ESMAP
Energy Sector Management Assistance Program

Energy Efficient Cities Initiative

GOOD PRACTICES IN CITY ENERGY EFFICIENCY

Yerevan, Armenia – Water and Sewerage Management Contract

Project title	Yerevan Water and Sewerage Management Contract
Sector	Water and Sewerage
Type of project	Performance-based management contract
City and country	Yerevan, Armenia
City population	1.12 million (2009)
Capital cost/initial investment	US$28.91 million
Annual % energy reduction	7.5% (71 GWh/year)
Project status	Completed

Project Summary

In 2000, the Armenian capital's water utility, the Yerevan Water and Sewerage Enterprise (YWSE), entered into a five-year, performance-based management contract with private operator Acea Spa Utility (Acea). Over the contract period (2000-2005), the duration of water supply was increased from 6 to 18 hours per day, collection rates improved from 20 to 80 percent, and electricity consumption was reduced by 30 percent.

Prior to the project, YWSE was in poor financial health with a very dilapidated system. Financially, the utility could not cover its operations and maintenance (O&M) costs and collections stood at a mere 20 percent. About 80 percent of those connected to the network only had access to tap water between 2-8 hours a day. Pumps broke down frequently and network leakages were rampant with some 72 percent of non-revenue water (NRW) (870,000 m^3/day). To meet water needs, many households purchased storage tanks and apartment buildings installed costly booster pumps.

In response, the Government of Armenia (GOA) decided to solicit private sector expertise through a management contract. Acea, a joint venture led by an Italian water operator, won an open and competitive bid to operate YWSE's system for five years. The World Bank and GOA also established an investment fund, for Acea's capital investments in the water utility infrastructure. Over the course of the contract, Acea invested US$24.07 million for a number of targeted improvements including: establishing water pressure sectors in the distribution network of three districts, purchasing and installing meters, rehabilitating several pumping stations, implementing a water leakage detection and repair program, and increasing gravity-fed water supply.

The project demonstrated that, under a conducive legal and regulatory framework, private operators can be effectively engaged using a performance-based management contract to deliver significant improvements in service quality, operational efficiency, financial performance, and energy efficiency in municipal water and sanitation utilities. Due Acea's strong performance and overall project results, GOA subsequently entered into a follow-on 10-year lease contract in 2005 with Veolia, a French international water company.

1. Introduction

Yerevan, a small town during the Soviet era, has been the capital city of the Republic of Armenia since 1991. With Armenia's strong economic growth between 2000-2004, Yerevan

experienced a construction boom, becoming the country's administrative, industrial, and cultural center. In 2009, Yerevan had about 1.1 million inhabitants, three-quarters of whom live in multi-apartment buildings over a 300 square kilometer area. The city is divided into two parts by the Hrazdan River, with the upper part surrounded by mountains. Yerevan's elevation ranges from 900 to 1,300 m above sea level. Although water sources are abundant, many residents did not have continuous potable water a decade ago.

The Yerevan Water and Sewerage Enterprise (YWSE) is the local utility responsible for providing water and sewerage services to Yerevan and surrounding areas. It is one of the two state-owned water utilities in Armenia. Prior to 2000, YWSE operated 11 water treatment facilities where ground and spring water are extracted, chlorinated, and then either pumped or gravity-fed into transmission mains, reservoirs, and distribution networks. It provided water to about 95 percent of the population residing in its service area and sewerage service to 94 percent, with approximate consumption of 250 liters per capita per day. In 2000, YWSE consumed 240 million kWh to produce 436 million m^3 of water, of which 60 percent was pumped and the remaining 40 percent flowed by gravity to the customers. Water and wastewater tariff averaged AMD 56/m^3 (US$0.112/$m^3$)[1].

Although YWSE's water and sewerage infrastructure needed investments, its financial situation was precarious. The infrastructure, inherited from the Soviet-era, was in very poor physical condition with outdated energy intensive pumps that frequently broke down and a leaky distribution network. Even though reliable infrastructure data were not available because the majority of customers were billed and not metered, estimates suggested that over 72 percent of the water produced was lost through water leakages (also known as "non-revenue water" or NRW)[2]. As a result, 80 percent of those connected to the water supply network had tap water for only six hours a day. Dissatisfaction with water supply service was widespread. Water pressure was too low to adequately meet the water needs of many households living on the upper floors of apartment buildings. As a result, many households had to purchase storage tanks and some apartment complexes installed costly booster pumps to increase water pressure for upper-floor residents.

