ARMENIA TAKES ON WATER MANAGEMENT CHALLENGES

Public-Private Partnerships in Water Sector

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THE WORLD BANK

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Introduction

This paper presents a background to the water and wastewater sector in Armenia and summarizes the strategy that the Government of Armenia took to meet the challenges faced by the sector through the effective and pragmatic use of different modalities of Public-Private Partnership (PPP). The paper analyzes in section 2 the successes and challenges to date, as well as evaluates against some key criteria, progress by each of the three types of PPP used in the country. Section 3 summarizes some of the key lessons learnt, and section 4 discusses possible future PPPs in the water sector.

1. Background

Successful Public-Private Partnership (PPP) projects in water and wastewater, as those implemented recently in Armenia, present viable alternative solutions for governments interested in undertaking significant reforms in the water sector. Armenia has learnt that it is possible to carry out modernization programs and undertake considerable water sector reforms when partnering with private sector institutions.

Uniquely, the Government of Armenia has had a track record of implementing successfully different forms of PPP in the sector since 2000. This stems from a pragmatic realization that the main reason for the poor water services being provided to the population was mainly weak management of available water resources. In order to improve water supply services, the Government opted for partnering with the private sector as a way to introduce significant reforms in the water and wastewater sector.

Previously, Armenia's water supply systems suffered from problems associated with old infrastructure dating back to the Soviet era; poor condition of water and wastewater networks; limited institutional capacity; and weak financial performance of water utilities all over the country. Over the past decade, the government of Armenia has strived to improve access, reliability and quality of the drinking water and its infrastructure.

This history of PPP in Armenia's water sector started with a performance-based Management Contract (MC) for the water utility in Yerevan in 2000. The utility, now called Yerevan Djur (YD), became a pioneering

example in Europe and Central Asia 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 the utility coupled with a program of hands-on training for the technical, financial, and management staff. The successful completion of the MC resulted in a greater risk transfer to the private sector through the establishment of a ten year lease contract with another international operator, Veolia from France. This experience was replicated for another larger utility in the country - Armenia Water and Sewerage Company (AWSC) - covering around 45% of the country's population. This utility serves more than 300 medium-size cities and towns, where the French company SAUR currently operates. Initially a Management Contract was signed in 2004 and has now evolved into an Enhanced-Management Contract (EMC) at the end of 2011, as a preparatory step into a Lease Contract at the end of the EMC period in 2013/2014.

The Government of Armenia has also implemented a third PPP Project granting a Management Contract for three Regional Water Utilities to another private operator in the country. These utilities are currently being operated by the German company MVV through a Management Contract which expires at the end of 2013. This project has been implemented with KfW support.

2. Successes and Challenges

The most recent World Bank toolkit on Water Services "*Approaches to Private Sector Participation in Water Services: a toolkit*" developed by the World Bank and PPIAF (2006), states that the key ingredients for a successful PPP are "Contracts [that are] well supervised, with strict reporting requirements and if possible the engagement of an independent, credible, technical auditor to monitor achievements. A true partnership needs to develop between the operator and the contracting government, to make it easier to find solutions to the inevitable problems that will arise over time".[1]

The 2006 Toolkit proposes nine steps for designing a successful urban Water Supply and Sanitation PPP; (i) considering PPP; (ii) planning the process of introducing PPP; (iii) involving stakeholders in the design of the arrangement; (iv) setting upstream policy; (v) setting service standards; (vi) allocating responsibilities and risks; (vii) developing institution to manage the relationship; (viii) designing the legal instruments for the arrangement; and (ix) selecting an operator.

Armenia has followed almost all of these steps. The PPP experience in the water sector of Armenia holds valuable lessons for governments willing to engage the private sector in the management of water services.

1 *"Approaches to Private Sector Participation in Water Services: a toolkit"* developed by the World Bank and PPIAF for a comprehensive review of good practice in PPP design and implementation; 2006

The private operators engaged in Armenia's water have been effective in improving the efficiency of water utilities. Public perception of PPPs is very high in Armenia. A beneficiary survey attested to increased overall satisfaction with water system management over the past 5 years; for example, 74 percent of respondents in AWSC service area and 65 percent of respondents in Yerevan Djur service area believe the management has improved.

A very good indicator of PPP success has been the widespread public acceptance of the arrangement, more than 70 percent of the beneficiaries preferring PPP over state managed services. Figures 1-1 and 1-2 below reflect the public perception of PPPs.

