

Water Operators' Partnership Case Study

GWOPA
Global Water Operators' Partnerships Alliance

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UNESCO-IHE
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Caesb
Brasília, Brazil

Aguas del Norte
Salta, Argentina

BEWOP

Aguas del Norte and Caesb

Water Operators' Partnership Case Study





◀ **Aguas del Norte** Salta, Argentina

◀ **Caesb** Brasília, Brazil

KEY FACTS



Partners

Mentee: *Compañía Salteña de Agua y Saneamiento S.A.* (Aguas del Norte), located in Salta province, Argentina.

Mentor: *Companhia de Saneamento Ambiental do Distrito Federal* (Caesb), located in federal district of Brasília, Brazil.



Facilitator

Water Operators' Partnerships Secretariat for Latin America and the Caribbean (WOP-LAC), first hosted by the Inter-American Development Bank, followed by the *Asociación Latinoamericana de Operadores de Agua y Saneamiento* (ALOAS).



Duration

2010–2015
(ongoing at time of printing)



Cost

US\$47,195 with US\$32,195 financed by the Inter-American Development Bank, and approximately US \$15,000 contributed jointly by Caesb and Aguas del Norte.



Aim

Strengthen mentee capacity to improve energy efficiency, facilitate a transition toward water metering and block tariffs, upgrade wastewater treatment technology and integrate IT systems.



Approach

Activities consisted of assessment visits, on-the-job and classroom training, and frequent remote exchanges that addressed issues ranging from technology and working methods to strategic organization and planning. The management of the WOP was informal and flexible.



Results

The WOP has enabled important changes in strategic organisation and planning, procedures and contracts, and working methods within targeted areas. An energy efficiency plan establishing concrete activities was developed by Aguas del Norte with the mentor's guidance.

The mentee is undertaking meter technology upgrades, planning installation and improving reading methods. A new tariff scheme is also being simulated to reduce water consumption and improve financial sustainability.

Targeted recommendations to optimize and expand waste water treatment plants and a feasibility study to introduce anaerobic technology in wastewater treatment have been produced.

Potential improvements on information management systems to optimise operations and inter-departmental data integration have been identified.



Success factors

Analysis of needs: A flexible initial agreement allowed the most urgent gaps to be identified jointly. Informal objectives in the early stages were replaced by formal mechanisms in the implementation phase to pursue more targeted results.

Similar experiences and technologies: Similarities between the partners' organisational structures, service coverage levels and technologies facilitated knowledge sharing and permitted genuine two-way exchange, benefiting the mentee as well as the mentor.

Geographical proximity: Proximity was a significant enabler for this cost-effective WOP.

Strong motivation to engage: The operators saw the WOP as a way to obtain low-cost technical assistance, but also as a vehicle to motivate staff.

Catalyser role: The mentor facilitated and encouraged technological and organisational change within the mentee utility, helping the WOP gain leverage with political and regulatory authorities.



Challenges

Financing and implementation: Financing the WOP remains a central problem for the partners. For this reason the project came to a virtual standstill for nearly two years. Furthermore, the mentee has struggled to mobilize the necessary funds and political support to effectively implement the recommendations.

Impact and sustainability: As the WOP is extended, future work could be better structured in terms of deadlines, budget and activities, in order to increase its impact and encourage the sustainability of its efforts.

INTRODUCTION

A Water Operators' Partnership (WOP) is a collaboration between two or more water or sanitation operators, conducted on a not-for-profit basis, in the aim of developing their capacity. These partnerships are being used as a way of helping the world's public operators to sustainably deliver adequate water and sanitation for all.

This narrative case study has been produced as part of the Boosting Effectiveness of WOPs (BEWOP) project, a collaboration between UNESCO-IHE and UN-Habitat's Global Water Operators' Partnerships Alliance, and is funded by the Netherlands Government. BEWOP is a 5-year research, operational guidance and outreach initiative aimed at boosting the effectiveness of Water Operators' Partnerships around the world.

The full case study from which this narrative report was produced, is part of a series of cases being documented under BEWOP using a common framework to facilitate analysis and comparison. The case studies, together with other research, are leading to the development of tools and guidance materials to support operators, facilitators and funders to do WOPs with greater ease and confidence in their effectiveness.

The present report analyses the Water Operators' Partnership (WOP) between the *Compañía Salteña de Agua y Saneamiento S.A.* (Aguas del Norte), located in the province of Salta, Argentina, and the *Companhia de Saneamento Ambiental do Distrito Federal* (Caesb), located in the federal district of Brasília, Brazil ([see Map](#)). In this WOP, Aguas del Norte is the recipient partner or mentee, while Caesb is the mentor utility. The partnership aims to strengthen technical and organisational capacity of Aguas del Norte through knowledge sharing with Caesb.

The analysis is informed by a 10-day field visit to Salta in December 2013, numerous remote interviews with employees from Aguas del Norte, Caesb, the Inter-American Development Bank and the *Asociación Latinoamericana de Operadores de Agua y Saneamiento*, which houses the WOP platform for Latin America and the Caribbean, as well as supporting documentation (agreements, activity reports, work plans, presentations). This first case study from the Latin American region was selected for its scale and duration, for the many positive aspects of WOPs it illustrates, and for the possibility to gain access to all key actors involved.

Great thanks are extended to all those who contributed their time and insights, especially Normando Fleming, Gabriel Sbrugnera, Andres Vucerakovich, Klaus Neder, Corinne Cathala and Juan Martin Ongay.



CONTEXT

Argentina is a Federal Republic with 23 provinces and a central government located in the capital of Buenos Aires. Argentina is one of the largest economies in South America. According to the World Bank, the country's gross domestic product of US\$609.9 billion in 2013 compares with US\$2,246 trillion for Brazil. Argentina ranked 45th on the United Nations' Human Development Index in 2013 while Brazil was in 85th position.

