

AquaFed

THE INTERNATIONAL FEDERATION OF
PRIVATE WATER OPERATORS

Private operators
delivering performance
for water-users
and public authorities



Examples from across the world
2nd edition

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AquaFed, The International Federation of Private Water Operators

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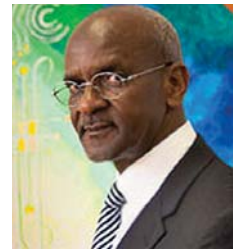
March 2015

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Preface to the second edition

By Mamadou Dia, President



The first edition of this brochure was produced at the Sixth World Water Forum in 2012. It has proved to be very popular and useful to those people interested in water services development. Since its original publication, it has been translated into French and Spanish and distributed widely. It has been made available on the AquaFed website and frequently downloaded from there. The case studies have also been linked to an interactive map on the website making each one accessible individually.

Given this success and the clear need for many people to have better information about what private water operators do, we have taken the opportunity to update the document for the Seventh Forum. This second edition brings the case studies up-to-date with the latest data available. It also extends the number of case studies that are included. It shows a sample of the achievements of private operators in supporting the public authorities that engage them.

Since 2012, the need for, and interest in, the private sector option has continued to grow. This means that the original purpose of the brochure: to explain what private water operators can do and give evidence of their performance is as important as ever.

In many parts of both the developed and the developing world, the backlog of underserved people, irregular or poorly performing services and the decline in existing public infrastructure continues to place a burden on the public authorities that have the responsibility to organise and control water and sanitation provision. At the same time the expectations that water users and the general public place on private water operators has also increased. The partnership contracts between public authorities and their private operators have to evolve to adopt to these changes. This requires both parties to work together to find appropriate outcomes. In the vast majority of cases they are able to do this successfully. Almost all the examples show that this has been achieved, even though a few have had to face difficulties. In most of these, careful negotiations between the parties have overcome the differences and the difficulties have been resolved. In the few exceptions where this is not possible, all parties have lost out and the service has suffered¹.

The richness of the case studies, their wide range of scope and of contract types shows clearly the diverse ways that private water operators contribute to meeting the objectives of responsible public authorities. It demonstrates the usefulness of the private sector option and the diversity of solutions it offers.

¹ For various reasons it has not been possible to publish updated versions of the cases of Jakarta, Latur and Uganda for this edition

Introduction

2.1. Objectives of this brochure

Most water-users need drinking water and sanitation services to be organised for them by public authorities. These services must be of good quality, reliable and cost-optimised to suit both consumers' and authorities' needs. Hiring a private company to deliver all or part of them is among the options that these authorities can choose. This brochure illustrates the many achievements that can be obtained by using the capacity of private professionals in the delivery of public water and sanitation services.

Public services that perform well are those that are able to deliver good results simultaneously for many different dimensions. For example, improving access to drinking water and improving the level of service to the population are equally as important as managing the utility in an efficient way.

This brochure collates a wide sample of field cases of private management of water or sanitation services. These illustrate the good results that are obtained, by public authorities who have engaged private operators, for all the most significant dimensions. Each case describes outstanding results achieved on several of these essential dimensions. The cases come from all around the world and illustrate the wide diversity of sizes of private companies.

This sample of cases does not present an exhaustive view of the performance of all private water operators that are members of AquaFed. Nor are all private operators able to perform as well as those examined here. However, these cases clearly illustrate that in appropriate conditions public authorities and water-users are able to obtain very high service performance from private operators. There are many other examples with similar results.

2.2. Introducing Private Water Operators and AquaFed

AquaFed, the International Federation of Private Water Operators, represents private companies that deliver water supply or sanitation services under the direction of public authorities.

Members of the Federation are water services providers of all sizes, operating in around 40 countries, as both locally or internationally owned businesses. The members of the Federation serve the majority of those people who get water from private companies that are mandated and regulated by governments. Some supply water and sanitation daily to a few thousand people, others to hundreds of thousands and others to millions or even tens of millions of people². AquaFed's members' business is to be the operators of public services entrusted to them by governments (central government, local government, water authority) through public-private partnership contracts or licenses to supply drinking water and to provide sanitation services to their populations. They do it as instructed by public authorities and under their control.

In this way these private operators are used by public authorities as tools to implement their water policies.

2.3. Private operation: a management option for delivering good performance

2.3.1. An option to be considered

Public authorities that have the responsibility to ensure the delivery of water supply or sanitation services to the population and other water-users have several options they can choose for organising the operational management of these services. They either manage the service themselves with their own operator (internal management), they entrust an external operator

² See ref. 15

or they organise a joint-venture with an external operator. External operators can be public bodies or private companies. All these options can deliver excellent results depending on the circumstances. In the case of external operators, public or private, success factors are mainly the capacity of the operator, the quality of public policy, sustained political support and above all, the good organisation of the relationship between the authority and its operator(s).

2.3.2. Private operators are change agents

To achieve their water policy outcomes, public authorities need to identify their goals, mobilise appropriate means and charge their operator(s) with appropriate operational targets. In the case of private operators these targets are imposed through a public-partnership contract (PPP) or an operating license and the corresponding regulations. These targets are usually measurable and time-bound. They will almost certainly evolve over time. When initial targets are achieved or objectives change, new targets can be fixed by the authority.

Regulated private operators are change agents that are used to create improvements in the quality and the efficiency of the service delivered. They cannot be held responsible for the situation of the service at the beginning of their contract or license. They are not a substitute for the public authority. Their responsibility is to achieve progress between the situation at the start of their engagement and the current status of quality and efficiency of the service.

This is where the performance of operators lies. It is in their ability to manage change effectively and improve the performance of the service delivered. The cases presented in this brochure describe improvements achieved over a specific period of time and not situations at a given date.

2.3.3. Legal arrangements that control public water services

All private sector involvement in public water services is controlled by one or more public bodies through formal legal arrangements. In the majority of cases the principal agreement is a time bound performance contract. These contracts set out the relationship, requirements and responsibilities between the contract principal (the public authority) and the contractor. Key elements of these contracts are the scope of the work to be carried out, key performance indicators, penalties for non-performance and the contractor's remuneration. The duration of the contract is specified and so are the grounds for extending or terminating it. The length of contract can be as short as 3 years and they rarely extend beyond 15 years. It is therefore perfectly normal for contracts to come to an end. A completed contract can be followed by a new one with different objectives if the public authority decides to do this. Creating a new contract gives the authority the opportunity to introduce competition and test that it is getting value for money.

2.3.4. Organising the road to performance

Performance in the delivery of water or sanitation services requires skills and the appropriate means, including legal, financial and operational capacities. It also requires mutual understanding between the public authority and the operator. The latter cannot invent the goals that will satisfy the authority. These goals have to be formalised in the contract or license. Usually, performance against these goals is monitored through performance indicators that are used to measure progress and contractual compliance.

Performance indicators can be very diverse. Some relate to the internal functioning and efficiency of the water utility or its cost-effectiveness. Others concern the service delivered to users, its impact on the environment or its relationship with stakeholders. The indicators are controlled by the public authority and show its priorities. They can vary over time since progress achieved in one direction can permit subsequent progress in other directions.

2.3.5. Common misconceptions about private water operators – “The Lamp Post Syndrome”

Many misconceptions circulate about the work of Private Water Operators. Private water operators mandated, regulated and controlled by public authorities through licenses or public-private partnership contracts (PPP) are far less numerous than public utilities. Private operation provides water services to less than 10% of the global population today compared to about 50% that is served by public operators and 40% who have no formal service whatever. In spite of this small participation, private operations are more visible than other options because of the concentration of commentary on them. AquaFed refers to this as “The lamp post syndrome”.

Because the work of regulated private operators is formalised, and made transparent by monitoring and reporting, knowledge of their action is far more developed in academic or official reports than knowledge of the action of informal operators, NGOs or even public operators. Contracts and licenses provide for strict monitoring, detailed regular reporting, public information and formally debated political decisions. This is not usually the case for the other types of operators. In addition public scrutiny is higher on private operators than on public ones and expectations are higher. As a consequence, the level of knowledge of the work of private water operators is far more extensive than knowledge of any other type of water provider. This increased basic knowledge creates a cumulative effect. The number of research papers on private operators is greatly out of proportion to their position in the water and sanitation services sector.

The most important issues are not necessarily where there is the most light. The risk of the “lamp-post syndrome” is the risk of looking at the problems of only the minority of cases where they are most visible or most documented and to miss the majority of cases where the magnitude of these problems might be much higher³.

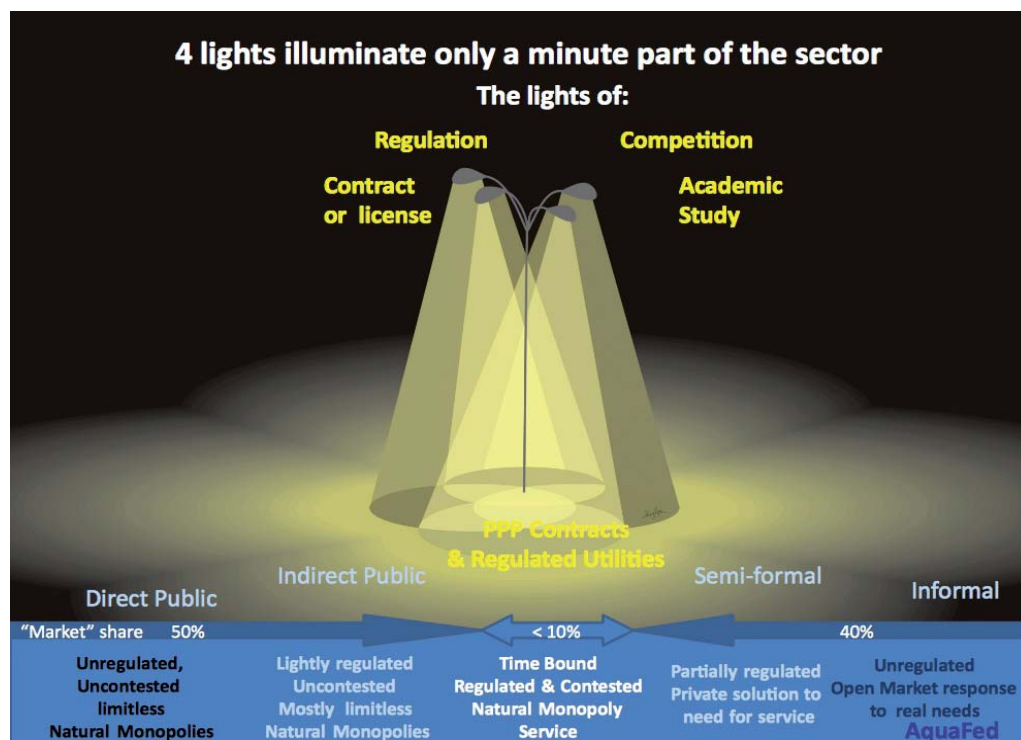


Figure 1 – The Lamp Post Syndrome

³ See ref. 5

The many research reports on individual public-private partnerships (PPPs) cases show a broad diversity of results and illustrate the challenges of ensuring that public-private partnerships are successful. However, they are not sufficient to give a fair and true vision of the beneficial impact of private management of public water services (Private Sector Participation or PSP). Some commentators have tried to present a global vision of water PSP, however these are marred by methodological limitations since systematically they omit or play down the good results achieved⁴. Others set out from an ideological starting point and seek to show private operations in relation to the interests of that ideology. Many such studies spread serious misconceptions about the private sector option. These are often detrimental to the interests of those whom these studies purport to protect. One such misconception is the relationship between private operation and the right to access to safe drinking water and sanitation. The human right is clearly and specifically neutral on the nature of the operator and clearly recognises the legitimacy of the option of engaging non-state actors including the private sector⁵.

To AquaFed's knowledge, the only serious global assessment of the impact of private management of public water services that has statistical value has been made by the World Bank. Its 2009 research⁶ provides evidence about the average performance of public-private partnerships contracts (PPPs) in developing countries, a part of the world where these kinds of contract have developed regularly since the eighties and made a significant impact in improving the services where they have been used.

2.4. Needs for high performance water services

Water-users need drinking water. They also need their wastewater to be collected safely and they need to be protected from polluted waters. The majority of them have no other choice than to expect these services from public authorities. The performance of such public services should match the expectations of users at an optimised cost.