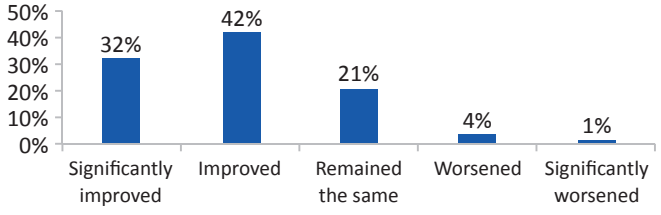

Figure 1-1: Armenia Water & Sewerage Company: Perceived changes in water system management over the past 5 years

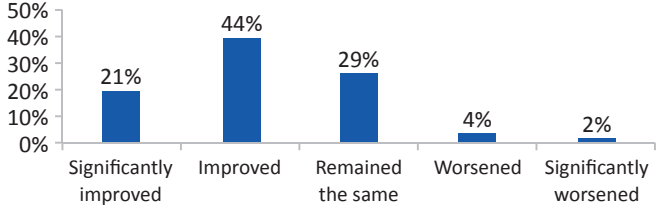

Figure 1-2: Yerevan Djur: Perceived changes in water system management over the past 5 years

Improving service quality and operational efficiency: Armenia water PPPs proved to be an efficient means in dealing with the problem of improved service and raising utility revenues. Customers become more willing to pay their bills when service improves, and more efficient operation creates increased cash flow from operations to invest in expansion. As creditworthiness improves, a utility can more easily access funding and invest in service expansion, thus contributing to a virtuous cycle of improved service. An efficient operator will make good use of funding for investment, regardless of whether the funding comes from public or private sources.

Beneficiary surveys suggest that 25 percent of the households in AWSC service area and 14 percent of the households in YD service area would be ready to pay a higher price to get better service quality (longer duration, better quality, less frequent failures). Evidence suggests that, among other factors, such as household incomes, willingness to pay more may be conditioned by the current level of satisfaction with the service; i.e. customers who expressed readiness to pay an increased price were generally less satisfied with service continuity, water quality, responsiveness to failures, and overall management (Figures 2-1 and 2-2). Hence, in the Armenian case, the finding that few beneficiaries would consider paying a higher price to get better service could be regarded as an indicator of PPP success, rather than lack of public confidence.

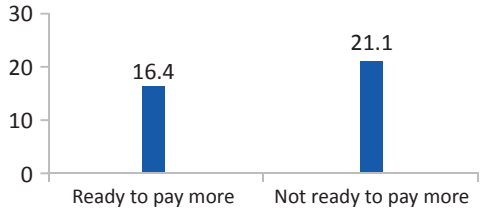

Figure 2-1: Yerevan Djur: Readiness to pay more for better services vs. average daily hours of service

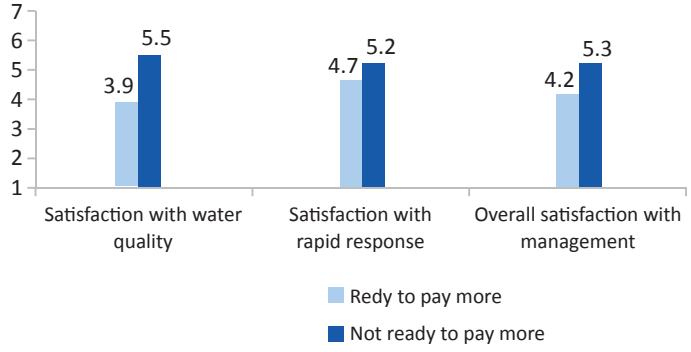

Figure 2-2: Yerevan Djur: Readiness to pay more for better services vs. other variables

As the literature notes, better management and increased investment are linked. In the case of Armenia beneficiary surveys suggest that customers would be prepared to pay more if services improve. Indeed, efficient management not only improves service quality but also ultimately leads to increased investment. Professional operation entails availability of cash flow for more investments in the system. Furthermore, improved service to customers makes them more willing to pay their bills, which would lead to improved collection ratios and eventually overall efficiency.

In order to measure the level of improvements in the water sector in Armenia, as well as to identify areas where improvements are still needed, we use below the basic criteria established in the World Bank Toolkit.

- *Reliability:* PPPs in Yerevan Djur and AWSC made good progress at improving reliability of the water service. The duration of water supply improved substantially in both service areas, as shown in Figures 3-1 and 3-2 below. In Yerevan Djur, the duration increased from 6 hours in 2000 to 21.5 hours in end-2011. And in AWSC, the duration increased from base value of 6 hours in 2004 to 15 hours in 2011.

