



## Public-Private Partnership Enhances Water Utility's Performance in Armenia

Zaruhi Tokhmakhian and Ahmed Eiweida

### Key Messages<sup>1</sup>

- **Public-Private Participation (PPP) schemes were successfully implemented in several water utilities in Armenia, yielding excellent results for the development of the water and wastewater sectors. Armenia is one of the few countries in the region to have had such a successful PPP experience.**
- **Private sector participation is increasingly seen by the Armenian government as a key component of sector reform strategies.**
- **PPP is only part of a broader process of sector reform in Armenia. While private operators focus on service management and urgent operational issues, the Government ensures long-term sector viability by putting a framework in place.**
- **Delegated management of urban water supply and sanitation to private operators has the potential to significantly improve the delivery services. However, significant investment is still needed to reduce wastage, rehabilitate poor water and wastewater infrastructure, and continue institutional and financial capacity building.**

### Armenia Takes on the Water Management Challenge

For many years after the collapse of the Soviet economy, most of the water supply and sanitation systems in Armenia were in disrepair. The country was faced with increasing demand, deteriorating assets and dilapidated infrastructure,

which resulted in a steadily decreasing and costly provision of services. Despite an abundance of water in the country, for almost all Armenians, water was available for only a few hours a day.

In recent years, Armenia has made significant strides in reforming the water sector by developing policies, enacting laws, and drawing up plans, programs and strategies aimed at improving water service provision.

### Public-Private Partnership as an Agent of Change

In recognition of the water sector's strong potential and the vital role it plays in the social safety net, the Government has attached special attention to the development of Armenia's water strategy. The weak management and lack of infrastructure of available water resources has led to poor water services in the country. To improve access, reliability and quality of drinking water, the Government has increased use of public-private partnerships (PPPs) over the past decade.

In 2000, with the support of the World Bank, under a Municipal Development Project, the Government introduced a performance-based management contract (MC) for the water utility in Yerevan. This utility, Yerevan Water and Sewerage Enterprise (YWSE), became a pioneering example in the Europe and Central Asia (ECA) region in terms of public-private partnership in the water sector. The services of an international water operator (ACEA S.p.A of Italy) were engaged to improve the functioning of YWSE through a direct operation and a program of hands-on training for the technical, financial, and management staff. Since then, private sector participation is increasingly seen by the Government of Armenia (GoA) as a key component of sector reform strategies aimed not only at improving service provision but also at facilitating institutional change.

Upon completion of the MC, the reforms in Yerevan water continued with increased private sector participation - a lease contract for ten years with another international operator, Veolia. The successful PPP model tested in YWSE

<sup>1</sup> This Knowledge Brief draws information from the report "Outage: Investment Shortfalls in the Power Sector in Eastern Europe and Central Asia", World Bank, 2011; the case study "Good Practices in City Energy Efficiency: Yerevan, Armenia – Water and Sewerage Lease Contract," ESMAP Energy Efficient Cities Initiative, April 2011; and the case study "Improving Urban Water Services through Delegated Management to a Private Operator: Case study of Yerevan, Armenia", J. Mugabi, P. Marin and J. Kamkwala, November 2008.

## ECA Knowledge Brief

---

was replicated for another larger utility in the country - Armenia Water and Sewerage Company - covering around 45% of the country's population.

---

### The Pioneering Yerevan Water Utility Management Contract

In Yerevan, the Government opted for a four-year, performance-based MC, a hybrid mechanism that included elements from a concession and a lease. The objective of such a contract was to increase the efficiency of the operation and development of the city's water supply system, increase consumer willingness to pay for the provision of high quality services, provide more responsive service, and mobilize the best available managerial and technical know-how. This option offered several advantages: it was highly flexible, of limited duration, and ensured the highest level delegated management while maintaining Central Government control over tariffs and local government ownership of infrastructure. In addition, the MC allowed the Government, the water utility (YWSE), and the general public to judge the advantages of private sector management without committing to a long-term relationship.

The private operator was responsible for the operation and maintenance of the water and sewerage infrastructure, as well as billing and collections. In addition, the operator managed an investment capital fund supported by Government contributions and a World Bank credit to improve and upgrade the most critical elements of the system. The private operator was supposed to achieve a total of 92 performance targets, including both quantitatively verifiable performance measures and technical deliverables.