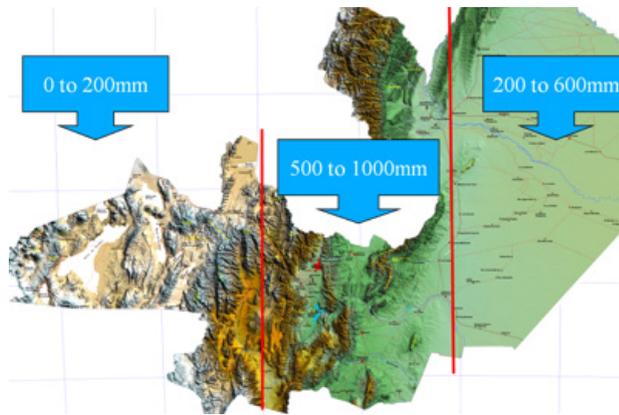
The provinces of Argentina are bound by federal laws and the national Constitution but are otherwise autonomous, organising their local governments and managing their own natural resources. The Province of Salta is located in north-western Argentina (borders with Bolivia, Chile and Paraguay) and is composed of 23 departments. Northern departments are relatively poor with mostly indigenous populations, and water and sanitation coverage remains low, at less than 80%. The mountainous western departments are the poorest of Salta and social unrest linked to demands for better services is frequent. Within the capital city of Salta, social inequalities are stark between high – and low-income neighbourhoods. The economy of the province relies mostly on agriculture (tobacco, soy, beans, sugarcane, vineyards and cotton), the oil and gas industry, mining (e.g. gold, copper), tourism

and small-scale factories. It accounts for roughly 1% of the national gross domestic product.

Salta's climate is typical of subtropical highland. The wet season lasts four months (December to March) and brings an average precipitation of 550 mm. The dry season extends through the rest of the year, with an average 150 mm of rain over eight months. The most critical time in terms of water supply is toward the end of this dry period when the resource becomes scarce and leads to supply disruptions. The first rains of the wet season cause important turbidity problems, which directly impact the quality of the service. In 2013, the province recorded the driest year in three decades.

The Province of Salta is divided in three main geographical areas, which receive uneven rainfall (see Figure 1). The western region is the driest and its snow-free high peaks (over 6,500 meters above sea level) and high plains get very scarce annual rainfall. The landscape of the densely populated central region, where the capital is located, is composed of sub-Andean mountains and valleys that get the most significant annual rainfall in the province. The eastern part is a vast plain of forests and hills that is less populated and receives moderate precipitation.

Figure 1: Annual precipitation in the Province of Salta



Source: Aguas del Norte, 2013

Aguas del Norte draws 400,000 m³ per day, of which 71% comes from groundwater sources (63% deep wells and 8% sub-fluvial) and 29% from surface water. Water quality is generally good, except for a problem of eutrophication (excess nutrients stimulating excessive algae growth) in some reservoirs a few years ago and periodic problems related to heavy metals, which are closely monitored by the utility. Supply is a challenge at the end of the dry season when the level of groundwater is critically low and the flow of surface water bodies decreases.

Aguas del Norte has been the provincial water and sanitation operator since 2009. It is owned by the provincial government (90%) and by employees of

the company (10%), and overseen by the provincial Ministry of Finance and Infrastructure. Two directors of the utility are directly appointed by the provincial government, and one represents the water workers' union. Aguas del Norte must comply with the national water regulations established by the regulatory agency ERAS (*Ente Reguladora de Agua y Saneamiento*).

While the provincial government has control over the utility, in practice Aguas del Norte has been operating relatively autonomously according to its Executive Director. In 2009, when the water utility returned to public hands after 11 years of private management (as Aguas de Salta, the private operator that replaced the public *Obras de la Nación* in 1998), the provincial government approved a five-year plan for public works and operations, which has guided the main decisions of the board of directors since. Decisions not justified under this plan must be endorsed by the provincial government and/or the national regulator, which has not represented an impediment yet. To some extent, however, the preparation of a new strategic plan for the next five-year period has given rise to political involvement, mostly on the sensitive issues of prioritisation of investments in network expansion and cost recovery through potential tariff hikes (so far the provincial government has been subsidising the utility to the level of 25-30% of its budget).

THE PARTNERS

Caesb

The *Companhia de Saneamento Ambiental do Distrito Federal*, located in Brasília, is a public company owned by the government of the Federal District, but operating under private law. Caesb has a concession contract with the national regulatory agency, and is financially autonomous. It generates its own income and does not need government support. The utility provides water and sanitation services to roughly 2.5 million users, with near universal coverage.

Internationally, Caesb is involved in a variety of projects. In 2008, the utility set up a strategic plan to develop technical cooperation internationally, guided by statutes approved internally. This strategy has resulted in a number of service contracts in Haiti, Nicaragua, and other Brazilian states such as Pernambuco and Amazonas, as well as not-for-profit technical cooperation through WOPs.

The motivations of Caesb to engage in WOPs are diverse, but foremost it seeks mutual benefits from technical exchanges with peer utilities. The utility considers that such collaboration should be not-for-profit and “not-for-loss” (recovering travel

expenses and staff time), and that there should be no competition between partners in order to allow for the open and transparent sharing of documentation. Caesb also sees WOPs as a way to motivate employees, especially younger staff.

Aguas del Norte

The public utility *Compañía Salteña de Agua y Saneamiento S.A.* supplies drinking water to more than one million people and provides sanitation to 800,000. Service coverage is rather high and in general the company and its 745 workers perform quite well. Most of Aguas del Norte performance indicators are on par with Latin American standards (see Table 1). Nonetheless, non-revenue water from commercial and technical losses remains high, mostly due to aging infrastructure. There is also limited public awareness on water conservation leading to soaring consumption patterns, and incentives to limit water use are few with a flat tariff structure and low rates of metered connections. As a consequence, the average water consumption in the city of Salta is one of the highest among Latin America cities (34 m³ on average per connection in 2013).