The cost of these services is ultimately borne by users, either as consumers through water bills or as taxpayers through public budgets. Public water or sanitation services can only be considered to be performing well if users' expectations are satisfied, improvements decided by public authorities are realised and the overall cost is optimised to ensure economic sustainability over the long-term.

The "raison d'être" of private water operators is to contribute to all these expectations as instructed, regulated and controlled by public authorities. This brochure provides examples of performance in a variety of directions identified below as the "dimensions" of performance.

2.5. Diversity of performance dimensions

The performance cases presented in this brochure illustrate outstanding achievements in a variety of dimensions. They are sorted according to the following categories.

2.5.1. Implementing the human right to safe drinking water

Individual water-users need clean water daily. Their basic needs are now the subject of the human right that was recognised at the UN level in 2010⁷ as part of the right to an adequate standard of living. In practice, this means precise requirements. It does not only mean that everybody gets a minimum quantity of clean water. It means that this water should be safe, accessible, acceptable, affordable and can be obtained without discrimination. These dimensions are

⁴ See ref. 5 ⁵ See ref. Z [CDA's report] ⁶ See ref. 26, 28 ⁷ See ref. X & Y [UN Resolutions]

independent one from another. For example, progress on safety and regress on affordability can occur simultaneously. In terms of performance, the improvements made can be measured on a “radar” diagram⁸ (see below) where progress on these different dimensions can be measured independently. The starting points differ from one city to another; they can also be very diverse according to different users in the same city.

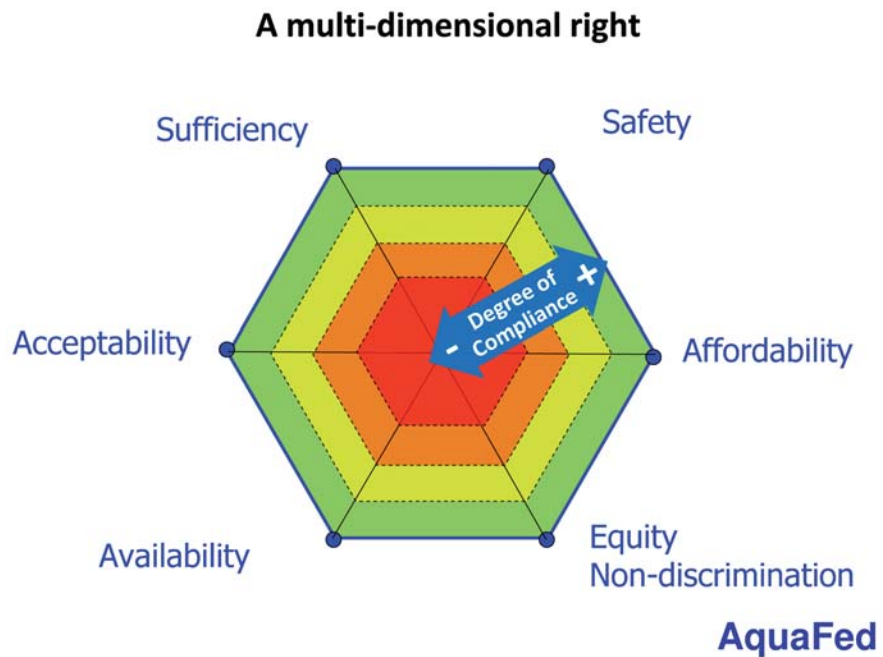


Figure 2 – Showing progress towards the criteria of the right to safe drinking water

The field cases presented in this brochure illustrate all these dimensions of the human right to drinking water. They describe the extension of coverage of water networks (physical access), realisation of domestic connections and increase of regularity of water supply (accessibility), compliance with potability standards (safety), suppression of bad taste or odour (acceptability), subsidy mechanisms (affordability) and pro-poor programmes (equity).

Access. The cases included in this brochure provide many examples of the extension of water supply to previously un-served people. *In many cases the increase in the domestic “coverage” of water networks is very impressive (see figure below). These achievements are all the more remarkable when one notes that on average the coverage of piped water supply in all cities of the developing world has only progressed by less than 1 percent in the last two decades⁹.*

At the global level, an extensive World Bank study¹⁰ has made a detailed examination of the 36 largest PPP contracts in developing countries. Initially these contracts supplied drinking water to 48 million people. After less than 10 years, the population served had been increased to 72 million people. This represents an increase of 50% in the number of people benefiting from a good public service on those contracts¹¹.

⁸ See ref. 21 ⁹ See ref. 3, 18, 19 ¹⁰ See ref. 28 ¹¹ See ref. 6

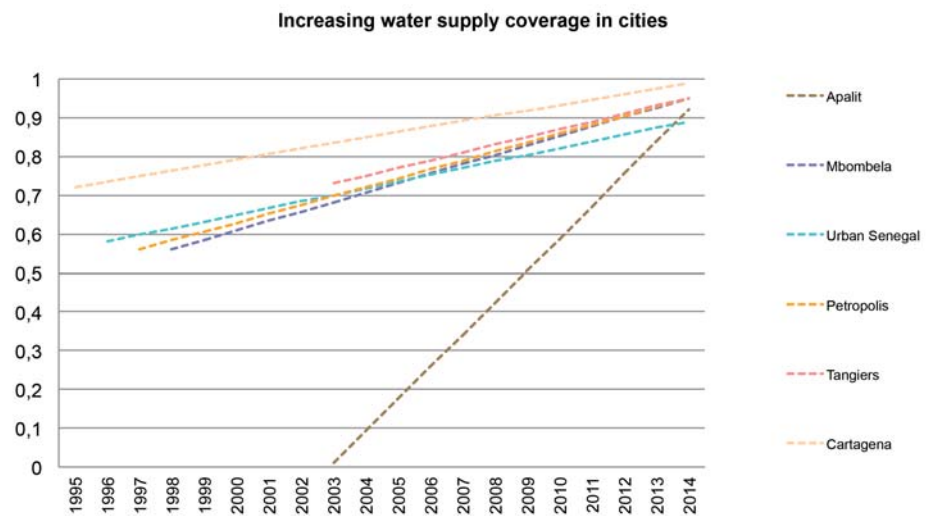


Figure 3 – Water supply: linear representation of progress of coverage in selected cities

Accessibility. Operators have created millions of new individual connections thereby facilitating access to water. *Urban Senegal* is an interesting example. In 1998, 20% of the population was completely un-served, without access to tapwater or to a public standpipe, and 22% were supplied through public standpipes. By the end of 2013 only 1.5% remain un-served and only 8.6% are still using standpipes. All the others benefit from tapwater at home. Switching people from standpipes to tapwater creates a dramatic improvement in their daily lives.

Furthermore, in all cases where water is not running continuously the operator is requested to improve the regularity of water supply which improves availability of water. *The examples of, Limeira, Mbombela, Cartagena, and Algiers* are described in this brochure. At the global level, a statistical survey made by the World Bank¹² found that on average in developing countries private management has brought a 41% increase of the number of hours a day that water is running at the taps.

Safety. Potability of water supplied is the primary target of all private operators. Their job is to provide healthy water to people¹³. In *Apalit*, over 82% of the population could have its water disinfected. In *Petropolis*, water is now safe everywhere when only 2% was treated in 1998. In cities where water coverage reaches 100%, safety of water becomes the utmost priority. Examples of *England* or *Algiers* are good demonstrations of this situation. In *Paris* a change in the safety regulation imposed the replacement of 70% of all connections because they were in lead. This was achieved in only 10 years.

Acceptability. Users dislike water that is coloured. In *Limeira* the cloudiness and the unacceptable colour that were present before 1995 have been removed so that the water is now correct aesthetically.

Affordability. The cases presented illustrate the many mechanisms that are used to keep access to water affordable for all users. For consumption, cross-subsidies between users are described in *Apalit, Limeira, Petropolis*. For new connections, subsidy mechanisms are described in the cases of *Urban Senegal*. In *Tangiers*, one third of the population pays for the volume of water supplied at home at a price that is cheaper than the price paid by the water supply company to purchase it from the bulk supplier. It could be added that the Government of Chile has put in place a pro-poor subsidy mechanism funded at the central level that aims to mitigating the impact of the cost of the huge

¹² See ref. 26 ¹³ See example of impact in ref. 10

investment program. As the subsidies are tailored to the income of each customer, this mechanism reaches the poorest people effectively.

Equity. Private operators are usually requested by public authorities to ensure, at least progressively, a universal service in the area where they are mandated to supply drinking water. This means that they have to face all individual situations including supplying water to all poor water-users. This is normal and usual. There are cases in this brochure that illustrate their pro-poor activities. *In Cartagena, 86% of domestic customers newly connected to water networks are from lower income classes. In 1999, in Mbombela, 79% of informal houses did not receive water at all and the remainder only received water irregularly. In 2014 in spite of the growth in number of informal houses, the proportion of informal houses with no access to water supply was reduced significantly from 79% to only 9% and 81% of informal houses were receiving water every day.*

2.5.2. Improving wastewater management

Wastewater management is a key sanitation service. It is essential for human health, economic development and protection of ecosystems. For individuals, it starts by collecting domestic wastewater from households and transferring it away from dwelling areas. Then pollution needs to be removed from the wastewater before its discharge or reuse. If not, water bodies and aquifers become more and more polluted by human activities and both humans and ecosystems suffer.

The field cases presented in this brochure illustrate significant improvements in wastewater collection and treatment. *In Limeira, in spite of a 31% population growth, the proportion of people connected to the wastewater collection system was raised from 78% to 100% in less than ten years. Simultaneously wastewater treatment, that was almost non-existent at the beginning, has been extended to all the urban wastewater. In the surrounding suburbs of Rostock, the proportion of the populations that is connected to the wastewater collection system has been increased from 28% to 93% In Chile where only 17% of urban wastewater was treated in 1998, the proportion of urban wastewater that is treated has been increased to 100% by 2013.*

These improvements in wastewater management are beneficial to people where they live. They also help to sustain and protect both the built and natural environment. In the field cases presented in this brochure there are several examples of complete recovery of the quality of beaches. *Beaches near Gdansk had been closed since 1978. They have been reopened and this has stimulated a tourist boom in the whole coastal area. In Rostock, the quality of the bathing water in the Baltic Sea at this seaside resort region has also been improved. The Bay of Tangiers is now free from wastewater discharge on the beaches allowing the city to upgrade its tourist resort status. In Algiers, all of the 72 beaches of Algiers have been permitted and reopened to the public for swimming during the summer 2014 against only 39 in 2006.*

2.5.3. Improving relationship with water-users

Supplying good quality water to people is not sufficient. The operator has to take care of water-users, their expectations and their interaction with the water utility.

The field cases presented in this brochure illustrate significant improvements in customer care with many examples of ways through which the life of water-users has been made easier: more reliable billing, customer centres closer to water-users, increased public information, call centres allowing quick responses, etc. These cases also describe outstanding results in increasing customer satisfaction ratings. *In Cartagena the proportion of satisfied users has increased from 71% to 87%. In Bucharest, it has rocketed from 46% to 86%.*

2.5.4. Improving efficiency of water utilities

The search for efficiency is rooted in the genes of private professional water operators. Private companies are used to improve efficiency of services, which is one of the main reasons why they are hired by public authorities. In particular, the authorities expect cost-savings that will enable them to limit the increase of water rates that they charge to their water-users.

In this brochure there are many examples of where significant improvements in reducing leakage and water losses in water networks are saving huge amounts of freshwater. The table below gives a flavour of these achievements.