Unfortunately, YWSE could not rehabilitate its infrastructure because of its precarious financial situation. In 2000, only 20 percent of water and sewerage bills were collected and generated revenues did not cover YWSE's operations and maintenance (O&M) costs. About 70 percent of its accounts were written off as bad debts and the company's liabilities exceeded its assets.

2. Project Description and Design

Selecting an appropriate contract instrument. The Government of Armenia (GOA) was looking for solutions to improve water and sewerage services in Yerevan and considered involving the private sector. GOA reorganized YWSE as a joint stock company, eliminated existing discounts for privileged customers, phased out cross-subsidies from the industry sector, and transferred the responsibility of water and sewerage service provision to Yerevan City. It knew, however, these initiatives did not address the water shortages in the short-term or put the company on the right track to attract long-term capital investments. The government considered hiring international consultants to assist YWSE in identifying and

[1] The exchange rate in 2000 was used for the conversion: US$1 = AMD500

[2] Non-revenue water is the difference between the amount of water put into the distribution system and the amount of water billed to consumers (also sometimes referred to as unaccounted-for water, or UFW).

implementing rehabilitation measures and to offer management advice. But given YWSE's low technical and management capacity and consultants' limited power to facilitate lasting change, this alternative was rejected. GOA explored tapping into the private sector's technical expertise, operational efficiency, and financing capacity without losing ownership of YWSE's assets and control over water tariffs.

GOA analyzed the suitability of a full range of private sector participation mechanisms including an outright sale, concession, lease, and management contract. The government felt it would be too risky for the municipality of Yerevan, which had been recently empowered to own YWSE, to enter into a long-term private sector contract for managing water supply. Also, given factors such as YWSE's precarious financial situation, widespread dissatisfaction of customers, low collection rates, and limited baseline data, likely interest by the private sector in a long-term contract would be low. Therefore, efforts to initiate a short-term contract were taken. This would enable GOA, Yerevan City, and consumers to test private sector management, while offering the option to revert to public management if necessary. Should significant improvements be realized, it would reduce stakeholder mistrust of private sector involvement while improving the attractiveness of YWSE, thus paving the way for longer-term concessional arrangements.

GOA opted for a four-year, performance-based management contract, a hybrid mechanism that included elements from a concession and a lease. The private operator would be responsible for O&M of YWSE's water and sewerage infrastructure as well as billing and collections. In addition, the operator would manage an investment capital fund supported by a World Bank credit and government contributions to improve and upgrade the most critical elements of the system. Unlike a concession, lease, or sale, which is a relatively long-term commitment and may require concessions for tariff increases in order to attract investors, the performance-based management contract has a shorter duration and would enable the government to maintain ownership and greater control, while providing performance bonuses to the operator to successfully achieve priority improvements. Also, such a scheme would permit YWSE to attract a concessionaire or lessee on more advantageous terms at the end of the management contract, once performance and efficiency improvements had been achieved.

Creating the PMU. As a first step, the government established a project management unit (PMU) to prepare the terms and conditions of the four-year management contract, competitively recruit an international private operator, and oversee and monitor the contract. Since recruiting the private operator would take time, the PMU was also needed to implement an immediate repair program to alleviate water shortages in selected underserved areas. The PMU, staffed with officials from the Ministries of Finance and Economy familiar with World Bank projects, reported to the Ministries of Finance, Economy and Urban Development.

Contract preparation. The PMU initiated the development of the performance-based management bidding documents in 1998. It began by consulting key stakeholders – YWSE management, Yerevan Municipality, the Ministry of Finance, and the Ministry of Urban Development – to agree on key objectives and approaches. International and local consultants were hired to prepare the detailed contract terms, from which bidding documents were prepared, costing about US$220,000. Among the 101 performance targets included in the documents, were increasing the average hours of water supply, improving the collection rates, and reducing energy consumption, as well as delivering technical outputs such as network maps, operational procedures, computerized billing, and accounting and maintenance systems (Table 1).