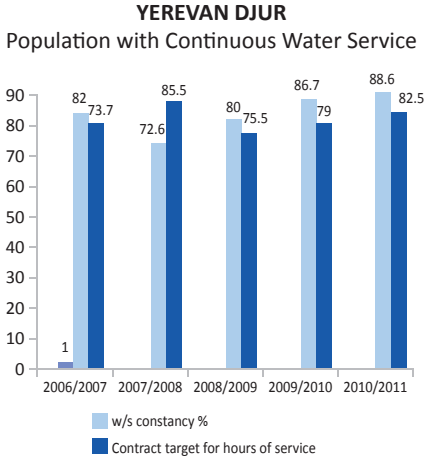

Figure 3-1: Yerevan Djur:
Duration of water supply

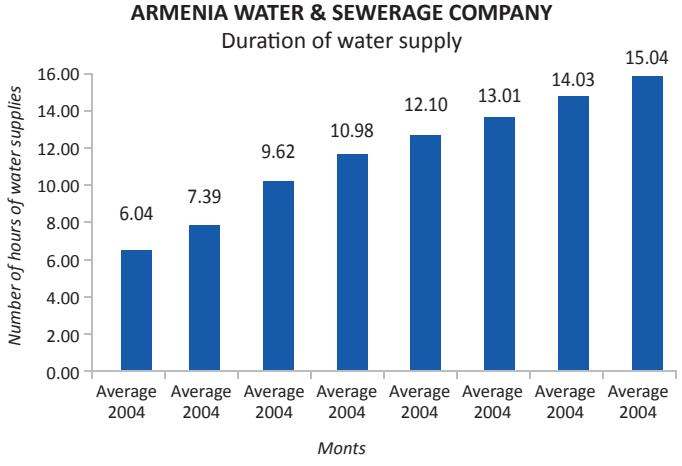

Figure 3-2: Armenia Water & Sewerage Company:
Duration of water supply

The beneficiary survey carried out in December 2011 suggests significant improvement in terms of daily average duration of drinking water supply since 2006: 70 percent of the sampled households reported 21-24 hour coverage, and the mean daily duration of water supply was estimated at 20.4 hours – consistent with the year-end target of 21 hours. Close to two thirds of the beneficiaries (61 percent) attested to increased hours of daily service over the past 5 years and half of them stated the improvement was significant. While 35 percent of the beneficiaries said the average duration of water supply had not changed since 2006, the average water supply for this particular group of beneficiaries was estimated at 22.1 hours per day, or significantly higher than the city average. Hence, in a five year perspective, the PPP helped to either improve or effectively sustain the daily average duration of water supply for the overwhelming majority of the beneficiaries (Figures 4-1 and 4-2).

Furthermore, evidence suggests that the improvement in service continuity has been sustainable. A household survey reported that 20% of Yerevan Djur beneficiaries noticed increased daily hours of water supply as compared to 2010.

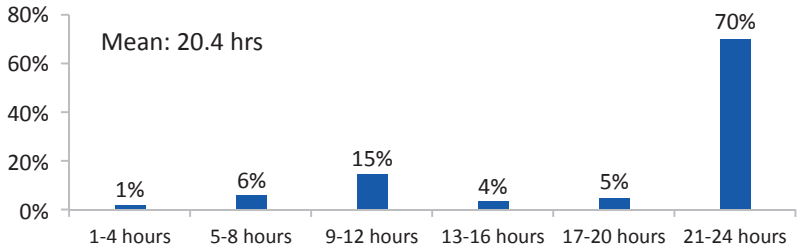

Figure 4-1: Yerevan Djur: Perceived Duration of water supply as of December 2011 (hours per day)

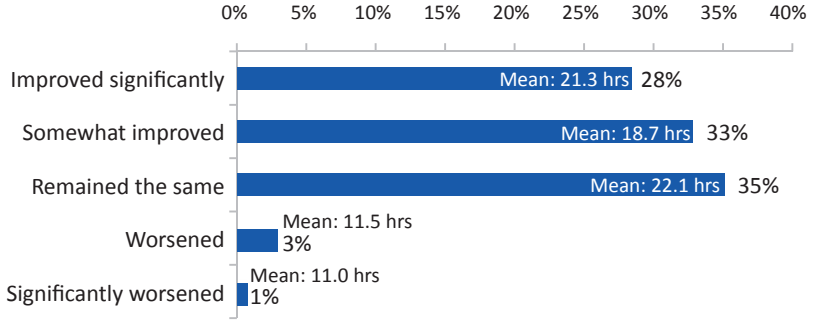

Figure 4-2: Yerevan Djur: Perceived change in the duration of water supply since 2006 vs. current mean duration