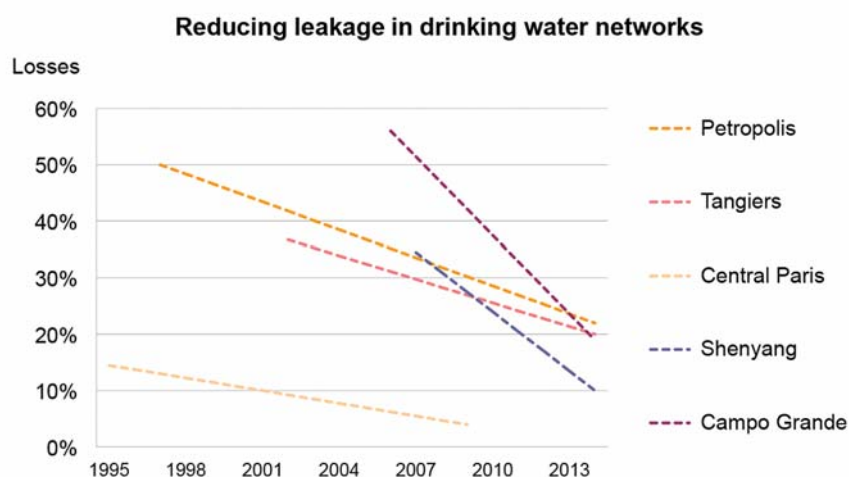


Figure 4 – Reducing leakage in water networks¹⁴

Energy consumption is another domain where optimisation is key. *In Bucharest the annual electricity consumption has been reduced by 60% between 2010 and 2013 (excluding the consumption of the WWTP that entered into operation in July 2011, the reduction would be about 78%).*

Water utilities can only deliver a good service if they are able to collect the monies due to them from users. *Field cases in Mbombela, South Africa, provide examples of significant improvements in billing and cash collection.*

Professional water operators care about the sustainability of the services that they deliver. In this respect, they work to improve the management of the existing assets and in particular to maintain the networks in good condition. *In the case of the distribution of water in Central Paris (intra-muros) more than 50% of the distribution networks were renewed by the private water operators. At the end of the contracts the average “functional” age of the distribution networks was 21 years younger than it was at the beginning of the PPP contracts 25 years earlier.*

Efficiency is necessary to be able to deliver a good quality service in all conditions. However, costs must remain reasonable and affordable. When an ambitious new water policy aims at improving the service significantly, it is also necessary for the government to limit the price increases that would inevitably result from the new investments required. This is one reason for hiring a private operator. In any case, budget constraints mean that cost-optimisation is always required from private operators. In addition, competition and regulation drives cost-effectiveness:

¹⁴ Indicators may not be calculated with the same method in all cities

a public authority would not hire a private operator if a cheaper option that could deliver the same results was available. The field cases presented in this brochure illustrate significant investments that private water operators have been able to undertake despite strict budgetary constraints. *Out of the 44 main Romanian operators, even though all the other operators receive subsidies to help them implement their investment programmes. In England and Wales, annual investments for water and wastewater infrastructure have more than doubled since the 1989 privatisation. However, huge efficiency savings have avoided nearly 70% of the cost of new investments from being reflected in water bills paid by water-users.*

2.5.5. Raising and maintaining staff capacity

The water services can only be efficient and well-perceived by users if the staff of the water supplier has appropriate skills. This is why training the personnel to upgrade its capacity is an essential tool for delivering additional performance. Private water operators are used to organising regular training of their staff. In some cases they have even invested in dedicated private training centres. *This is the case of Amendis, in Tangiers, that has built a large training centre. The quality of the training programmes is so good that the centre is entitled to deliver diplomas through an agreement with universities. In Cartagena, the initial training programme has been massive: 125 hours per employee in 2000. In Algiers, 115,000 training days have been undertaken from 2006 to 2014, through trained trainers.*

2.5.6. Responding to natural disasters

Operators of public water services must do more than just operating public systems in normal conditions. They must be prepared to anticipate and react to exceptional events such as heavy storms, floods, droughts or accidental pollution or disruption of infrastructure. This is because users need water every day and experienced professionals know that exceptional events have a high probability of occurring over several decades. The case of earthquakes is particularly difficult since it happens very rarely and is particularly disruptive. A big earthquake can destroy water plants and break the main water pipes. In such case, water supply may be completely stopped for days or even weeks since repairing large underground pipes may be particularly difficult. *The case of the February 2010 earthquake in Chile is remarkable. There, an earthquake more powerful than the one that destroyed Port-au-Prince in Haiti has damaged water networks in a whole region of Chile. The local private water operators reacted immediately. Only 72 hours after the disaster, 87.5% of the water supply was restored and operating in the areas affected. Five days after the earthquake, 90% of the water services had been restored and regions such as Valparaíso, Metropolitana, de O'Higgins and La Araucanía had 100% of its services restored. This was a costly operation, yet, thanks to the insurance contracts secured by the private operators in charge of the affected areas, the damage suffered by the water industry has not had any cost transferred to the government and has not had or will not have any impact on the tariff that the population in the affected areas.*

Exemples of achievements illustrating the many dimensions for which performance is needed

Implementing the human right to safe drinking water

Extending access to water to un-served people	Apalit, Cartagena, Mbombela, Petropolis, Tangiers, Urban Senegal, Saltillo
Improving accessibility of water	Petropolis, Urban Senegal, Bucharest, Cartagena, Santa Ana, Saint Marc, Guayaquil, Benin, Niger
Improving availability of water	Algiers, Cartagena, Limeira, Mbombela, Santa Ana, Armenia, Benin
Securing water safety	Algiers, Apalit, England & Wales, Gdansk, Paris, Petropolis, Urban Senegal, Pennsylvania, Santa Ana, Saltillo, Shanghai Pudong, Niger
Improving acceptability of water	Pennsylvania, Rostock, Urban Senegal, Gdansk
Contributing to affordability of water services	Apalit, Urban Senegal, Limeira, Petropolis, Tangiers, Guayaquil
Ensuring more equitable water supply	Cartagena, Mbombela, Tangiers

Improving wastewater management

Extending wastewater collection	Limeira, Cartagena, Chile, Petropolis, Rostock, Mogi Mirim, Campo Grande, Guayaquil
Protecting the environment from wastewater pollution	Chile, England & Wales, Gdansk, Limeira, Rostock, Tangiers, Algiers, Petropolis, Fillmore, Mogi Mirim, Bristol

Improving relationship with water-users

Satisfying users' expectations	Algiers, Bucharest, Limeira, Cartagena, Senegal, Bristol
Making life of users easier	England & Wales, Rostock, Tangiers, Cartagena, Guayaquil

Improving efficiency of water utilities

Reducing leakage and water losses	England & Wales, Paris, Shenyang, Urban Senegal, Limeira, Pennsylvania, Tangiers, Campo Grande, Bristol, Shanghai Pudong
Improving energy efficiency	Bucharest, Pennsylvania, Shenyang, Fillmore, Mogi Mirim, Saltillo, Campo Grande, Bristol, Adelaide, Armenia, Niger
Securing revenue streams	Mbombela, Shenyang, Saint Marc, Armenia, Benin
Managing infrastructure assets sustainably	Paris, Algiers, Pennsylvania
Optimising economics of public services	Bucharest, England & Wales, Paris, Chile, Petropolis, Urban Senegal, Fillmore

Raising and maintaining staff capacity Algiers, Apalit, Cartagena, Tangiers, Saint Marc

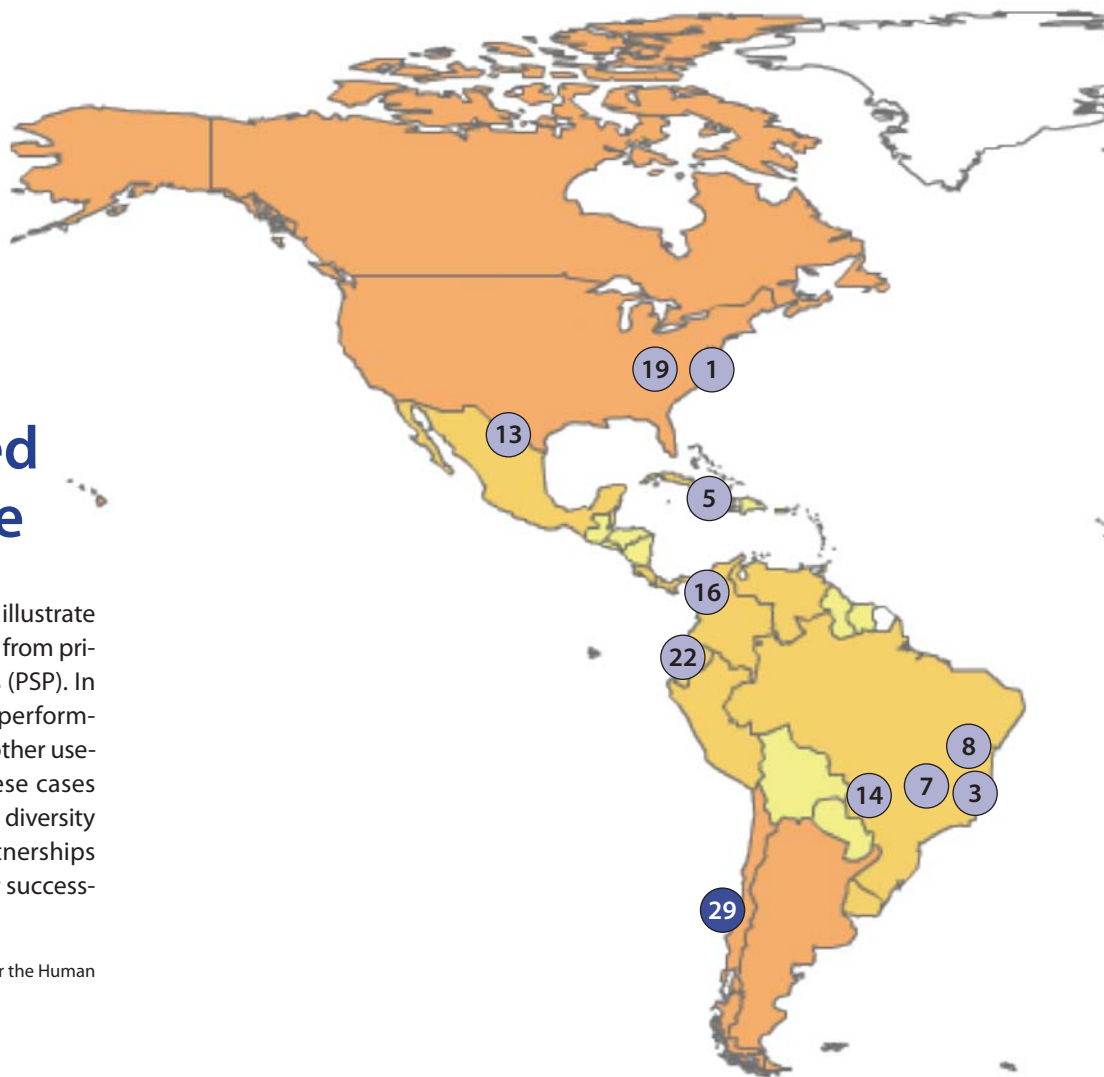
Responding to natural disasters Chile

Cases presented in this brochure

The cases presented in this brochure illustrate many types of performance resulting from private management of public services (PSP). In each field case only a few types of performance achieved are described even if other useful results have been obtained. These cases have been selected to show the wide diversity of countries, types and sizes of partnerships and operators. There are many other successful cases in the world.