Table 1. Key performance targets[3]

Performance indicator	Contract year				Total
	1	2	3	4	
Reduce unaccounted for water (NRW) by 25%	-10%	-7%	-5%	-3%	**-25%**
Increase hours of service by 50%	12%	13%	13%	12%	**50%**
Develop and implement an energy management plan to reduce power consumption by 20%	5%	5%	5%	5%	**20%**
Install and replace 20,000 subscriber meters	5,000	5,000	5,000	5,000	**20,000**
Reduce number of breakdown repairs in water network by 80%	-20%	-20%	-20%	-20%	**-80%**
Reduce number of breakdown repairs in wastewater network by 50%	-12%	-13%	-13%	-12%	**-50%**
Reduce average response time for repairs to 6 hours	24	18	12	6	
Improve collection percentage from sales and accounts receivables by 20%	5%	5%	5%	5%	**20%**
Prepare standard operating and maintenance procedures	100%				**100%**
Develop and implement a customer service program	100%				**100%**
Develop and implement a public information program	50%	50%			**100%**
Map the network	100%				**100%**
Develop an hydraulic computer model and train staff in its use	100%				**100%**
Implement a preventive maintenance program		50%	50%		**100%**
Implement a leak detection and repair program	25%	25%	25%	25%	**100%**
Develop and maintain computerized information systems for subscribers, billing and collection, A/R, accounting, maintenance management and inventory		50%	50%		**100%**

The bidding documents specified that interested private operators should bid a fixed fee not exceeding US$5 million for remunerating the core international team that would manage YWSE over the four-year contract. A performance-based bonus of up to US$1.5 million for the four years would be awarded based on how well the operator met the predefined targets (Table 2).

Selection process. The international competitive bidding process followed World Bank procurement guidelines and took about six months to complete. Three qualified bids advanced to the financial bid opening stage. Acea Spa Utility, a joint venture led by an Italian water operator, was ultimately awarded the four-year, performance-based management contract, which was signed on February 14, 2000. The contract began on May 1,

[3] The baseline values were not defined prior to recruiting the private operator. The private operator later developed and submitted the baseline values for the PMU review and approval.

Table 2. Performance Indicator Weights and Values in the Calculation of the Annual Incentive Compensation[4]

Performance Indicator	Units	Weight	Indicator Scores				
			5 Excellent	**4** Very Good	**3** Good	**2** Fair	**1** Poor
Constancy of Water Supplied	% of month	0.30	60	55	50	45	40
Electricity Use	% reduction in kWh/m^3	0.25	20	18.5	17	16	15
Leak Detection Survey	km	0.15	250	225	200	175	150
Collection of annual billed amounts	% collected	0.30	90	85	80	75	70

Source: Performance Incentive Compensation Appendix – Execution Copy - Yerevan, Armenia – November 25, 1999.

2000 but the operator did not assume YWSC's day-to-day management until June 6, 2000. (Acea managed YWSE from May 1, 2000 to April 30, 2004. The contract was extended for a year by mutual consent.) To ensure an adequate bonus payment, the PMU and Acea jointly hired an independent technical auditor as well as a financial auditor to review Acea's performance and calculate the required annual bonus.

Investment program. The GOA created a US$20 million capital investment fund, partially supported by a World Bank credit, for the private operator to implement necessary system repair and upgrade measures to achieve the agreed targets. Each contract year, Acea was required to submit an investment plan laying out required works, goods, and services to be procured for PMU review and approval. Once approved, Acea followed World Bank procurement guidelines to purchase the approved items.

Service improvement. Acea purchased and installed block water meters for about 90 percent of all apartment buildings and individual customer water meters for about 87 percent 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 parallel to these improvements, Acea implemented public information campaigns to explain ongoing works and facilitate water meter installation. It improved YWSE's management and operations, establishing 11 commercial branches and 26 additional districts, and implementing computerized information systems for billing, accounting, and maintenance management, as well as for training staff on the use of these systems.