Table 1: Key performance indicators, Aguas del Norte

	2010	2011	2012	2013
Water				
Population served (water supply)	1,063,276	1,179,734	1,068,049	
Water supply coverage	95.00%	95.28%	96.46%	
Water supply connections	259,756	262,163	267,000	
Percentage of metered connections	20.24%	21.00%	21.73%	
Length of water supply network (in km)	3946	3996	4118	
Potable water produced per day (annual average in m ³)	601,782	605,808	619,718	
Sanitation				
Population served (sanitation)	755,720	891,014	821,797	
Sanitation connections	194,749	198,003	205,441	
Sanitation coverage	72.19%	71.96%	74.22%	
Length of sanitation network (in km)	2213	2289	2420	
Financial indicators				
Billing/collection ratio	0.908	0.924	0.920	
Annual turnover of the utility				US\$51 million
Average monthly customer bill				US\$11.70 (\$6.60 for water)

Source: Aguas del Norte, 2013

To access funding, the utility cooperates with administrative authorities. It must receive approval from the Ministry of the Economy before taking any loan or making other such investment decisions. About 25 to 30% of the utility's operational costs are covered by subsidies from the provincial government. The investment in infrastructure (new, upgrade and maintenance) mostly comes from the provincial government, amounting roughly to ARS 400 million annually (approximately US\$47million). One of the provincial funds available for infrastructure is the historical restoration fund (*Fondo de recuperación histórica*) coming from oil revenue. In addition, investment can be funded through the national water regulator, which takes on loans from international donors to finance infrastructure projects. While it was feared that financial reliance on public authorities would hinder long-term infrastructure planning, to the contrary, following the 2013 water cuts caused by severe drought, political authorities have prioritised water services according to the Executive Director of the utility. Since this water emergency was proclaimed, the province has made more funds available for water works to reinforce the resiliency of the service.

In taking part in this first WOP, Aguas del Norte wanted to benefit from the technical assistance the partner could provide. In addition, it was seen as

a way to encourage staff and to gain credibility vis-a-vis political authorities.

Facilitator: WOP-LAC

In 2007, the Inter-American Development Bank (IDB) launched a water and sanitation initiative with components on capacity-building and mutual support between water operators. When UN-Habitat introduced the Global Water Operators' Partnerships Alliance (GWOPA), the financial institution recognised common goals and decided to adopt the model.

The IDB, with collaboration from GWOPA, hosted the first WOP secretariat for Latin America and the Caribbean (WOP-LAC) for a period of five years, engaging as a complement to its core lending activity to member countries for infrastructure development. The bank perceived WOPs as another means of strengthening the water utilities they were already working with.

In the partnership between Aguas del Norte and Caesb, WOP-LAC played a key facilitator role. It not only brought parties to the table, but it also provided resources to launch the partnership through two exchange visits.

In 2012, after taking part in 12 such initiatives in the region, the IDB transferred the ownership of the WOP-LAC secretariat to the *Asociación Latinoamericana de Operadores de Agua y Saneamiento* (ALOAS) based in Argentina, where the secretariat now functions as a multi-stakeholder platform guided by a steering committee comprised of utilities in the region. IDB has recently bolstered the platform with a new round of funding for WOPs that will include continued support to the Aguas del Norte–Caesb partnership.



PARTNERSHIP DESIGN

Caesb and Aguas del Norte met for the first time during a water and sanitation workshop organised by the IDB and UN-Habitat in June 2009 in Medellín, Colombia. During the meeting the WOPs concept was presented and participants identified relative strengths and weaknesses of water operators in the LAC region.

As a result of this exercise, the WOP-LAC secretariat developed a matrix that linked the expertise and demands of water and sanitation operators for potential partnerships. Aguas del Norte received a proposal in August 2009 with possible mentoring utilities based on capacity and knowledge gaps they had identified in energy efficiency, unaccounted-for water and project management. The IDB offered the possibility to support and facilitate the formation of the partnership with a selected mentor, and Aguas del Norte decided to engage in a WOP focusing on energy efficiency. Caesb was selected as the mentor utility, a choice influenced by cultural and technical similarities between the utilities, comparable size but also initial positive interactions.

In the months leading up to that decision, IDB organised two other training workshops that allowed representatives from Caesb and Aguas del Norte to exchange on the topic of energy efficiency and

further strengthen their relations (in Costa Rica, October 2009, and in Argentina, December 2009). These preliminary contacts were crucial in building confidence and trust between the partners. The first memorandum of understanding signed in 2010 formalised IDB's commitment to providing funds to put the partnership on track.

Analysis of needs

The first years of the WOP were an exploratory phase. During two visits organised in 2010, the partners worked on an energy efficiency plan and broadened the collaboration to other departments by organising various presentations. Based on joint discussions, they assessed their strengths and weaknesses, resulting in the definition of four additional improvement tracks: metering, tariff schemes, IT systems and wastewater treatment. Visit reports illustrate how the process allowed the initial focus to shift toward these new areas of interests. Thus the first agreement was more general and gave the partners considerable flexibility to explore collaboration opportunities. Once new improvement tracks had been identified, a lack of funding delayed the launch of the implementation phase that only started in 2012.

The agreement: energy efficiency (2010–2012)

The first memorandum of understanding between Aguas del Norte and Caesb was signed for a duration of one year on April 19, 2010, with the IDB as main facilitator and funder. The IDB provided US\$17,195 to cover two capacity-building visits (one to Brasília and one to Salta). In addition, both partners committed to contributing staff time and local transportation during field visits.

According to this agreement, the primary objective of the partnership during this period was to support Aguas del Norte in developing its energy efficiency plan (e.g. including resource optimisation and autonomous energy production). The reduction and treatment of algae blooms in surface water sources as well as the disposal of wastewater treatment residue were also on the agenda.

The planned activities to achieve these objectives were limited to two trips of three days for five persons. The partners identified jointly a first set of topics to address during the visits in order to produce final reports and an action plan one month after the visits:

- Team work: interaction, responsibilities, ongoing projects, standard deadlines, etc.
- Energy audit: successful steps for implementation and financing
- Electromechanical systems: procedure for preventive maintenance
- Deep wells: building and maintenance
- High-performance pumping systems: technical versus real savings
- Distant monitoring: technology and human resources required
- Lighting: more efficient technologies
- Unaccounted-for water
- Operative units: automation
- Treatment of raw water with algae: new techniques, chemical products, etc.
- Wastewater treatment plants: disposal of final liquids and solids

A flexible governance structure was adopted for the partnership, and the special project advisor for Caesb was appointed as the general coordinator of the partnership. Partners committed to providing experienced staff to carry out planned activities. Apart from these elements, the memorandum of understanding reconfirmed their adherence to the GWOPA code-of-conduct and reiterated the

general guiding principles of the model such as inclusiveness, not-for-profit orientation, mutual benefits, transparency and solidarity, among others.