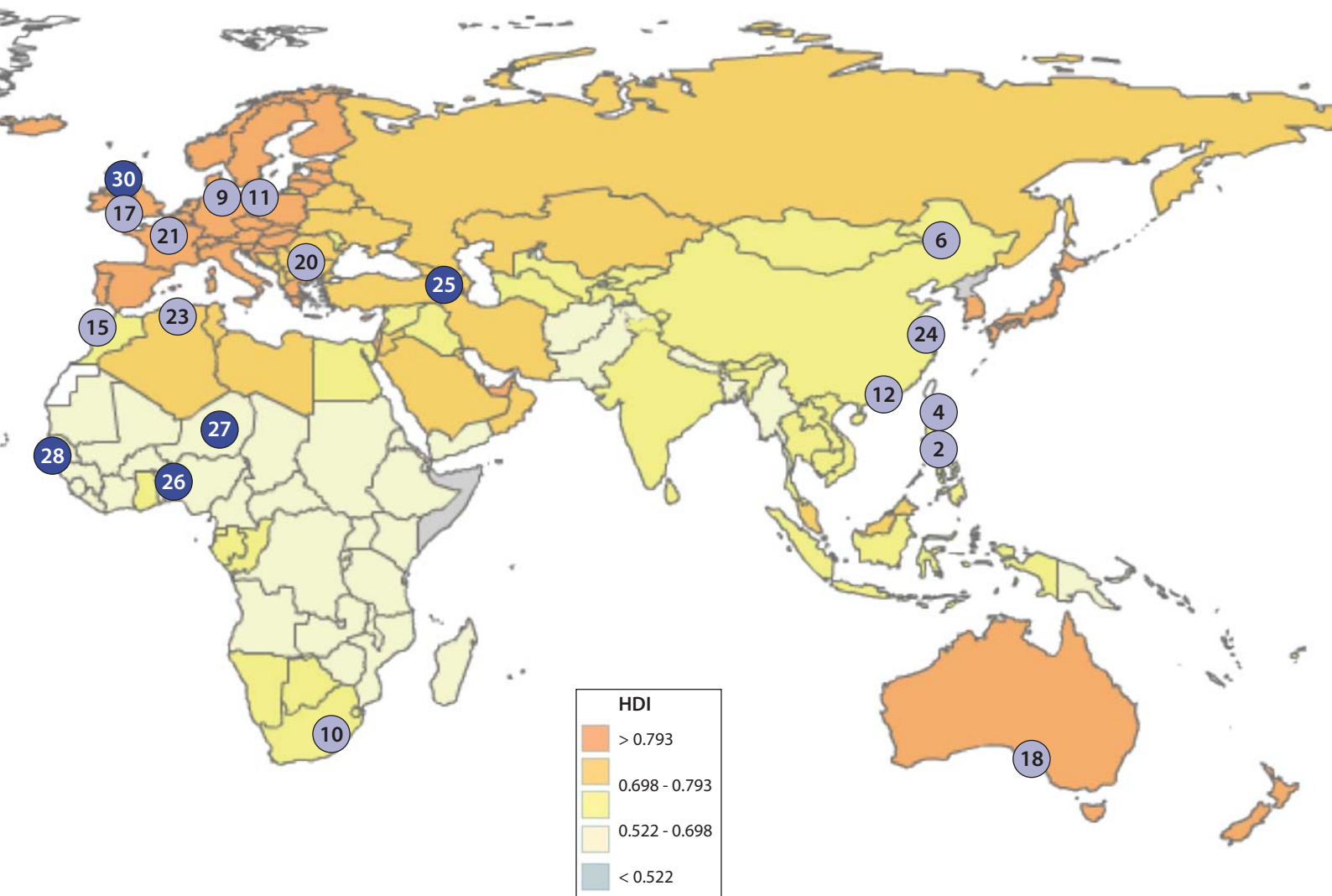
Note: on this map, the darker the colour, the higher the Human Development Index (HDI) in the country

Source: UNDP – 2011 Human Development Report



Field cases

N°	Country	Area	Operator	Population in the area	Page
1	United States	Fillmore	Americian Water, Shenyang SEDA	15,000	16
2	The Philippines	Santa Ana	Balibago	54,000	18
3	Brazil	Mogi Mirim	SESAMM S/A	66,500	20
4	The Philippines	Apalit	Balibago	103,000	22
5	Haiti	Saint Marc	SESAM	130,000	24
6	China	Shenyang SEDA	Shenyang Sembcorp	127,000	26
7	Brazil	City of Limeira	Odebrecht Ambiental	280,000	28
8	Brazil	City of Petropolis	Agua do Brasil	290,000	30
9	Germany	Rostock	Eurawasser	310,000	32
10	South Africa	Mbombela	Sembcorp Silulumnzi	440,000	34
11	Poland	City of Gdansk	Saur Neptun Gdansk	500,000	36
12	China	Macao	Macao Water	607,500	38
13	Mexico	Saltillo	Agua de Saltillo	823,000	40
14	Brazil	Campo Grande	Agua de Guariroba	843,000	42
15	Morocco	Tangiers	Amendis	985,000	44
16	Colombia	City of Cartagena	Acucar	1,000,000	46
17	United Kingdom	Bristol	Bristol Water	1,200,000	48
18	Australia	Adelaide	Allwater	1,200,000	50
19	United States	Part of Pennsylvania	Aqua America	1,400,000	52
20	Romania	Bucharest	Apa Nova Bucharesti	2,000,000	54
21	France	City of Paris (Central Paris)	Veolia + Suez-Environnement	2,200,000	56
22	Ecuador	Guayaquil	Interagua	2,466,000	58
23	Algeria	Algiers (City and wilaya)	SEAAL	3,200,000	60
24	China	Shanghai Pudong	Pudong Veolia	3,700,000	62



Country level

N°	Country	Area	Operator	Population in the area	Page
25	Armenia	The whole country excluding Yerevan	SAUR Sevan Services	1,230,000	66
26	Benin	Rural areas	Members of AFEB	2,100,000	68
27	Niger	54 urban centers	SEEN	2,921,000	70
28	Senegal	Urban Senegal	Sénégalaise des Eaux	5,500,000	72
29	Chile	Urban Chile	Members of ANDESS	15,000,000	74
30	United Kingdom	England and Wales	Members of Water UK	55,000,000	76

Global level

N°	Country	Area	Operator	Population in the area	Page
31	Developing Countries	Locations supplied by private operators	Many private operators	160,000,000	80

Fillmore, California, U.S.A.

Population: 15,000

100% of the treated water is recycled.

Organising authority: City of Fillmore.

Water operator: American Water's Contract Services Group (American Water).

Location: Fillmore, California.

Description of contract

American Water was chosen by the city of Fillmore to design, build and operate (DBO) the new wastewater recycling facility under a public-private partnership. The new facility has replaced Fillmore's existing 50-year-old facility and serves approximately 15,000 residents and businesses. American Water will operate the facility until 2029. The construction commenced in 2007 and operation started in 2009.

PPP context and objectives

As per the new regulations, the city was required to improve the quality of treated wastewater discharges to the Santa Clara River. This threatened the continued operation of the city's old WWTP in its current state. The Fillmore WRP was undertaken in response to the stricter discharge regulations brought down by the Los Angeles Regional Water Quality Control Board. The Fillmore wastewater treatment plant needed significant upgrades in order to comply with stricter environmental standards.

The objective of the PPP was to design, build and operate a facility to produce high-quality disinfected water to meet the stringent standards required for surface and sub-surface irrigation of public and private utilities.

Improving energy efficiency

The plant features state-of-the-art technology that maximizes energy efficiency helping to keep costs down. A flow-equalization system

minimizes water flow during the day, when cost and energy use is highest. The facilities also include a recycled water tank that has a storage capacity of 1 million gallons (3,785 m³). Wastewater is cycled back into the plant where it is treated during off peak hours – when power demand and cost is lower. The current configuration is intended to operate at 1.8 million gallons (6,813 m³) of water daily. The plant's peak pumping capacity is 4,146 gallons (16 m³) of effluent per minute.



Fillmore water recycling plant

Protecting the environment from wastewater pollution

The new plant is yielding water 10 times cleaner than other types of modern activated sludge plants, and this water is being used to irrigate multiple properties, which is a true luxury in California, where water supply is always in demand. The plant currently produces up to 1 million gallons of water daily that meets the standards for unrestricted reuse irrigation purposes. About 800,000 gallons (3,028 m³) per day is discharged to percolation ponds and an underground Effluent Disposal System that provides rainy weather disposal. A membrane bioreactor system and an ultraviolet disinfection system yield cleaner recycled water suitable for irrigation.

- Improving energy efficiency
 - Protecting the environment from wastewater pollution
 - Optimising economics of public services
-

Optimising economics of public services

The current irrigation system provides 200,000 gallons per day to two public schools, the new Two Rivers Park and a new greenbelt along a historic railroad. Plans for the irrigation water also include areas in new home developments, commercial building developments, the site of the old wastewater treatment plant

(being converted into a park), the grounds at City Hall and other public areas. The PPP approach and DBO model helped the City achieve a \$4 million savings. Savings and water quality have both turned out to be far superior to initial projections. Costs are lower, life span of the membranes is longer, and use of recycled water is reducing demand upon the potable water system as well as providing additional revenue.

"This is a highly successful partnership. We avoided cost escalation, treatment risks, and obtained excellent operator expertise by engaging in a public private partnership with American Water." **Bert Rapp, Former Public Works Director of Fillmore, California**

The plant won eight awards, including two Project-of-the-Year (POY) prizes, within seven months of its operation.

Santa Ana, Pampanga, Philippines

Population: 54,000

Organising authority: Municipality of Santa Ana, Pampanga Province, Central Luzon Region, Philippines.

Water operator: Santa Ana Waterworks a subsidiary of Balibago Waterworks System, Inc.

Location: Municipality of Santa Ana.

PPP description

Santa Ana Waterworks is the 25th franchise of Balibago Waterworks System, Inc. (or BWSI for short), a private water utility that operates small to medium scale water supply and distribution systems in the provinces of the Philippines. The terms of the agreement included that BWSI would finance the construction and operation of the complete water supply system and recover its investment through the water tariffs charged to the customers. In return, the municipality granted BWSI a 35-year franchise to operate the Santa Ana water system.

Context and PPP objectives

In early 2007, local government officials led by Santa Ana's municipal mayor approached BWSI to provide a water system for the municipality. The municipality was having difficulty providing water to its population especially during the summer, when its shallow wells with cheap hand pumps would dry up. The mayor wanted to establish an institutionalized water supply and distribution system for the municipality.

After a process of consultations with the executive and legislative branches of the local government and public hearings with the constituents of Santa Ana, an agreement was signed by the municipal mayor and BWSI to supply and serve all 14 barangays of the municipality with a total of 9,856 households or a population of 54,129.

Key performances:

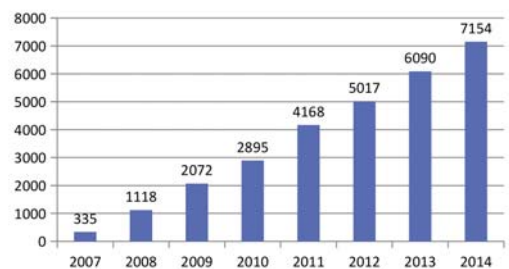
Improving accessibility of water

Immediately after the beginning of the PPP, the construction of the first deepwell pumping station commenced together with the implementation of pipe laying for the first five (5) barangays namely San Pedro, San Juan, Sta.

Maria, San Jose, and Sta. Lucia. Operations officially started on January 2008 with 335 billed customers. By the end of the same year the branch had 1,118 customers. Because of the positive feedback about the sustainable, 24 hours a day 7 days a week water service and the clean and potable water quality, the local officials and residents from other barangays requested speedy expansion in their areas.

The pipe network was expanded to the remaining 9 barangays in batches of 3 barangays per year over the succeeding 3 years. As of end 2014, the pipe network has been extended from 0 kilometers in 2007 to 70.4 kilometers. The number of billed customers increased from 335 in 2007 to 7,154 in 2014. Santa Ana Waterworks grew on average by 1,022 billed accounts per year in its seven year life span.

Number of Billed Customers



Increasing availability of water

As the pipe distribution network expands, so does the number of customers connected to the water system. Santa Ana Waterworks ensured that supply would keep up with demand by increasing significantly water production from 165,612 to 1,625,825 liters a year and erecting additional pumping stations. Santa Ana is located in the Central Luzon region of the Philippines which is a flat plain land. One benefit of this landscape, is that there are good underground aquifers with excellent volumes of water. As demand increased, Santa Ana ensured sufficient supply by drilling new wells and erecting pumping stations. To further augment the water supply and pressure, Santa Ana Waterworks is also purchasing bulk water from neighboring water systems: Arayat Waterworks (also owned and operated by BWSI) and Sinukuan Waterworks (the water system of the Municipality of Mexico, Pampanga).

In 7 years, the number of customers has increased from 335 to 7,154.

- Improving accessibility of water
- Increasing availability of water
- Securing water safety

Securing water safety

Prior to the entry of BWSI in the municipality of Santa Ana, residents in the area sourced water by digging shallow wells and installing hand pumps or electric-powered or jetmatic pumps. The quality and potability of such water is always questionable. Because BWSI sources water from deepwells (ranging from 90 to 150 m in depth), the pumping stations are able to tap clear and potable water that has been filtered naturally by the layers of the earth. To ensure that the water is truly potable, BWSI installs online chlorinators with static mixers to ensure that any bacteria present in the water is eradicated. Further, as required by the Department of Health, the water from the various deepwells of Santa Ana must be tested by accredited laboratories. Bacteriological tests are conducted monthly while Physical-Chemical tests are conducted semi-annually. Other regular practices that Santa Ana undertakes to ensure water quality is the draining of the mainlines to remove sand particles and other debris that may have entered the pipelines and the immediate repair of broken pipelines to prevent water from being contaminated by exposure to bacteria.