Similar to the survey results in Yerevan Djur, findings suggest that AWSC respondents witnessed significant improvement in terms of daily average duration of drinking water supply:

- The average duration was estimated at 15 hours a day suggesting 150 percent increase as compared to the base value of 6 hours in 2004. Over 75 percent of the beneficiaries reported increased hours of daily service over the past 5 years, 53 percent of them stating the improvement was significant.

The survey has also confirmed that the improvement in service continuity has been sustainable, 26 percent of AWSC beneficiaries attesting to increased daily hours of water supply as compared to 2010.

(Figures 4-3 & 4-4)

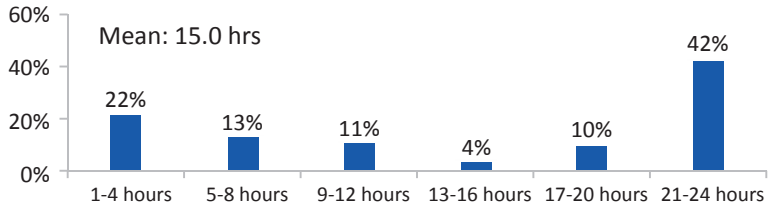

Figure 4-3: AWSC: Perceived Duration of water supply as of Dec 2011 (hours per day)

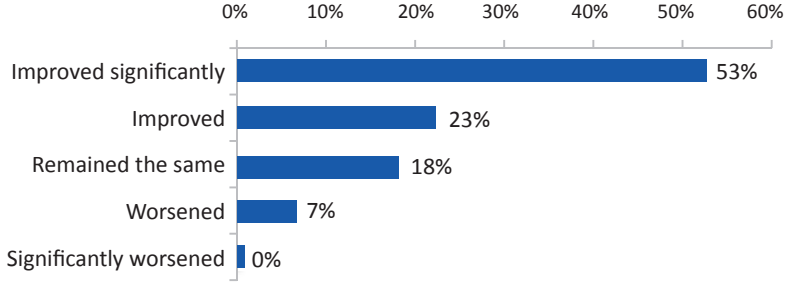

Figure 4-4: AWSC: Perceived change in the duration of water supply since 2006 vs. current mean duration

There have been other improvements in terms of reliability, such as water quality is maintained at high levels; bacteriological safety compliance increased from 93 percent at baseline to 98 percent for both utility service areas.

Beneficiary surveys reported sustainable improvement of water quality both in five-year and one-year spans. The survey measured water quality through a composite index combining beneficiary assessment of water taste, color and smell suggested increased appreciation of water quality over the past five years (composite mean estimate of 5.5 in 2011 vs. 4.9 in 2006 on a 1-to-7 point scale), while the survey reported that 14 percent of the beneficiaries noticed improved water quality since 2010.

(Figure 5)

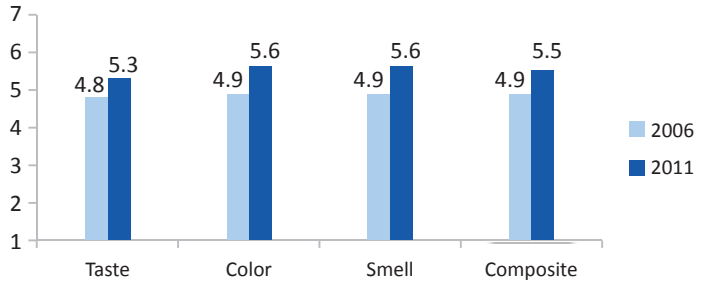

Figure 5: AWSC: Perceived improvement in the quality of water since 2006

- *Efficiency*: Both PPPs made progress at reducing energy consumption, improving metering and collection ratios. Energy consumption was the biggest O&M cost for both utilities, which was reduced significantly with a decline in energy use owing to installation of energy-efficient pumps, more efficient network management, and greater use of gravity-fed water (Figures 6-1 and 6-2).