The agreement: metering, tariffs, IT systems, wastewater treatment (2012–2013)

The second memorandum of understanding signed between the parties built on previous activities, adjusting the scope of intervention and financing modalities, and detailing objectives, methodology, activities, resources, planning and deliverables. Based on the previous analysis of needs, four main improvement tracks were jointly identified for Aguas del Norte:

- Metering: analyse installation, maintenance and replacement strategies
- Tariffs: explore a new tariff scheme, based on metered service, to reduce water consumption and improve the utility's financial situation
- IT systems: identify and implement improvements for information management
- Wastewater treatment: assess the possibility to include anaerobic treatment in the new plant

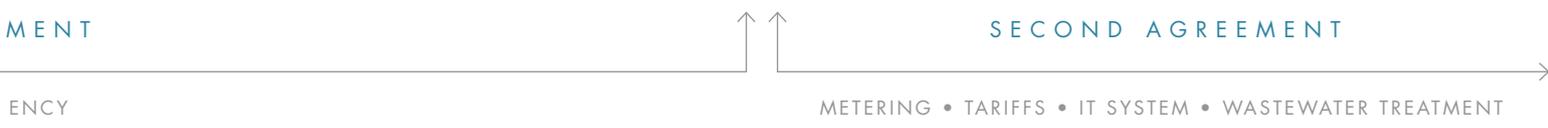
The partners allocated funds to conduct these activities, each to the amount of US\$7,510, adding up to half of the total budget of this phase. The other 50% was financed by remaining IDB funds via the new facilitator, ALOAS, for a total WOP budget of approximately US\$30,000 over 12 months. The budget covered three visits (two to Salta and one to Brasília).

The timeline indicates the key steps in the development and implementation of the WOP (see Figure 3). The gap during 2011 and 2012 was due to a lack of funds to finance partnership activities until ALOAS took over the WOP-LAC secretariat. However, during this period partners informally kept contact by exchanging information on specific themes related to utility operations and management. Toward the end of 2013, partnership activities resumed.

Timeline

This timeline is not exhaustive, but highlights some key events in the WOP.





PARTNERSHIP IMPLEMENTATION

The management of the partnership has been based on trust and mutual understanding. Even though the two agreements helped formalise the relationship, interaction between partners has been mainly informal and guided by their respective needs and availability. As the number of topics grew over time, the management of the partnership extended from two designated WOP managers to involve more staff, with an emphasis on peer-to-peer exchanges. This was facilitated by the flexibility of the first agreement, which allowed original objectives to be adapted to respond to the most pressing challenges.

Since the beginning of the partnership in 2010, the partners have worked on five main thematic improvement tracks. Track 1 corresponds to the development and implementation of an energy efficiency plan at Aguas del Norte as initially planned. Tracks 2 to 5 concern metering, tariff schemes, IT systems and wastewater treatment, as per the second agreement. These improvement tracks are interrelated and cover different departments of the utilities.

Improvement track 1: Energy efficiency

Guided by Caesb's experience, the special project manager at Aguas del Norte mapped out an energy efficiency plan to be improved throughout the WOP. In July 2010, three managers from Aguas del Norte (special project; operations; and quality) travelled to Brasília. This exploratory exchange visit was part of the first activity stated in the memorandum of understanding. Together with Caesb professionals, they looked at:

- Institutional indicators, structure and operating systems
- Strategic planning, regulation and tariffs
- Laboratory tests and meter calibration bench
- Removal of algae and final treatment at the automated drinking water plant
- Strategies for the recovery of Paranoa Lake and new water abstraction projects
- Deep well systems
- Automation and remote monitoring of processes and installations
- Maintenance program of operating units

- Sludge treatment, final disposal and biogas capture at the automatic wastewater treatment plant of Gama

As a result of their exchanges, the partners jointly identified collaboration opportunities and specific interventions to reduce energy consumption at the mentee utility. Caesb considered it was essential to implement a ‘massive meter installation plan’, not only to better control processes, but also to identify possible improvements for greater energy efficiency. Mentor experts also recommended introducing new technologies for process automation. Following this first visit to Brasília, partners highlighted the following areas of interest to which they attached a list of expected outputs and people in charge:

- Administration and contracts: energy consumption control and adequate energy billing
- Automation and remote monitoring of installations: analysis of the experience of Caesb in the implementation of such devices and search for funds
- Flow metering: analysis of the experience of Caesb in the implementation of such devices and identification of a pilot neighbourhood in Salta, as well as search for funds
- Sub-metering: preliminary analysis and development of a program to increase the number of metered connections and assess the impact on consumption and billing

- Tariff scheme: development of a proposal for restructuring the tariff structure, assessing the impacts on utility incomes
- Unaccounted-for water: exchange on the detection and reduction of water losses

Even from the first visit, it was clear that the energy efficiency improvement track would also touch upon other topics such as metering and tariffs. These issues would be addressed more in-depth in separate improvement tracks in the later implementation phase of the partnership. Other topics were temporarily dropped due to limited resources.

Since then, Aguas del Norte has implemented the energy efficiency plan with close monitoring by Caesb, achieving concrete results without any additional funding. The key results are:

- Improved stock management and integration of new technology: bi-annual procurement process for roughly \$US800,000 to acquire switch boards (25-50 per year) and pumps.
- Implementation of speed variation pumping for wastewater in three plants.
- Implementation of automation pilot and Supervisory Control and Data Acquisition (SCADA) system, as well as surveillance, alarms and remote control.

- Renegotiation of 450 contracts with energy supply utilities to reduce penalties or costs and adapt tariffs leading to more than US\$100,000 in savings.

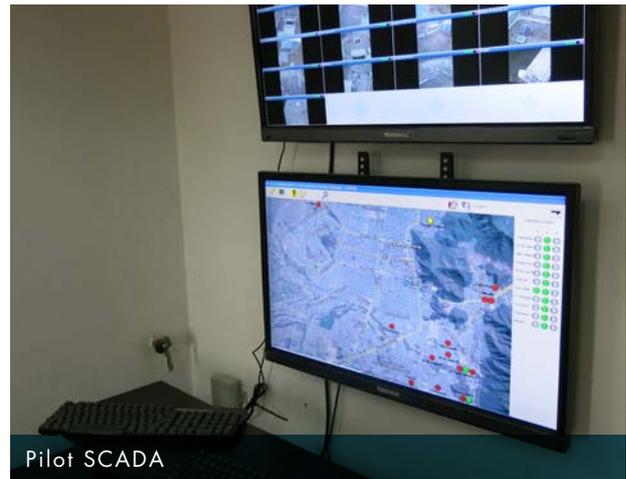
Aguas del Norte is hoping to save large amounts of energy by using more appropriate and modern equipment. In 2014, Aguas del Norte continued to build internal capacity on energy efficiency and improvement of operational processes. In August, staff took part in a capacity building workshop on well and sewage pumping telemetry, organised by the *Empresa de Obras Sanitarias* from the city of Mar del Plata. Finally, Aguas del Norte is planning a workshop on energy efficiency for the northern provinces of Argentina. Caesb was planning to also attend this workshop to share its expertise on this theme.