Other significant improvements: raising and maintaining staff capacity

Employees are a key factor in the success of any business. BWSI wholeheartedly believes that philosophy and invests much in its people, both in the form of training and development and by improving their quality of life through provision of benefits that employees highly appreciate.

The success of Santa Ana can be attributed to proper administration and implementation of a “lean and mean” mode of management. The

rank and file are taught how to become “multi-taskers”. This is the key to the efficiency of Santa Ana Waterworks and why it is able to achieve a high customer to employee ratio. The field staff are trained on three roles: Plumber, Meter Reader and Pump Operator. Through proper delegation of work by the Branch Manager, the minimal number of branch staff are actually able to accomplish all the work necessary for the proper and efficient operations of the water system. Some key performance indicators of the branch include an impressive employee to customer ratio at 1 employee for every 385 customers; an enviable past due rate of only 3% and an admirable non-revenue water of less than 10% month on month.

The rate of non-revenue water is less than 10%.



BWSI staff

For the supervisors and managers, key training programs include a series of modules that focused on having the proper attitude: Personal Empowerment or Emotional Quotient Training, Change Management, Work Attitude and Values Enhancement and last but not the least Customer Service Excellence. Developing the right attitude amongst its employees is another key to the success of BWSI’s management.

“Santa Ana Waterworks’ customer service is excellent and the water rate is very affordable. The water is clean and with good taste, unlike the water coming from hand pumps in their area. All employees from the manager down to the plumbers are very respectful, responsible and know how to deal with their customers. They immediately respond to customer needs.” **Hon. Ernesto F. Lazatin, Barangay Chairman of Barangay San Jose**

Mogi Mirim, São Paulo, Brazil

Population: 66,500

Organising authority: Mogi Mirim City Hall.

Name of Concessionaire: SESAMM - Serviços de Saneamento de Mogi Mirim SESAMM S/A is a consortium in which the following companies are shareholders: GS INIMA, SABESP and ECS, being formed by private companies and one mixed capital (private and public).

Location: Mogi Mirim, state of São Paulo.

Description of concession

The Mogi Mirim City Hall, with intervention by SAAE – Serviço Autônomo de Água e Esgoto de Mogi Mirim, signed a Partial Concession Contract for wastewater treatment with SESAMM – Serviços de Saneamento de Mogi Mirim S/A.

The contract started in 2008 and has a 30 year term. Its objective is the provision of services to supplement implementation of the wastewater removal system and implementation and operation of the Mogi Mirim Municipal Wastewater Treatment system. An investment of BRL 77.54 million (US \$ 2,45 million) is stipulated in the contract.

Context and PPP objectives

The SAAE of Mogi Mirim has an over 40 year long history. Having achieved universal coverage of the water supply in 1998, the company turned its attention towards wastewater collection and treatment. To speed up the process, a private sector concession was established for this service in 2008.

Main goals of the concession are:

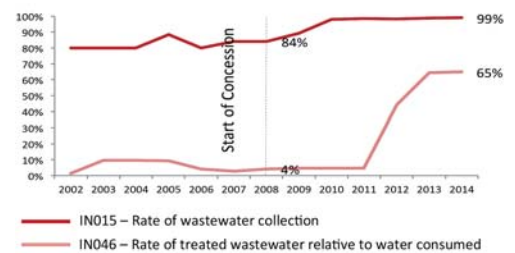
- Universal coverage of wastewater service by 2033
- Reinforce the wastewater system, involving the construction of trunk lines, lift stations, discharge lines, outfall and wastewater treatment station, including their operation
- Clean the Mogi Mirim and Mogi Guaçu rivers
- Stimulate the local economy, creating 250 direct and indirect jobs
- Transfert of technology

Extending wastewater management

In 2008, the SAAE of Mogi Mirim decided to improve significantly wastewater collection

and treatment by entering a concession contract with SESAMM. This kicked off the execution of an expansion of wastewater infrastructure and management. The rate of wastewater collection increased from 84% in 2008 to 99% today with the construction of 9.4 km of reinforced concrete trunk lines and 10.9 km of reinforced collection networks and outfalls.

Rate of wastewater collection before and after the concession



This has been achieved through a project split into four main phases, all with well-defined scopes, terms and investments. By the end of 2014, around BRL 77.54 million (US\$ 2,5 million) had already been invested.

Protecting the environment from wastewater pollution

The partnership established between the private sector and SAAE of Mogi Mirim was fundamental to quickly reaching the goals as well as to achieving environmental improvements in the region. Controls performed by the environmental agency, CETESB – Companhia de Tecnologia de Saneamento Ambiental, connected to the São Paulo State Secretariat of Environment, for the period before and after the concession have permitted the monitoring of real indicators of effluent quality that are currently a source of pride for the people of Mogi Mirim.

The quality of the effluent is controlled by the Urban Municipal Population Wastewater Collection and Treatability Index – ICTEM, its acronym in Portuguese, monitored by the São Paulo state environmental control agency (CETESB) at the receiving body of water, the Mogi Mirim River. The ICTEM is an indicator formed by five key weighted elements: i) Collection, ii) Existence and efficiency of the wastewater treatment system, iii) Effective removal of the organic load in relation to potential load, iv) Appropriate disposal of sludge and waste generated in treatment, and v) Quality com-

In 6 years, the rate of wastewater collection increased from 84% to 99%.

- Extending wastewater management
- Protecting the environment from wastewater pollution
- Improving energy efficiency

pliance of the receiving water body (into which treated and untreated wastewater is discharged).

Comparison of performance monitored by the ICTEM: the table below shows the average results for a period 2007-2011 prior to the start of contract and the improvements achieved afterwards in 2013.

	Average 2013	Average 07-11
Conductivity (µS)	122.0	189.0
Turbidity (UNT)	41.0	50.0
Nitrate (mg/L)	0.23	0.13
Ammoniacal Nitrogen	0.78	4.0
Dissolved Oxygen (mg/L)	5.0	1.3
BOD5.20 (mg/L)	5.0	28.0
Phosphorous (mg/L)	0.19	0.86

Since the recycled water system was implemented (2013), an average of 75% of the total water needed to carry out the operational activities executed by SESAMM has been recycled water.

SESAMM's commitment to preserving water resources

In addition to contractual obligations to improve the quality of wastewater treated, the efficiency of the service provided and SESAMM's commitment have led the operation to develop actions resulting in optimized use of this treated wastewater.

Urban Municipal Population Wastewater Collection and Treatability Index – ICTEM

Year	ICTEM	Note
2011	1,5	Year preceding the start of the WTS-Mogi Mirim operation
2013	6,92	Year after the start of the WTS-Mogi Mirim operation

The higher the value the better the result

Water re-use

The good quality of the effluent allows it to be used for non-potable purposes. Use of recycled water for operational purposes and other purposes contributes to improving a balance between the supply and demand of water in the region which is under stress.

In November 2013, after various technical, economic, environmental and social studies, especially in relation to employee health, SESAMM implemented the recycled water system, producing an average of 1,335 cubic meters per month. Recycled water has made it possible to maintain planting of 2,550 native trees and has supported various operational infrastructure and equipment cleaning activities at the WTS-Mogi Mirim.

Since this system was implemented, an average of 75% of the total water needed to carry out the operational activities executed by SESAMM has been recycled water. This system has also allowed SESAMM to save approximately 92% on the cost of purchasing water from the public system. In addition to lowering operational costs, the reuse system will contribute to improving the region's water sustainability in the long run.

Environmental protection

With the construction of trunk lines, collectors and outfalls that now collect and transport the wastewater generated to the treatment system, it has become possible to prevent uncontrolled release of these effluents directly into the municipalities bodies of water, keeping them from becoming polluted.



Water Waste Treatment Plant – SESAMM, Mogi Mirim

Other improvement: improving energy efficiency

Besides all the benefits of the recycled water, the project has improved energy efficiency, due to the aeration system, orbital-type aerators, which consist of disks that work at various speeds and spin in the two directions of the reactor's flow, an innovative feature that allows for significantly less energy consumption and a high degree of elimination of the contaminant load.

Apalit, Philippines

Population: 130,000

Continuous water supply has been installed for 12,919 customers in 11 years, increasing the coverage ratio has from 0.89% to 82%.

Organising authority: Municipality of Apalit, Pampanga Province, Central Luzon Region, Philippines.

Water operator: Apalit Waterworks, a subsidiary of Balibago Waterworks System Inc.

Location: Municipality of Apalit.

PPP description

Starting from a Memorandum of Agreement in 2003 to take over a pump and borehole provided by an NGO, Apalit Waterworks was able to develop the water system rapidly through coordination with barangays¹ in Apalit and neighbouring Macabebe. The aim was to develop additional boreholes, networks and customer management systems. Investment and operation are carried out by the company, which finances the works and operations mainly from revenue from customer charges. It now serves 103,000 people.

Context and PPP objectives

The Municipality of Apalit is situated in the eastern portion of the province of Pampanga in the Central Luzon Region of the Philippines. It has a total land area of approximately 6,147 hectares and it is composed of 12 barangays.



As with many towns in the region, urban growth has been very rapid. Between 2000 and 2014 the population has grown by 78% and the number of households by 82%.

Prior to the involvement of Apalit Waterworks, the municipality was having difficulty providing water to its fast growing population, especially in outlying districts. The initial objective was to overcome this with a pilot project

to show how a private company could improve the operation of the borehole and create a piped water network.

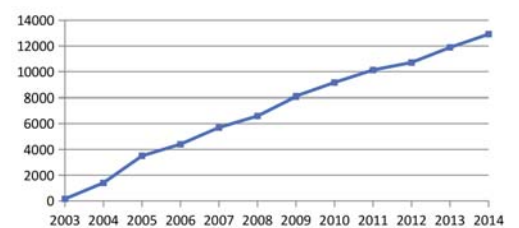
Subsequently, the services have been extended to the other barangays in Apalit and parts of the adjacent municipality of Macabebe.

Extending provision of water supply

Having been given the initial well and pump by the barangay of Tabuyoc (the farthest from the town centre), Apalit Waterworks started to install a network of PVC pipes and connect customers with meters. Since then the company has progressively extended its water services to other areas, installing new boreholes, pumps, backup generators, 3 elevated storage reservoirs and distribution networks to extend the service to parts of all 12 barangays in the municipality and 2 barangays in Macabebe.

The number of customers supplied in Apalit has increased from 150 at the end of 2003 to 12,919 in 2014. In Macabebe, the numbers served have risen from 258 in 2008 to 550 at present. This means that the overall coverage ratio has increased from 0.89% to 82% of Apalit Municipality and the 2 barangays served in Macabebe.

Growth in Customers served



The number of pumps and boreholes has increased from 1 in 2003 to 11 in 2014 (includes the additional well in Barangay Sucad completed in November 2014), with more planned in 2015.

To ensure reliability, pumps have backup diesel generators, all procured and installed by Apalit Waterworks. In this way the water supply is assured on a 24/7 basis for all connected users.

The length of the networks has been extended from 0 in 2003 to 91 kilometers in 2014.

¹ Barangay is the smallest administrative unit in the Philippines

- Extending water supply to un-served people
- Ensuring water safety
- Contributing to affordability of water services

The safety of the water supply for over 82% of the population of Apalit has been assured within almost 11 years.

The volume of water produced in 2013 reached 3,488,482 m³. Average consumption in December 2013 was 23 m³. per customer. The majority of customers are domestic households, but commercial customers are also supplied.

Water users that are not connected to the water networks mostly use shallow wells with cheap hand-pumps or small electrical pumps that are expensive to operate. In both cases, supplies are of dubious quality and are time consuming or costly to use.

Ensuring water safety

All the pumping stations are equipped with electronic chlorinators to ensure water safety. The water quality is tested and controlled for bacteriological and physical-chemical compliance with the Philippine National Standards for Drinking Water (PNSDW 1999). Copies of these tests are submitted to the National Water Resources Board (NWRB) and results show consistent compliance with PNSDW parameters.

When combined with the extension of the water network, the safety of the water supply for over 82% of the population of Apalit has been assured within 11 years.