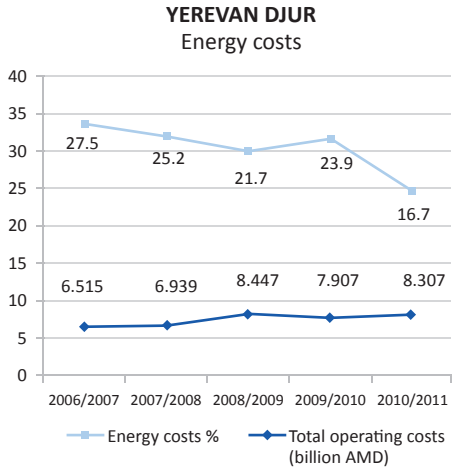

Figure 6-1: Yerevan Djur: Energy costs and total operating costs

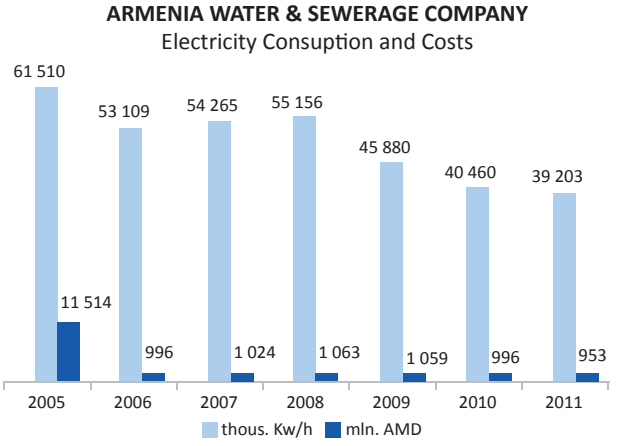

Figure 6-2: Armenia Water & Sewerage Company: Energy consumption and costs

Despite these major achievements, Non Revenue Water (NRW) is still above 80 percent. Reduction of NRW is a key measure of improved technical efficiency. However, NRW reduction fell short of expectations (Figures 7-1 and 7-2). Limiting physical losses on the public distribution network would require the gradual replacement of aging and poor quality distribution pipes, a very large investment that may not be economically justified, now that energy consumption has been significantly reduced by substituting gravity water sources to pumped ones. Furthermore, limiting physical losses located on internal distribution networks of apartment buildings would require a revision of the condominium legislation, an action that is probably beyond what public and private parties involved in the water sector could achieve. Limiting commercial losses would require replacing all existing poor quality meters located in each unit of apartment buildings and currently belonging to customers by accurate anti-magnetic meters preferably with remote reading equipment that would then be the property of the utility company.

Reducing NRW to internationally accepted levels of 20 percent and below may not be a realistic objective in the medium-term for AWSC, and before deciding on the next PPP model, it would be beneficial to develop a NRW reduction strategy justified by further energy savings.

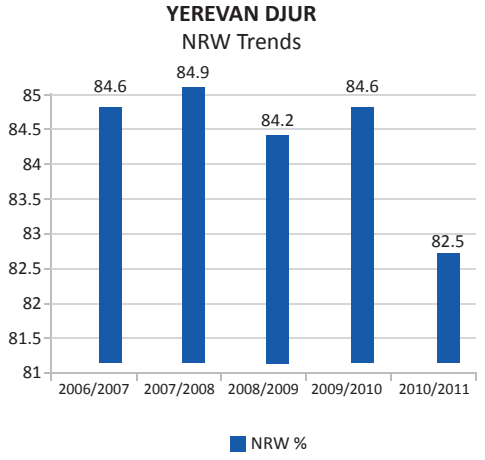

Figure 7-1: Yerevan Djur: Non Revenue Water

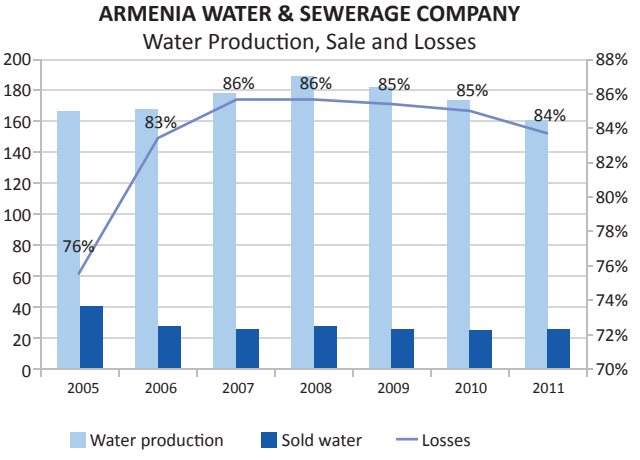

Figure 7-2: Armenia Water & Sewerage Company: Non Revenue Water

- *Financial sustainability*: Yerevan Djur has achieved full cost recovery of O&M costs, including associated Lease contract costs, and debt servicing. AWSC still has to build financial sustainability, the utility is being subsidized by the national government, and the tariffs are well below the cost recovery levels.