Unlike a concession, lease, or full privatization, the performance-based MC has a shorter duration and enables the Government to maintain ownership and greater control, while providing performance bonuses to the operator to successfully achieve priority improvements. Also, such a scheme permits the utility to attract a concessionaire or lessee on more advantageous terms at the end of the MC, once performance and efficiency improvements have been achieved.

### Contracting

ACEA S.p.A, a joint venture led by an Italian water operator, was ultimately awarded the four-year performance-based MC in Yerevan, as a result of international competitive bidding. The contract was signed on February 14, 2000, and began on June 1, 2000.

### Capital Investment Fund

The Government established a US\$20 million capital investment fund, partially supported by a World Bank credit, for the private operator to implement necessary system repairs and upgrade measures to achieve the agreed targets. During each contract year, ACEA was required to submit an investment plan laying out required works, goods, and services to be procured for Government review and approval. Once approved, ACEA followed World Bank procurement guidelines to purchase the approved items.

### Major Rehabilitation Work Carried Out

The operator purchased and installed block water meters for about 90% of all apartment buildings, and individual customer water meters for about 87% of its subscribers. ACEA also equipped all water treatment plants with state-of-the-art chlorination systems, implemented new procedures for monitoring water quality, and mapped the water/wastewater transmission network.

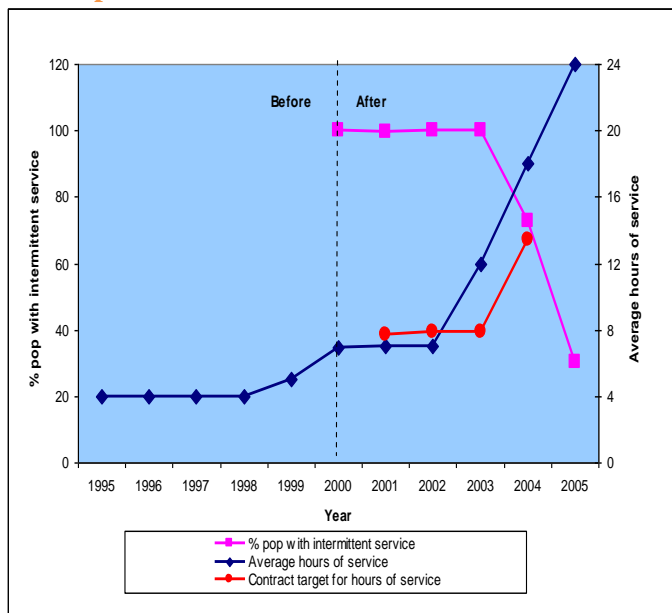
In addition, the operator completed the sectorization of three districts - Nor Nork, Kentron, and Arabkir - and identified sectors for about 50% of the Yerevan service area. The network sectorization not only increased water pressure to acceptable levels for more residents, but also enabled systematic leak detection and long-term planning for rehabilitating water mains. The operator rehabilitated Garni, Shor Shor, Aparan, Khatnaghbyur, and Araratyan pumping stations, and installed new and more energy efficient pumps, which resulted in major energy savings. ACEA implemented a campaign to reduce electricity waste at booster pumping stations. These measures reduced the total installed pump capacity, resulting in significant reductions in electric power use.

ACEA also implemented a leak detection program. To this end, it analyzed the volumes of water produced and billed, mapped out the distribution network, inspected the city's transmission mains regularly for repairs, and investigated water leaks in low pressure or water shortage areas.