Subsidies to domestic users

Customers are offered the opportunity to connect to the Apalit Waterworks network on a voluntary basis as the pipes become available. The connection charge is currently (2014) 2,760 Pesos for ½ inch (12 mm) domestic connection and 3,060 Pesos for a ½ inch (12 mm) commercial connection.

The tariffs are agreed between the Local Government Unit and Apalit Waterworks and then approved by the NWRB. The current water charges are set out in the table below. This shows that there is a cross-subsidy in place that enables commercial users to give some support to domestic customers.

Apalit Waterworks Tariffs 2014

Residential

Min: 1-10 m ³	P 205.00
11-20 m ³	P 21.30 /m ³
21-30 m ³	P 22.10 /m ³
31-40 m ³	P 23.00 /m ³
Above 41 m ³	P 24.20 /m ³

Commercial

Min: 1-10 m ³	P 409.00
11-25 m ³	P 40.90 /m ³
Above 26 m ³	P 44.20 /m ³

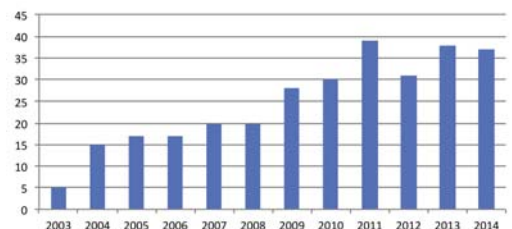
Note: the average conversion rate Php – Euro for 2014 was 0.0170

Other significant improvements

It is notable that Apalit Waterworks has created 40 jobs directly (including 1 accountant and 1 assistant accountant). Its continuing pipe-laying, construction, repair and other activities likewise promote local employment. Also, as the company has developed, it has implemented appropriate modern technology such as data loggers, hydraulic modelling, geographic information systems and variable frequency drives. This has required it to expand the skills and competencies of its staff accordingly.

Moreover, aside from the increased productivity and improved sanitation it brings with its piped water, Apalit Waterworks has made a considerable contribution to the local economy through providing water to commercial and industrial activities and permitting the construction of new housing subdivisions.

Number of Staff



“Apalit Waterworks has been the Municipality of Apalit’s partner in our pursuit to improve the quality of life in our town. It has been providing potable water to the Apalitenos. Challenges though are present and many areas for improvement are abundant but with the local government unit and Apalit Waterworks’ solid cooperation, the obstacles for continued success will be handled all for the common benefit of our townfolk.” Mayor Oscar Tetangco Jr.

Saint-Marc, Haiti

Population served: 130.000 inhabitants

Unprecedented in Haiti: the introduction of volumetric meters for subscribers.

Organising authority: National Directorate for Water Supply and Sanitation (DINEPA).

Water operator: Saint-Marc Water Utility (SESAM), LYSA's subsidiary.

Location: Saint-Marc city, department of Artibonite, Haiti.

PPP description

The public service delegation of Saint-Marc working in association with the new Enabling Legislation (2009) on the reorganisation of the water and sanitation sector aims gradually to transfer the management and operation of water and sanitation to local authorities. The operation was assigned to SESAM following an international bidding process won by LYSA in 2009.

Context and PPP objectives

This is the first public-private partnership for drinking water in Haiti. Once the infrastructure had been renovated with funding from the IDB, the challenge was to achieve an efficient service that is provided by a local workforce and that is financially balanced through water charges, whilst ensuring the maintenance of the network through the payment of a sectoral tax and a tax on turnover.

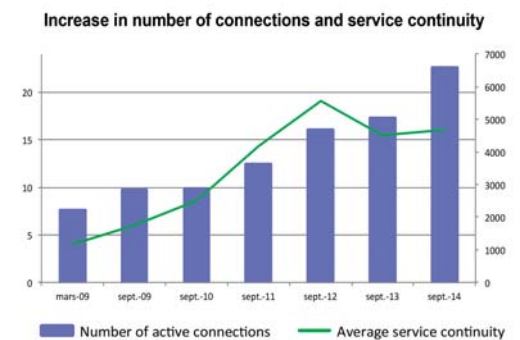
Specific objectives have been added to these general objectives, such as acceptance by the users of volume-based invoicing, respect for public infrastructure and removal of small scale tap connections, resolving usage conflicts that were not anticipated when creating new supply infrastructure, as well as adapting to the impact of the disastrous events that hit the country and its population and delayed and complicated action plans.

By the beginning of the 6th year of the contract, the links between the organizing Authority and the operators have developed to a level where unforeseen problems and difficulties can be overcome and a dialogue built around the performance of the service and its financial stability.

Improving accessibility of water

The number of connections has been increasing steadily, rising from nearly 2,200 in 2009 to 8,100 in 2015. This has been coupled with the

improvement of the quality of the water delivered and the continuity of the service that has gone from a few hours a week to almost 16 hours per day on average. The commercial coverage of the city reached 71% in early 2015. The increased accessibility of the service improved through responsiveness to customer requests, the establishment of traceability of actions and effective monitoring of complaints. A works renewal project with design and supervision carried out by LYSA-SESAM was implemented. This allowed the setting up of water connections to be adjusted to tally with actual customer demand, alongside verification that a subscription agreement had indeed been put into place before the connection was made.



Putting an effective billing system into place

LYSA and its subsidiary SESAM took over the delegation contract after the water supply had been set up and the meters had been installed but not before the volume-based billing had been introduced. The first priority was to reverse the trend that had left the public believing that flat rate billing would continue in the same old way; the payment rate was of the order of 3%. The change in charges for a household between the previous flat rate and the new volumetric rate was of a ratio of 3. Under these circumstances it was important that volume-based billing be set up with regularity to allow users to get used to monitoring their consumption to fit their means. It was also necessary for SESAM to chase up customers in arrears. Billing had to be carried out rigorously in order to leave the system free from criticism in a context where billing by volume was being tried for the first time in Haiti. For these reasons the personnel were trained to meet all scenarios effectively and fairly.

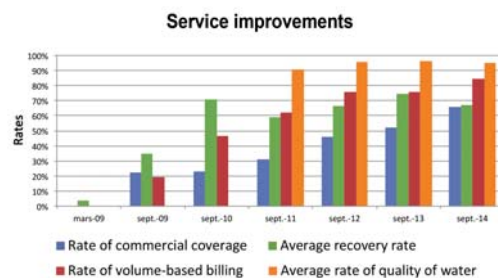
- Improving access to services
- Improving accessibility of water
- Securing revenue streams
- Raising and maintaining staff capacity

In four years the recovery rate reached 75% and was then maintained at this level despite many uncertainties: the earthquake that the capital suffered and which paralysed the country, the cholera epidemic which fortunately was contained outside the city, severe cyclonic episodes, the drought which led to conflicts regarding usage of the supply, the economic crisis which resulted in temporary and organised attempts to create illegal connections and the political crisis that led to protest in the form of sabotage.

To transformational Management

SESAM has had an independent management team since May 2014, in other words after its fifth year. The personnel of the previous public institution was retained and staff had to assimilate a new corporate culture. They also had to be trained in the use of modern management tools and the systematic organisation of work. This process had to be put into place while incorporating new recruits and ensuring that several aspects of business that were new to Haiti were introduced. They included volume-based water consumption billing with the required consumer education and the establishment of an effective and rigorous management of metering. This first public-private partnership in the water sector required the construction of responsible relationships with the delegator and the National Directorate of drinking water as well as the mayor and representatives of civil society. Finally, a management culture in which improved performance was combined with the achievement of operational balance has to be established. The technical assistance provided by LYSA included permanent expatriate staff during the first five years, with regular support missions focusing on technical or specific forms of organisation. An engineer recruited three years ago and trained internally became CEO in May 2014. The autonomy of local staff is supported by a rigorous management framework, with a dashboard and remote meetings as well as ad hoc technical assistance missions.

At Saint Marc, improved quality of service in urban areas in Haiti: from 16 to 24h of water service per day.



While the regular payment for water by volume is a heavy burden for people who do not have health insurance, are old or unemployed, or are experiencing inflation and very significant levels of unemployment, the satisfaction survey conducted by DINEPA in February 2014 showed that 60% of respondents expressed satisfaction with the service.



Customer survey

"I am aware that SESAM has made great efforts to improve the conditions of the water supply. Using polyethylene to renovate the network is a good thing, giving us a modern network. I hope that through this, the whole city will benefit from the water round the clock. I ask all customers to continue to consume tap water." **Dr. Raoul Vincent, coordinator of the Union of Municipal Health (Union Communale de Santé) radio interview 1 December 2013**

"The job SESAM has done deserves congratulations and thanks. This is a positive achievement that is useful to the community. I personally hope that the service continues to improve every day." **Chapelet Makfret Ak, rapper, 12 March, 2014**

Shenyang SEDA, China

Population: 200,000

Non-revenue water has been reduced from 30% to 10% within the initial 3 year period, and been kept around 10% until now.

Organising authority: Shenyang Economic & Technological Development Area (SEDA).

Water operator: Shenyang Sembcorp Water Co. Ltd.

Location: Shenyang is the capital of Liaoning province and a major economic, political, industrial centre in North East China. The service area of the concession has a population of 200,000 over 88.5 km².

PPP description

In 2008, Shenyang Sembcorp Water Co. Ltd. in an 80/20 partnership with SEDA acquired 3 water works facilities and corresponding water supply networks. The company was granted exclusive concession rights for 30 years to supply water to customers in the area plus future areas to be developed. The company currently supplies over 899 industrial and over 38,168 domestic customers (a population of around 98,300 people).

Context and PPP objectives

Shenyang Project is the first tap water supply project of Sembcorp in China. The total design capacity of the company is 160,000 m³/day, and the total network length is 212 km. The project objective is to supply high quality water to customers inside SEDA and provide the best services to customers. Its aim is to develop an optimum mode of operation to set a standard for other water supply projects in China.



Location of SEDA

Reduction of non-revenue water

The company made a comprehensive plan to reduce the Non-Revenue Water (NRW), which

was more than 30% before takeover. Losses were mainly from pipeline leakage caused by the corrosion of underground pipelines, uneven ground settlement, or extreme weather. However, some special factors, which cause the high NRW in China, were also found.

1/ Disorderly construction

Before takeover, construction of water pipelines was managed by various parties, and was haphazard and unorganised, leading to incomplete and inaccurate data on underground pipes. Unauthorized connections were difficult to identify. The company made a big effort to investigate pipelines, valves and fire hydrants. The company also strengthened the inspection team and set up Standard Operation Procedures (SOPs).



Losses caused by disorderly construction

2/ Improper meter management

A meter management system has been set up. It was common that meters were not calibrated and were not replaced for many years beyond their lifespan. The inaccuracy of some old meters was between 12% and 14%, which caused a lot of the water used by customers to go unregistered. An ongoing meter management plan was implemented.

3/ High NRW in residential estates

There are about 20 old residential estates, and most showed very high NRW of 70% to 80%. Thus only 20% to 30% of water supplied to such estates was registered. This was mainly due to the poor quality of the estates' internal pipelines. A detailed work plan has been imple-

- Reducing water losses
- Improving energy efficiency

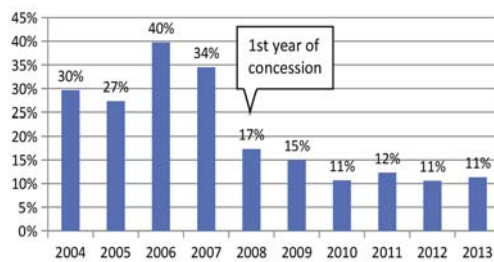
mented. Measures include monitoring of the static water level of storage tanks, checking all valve pits and fire hydrants and the pipelines of the cogeneration company, checking for unauthorized connections and unmetered water connections. For one estate the NRW has been reduced 70% to below 5%.



Inspection of Residential Estates

With these measures, NRW has been reduced from over 30% to around 10% to 12% within a 3 year period, and been kept around 10% until now.

The trend of NRW from 2004 to 2013



Energy efficiency

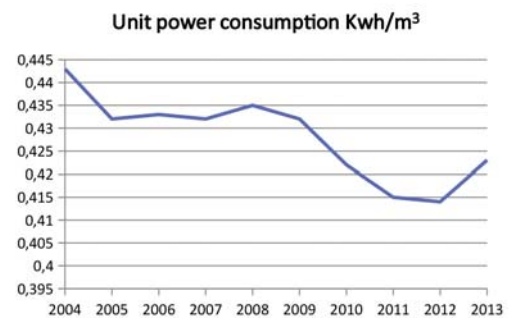
Reducing NRW also leads to higher energy efficiency. The optimization of the energy consumption of the whole operation has been completed. The major areas of improvement after takeover are supply pump station operation, use of storage tanks, backwash management and supply pressure control.