Service improvement, combined with the improved collection procedures, metering campaigns as well as outreach programs, increased the revenue collection for both utilities from 20 percent on average to close to 100 percent (Figures 8-1 and 8-2).

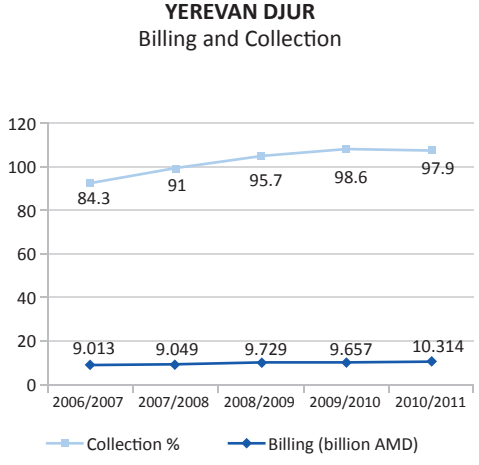

Figure 8-1: Yerevan Djur: Billing and collection

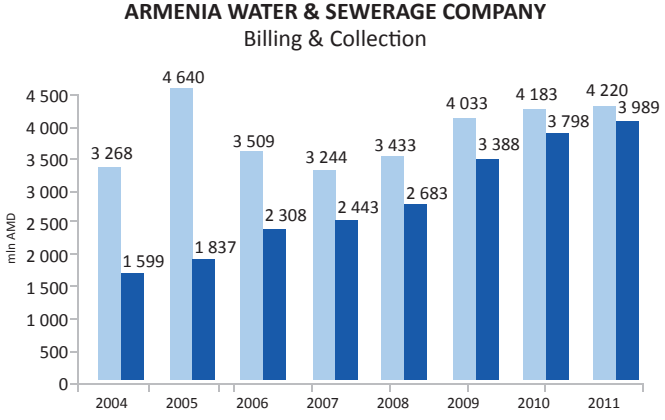

Figure 8-2: Armenia Water & Sewerage Company: Billing and collection

- *Affordability*: Both PPPs implemented a few programs to address this issue such as putting in place a revolving fund for residential meters and by maintaining water and wastewater tariffs at below cost recovery level (for AWSC). Affordability is a major consideration for tariff increase, especially for population living outside the capital city. The tariff needs to be adequate however to carry out services in the long term, with planned level of cost recovery and how maintenance and depreciation will be dealt with to ensure long term viability.

By and large, statistical analysis of the survey results reveals that the population is satisfied with the service quality improvements and response to failures. The survey suggests that while 57 percent of households in YD and 35 percent of households in AWSC service areas experienced water service failures in 2011 (the percentage excludes internal system failures for which the utility is not responsible), each of the households reporting an average of 3 and 2 such incidents respectively, the rapid response to service failures by the utilities over the past five years have improved (mean level of satisfaction 5.2 in 2011 vs. 4.1 in 2006 on a 1-to-7 point rating scale).

3. Some Lessons from the Armenia Experience

PPP is an effective tool to enable sector reforms: The Armenian experience with PPP proves that successful water PPPs are one of the multiple sector strategies designed by the authorities to achieve sector reform. While private operators focused on service management and urgent operational issues by bringing know-how and expertise, Government ensured long-term sector viability by putting the right framework in place, setting up the right legislative and regulatory environment conducive for PPP.

Government commitment: The Government of Armenia's commitment to reforming the water and wastewater sector proved to be the key factor for the successful PPPs. Political support has been present at all times during the partnership. 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 three management contracts and lease contract, both the Government and the operators demonstrated willingness and openness to work things out and agree on common benefits for the sector.

Quality of the private partner: The outcome of a PPP depends highly upon the performance of the private partner / operator. For a successful partnership it is essential to: (i) mobilize a reputable international partner for establishing and developing a locally incorporated Operator; (ii) ensure that the conditions of the PPP contract are acceptable to both parties; and (iii) establish a true "partnership" between public and private parties.