Distribution network sectorization. Acea completed the sectorization of three districts - Nor Nork, Kentron, and Arabkir - and identified sectors for about 50 percent of the Yerevan service area. Sectorization consisted of establishing pressure zones that are further divided into sectors to ensure adequate water supply pressure and to better control water leakages. This process was implemented in three steps. First, Acea hired a consulting firm to design the sectors which involved: (i) analyzing the distribution

[4] Annual Incentive Compensation = Composite Score X 0.2 X Maximum Annual Incentive Compensation
Where: Composite score = Total of All Weighted Scores for the Performance Criteria (weighted score for an indicator = weight x indicator score)
Maximum annual incentive compensation is the minimum between: US$375,000 and the total revenues collected by the Operator from Customers in the Contract Year for which the Incentive Compensation is being calculated minus the total revenues from the same time period in the year immediately prior to the year of calculation.

network through computerized hydraulic modeling and field measurements of water flow and pressure; (ii) identifying potential water pressure sectors; and (iii) prioritizing the works. Second, Acea procured the required goods and hired construction companies to lay out necessary pipes and install boundary valves, pressure reducing valves, and magnetic flow meters to establish the pressure sectors. Finally, Acea tested the operation of the district sectors to identify and replace leaky pipes, since sectorization results in significant water pressure, increasing the risk of pipe leaks. 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.

Figure 1. Photos of Project Execution

Pumping station rehabilitation. The operator rehabilitated Garni, Shor Shor, Aparan, Khatnaghbyur, and Araratyan pumping stations, which resulted in major energy savings. At the Garni station, Acea diverted water supply from pumping to gravity by laying out pipes from the river up to transmission mains, trimming the pump impellors to adapt their charge to the demand, and upgrading three pumps. With increased water savings as rehabilitation and leak detection continued, operating the Shor Shor pumping station at its full capacity turned out to be unnecessary. Acea phased out old pumps, installed two new and more energy efficient pumps, and kept only one pump in operation. Similarly, at Aparan, Khatnaghbyur, Araratyan stations, new and more energy efficient pumps were installed. Also, 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.

Leak detection and repair. Acea also implemented a leak detection program. It set up leak detection and repair crews led by branch managers. To complete this work, two approaches were adopted, one for transmission mains outside the city and the other for the city's distribution network. For the transmission mains outside the city, leakage detection operations consisted of: (i) routine visual inspections of water mains to detect leaks; and (ii) investigations of specific areas where leakages were suspected based on discrepancies between water balance figures and flow measurements. For the city's internal distribution system, the leakage detection operations' objective was to ensure constant water supply to city areas well known for chronic water shortages. To this end, Acea prepared a water balance, 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 using leakage noise collators, flow measurements, and pressure monitoring. Where possible, the operator transferred connection of the distribution network from the transmission mains to the reservoirs to minimize water shortages due to transmission main leakages.

Contract completion. Acea successfully completed the four-year management contract, which built the government's confidence for greater private sector involvement. Most of the performance targets were achieved except the NRW reduction target. Acea received a US$1.41 million of performance bonus, which represented 94 percent of the maximum possible US$1.5 million incentive payment. As a result of Acea's performance, the PMU extended the management contract for one year – until April 30, 2005. In April 2004, the government also increased the water and wastewater tariff by 61 percent to AMD 90.2/m^3 – the only tariff increase during the management contract.

Parallel regulatory measures. Aside from the management contract, GOA took a number of other important measures to help support the sustainability of the water sector in Armenia. GOA passed a number of laws and institutional decisions – the Water Code in August 2002, the right to disconnect non-paying customers decree in January 2002, the Partial Debt Relief Law in November 2002, the creation of the Public Services Regulatory Commission in December 2003 – which made the legal and regulatory framework more conducive to private sector involvement. The debt relief law, which offered amnesty to indebted customers on condition that they acquire metered connections, was also critically important in helping to boost water meter installations by Acea.

3. Cost, Financing, Benefits, and Impacts

Project costs and financing. The entire project cost US$28.91 million, including capital investments, management contract fees, and operator bonuses. 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 five years and received a US$1.41 million performance-based bonus. The capital investment fund and management contract was financed in part from a US$30.87 million credit from the World Bank.

Benefits and impacts. The overall results of the project were substantial (Table 4). Yerevan residents had daily water supply for longer periods of time. YWSE collected more revenues from customers and reduced its electricity costs. In 2004, customers had, on average, 18-hour water supply a day compared with 6-hour water supply in 2000. Fifty percent of the customers had continuous 24-hour water supply, due in large part to the network sectorization. This service improvement combined with Acea's improved collection procedures and metering campaigns increased revenue collection from 20 percent, when the

contract was signed, to over 100 percent (including arrears) in 2003. Moreover, YWSE's energy consumption, the company's biggest O&M cost item, was reduced by 30 percent, exceeding the 20 percent contract target. 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. (This was achieved as the service levels increased.) The energy savings translated into an estimated US$4.83 million of annual electricity cost savings. Unfortunately, the NRW target was not met and appeared to increase over the course of the contract (see Lessons Learned section for further discussion on this.)