“Shenyang Sembcorp Water is a typical successful JV case in Shenyang, and Sembcorp used their vast experience and technology of water business resolving the problems and brought excellent service to SEDA.” Director of SEDA

Currently, a combination of variable speed pumps and constant speed pumps is used for all the supply pump stations, and there are 8 variable frequency drives installed at 4 supply pump stations to ensure that the pumps are operating at high efficiency levels. The maximization of the use of the off-peak electricity tariff, which is only 1/3 of the peak tariff, has been reviewed for every pump in the company. The water level of storage tanks is kept at a low level in the daytime by shutting down some of source well pumps.

The filter backwash has also been changed to occur late at night. The filtration tank backwash cycle has been optimized from 24 hrs to 120 hrs, and the backwash duration shortened from 8 minutes to 5 minutes. The pipeline network for the 3 water plants, which were not inter-connected before takeover, was eventually interconnected in January 2011. This enables supply pressure optimization using a hydraulic model. As a result, the unit power consumption is reduced significantly. A saving in energy consumption per unit of production of 6% has been achieved.

Other significant improvements



Note: Main transmission pipeline connected to WTP#3 was broken in Feb 2013; it made higher distribution pressure of WTP#1 and led to an increase of energy consumption.

After takeover, a localised billing and collection system was established and implemented for all customers in 2011, and it created a secure and reliable platform for billing and collection.

A saving in energy consumption per unit of production of 6% has been achieved.

City of Limeira, Brazil

Population: 280,000

In spite of the 31% population growth, the proportion of people connected to the wastewater collection system was raised from 78% to 100% in less than ten years.

Wastewater treatment was almost non-existent. Today all urban wastewater is treated.

Organising authority: The city of Limeira.

Water operator: Odebrecht Ambiental - Limeira Facility.

Location: Limeira is a city located in the state of Sao Paulo, 150 km from the city of Sao Paulo.

PPP description

Odebrecht Ambiental - Limeira Facility manages the municipal water and sanitation services of Limeira through a concession contract. Odebrecht Ambiental - Limeira Facility was selected by a process of international competitive bidding among 18 other proposals. The operations started in 1995 and the duration of the contract is 30 years. Limeira is the first city in Brazil to enter into a concession for its municipal water and sanitation services.

Context and PPP objectives

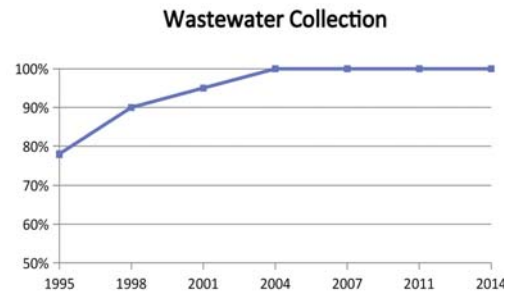
The city of Limeira had a significant population growth since 1960, the population increased from 61,000 to 280,000. This city growth, in number of inhabitants and thus in surface area, created some serious problems for the safe water system and sewerage. Through a public and international bidding process, the city of Limeira called on the private sector for cooperation and created a Public-Private Partnership, aiming at the following goals:

- Universal coverage of water and sanitation
- Water supply 24 hours a day and 7 days a week
- Water quality improvement
- Water losses reduction
- No pollution of local river basin PCJ (Piracicaba, Capivari and Jundiaí)
- Universal treatment of wastewater
- Affordable tariffs for the whole population

Extending wastewater collection

At the beginning of the concession there were 164,000 people connected to the wastewater system, they represented 78% of the whole population. Thanks to the investment that has been made since 1995, the whole population was connected to the sewerage system by 2004; thus, the company achieved one of its main goals – collection of 100% of wastewater from the population – in less than 10 years.

The following graphic shows this evolution. The number of people connected to sewerage system has been increased by 68%.



The city is included in the regional sanitation plan named "Piracicaba, Capivari and Jundiaí". At the end of 2010, the average of wastewater collection of the 62 municipalities from the valley was 85%, Limeira being one of the most advanced cities collecting 100% of its wastewater.

Increasing wastewater treatment

At the beginning of the operations, only 2% of population had its wastewater treated. Industrial wastewater did not receive any kind of treatment, which means that wastewater from all industries, charged with industrial contamination such as heavy metals, grease, detergent, etc. was dumped into the river. Since only a tiny percentage of urban wastewater was treated, water poured in Piracicaba River produced serious pollution. At this time the city of Limeira was responsible for 40% of the river's pollution.



Thanks to the investment that has been made by the operator, the percentage of treated wastewater has increased every year, as shown in the graph, attaining a 100% of wastewater treated since 2011.

- Extending wastewater collection
- Increasing wastewater treatment
- Satisfying users' expectations

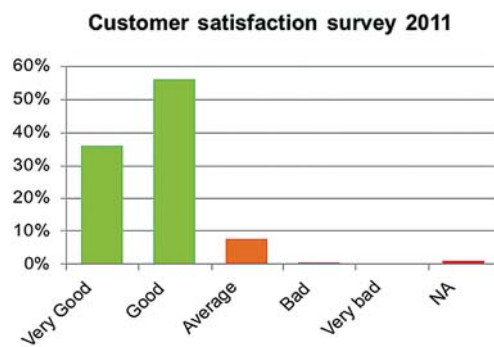


Wastewater treatment plant

Customer satisfaction surveys show that more than 91% of the water users are satisfied.

Satisfying users' expectations

The company has proved high performance in numerous matters such as the universality of water supply and sanitation, the treatment of the total flow of wastewater, the water quality improvement – which, before 1995, suffered from cloudiness and a certain colour – the decrease of water losses from the drinking water network – which has been reduced from 40 to 15% – and the consequent improvement to a 24 hours a day water supply for all connected households. All these improvements have had a positive impact on customers and public authority's satisfaction.

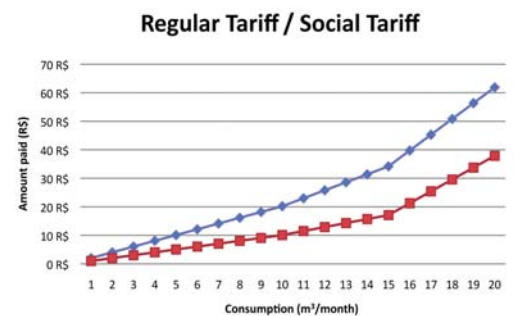


The social tariff program allows 5,000 families to have a 50% reduction on their bills for their consumption below 15 m³.

This is proved by the satisfaction poll conducted by the company with its customers. According to the results of the 2011 survey, 91.5% of those polled considered the service satisfactory, and only 0.4% of them are not satisfied with the service.

Other significant improvements

The company and the municipality have launched a social tariff program through internal subsidies. Subsidies are funded and delivered by the operator to 5,000 families selected by the municipality on the basis of their low revenues. The graph shows the money paid by a family with a social tariff (in red) and the money paid by a family with the regular tariff (in blue) according to their consumption. The difference between both curves represents the savings realized by a family with social tariff. A family with consumption of 15 m³ or less will have a discount of 50% on their bill.



Finally, Odebrecht Ambiental - Limeira Facility obtained the ISO 9002 certification for its quality policy in 1998, the ISO 9001:2000 in 2002 and the ISO IEC 17025 for its laboratories in 2008.

See ref. 28

In 2011, Odebrecht Ambiental - Limeira Facility received the title of "Company of the Year in the area of Social and Environmental Responsibility". Awarded by the City of Limeira

Petrópolis, Rio de Janeiro, Brazil

Population: 298,000

Organising authority: Petrópolis City Hall.

Operator of water and sanitation service: Águas do Imperador, Águas do Brasil group.

Location: Petrópolis, a City located in the state of Rio, 65 km from Rio de Janeiro.

Description of PPP

Águas do Imperador manages municipal water service in Petrópolis. Águas do Imperador was selected by an international competitive bidding. The 30 year contract began in January 1998.

Context and PPP objectives

Before 1998, the city of Petrópolis had serious water supply problems such as the coverage (44% of population had no access to water prior the beginning of the contract), continuity of water supply (some households had water supply once a week or even a month), and only 2% of the population with access to water received disinfected water (only by chlorination). In addition, the water losses in the network were about 50%. Only 45% of the population was connected to the sewerage system and only 4% of wastewater was collected.

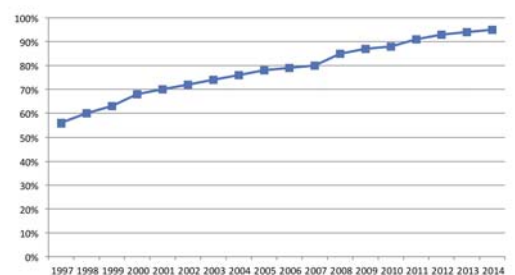
Through a process of international competitive bidding, The city of Petrópolis called the private sector for cooperation and created a Public-Private Partnership aiming at the following goals:

- Regularization and increase of water production in order to supply water 24 hours a day and 7 days a week
- Universal coverage of water and sanitation
- Replacement of obsolete pipes in order to reduce leakage and water losses
- Purification treatment of 100% of water supplied
- Installation of water meters and implementation of a reading and billing system
- Increase the amount of wastewater collected and treated
- Enhancement of customer service

Improving accessibility and availability of water

In spite of the 15% population growth since 1997, the proportion of population connected to public networks has risen from 56% in 1997 to 91.3% in 2014 while most people live in neighborhoods outside the city center in areas that are difficult to access due to the rugged landscape of the region.

% of Population connected to Water Networks



In order to supply water for this growing population, the company increased the number of connections from 24,000 in 1998 to 68,500 in 2014. This means 150% more connections made in the last 15 years. Today, there are seven water treatment stations that, together, produce 61.8 million liters of water daily – complying with standards established by the World Health Organization. The concessionaire is able to serve 95% of the population.

In 2014, the concessionaire finished work on interconnecting the six main municipal supply systems. With the installation of 11 km of pipelines, interconnection made it possible to transport water produced in any systems to wherever there is an immediate demand. With this, water can be moved from the city center to the outer districts, for instance, covering a distance of nearly 30 km.

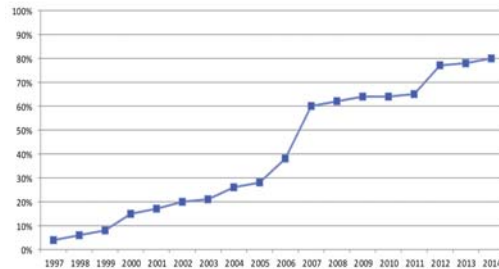
Improving wastewater management

Notable progress has also been made in relation to wastewater. The number of connections to the wastewater system increased by 87%. Prior to the concession, wastewater treatment was almost inexistent (only 4% of wastewater was collected). Now, 80% of the population has its wastewater treated, a total of 52.5 million liters of wastewater per day.

In spite of 15% growth, the proportion of people connected to public water networks has risen from 56% to 95%.

- Improving accessibility and availability of water
- Improving wastewater management
- Protecting the environment from wastewater pollution

Treated wastewater coverage 1997-2014



The wastewater system in Petrópolis currently has 25 treatment units (3 large WTSs, 5 compact WTS, 8 small WTS, 8 biodigesters and 1 biosystem). According to Instituto Trata Brasil, Petrópolis is 27th among the 100 largest cities (more than 300.000 inhabitants) with the best sanitation in Brazil.

Protecting the environment from wastewater pollution, an innovative approach

The pioneering work that Águas do Imperador is doing with biodigesters is a national and international reference. Implemented in regions with uneven topography and disorderly occupation, these units represent a unique solution in the treatment of wastewater for these locations and they fit within the best models of sustainability.



Biosystem, Carangola

They therefore play an important social role. Work in environmental education was done in the region to implement them and, whenever

possible, local manpower is used to build them. The filters are made of thousands of tires and PET bottles, allowing polluting materials to be used in a better way. There is no treatment fee charged and the biogas generated is used by daycares and residents in the community.