New switchboards



New pumps



Pilot SCADA

Improvement track 2: Metering

Aguas del Norte has a low metering rate (20%), which Caesb strongly recommended increasing in order to reach the objectives of improvement track 1 on energy efficiency because better control and monitoring of water supply and sanitation processes lead to energy gains. The combination of low metering and flat tariffs results in high consumption patterns, in turn creating a fragile financial situation for the utility. This gap was identified during the visits conducted in 2010, involving the Business Manager at Aguas del Norte and staff of the metering department. Based on this assessment, the partners decided to deal with the issue under a separate improvement track, which became part of the second memorandum of understanding.

The objectives for this track are to analyse strategies and processes of installation, maintenance and replacement of meters, based on Caesb's experience with:

- Life-cycle analysis and replacement needs
- Quality of the material and performance curves
- Commercial losses
- Sub-metering efficiency
- New technologies and instruments

To achieve these objectives, the partners agreed to develop a strategy for knowledge transfer. The activities involved gathering preliminary data, conducting a site visit to Caesb, preparing a joint report and proposal via email, visiting Aguas del Norte to present the initial plan to the board of directors, and following up on energy management activities and new projects. In addition, informal activities on the metering theme, consisting of remote consultation and information exchanges started in 2010.

Based on the two visits carried out for the interrelated improvements tracks 2 and 3 (see [Box 1](#)), the partners established the need for Aguas del Norte to develop and implement a feasible meter installation plan, and to translate it into work plans for the different sections of the Business Department at Aguas del Norte.

The visits led to a number of key findings. First, the service locations are scattered around the Province of Salta, which required adapting the metering plan by locality as they differ significantly. Second, the partners realised that low metering rates combined with flat tariffs lead to over-consumption, but they needed to complete more consumption profiles in each area in the province to obtain a full picture. Finally, the diagnostics showed the strong need for political and legal support, in addition to customer awareness campaigns, to address resistance of the population to the introduction of a metered system.

The resulting work plan defined general objectives, resources and deadlines for a set of additional activities. These were to:

- Conduct a statistical analysis to understand consumption profiles.
- Generate and apply metering standards to help determine the types of meters to use based on the characteristics of the system (supply system, water quality, criteria for installation in different zones, etc).
- Analyse current meters and improve the existing performance index, including through use of a new meter calibration bench to test efficiency and wear, and to adapt procurement accordingly.
- Estimate the budget needed to implement the meter installation plan in the province.
- Specify and implement a meter management system for monitoring and control of meter data, analysis of material life cycle and necessary replacement, quality of material and performance curve, reduction of commercial losses, efficiency of sub-metering, new technology, installation of metering laboratory and training plan.
- Define zones to start meter installation, prioritised in relation to service problems.
- Establish a plan for macro-metering jointly with the implementation of the sub-metering plan in pilot

areas, and then develop a plan for loss control based on the balance between macro- and sub-metering.

- Evaluate the possibility to bill all services related to metered uses, with the objective of increasing user responsibility and ownership of meter maintenance and care.
- Plan periodic technical trainings, focusing on business and operational areas.

The activities related to this second implementation phase of the WOP were officially started at the end of 2013. Consequently, it is still early to evaluate outcomes. The implementation of the former list of tasks is expected to unfold over the medium and long term, starting in 2014.

Two concrete results have nevertheless emerged already. First, a new public tender for meter reading launched in December 2013 demonstrated improvements made on outsourced contracts and public tendering processes based on the standards used by Caesb to improve legal recourse in case of non-compliance with the contract. Second, a new codification system was put in place to identify meters based on year and diameter in order to avoid reading duplication. Aguas del Norte chose San Lorenzo as a pilot area in which to assess the water balance. They have installed three

electromagnetic bulk meters (four more pending) in this area with domestic meters already installed.

The initial assessment puts unaccounted-for water at over 50%. A positive and encouraging aspect of the metering activity is the coordination and commitment of different units of the utility in working to achieve this common objective.



Visit to the Meter Calibration bench at the Alto Molino water supply plant in Salta



Visit to the Meter Calibration bench at the Alto Molino water supply plant in Salta



Visit to the Meter Calibration bench at the Alto Molino water supply plant in Salta

Box 1: Visits for improvement tracks 2 (Metering) and 3 (Tariff Scheme)

November 11 to 15, 2013

The first visit took place in Brasília. The Business manager of Aguas del Norte travelled with two other employees to address the interrelated improvement tracks 2 and 3. The partners examined:

- Tariff models: evaluation of sub-metering system and tariff model used in Brasília; simulation applying same tariffs pattern in Salta.
- Administration of meters fleet: maintenance of installed meters; information system; procedures; equipment; costs; performance curve; meter reading; addressing frauds; statistics.
- Analysis of the state of meters (metrology): efficiency in metering; lifespan; systematic replacement plan; evaluation of consumption profiles; new technologies; sub-metering laboratories.
- General commercial management: call centre; complaint administration system; technical claims.
- Technical management: commercial/technical GIS; SCADA for automation and monitoring.