The objectives of establishing a partnership between the public authorities and their local private partner and transferring knowledge to the latter by its international shareholder have been successfully met in

Yerevan. A proof that the know-how has been properly transferred and that contractual incentives are working well is substantiated by the fact that a private professional operator is now functioning under Armenian management with very limited back office support from its foreign professional partner and is able to exceed its contractual obligations. Furthermore, Yerevan Djur become one of Armenia's largest tax payers without having to increase the water tariff beyond the automatic contractual indexations is a proof that the sector is on the right track for financial sustainability.

A mutually beneficial partnership between the Government and Saur was also successfully established: institutional capacity has been built for enabling local staff to operate AWSC in the future. Furthermore, while implementing PPP projects Government established Project Monitoring Units (PMUs) to monitor the implementation of projects and particularly performance of PPP contracts. These PMUs developed skills and knowledge to identify and prepare future PPPs and interact with private partners in other sectors.

Autonomy of the operator: A key element of the successful PPPs has been the autonomy and independence granted by the Government to the operators, whilst at the same time ensuring adequate public monitoring and control functions to ensure contractual obligations are met. The operators were able to: (i) implement an independently designed investment plan; (ii) take some commercial risk; and (iii) properly manage financial resources available and even to contribute some working capital. Armenia's experience proved that efficient implementation of a rehabilitation program is key to achieving the expected performance improvements by granting autonomy to the operators while ensuring that contractual obligations were met through independent technical audits. Specifically the case of Yerevan allowed: (i) much improved commercial operations (metering, billing and collection); and (ii) financial resources, including those

provided by Operator under the form of working capital, to be efficiently managed to achieve operational improvements.

Benefits to the poor and affordability: As discussed earlier, Armenian water sector PPPs made good progress on improving the reliability of the water service and, to some extent, addressed environmental sustainability issues. But the PPP design did not touch upon affordability issues. PPP projects have brought tangible benefits in access and quality of service to the population as a whole, but it is difficult to assess the impact of these PPP projects on the poor. Affordability and subsidies to the poor has to be made an integral component of the sector reform. There is need to emphasize poverty implications of any reform of the expected tariff reform process and the targeting of subsidies.

The customer "willingness-to-pay" and the Government "willingness-to-charge" are likely to set the upper limits to future tariff increases. The Government may be unwilling to charge customers living in small towns and villages a much higher tariff than that applying in Yerevan, where households are reported to have much higher incomes. Addressing the "equity" objective of water and wastewater pricing raises the issue of uniformity of the water tariff throughout the country and thus that of the rationale for having several utility companies providing the water and wastewater service. It also raises the issue of subsidies, ideally to be transparent, targeted and time limited, three criteria that are not met by operating subsidies currently extended to AWSC.

Time is vital to build up the partnership: Armenian experience, especially in the case of Yerevan water utility, demonstrates that it really takes time to establish a viable partnership between the public entity and

a private operator, in an effort to achieve solid results. No matter how experienced a private operator is, it would need time to understand the situation in a utility and the specifics of the local environment. The operators could prioritize their interventions only after a thorough understanding of the water systems in YD and AWSC, particularly in Armenia, where the actual infrastructure was old and deteriorated, and the network was poor and leaky. The time factor is especially important, given the limited resources to invest in the infrastructure rehabilitation, and the decisions to be taken by the operator as to how to maximize the returns for these selective investments.

Engaging a foreign experienced private operator is not a solution to all problems in the water 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 and sustaining the private sector, establishing a legal and regulatory framework, and developing a reform strategy to achieve sector development objectives.

Realistic performance targets must be set: Before engaging the private sector, Government needs to set realistic targets for PPP to be viable and functional. Furthermore, Armenia PPP experience in water sector demonstrates the need to have realistic expectations about the scale and pace of reforms in the sector as sustainable change doesn't happen overnight.

The need for good baseline information: Economic justification of projects that mostly focus on rehabilitation of existing facilities and operations is always difficult without reliable data before and at the

completion of the contracts. Establishing a reliable baseline presents a fundamental challenge. If energy savings are usually easy to identify, time savings, reduction of coping costs, health improvements and environmental improvements are much more difficult to document.

In the early days of the reform program it was extremely difficult to measure key performance indicators such as the level of water losses, the utility lacked data on its operational record, and the customer database was inexistent; so baseline in some cases was not reliable. This has caused contractual renegotiations but didn't affect contract implementation. Future projects should consider establishing good baseline information for better supporting estimates of economic benefits in an environment where the competition for financing is likely to remain strong. The choice of the indicators for measuring progress, the reliability of the baseline, and the mechanism for verifying compliance with the targets agreed are key.