### Project Costs

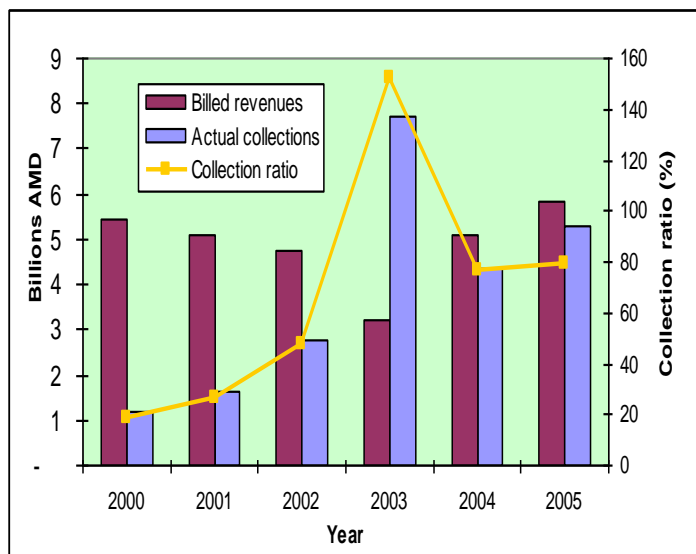
During the contract period, ACEA disbursed US\$24.07 million of the capital investment fund to rehabilitate the existing system. It was paid US\$3.43 million for managing YWSE for the duration of the MC, and received a US\$1.41 million performance-based bonus. The capital investment fund and MC were financed, in part, from a US\$30.87 million credit from the World Bank. The financial rate of return for the overall project was estimated at 49%. The cumulative net benefits of the World Bank project were estimated at US\$97.23 million (from 1998 to 2010).

**Figure 1: Duration of Water Supply and Percentage of Population with Continuous 24-hour Service**



Source: ACEA S.p.A

**Figure 2: Revenue and Collections**



Source: ACEA S.p.A

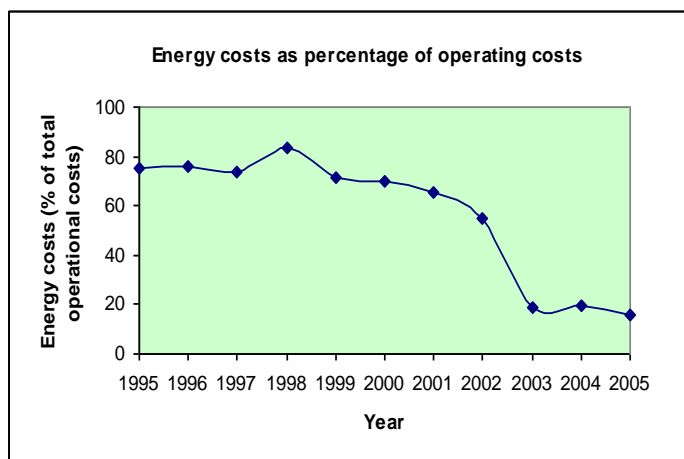
## Results Achieved by Management Contract

The overall results of the project were substantial. Over 332,000 households in Yerevan (about 1.1 million inhabitants) have benefitted from the following improvements between June 2000 and June 2004:

- The duration of water supply (with a base value of 6 hours in the year 2000) increased to 18 hours in 2004 (see Figure 1). 50% of the customers had continuous 24-hour water supply, due in large part to the network sectorization.

- As seen in Figure 2, service improvement, combined with the improved collection procedures and metering campaigns, increased revenue collection from 20% when the contract was signed to over 100% (including arrears) in 2003.
- The utility's energy consumption, the biggest O&M cost item, was reduced by 30%, exceeding the 20% contract target (Figure 3).
- Energy use declined from 240 million kWh in 1999/2000 to 169 million kWh in 2003/2004 due to pump upgrades and replacements, more efficient network management, and greater use of gravity-fed water. The energy savings translated into an estimated US\$4.83 million of annual electricity cost savings.
- Reduction of non-revenue water (NRW) is a key measure of improved technical efficiency. However, NRW reduction fell short of expectations. Although data appears to show a reduction in actual water losses by 17%, the NRW target expressed as a percentage of water production increased (Figure 4). Given the increased water pressure and a badly deteriorated distribution network, water losses as a percentage of production are not expected to decrease until most of the network is renewed.