November 18 to 22, 2013

For the second visit, the Metering Manager from Caesb went to Salta. Aguas del Norte proposed the following schedule:

- Visit of the water meter calibration bench in Alto Molino plant with the Sub-metering Manager.
- Meeting with the Sub-metering Department about: consumption profiles, results of data logger installed, specification and ideal capacity of meters to be installed in Salta, life cycle analysis of installed meters and replacement plan, meter quality and performance curves, and test results from the regulatory agency.
- Visits to water meter installations
- Visit to the Land Registration Department to discuss metered connection complaints, work order, verification of meter functioning, detection of internal leaks, and updating of billing parameters.
- Visit to the Frauds and Unaccounted-for Water Department to look at analysis and control of low consumption, commercial losses, frauds, control of high consumption and customer notification.
- Visit to the Operations Development Department to discuss flow metering, and analysis of capacity and flows of supply systems.
- Meeting with the Billing Department to see sectors, routes and processes for meter reading, monitoring and controlling metering data, as well as to evaluate the sub-metering tariff system in Salta.
- Final meeting to discuss recommendations by Caesb based on a discussion of the sub-metering system and tariff model used in Brasília (99% metered connections), consumer profiles and criteria used, specification and determination of budget needed for procurement and installation of sub-meters for all active connections of Aguas del Norte.

Improvement track 3: Tariff scheme

The improvement track on tariffs is closely connected with the track on metering, and involves the same departments. The current flat water rate applied by Aguas del Norte to nearly 80% of its users considers variables such as property area, built area and number of sources (tap, toilets, etc). However, it impedes the efficient implementation of a metered system.

The need to deal with the tariff structure became clear during the exploratory phase of the WOP in 2010, when Caesb strongly recommended to Aguas del Norte that it reconsider the tariff model to reduce water consumption and adopt increasing block tariffs to avoid penalising small users.

Hence, the objectives of this track are to elaborate a new tariff scheme based on sub-metering to provide incentives for reduced water consumption and allow Aguas del Norte to improve its financial sustainability, without neglecting the basic needs of the most vulnerable populations. The expected outputs for this track are to test the idea of metering coverage, and to simulate the impacts it would have on utility incomes.

To reach these objectives, the partners decided to adapt and fine-tune the tariff scheme used in Brasília for its application to the Salta context. A simple replication of the model would be politically impossible according to the Business Manager of Aguas del Norte, given that tariffs in Brasília are much higher than in Salta. The partners shared internal data through WOP activities, including full details on consumption patterns for metered and non-metered connections, the calculation methodology for current tariffs (e.g. subsidies to low-income areas, industry, etc) and other relevant data. The first knowledge-sharing visit to Caesb installations was followed by a visit to Aguas del Norte where the initial results of the project were presented. The topics addressed during both visits are summarised in [Box 1](#).

Caesb practices greatly inspired the staff of Aguas del Norte, giving them a new perspective on water services management. For instance, one result is that Aguas del Norte decided to adapt a billing method widely used in Brasília: the so-called “read-and-bill” system, which consists of printing the bill immediately after reading the meter. This method saves resources and time, and could increase the billing/collection ratio without major investments. This solution was to be tested in a specific area (a neighbourhood called Huaico) at the beginning of 2014 to assess its feasibility in the context of Salta.

However, due to an electoral campaign in progress, water tariff changes are not likely to happen before the end of 2015.

The new tariff model is still under development. Caesb is currently working from Brasília on different simulation scenarios based on all the data provided by Aguas del Norte. Aguas del Norte is now adapting the tariff model of Caesb to the local context and working on its own simulations for validation. Once a full tariff scheme proposal is developed, Aguas del Norte will present it to the provincial government for approval. The fact that this plan is being developed in close cooperation with another experienced water company will lend it even more credibility.

Work plans to continue advancing this improvement track have been established within each section of the business department. The next step will be to implement these plans. All the employees interviewed showed strong motivation and a willingness to translate objectives into concrete actions and results. The Business Manager appeared confident about expected outcomes.

Improvement track 4: IT and GIS systems

The objective of improvement track 4 is to share experiences between the partners' Information Technology (IT) departments in order to identify possible improvements for information management systems. The methodology consists of an evaluation of existing information systems, the identification of areas of interests and the development of solutions, through technical presentations on their respective systems and technical trainings to incorporate new technology.

Planned activities were a visit to Salta and a visit to Brasília to gain an understanding of existing systems, the preparation of a report on mutual areas of interests, the identification of training needs, the production of final reports and the possible organisation of workshops to present results ([see visit agendas in Box 2](#)).

Together, the two planned visits produced an analysis of the IT and geographical information system (GIS) systems of Aguas del Norte. The partners jointly elaborated a work plan and a set of recommendations for the mentee. However, the Aguas del Norte IT team also provided useful inputs for counterparts in Caesb who were very interested to learn about the ways in which the mentee was managing to accomplish so much with limited resources.

Box 2: Visits for improvement track 4

September 22 to 28, 2013

Two engineers from Caesb visited Aguas del Norte's IT team led two visiting Caesb engineers to examine its approaches to:

- GIS to map water and sanitation networks and integrate data analysis with other information systems (commercial, financial, operational)
- Operational units land register to produce reports (operational indicators, costs, energy) and remote control
- Operational management controlled by IT systems
- Forthcoming plan for IT: geo-processing, control of water and sanitation operational systems, maintenance of operational units, service control, and strategies for their development

November 11 to 15, 2013

The IT Manager and the IT Development Head from Aguas del Norte went to Brasília to work based on the agenda established by Caesb, to explore its:

- IT management systems for support in administrative and operational management (methodology, work flows and teams, trainings)
- GIS systems (methodology, software, development and maintenance, integration with other systems, trainings)
- SCADA system (technology, evaluated variables, integration with other systems, data produced)
- Integral control framework (methodology, software, development and maintenance)
- IT infrastructure and organisation of IT area (hardware, software, telecommunication, security, helpdesk)

Improvement track 5: Wastewater treatment

The objective of this last improvement track is to assess the possibility of including upflow anaerobic sludge blanket (UASB) technology in the wastewater treatment plant located south of the city of Salta. The main expected output was a feasibility and viability study including preliminary redesign, budget, investment, operations and maintenance. To do so, the partners committed to exchanging all relevant operational and financial information related to the current and expected characteristics of the wastewater treatment plant.

