--------------|---|-------|-------------------------|-------|
|              | Before  | After | Before                  | After |
| Amman        | 90  | 100   | 4                       | 9     |
| Antalya      | 93  | 95    | 19                      | 23    |
| Barranquilla | 60  | 89    | 19                      | 23    |
| Cartagena    | 74  | 95    | 17                      | 24    |
| Gaza         | 58  | 56    | —                       | 8     |
| Gdansk       | 100   | 100   | 24                      | 24    |
| Senegal      | 59  | 73    | 16                      | 22    |
| Zambia       | 100   | 100   | 13                      | 18    |

— Not available.

Source: Survey data from service providers.

Nonrevenue water dropped more sharply where levels were very high before the private operator took over (Barranquilla, Cartagena, Zambia) and where the private operator faced particularly strong incentives to reduce it (Barranquilla, Cartagena). Nonrevenue water can also be expected to drop substantially if the management or lease-affermage contract is implemented in parallel with programs to rehabilitate distribution networks or to replace individual connections, where typically 70 percent of physical leaks can be found.

Expectations of rapid reduction in nonrevenue water must be carefully managed, however. In almost all the cases the pace of reduction was slower than targeted in the contract. The failure to realize initial expectations of a sharper decrease in nonrevenue water may have been one reason that three of the contracts were not renewed.

### Growing sustainability of service

Financial sustainability improved under the public-private partnerships, through gains in operating efficiency and cost recovery. Utilities typically reduce their working ratio (the ratio of cash operating costs to cash collections) through higher tariffs, better collections, and better control of operating costs. In six of the eight cases the working ratio improved by 55 percentage points on average (Figure 2). This allowed operating surpluses to be applied to investments, reducing the pressure on the public budget. (No data were available for the other two cases.)

Several factors influencing the working ratio are under the private operator's control. But the tariff level is controlled by the public utility owner or the government, and it can account for consider-

able variations. The average tariff increased (in constant 2000 prices) in four cases—in Antalya by 129 percent, Barranquilla by 43 percent, Gdansk by 150 percent, and Senegal by 7 percent. But it actually decreased in three others—in Amman by 7 percent, Cartagena by 46 percent, and Zambia by 53 percent (figure 3).

On the cost side, employee productivity (measured by employees per 1,000 connections) improved in six of the eight cases. Except for Barranquilla, where the operator is jointly owned by the municipality and a private investor-operator, there was no retrenchment of staff after the signing of the contract. Instead, most of the productivity gains came through a combination of staff reduction through normal attrition and an increase in connections.

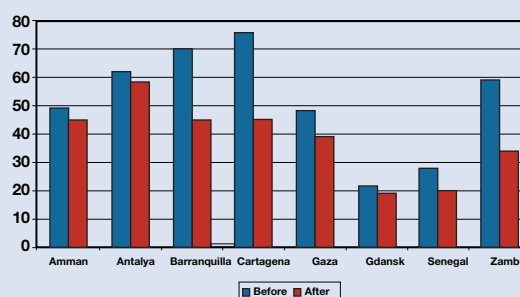
Two cases, Amman and Cartagena, illustrate the efficiency gains achieved (Figure 4). Both private operators were able to reduce their working ratio

**Nonrevenue water declined in all cases—but expectations of rapid reduction must be carefully managed**

FIGURE 1

### Private operators cut commercial losses

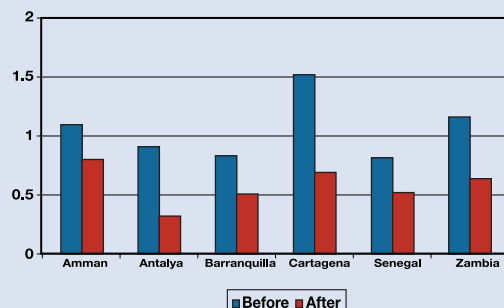
Nonrevenue water as a percentage of the total



Source: Survey data from service providers.

**FIGURE 2**

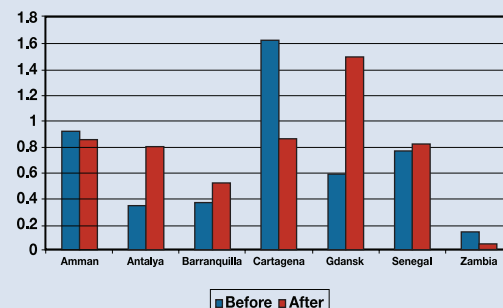
**Private operators improved financial sustainability**  
Working ratio



Note: No data available for Gaza and Gdansk.  
Source: Survey data from service providers.

**FIGURE 3**

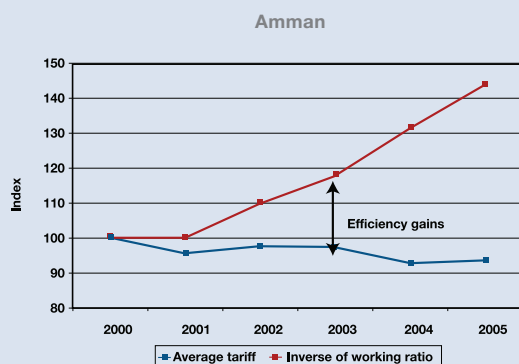
**Tariffs rose in phased moves toward cost-recovering levels**  
Average tariff (US\$ per cubic meter)



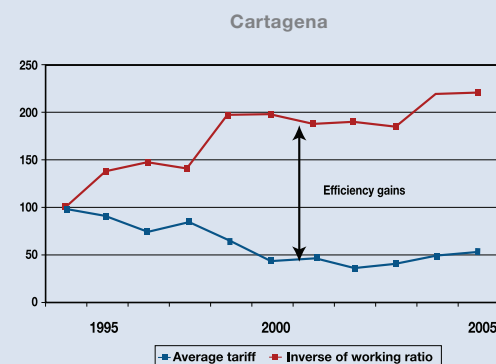
Note: Tariffs are in constant 2000 prices. No data available for Gaza.  
Source: Survey data from service providers.

**FIGURE 4**

**Big gains in productivity in Amman and Cartagena**



Source: Survey data from service providers.



through measures to reduce costs through higher productivity—even as the tariff was reduced in constant terms.

Several factors influencing the working ratio are under the private operator's control. But the tariff level is controlled by the public utility owner or the government, and it can account for considerable variations. Tariffs moved toward full cost recovery,

though this did not systematically translate into increases. The average tariff rose (in constant 2000 prices) in four cases—in Antalya by 129 percent, Barranquilla by 43 percent, Gdansk by 150 percent, and Senegal by 7 percent. But thanks to efficiency gains, it actually decreased in three others—in Amman by 7 percent, Cartagena by 46 percent, and Zambia by 53 percent (Figure 3).

Notes

1. Data are from the World Bank and PPIAF Private Participation in Infrastructure (PPI) Project Database ([ppi.worldbank.org](http://ppi.worldbank.org)).