**Figure 3: Energy Costs as Percentage of Operating Costs**



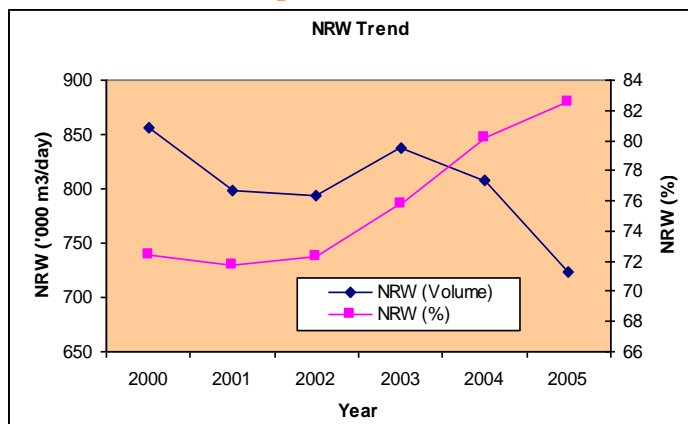
Source: ACEA S.p.A

## Energy Efficiency Achievements

The energy efficiency investments, in particular, were deemed highly cost effective. Prior to 2000, the utility's energy cost was on average 75% of the total operating cost due to over-reliance on pumped supplies. For this reason, one of the key objectives of the MC was to develop and implement an energy management plan to reduce power consumption by 20%. Between 2000 and 2005, YWSE registered close to 50% reduction in the share of energy costs. Pumped water supplies decreased by about 52%, while gravity water supplies increased by over 40%. In

cases where pumps were still needed, YWSE increased efficiency in operation of pumping plants, reduced the number of booster pumps for high rise buildings, and replaced old energy intensive pumps with modern energy efficient pumps.

**Figure 4: NRW Trends Expressed As Volume and Percentage of Water Produced**



Source: ACEA S.p.A

### Overall Impact and Sustainability

The introduction of the MC with ACEA S.p.A resulted in significant and measurable improvements in overall sustainability of YWSE, the water utility in Yerevan. The utility's financial situation improved drastically, with increased bill collection and reduced energy costs. This enabled the utility to generate sufficient revenues to cover operation and maintenance costs. Further, the PPP helped transform the utility into a sustainable business, with improved levels of service, full metering, and customer payments and satisfaction. The operator achieved and exceeded targets on continuity of supply, metering, collections, and energy efficiency but failed to meet targets on non-revenue water reduction. In addition, YWSE's capacity to manage and efficiently operate water services improved, as a result of increased technical know-how and knowledge transfer from an international private operator. Also, the fact that YWSE has recently signed a longer term contract with another international private operator, and the presence of similar PPP arrangements elsewhere in the country, is evidence that Armenia's institutional framework has improved and created a more conducive environment for increased private risk-taking. By and large, the MC was a good first step to reform, resulting in significant

improvements in the short-term. It laid the foundation for a more elaborate form of PPP that could offer long-term solutions to Yerevan's service problems.

### Lessons Learned

The PPP experience in the water sector of Yerevan holds valuable lessons for governments willing to engage the private sector in management of water services.

- A mutually beneficial relationship is crucial for the success of any public-private partnership. Political support and commitment by policy-makers helped the PPP work and succeed effectively. Despite many bottlenecks during the implementation of the MC, both the Government and the operator demonstrated willingness and openness to work things out and agree on common benefits for the sector.
- PPP contracts alone cannot resolve all sectoral challenges but they can be viewed as a significant tool in the reform process. Policy-makers should focus on creating an enabling environment for involving the private sector, establishing a legal and regulatory framework, and developing a reform strategy to achieve sector development objectives.
- Under the MC, the only performance target that was not achieved was in the area of non-revenue water reduction - it was underestimated prior to signing the contract and the target values were set based on wrong assumptions. The experience shows that the correct assessment of baseline values is important, particularly for setting realistic performance targets and defining a program of activities to successfully solve the problem.
- The Yerevan MC experience also demonstrates the need to have realistic expectations about the scale and pace of reforms in the water sector because sustainable change doesn't happen overnight.

#### About the Authors

Zaruhi Tokhmakhian is an Operations Officer with the Urban Water Supply and Sanitation Sector Unit of the Europe and Central Asia Region of the World Bank.

Ahmed Eiweida is a Country Sector Coordinator for the Sustainable Development Sector Unit of the Europe and Central Asia Region of the World Bank.