The following activities were planned: preliminary data gathering, training in Brasília, redesign of the plant and determination of preliminary costs, and a visit to Salta to present the project to the board of directors. This track started recently and few formal activities have so far taken place. However, the counterparts have been working informally on the topic since the first agreement. In fact, the Operations Manager at Aguas del Norte took part in the first trip to Brasília in 2010 where he was able to discuss sanitation technology with the Special Project Manager at Caesb who introduced the idea of incorporating UASB reactor technology at the mentee's wastewater treatment plant. Requiring less space than traditional sanitation technology, it could

allow Aguas del Norte to overcome space limitations and expropriation difficulties linked to building a new treatment plant. Caesb recommended optimising the use of the existing plant south of the city of Salta (built in 1981) before any extension or construction of a new site, a suggestion that Aguas del Norte decided to follow. The restructuring of this plant, as informed by these informal exchanges, was done using provincial funding of ARS 15 million (approximately US\$2.6 million) and finalised by the end of 2013. During the optimisation works, Aguas del Norte frequently consulted experts from Caesb for their inputs on installation, utilisation and maintenance of pump technology. By the end of 2014, Aguas del Norte was finalising the SCADA system (for the sludge lift and repumping station) and replacing pumps with more powerful ones to reduce clogging problems. In addition, the project to expand the facility was accepted, and the board of directors, together with the provincial government, is now seeking the needed investment.

Further national investment of ARS 10-15 million (approximately US\$1.8-2.7 million) had been earmarked to build a new wastewater treatment plant with capacity for 3,000 households (roughly 11,000 people). However, by October 2014, the project had not yet reached financial closure. Aguas del Norte remains in touch with Caesb concerning the building plans, even if it is not a formal objective of this track.



A secondary clarifier at the rehabilitated wastewater treatment plant south of Salta



Aguas del Norte's WOP participants stop for a photo during a tour of the upgraded plant



New pumps installed during the renovation work at the wastewater treatment plant

CROSS-CUTTING THEMES

During the WOP process, the partners identified two emerging cross-cutting topics that needed to be addressed to support and sustain achievements made in other improvement tracks: the enforcement of legislation and an awareness campaign. On the one hand, Aguas del Norte's metering plan and new pricing system requires adapting laws and regulations to ensure compliance. The legal and commercial departments of Aguas del Norte would need to elaborate and propose legislation to the regulatory agency in order to create enforcement tools such as fines or service cut-offs where absolutely necessary. The Head of Billing at Aguas del Norte is examining the legislation in use in Brasília for these situations to move this theme along.

Furthermore, the implementation of new metering and tariff systems requires a thorough awareness campaign directed at consumers to overcome their resistance to change. The institutional department responsible for public relations planned a campaign in 2014 to educate people on the benefits of using meters and block tariffs, and to raise awareness on the equity, financial and water conservation objectives of this new billing system.



OUTCOMES

The partners consider that their collaboration has been successful and that they achieved the expected objectives their first agreement, notably the development of an energy efficiency plan.

The implementation of the second agreement is still ongoing, but it appears to be progressing well and the targeted results are likely to soon be achieved on IT systems and wastewater treatment (see preliminary results in Table 2). However, the recommendations in relation to metering and tariffs might be difficult to implement due to political and financial impediments.

This WOP has focused on knowledge sharing and organisational improvements, rather than aiming to make a direct impact on key performance indicators. This has enabled important changes in strategic organisation and planning, procedures and contracts, and working methods within targeted areas, and will certainly improve performance indicators in the near future.

The total cost of this WOP was US\$47,195. The first phase was financed by the IDB, while the second phase was equally funded by both partners through in-kind contributions, with the support of the WOP-LAC secretariat. Even though the quantity and

intensity of activities was limited, the partnership has produced positive results for the mentee utility. This case suggests that short-term WOPs can be fruitful.

Next steps

WOP-LAC is extending funding to pursue this partnership through its technical cooperation with IDB. It should be effective by the beginning of 2015. Furthermore, Aguas del Norte is initiating a national partnership with another Argentinian utility called *Aguas Santafesinas*. Based on the successful experience of knowledge sharing with Caesb, Aguas del Norte is planning to conduct this new WOP through direct exchanges of the concerned staff in each utility. The WOP will address eight thematic areas. Such a partnership might be more cost-effective, but since the utilities are quite similar the potential to share knowledge and improve may also be more limited.

Table 2: Objectives, activities and preliminary results for each improvement track

Date	Improvement track	Objective
2010 – 2012	Energy efficiency	Develop and implement an energy efficiency plan at Aguas del Norte.
2012 – ongoing	Metering	Develop and implement a feasible meter installation plan to contribute to energy efficiency.
	Tariffs	Elaborate a new tariff scheme based on submetering to reduce water consumption and improve mentee financial sustainability.
	Wastewater treatment	Assess the possible introduction of anaerobic treatment technology unit for the wastewater treatment plant to help maximise space.
	IT Systems	Identify possible improvements for information management systems to optimise operations and inter-departmental data integration.

Activities	Preliminary results
<p>Exploratory exchange visit to review mentee institutional indicators, structure and operative systems, and mentor technology (sub-metering, calibration bench, deep well systems, automation and remote monitoring of operations and sludge treatment).</p>	<p>Improved stock management and integration of new technology including speed variation pumping for wastewater in three plants, automation pilot system (SCADA) and remote control.</p> <p>Renegotiation of 450 energy supply contracts to reduce penalties/costs and adapt tariffs leading to more than US\$100,000 in savings.</p>
<p>Two visits for preliminary data gathering.</p> <p>Preparation of a joint report.</p> <p>Presentation of the initial plan to the board of directors.</p>	<p>New codification system put in place to identify meters based on year and diameter in order to avoid reading duplication.</p> <p>New public tender for meter reading launched December 2013 demonstrated improvements on outsourced contracts and tender processes based on the standards used by Caesb (better legal recourse in case of non-compliance with contract).</p>
<p>Two visits to learn about mentor tariff methodology.</p> <p>Adapt and fine-tune the tariff scheme used in Brasília for its application to the Salta context.</p> <p>Test the hypothesis of full metering coverage and simulate the impacts it would have on utility incomes.</p>	<p>Aguas del Norte adapted the 'read-and-bill' method widely used in Brasília to save time and increase the billing/collection ratio; it was tested in the Huaico neighbourhood to assess its feasibility.</p> <p>Work plans to implement a new tariff structure are in place in different sections of the Business Department at Aguas del Norte.</p>
<p>Data gathering visit.</p> <p>Feasibility and viability study including preliminary redesign, budget, investment, operation and maintenance.</p> <p>Presentation of project to mentee board of directors.</p>	<p>Optimisation of old treatment plant supported by informal discussions with Caesb (e.g. installation, utilisation and maintenance of new pump technology).</p>
<p>Two visits to gain an understanding of existing systems.</p> <p>Preparation of a report on mutual areas of interests.</p> <p>Identification of training needs.</p>	<p>Assessment of the IT and GIS systems of Aguas del Norte completed.</p> <p>Partners jointly elaborated a work plan and a set of recommendations for the mentee.</p>