Table 4. Key Results from the Performance-based Management Contract

Key indicators	Baseline (2000)	Target (2004)	Achieved (2004)
Increased daily hours of water supply	6 h/d	10 h/d	18 h/d
Reduce power consumption	240 GWh	192 GWh	169 GWh
Increased gravity use	40%	NA	52%
Decreased NRW	73%	48%	80%
Increased metering	1,000	20,000	277,000

Cost-benefit analysis. The ex-post costs-benefits analysis of the entire World Bank municipal development project, which included the management contract as well as a number of other investments, shows that the project benefits exceeded the costs. Besides the annual electricity cost savings and the increased revenue collection, the project also resulted in other O&M expense savings. The cumulative net benefits of the World Bank project were estimated at US$97.23 million[5], from 1998 to 2010.

In particular, the energy efficiency investments were deemed highly cost effective. The simple payback period of the energy efficiency investments was estimated at 3.5 years (Table 5). This was evaluated using the annual electricity cost savings (US$4.83 million/year) and all investments that had energy-saving impact[6] (US$16.78 million) based on data from project documents. This represents a conservative estimate, as some of the costs had benefits beyond energy efficiency and many of the benefits accrued went beyond mere energy savings.

Table 5. Simple Payback of Energy Efficiency Investments

Cost-effectiveness of Energy Efficiency Measures	
Benefits: Average annual electricity savings	US$4.83 million / year
Energy Efficiency investment costs ➢ Sectorization costs (61% of the capital investments) = US$14.68 million ➢ Pump upgrades & leaky pipes rehabilitation + gravity use = US$2.10 million	US$16.78 million
Simple Payback	**3.5 years**

[5] Source: Project Implementation Completion Report.

[6] Since the project documents do not specify investments dedicated to implement energy efficiency measures, energy efficiency investments were estimated by determining and adding up contract amounts to procure works, goods, and services related to (1) network sectorization, (2) pumps rehabilitation, (3) leaky pipes replacement, (4) and greater use of water supply by gravity. The project's average annual benefits are determined from the benefit figures presented in the summary of the project's cost-benefit analysis.

4. Project Innovation

Although management contracts have been used for many years to help improve water utility operations, some aspects of the elements of this hybrid contract were uniquely designed based on GOA needs. This was extremely important as many attempts to engage the private sector to soon or too quickly have been met with public resistance. In this case, the private sector was introduced on a relatively short-term contract, with performance-based payments for service improvements, which helped to gain public trust. This helped pave the way for universal metering and the later tariff increase, which were more accepted once service levels improved. Another feature of the contract was a performance target for energy savings, which was deemed necessary because energy was a major O&M cost. This led Acea to develop and implement an energy management plan that eventually helped Acea exceed the target.

5. Lessons Learned

This case underscores the need for continued political support to make public private partnerships (PPPs) work effectively. The establishment of clear performance targets, a strong incentive mechanism, and careful selection of a contractor, all helped lead to a successful outcome. GOA, Yerevan City officials, and the PMU also met frequently with Acea to assess progress, identify and discuss challenges, and agree on corrective actions. As previously noted, they passed a series of laws and regulatory changes to facilitate collections and improve the investment climate in the sector. The government also worked with Acea to focus on service improvements early in the management contract, to help gain public acceptance of the reforms before introducing some of the less popular measures, such as the disconnection decree and tariff increase.

Under the management contract, the only performance target that was not achieved related to non-revenue water. In fact, the NRW indicator actually increased during the contract term because the baseline NRW amount was grossly underestimated prior to the signing of the contract. The NRW reduction target was set assuming a daily water consumption rate of 250 liter/capita/day, but it was later found to be much less, at about 110 liters/capita/day. This meant that the magnitude of water leakages occurring in the distribution network was substantially higher than initially estimated. An upfront network assessment prior to the release of the bidding documents and setting of the performance targets would have provided more realistic data to not only establish sound NRW reduction targets, but also to help define more appropriate activities and resources to successfully decrease water leakages.