Impact of PPP on tariffs: Literature on the water tariffs has not found any direct link between PPPs and increasing tariff levels. For many utilities where the private sector is engaged in management of services tariffs often were increased, but it did not happen as a direct result of employing a private operator, but rather as a consequence stemming from the initial tariff levels[2], which in case of AWSC were below cost recovery levels. Raising tariffs is often a necessary component of overall sector reform and needs to be put in place as a policy by the government to identify what degree of costs is to be financed through tariff revenues, and how much cost reduction the private operator is expected to achieve through efficiency savings.

2 Public-Private Partnerships for Urban Water Utilities in Developing Countries: Facts and Lessons from 15 Years of Experience, by Philippe Marin, 2009

4. Possible Future PPP Contracts in Water

Looking forward, the Government intends to continue its partnership with private sector in management of water services. In this context, it will identify feasible future PPP arrangements and options for transferring additional risks and responsibility to the private partner.

Yerevan Djur: The incentives created by the lease contract for YD have so far proven to be well adapted to addressing the main challenges of the water and wastewater service in Yerevan, i.e., improving the constancy of water supply, reducing operating expenditures (OPEX), improving commercial operations (metering, billing and collection) and improving customer management. Also, the transfer of responsibility for implementing a CAPEX consisting mostly of rehabilitation projects to the Lessee has proven to be a positive decision. This PPP is expiring in 2016 and there needs to be a decision on the next steps. Of course, the Lease contract could be renewed, or the utility could be concessioned. The possibility of transferring the responsibility of financing the CAPEX to the Operator as part of a long-term Concession would depend mostly upon the future pricing policy to be implemented and availability of debt financing in local currency on terms compatible with an industry that depreciates its fixed assets over long periods.

Armenia Water and Sewerage Company: The Government, eager to pursue its successful PPP experience, envisaged evolving the Management Contract into a "Lease" contract similar to what has been successfully implemented in Yerevan since 2006. But AWSC poor financial situation and limited future cash generation

capacity have caused this move to be postponed. In a Lease, collections would have to be sufficient to cover the Operator's costs, including that of its foreign professional partner, and to generate cash surpluses to service the debt and contribute to the CAPEX. The feasibility of a Lease contract for AWSC operations would greatly depend upon future GOA tariff, subsidy and financing strategies.[3]

Three regional utilities: The three regional utilities (Nor Akunq, Lori, and Shirak) water and wastewater services, previously operated as three municipal entities, have been re-established and operated under single Management Contract, by the PPP operator, MVV. The institutional arrangements are in many ways similar to that for the AWSC, but with the involvement of the Municipalities at Board and overall management level together with SCWS. The overall responsibility for assets and sector development remains with the SCWS, and project monitoring is carried out by the Project Monitoring Unit. Responsibility for developing and funding the necessary capital investment program remains with the Government. Current capital works funding is with support of KfW, the German bi-lateral development agency. This is a 5 year contract that is currently planned to end, unless extended, in 2012. The 3 Regional Utilities management contract has not been long established, but improvements are expected.

Rural water: With a total population of around 1.1 million in small communities throughout Armenia and being served by widely varied quality and types of institutional, operational and technical arrangements,

3 There are examples of Leases successfully implemented in cases where tariffs were originally insufficient to cover O&M costs: the best documented one is that of the Guinea (Conakry) Lease that started in 1989 (with SAUR and Veolia as foreign partners of the locally incorporated Lease Operator). The Guinean Government agreed to gradually increase the Customer tariff from a level sufficient to cover only about two thirds of O&M costs to a level sufficient to cover O&M, depreciation and financing costs over a ten-year period.

this is a neglected area of the sector that would benefit from a coordinated approach to development. To establish the basis for effective development of this part of the sector, a full review of current situation and needs would be required, coordinating existing work and studies and supplementing with field surveys to obtain a full picture of the current situation.

Financing needs: Current estimates for the future long-term CAPEX for the Yerevan WW systems are in the range of US$600 million, of which about US$80 million for the coming five years. So far, Yerevan has been able to secure financing for a total of about US$84 million through several externally financed projects, including the MDP (US$30 million) and the YWWP (US$20 million). Current estimates for the future CAPEX outside of Yerevan are in the range of US$1,000 million for the coming 20 years, of which about US$75 to US$100 million for the coming five years. So far, AWSC has been able to secure financing for a total of about US$140 million from various financing agencies.

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