SUCCESS FACTORS

Analysis of needs

Water operators and facilitators of WOPs frequently argue for the need to have a structured agreement with clear targets from the outset to achieve planned outcomes. However, this WOP pursued a different route and its first phase was more exploratory in nature. Initial exchange visits and informal discussions identified the most urgent gaps to address. The joint analysis of needs later informed the partners' decision to extend the scope of the collaboration with a second, more targeted agreement. This two-staged approach, in which the first phase is purposely broad and oriented toward achieving a thorough assessment, and the second is more focused and concrete, may be more effective when the emphasis of the WOP is on knowledge sharing rather than on achieving rapid performance improvement. This type of arrangement is very likely to improve performance over the long term, however it is more time-consuming, requiring understanding and trust between the partners to grow in the early stages of the partnership.

Governance mechanisms

This WOP highlights the importance and complementarity of formal and informal mechanisms. While the first memorandum of understanding provided a simple framework for cooperation, allowing for more informal interactions and for room to adapt objectives, the second identified particular activities, resources and targets. The formal governance mechanisms of the WOP found in the two official agreements were key to accessing external funding from an international agency, to secure an initial commitment from the parties involved, and to establish a broad framework to guide the process.

Similar experiences and technologies

In this case, the similarities between partners in terms of their organisational structures, service coverage and technologies used, rendered exchange of information and experience effective. Noteworthy is the fact that a few years ago Caesb went through the challenges that Aguas del Norte is facing today, addressing them with low-cost technological solutions and new working methods. Lessons learned

from this experience have saved Aguas del Norte significant time and money.

Common technologies used by WOP partners also permitted genuine two-way information exchange, benefiting the mentor as well as the mentee. WOP-LAC sees a limited gap in expertise between the WOP partners as an advantage. Support from a Northern utility with a wider experience gap may lead to less appropriate or readily adaptable responses to a utility's challenges, or underestimate the capacity development required to adopt them. However, for WOPs that focus less on knowledge and technology transfer, such similarities may not be as important.

Geographical proximity

The fact that the partners are relatively close by geographically helps “optimise the use of funds” according to the Secretary of the WOP-LAC platform at ALOAS.

Proximity emerges as a significant advantage of South-South WOPs. The WOP-LAC secretariat is considering further promoting national partnerships with a focus on small to medium-size recipient utilities. First, it would be a way to use available funds efficiently, as travel costs are limited. Second, national partners are more aware of the local



realities and culture. In that way, national WOPs have the potential to be more sustainable.

Mutual benefits

Caesb initially engaged in the WOP as part of its social responsibility strategy and because it saw the partnership as contributing to the goal of extending the utility's international network. Aguas del Norte, for its part, was seeking low-cost technical assistance and hoping to get easier access to funds. But as the WOP evolved, both realised the numerous other potential benefits of cooperation. As such, their rationales for continuing the partnership have changed and somewhat converged. Both partners see the WOP as a vehicle to motivate staff, to retain young employees and reward experienced ones. When staff from the utilities present their work and exchange ideas, they gain confidence in their skills. Similarly, according to the Executive Director of Aguas del Norte, it helped staff see that finances were not the only obstacle to improvement: "The staff can see that it is possible to control the whole water cycle effectively with existing human and material resources." Peer-to-peer exchanges about experiences and lessons learned saved time and money for both utilities. The mutual benefits were particularly clear for the IT departments in this case. An interesting aspect of this WOP is that it encouraged cooperation between different

departments within the utilities themselves because the issues that surfaced as part of partnership discussions highlighted the need to involve a cross-section of experts to address them. For example, in Aguas del Norte, the business department now seeks to coordinate its actions with the legal and communications departments to successfully introduce a new tariff structure. In Caesb, the IT department is now trying to better integrate its information management system with other departments in the utility to make efficiency gains.

Catalyser and leverage

If Aguas del Norte was well aware of necessary changes to improve performance, Caesb's experience with similar challenges in the past stimulated and facilitated the actual implementation of changes within the mentee utility. It has also been a way for Aguas del Norte to strengthen its bargaining position with political and regulatory authorities. When it comes to a sensitive issue such as tariff adjustments, the backing of a renowned mentor utility is a considerable asset, providing leverage to the mentee in its political dealings.

WHAT THE PARTNERS SAY

“All WOPs should be like this: funders only enable and trigger the partnership.”

Corinne Cathala, Senior Water and Sanitation Specialist in the Water and Sanitation division of the Inter-American Development Bank.

“We were looking for technical assistance and we found friends.”

Normando Flemming, Director of Aguas del Norte.

“It is extremely valuable to learn from others’ mistakes.”

Juan Bonifacio, Operations Manager at Aguas del Norte.

“The WOP was very productive. We realised that we act day by day, when Caesb has everything planned in advance. It has been an eye-opener for us and we will benefit from this experience.”

Cristian Leguizamón, Head of commercial department at Aguas del Norte.

“The WOP is very useful. It confirms that we are going in the right direction. It also gives us a boost to pursue our work.”

Angel Diaz, Head of Land Tenure department at Aguas del Norte.

“In the end, the process is more important than the results... knowing another reality and culture, and sharing working methods are more valuable than tangible results.”

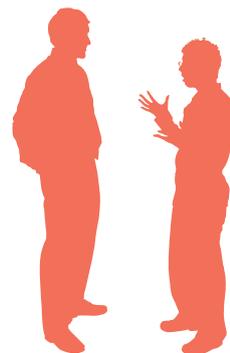
Klaus Neder, Special Project Manager at Caesb.

“We had no problem sharing information, and to discuss our problems and how to solve them. It was easy and natural to build trust between us.”

Nilce Sila, Metering Manager at Caesb.

“The WOP is very important for our company because we learn other processes, working methods, ways to save money... And for us, it is very nice to be able to talk about our work, to share how we are growing, to help other utilities. I’d like to repeat this type of experience.”

Wildener Rodovalho, IT Project Leader at Caesb.





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