This case also showed that while the overall impacts largely met the desired results, achieving concrete improvements in services takes time. During the first two years of the management contract, Acea actually performed below expectations and, thus, did not receive any performance bonus. The operator, Acea, had to acquire a sound knowledge of the infrastructure including the distribution network, map the network, identify more efficient operational procedures, and train inherited staff to implement new operational guidelines that would eventually lead to the targeted improvements. This case demonstrates the need for governments involved in such PPPs to have realistic expectations about the scale and pace of the improvements and to build fair and reasonable performance plans around achievable benchmarks.

6. Financial Sustainability, Transferability, and Scalability

The introduction of a private operator to YWSE resulted in significant and measurable improvements in the utility's overall sustainability. YWSE's financial situation improved under the management contract, with increased bill collection and reduced energy costs. YWSE operations, which were not previously covered by revenues, were turned around to generate sufficient revenues to cover O&M costs. The financial rate of return for the overall project was estimated at 49%. Further, the PPP helped to transform the utility into a sustainable business, with improved levels of service, full metering, and customer payments and satisfaction.

As a result of the successful experiences with the performance-based management contract and private sector involvement, GOA decided to follow-up the Acea contract with a 10-year lease contract. The lessee was recruited through a similar international competitive bidding process, where pre-qualified international firms were invited to bid the lowest tariff required for them to run the utility over the lease period. Veolia, a French-based multinational water company, offered the least average-rated tariff, at US$0.30/$m^3$, and was awarded the contract. In accordance with the contract terms, Veolia established a closed joint stock company in Yerevan, entitled "Yerevan Djur", to act as the lessee. On June 1, 2006, Yerevan Djur took over the operation, maintenance, and management of water and wastewater infrastructure as well as the responsibility for billing, revenue collection, expenses payment including debt service. To ensure a smooth transition, Acea's key staff, including the former Managing Director, was retained as individual consultants to serve in key positions. The lease contract is now in its fourth year and is performing well. The lessee has further reduced energy consumption by 21 GWh/year and decreased NRW by 2.7 percent (Table 6).

Table 6. Results from the Lease Contract

Key indicators	**Mgmt Contract Achieved (2004)**	**Lease contract**		
		Baseline (2006)	Target (2011)	Actual (2010)
Increased daily hours of water supply	18 h/d	19.6 h/d	21 h/d	20.14 h/d
Reduce power consumption	169 GWh	119 GWh	94 GWh	98 GWh
Increased gravity use	52%	55%	65%	64%
Decreased UFW	80%	86.3%	55%	83.6%
Increased metering	277,000	89.6%	96%	95.29%

Following the positive experience in Yerevan, the approach was replicated in the second state-owned water utility, the Armenia Water and Sewerage Company, which covers about 300 communities and serves about 45 percent of the population. The utility entered into a management contract with an international operator in October 2004.

A number of countries have used management contracts in order to help improve overall performance and financial viability. In Albania, Mozambique, Trinidad, Argentina (Lara), Guyana, and Lebanon (Tripoli), for example, management contracts resulted in increased bill collections. In Gaza City (West Bank and Gaza), Zambia, Amman (Jordan), Kampala (Uganda), and La Rioja (Argentina), the use of management contracts reduced water rationing. In Yerevan, the management contract proved to be a successful approach in not only improving bill collections and service continuity, but also enhancing energy efficiency.

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ANNEX: CITY AND PROJECT PROFILE

CITY PROFILE

1. Name of the City	**Yerevan**
2. Area	**300 km^2**
3. Population	**1.12 million (2009)**
4. Population Growth Rate	**0.29%**
5. GDP of the City	**3.6 billion**
6. GDP Growth Rate	**11%**
7. GDP per Capita	**3,328 (2008 estimates)**

PROJECT PROFILE

1. Project Title	**Municipal Development Project**
2. Sector	**Water**
3. Project Type	**Management Contract to improve water supply**
4. Total Project Capital Cost	**US$28.91 million**
5. Energy/Cost Savings	**71 GWh/year (from 2000 to 2004)**
6. Simple Payback	**3.5 years**
7. Project Start Date	**09/16/1998**
8. Project End Date	**04/30/2005**
9. % of Project Completed	**100%**

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