In addition, the biodigesters consume no electricity, they treat waste at the location where it is generated and, at the end of the process, the treated effluent is returned to the rivers with up to 85% purity in relation to the initial organic load.

Águas do Imperador currently has eight biodigesters and one biosystem, with a total of 10,400 people benefitting from treatment of 731,000 liters of wastewater per day. The projects are always sustainable and have already guaranteed reuse of around 280,000 PET bottles and approximately 3,000 tires.



In 2014, Águas do Imperador was among the top three of over 100 projects in the National Water Agency (Agencia Nacional de Águas – ANA) Award, in the Corporate category, with its 'Sustainable Sanitation – Use of Biosystems and Environmental Education in Low-Income Community' project, which included the renowned work that the company does with these treatment units. The awards are aimed at recognizing and publicizing good practices that contribute to management and sustainable use of water resources in Brazil.

See ref. 27

The proportion of treated wastewater has risen from 4% in 1997 to 80% in 2014.

City of Rostock and adjacent districts, Germany

Population: 310,000

Extension from 28% to 93% of the number of people in the surrounding suburbs that are connected to the wastewater network.

Responsible authority: Warnow Wasser and Abwasserverband Water Board (WWAV) as well as Water and Wastewater Association Güstrow-Bützow-Sternberg (WAZ).

Water and sewerage operator: EURAWASSER Nord GmbH (EWN), a private company, established in 1993 in the state of Mecklenburg-Vorpommern, Germany and now a subsidiary of Remondis Aqua.

Location: City of Rostock and neighbouring towns and rural regions in Mecklenburg-Vorpommern.

PPP description

A cooperation between EURAWASSER and the Warnow Wasser and Abwasserverband Water Board (WWAV) through a PPP contract for 25 years. Signed in December 1992 after a competitive tender, the contract was initially for drinking water supply and wastewater management in the City of Rostock and the surroundings. In 2003 it was merged with another contract to serve now approximately 310,000 people in Rostock and neighbouring towns and rural regions in Mecklenburg-Vorpommern today.

The figure below shows the drinking water supply and wastewater management area of EWN with the division into regional responsibility areas.



Water supply and sanitation area of EWN

Wastewater collection and treatment to protect the environment

EURAWASSER Nord GmbH has extended and operates wastewater systems in the service areas, and has realised the following system upgrades and network rehabilitation:

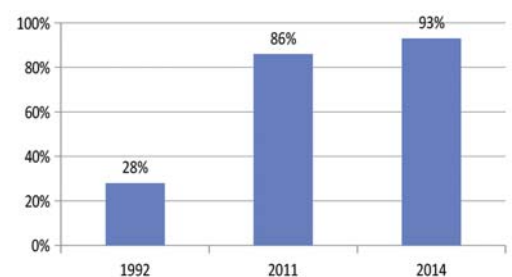
- 56 wastewater treatment plants with the Rostock central wastewater treatment plant as one of the most modern in Europe.
- 2,073 km of sewers and stormwater lines.
- 7,562 small sewage treatment plants and septic tanks for areas that are not yet developed.

Since the beginning of the contract, EURAWASSER Nord has spent a total of 454 million € for the restoration and investments in water and wastewater infrastructure. The table below shows these top Investments.

Project	Investment (million €)
Development of the Rostock water plant	16.7
Modernization of the Rostock Waste Water Treatment Plant	90.7
Extension of the drinking water system	105.5
Increase of access to the wastewater network for the people in the surrounding suburbs (from 28% to 93%)	241.5

The extension of the wastewater network in the suburbs surrounding Rostock has resulted in an increase from 28% to 93% of the number of people that have their wastewater collected.

Increase of people connected to wastewater network in suburbs surrounding Rostock



- Removing pollution to protect the environment
- Improving the acceptability of water
- Making life of users easier

55,000 customer contacts a year. 78% of water-users find the water of excellent quality.

Management of drinking water quality is certified ISO 22000. Water quality complies with the German DIN 2000 standards.

An environmental commitment

EURAWASSER Nord has always been strongly committed to environmental protection in order to attain the objectives of the Helsinki Convention to protect the Baltic sea.

In obtaining a modern wastewater treatment plant, Rostock succeeded in complying with the new environmental requirements in force in the countries of the Baltic region.

The quality of the bathing water in the Baltic Sea at this seaside resort region has also been improved as a result of this investment.

Optimising water treatment to improve quality and acceptability of water

In Rostock, EURAWASSER Nord took up the challenge of quality water.

The construction of ozonation units in the drinking water production plant improved taste quality and reduced the quantity of chlorine used for disinfection by 80%.

In addition to its better taste, the water distributed in the city and its surroundings is strictly monitored today.

Today, the quality of drinking water meets the strict standards of the German DIN 2000

regulations on drinking water. External independent monitoring by the German Public Health Department attests the good quality of the drinking water.

Each month, 120 samples are subject to microbiological tests and 460 samples are analysed for chemical compliance.

The storage of drinking water in Biestow, with a capacity of 10,000 m³, and in Niederhagen, with a capacity of 5,600 m³, guarantees a high degree of safety of supply for the city of Rostock and 19 municipalities in the administrative district of Rostock.

Services designed for customer satisfaction

A series of customer satisfaction surveys have been carried out. These examine issues such as the setting up of a single call number and a call centre (handling 55,000 customer contacts a year). In the last survey, a total of 1,000 customers were asked about EURAWASSER Nord. 78% of the sample thought that the company provides an excellent water quality, 96% are satisfied with supply guarantee and 84% rate the provision with wastewater services as very good.

Mbombela, South Africa

Population: 440,000

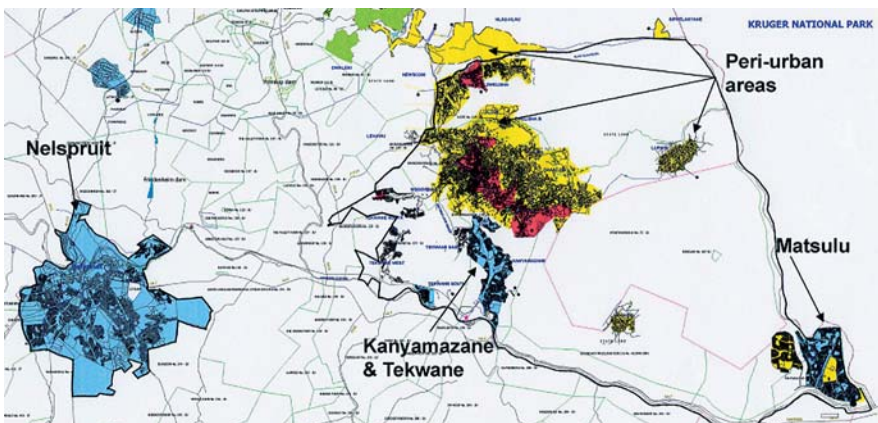
Basic water supply has been expanded from 56% of the population to 95%.

Organising authority: Mbombela Local Municipality. In 2000 Greater Nelspruit Transitional Local Council (created in 1994) merged with White River and Hazyview to become Mbombela Local Municipality.

Water and sewerage operator: Sembcorp Silulumanzi.

Location: Greater Nelspruit area. Nelspruit is the capital of the province of Mpumalanga, South Africa. The concession covers the city of Nelspruit, and the main Nsikazi townships of Kanyamazane, Tekwane, Msogwaba and Matsulu. It also extends to other peri-urban areas such as Zwelisha, Mpakeni and Luphisi.

Total population in concession area is 440,000 of which currently 380,000 are receiving the services (2013).



PPP description

Sembcorp Silulumanzi (formerly known as Greater Nelspruit Utility Company) is the water utility in charge of the Greater Nelspruit area. It is a subsidiary of Sembcorp Industries of Singapore.

On the advice of the Development Bank of Southern Africa, a request for proposal was issued in 1996. The Transitional Local Council selected Sembcorp Silulumanzi by a process of competitive bidding among 5 other companies and in 1999 the contract was signed. The concession agreement was approved by the Department of Constitutional Affairs and the Department of Water Affairs and Forestry. Operations started in November 1999 and the duration of the contract is 30 years.

Sembcorp Silulumanzi operates, maintains, replaces and upgrades the assets leased from the council. The assets will be transferred back to the council at no cost and in the same or better condition at the end of the concession. The PPP is regulated by a Concession Monitoring Office within the municipality.

Context and PPP objectives

Nelspruit Town population was 25,000 in 1990 and the majority of households were mid to upper class. In 1994, when Greater Nelspruit Transitional Local Council was created, the area increased by over 8 times and the population to 250,000. The total income of the area, however, was only 38% greater. This was due to the fact that the new areas included were less wealthy and had a significant proportion of informal households, particularly the peri-urban areas which had 100% informal households. Consequently, when the operations started in 1999, 56% out of the 43,000 households were informal. Thus, the access to water service was limited, 44% of all households and almost 80% of informal households did not have access to water supply.

Some of the main performance targets assigned to the operator to be achieved by 2009 were:

- 24 hour water supply to all formal households by 2009
- to use best efforts to improve the number of households in informal areas with a 24-hour water supply
- to comply with national water quality standards
- to improve revenue collection
- annual customer satisfaction survey and follow-up actions to address issues identified
- community-oriented training and development programmes

Extending access to water to un-served people

The company achieved the first target: areas with a 100% of formal houses, such as Nelspruit and Tekwane, had full coverage of basic water supply, 24 hours a day and 7 days a week, by

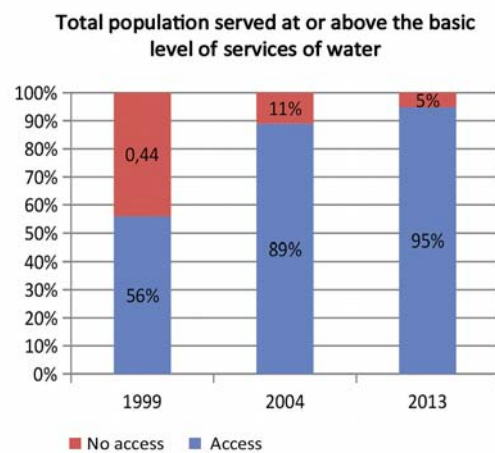
- Extending access to water to un-served people
- Ensuring more equitable water supply
- Securing revenue streams

The proportion of revenue collection out of the total bills increased from 73% to 83%.

Sembcorp Silulumanzi is accredited with the International Standards for ISO 9001 Quality Management, 14001 Environmental Management and OHSAS 18001 Health and Safety Management Systems.

Sembcorp Silulumanzi is one of the few water systems to obtain the Blue and Green Drop awards.

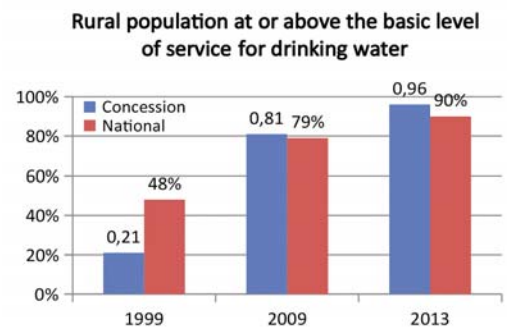
2009. Over and above the 24-hours services, the operator was successful in connecting all customers in these two areas to sewer network. Overall performance figures are also remarkable, especially considering the demographic expansion. The population has grown by 65% between 1999 and 2009, with most of this growth concentrated in informal areas, an increase of 20,000 informal houses. In spite of the high level of growth of the population, the concessionaire improved the coverage of basic water supply from 56% to 95% of all households in only the first five years of the concession.



Equity & non-discrimination

It is important to note the efforts made by the company to supply water in areas where most of the houses are informal. In 1999, none of the informal houses received water 24 hours a day, and 79% of informal houses did not receive water at all. In 2013, fourteen years later, in spite of the growth in number of informal houses, the proportion of informal houses with no access to water supply was reduced significantly from 79% to only 9% and 81% of informal houses were receiving water every day.

The same improvement can be seen in the statistics in rural areas. In 1999, only 21% of the rural population of Mbombela Concession was served at or above the basic level of service. This figure is far lower than the average national statistics, where 48% of rural population had access to water. After the first ten years of the concession, the percentage of rural population with at least a basic level of service increased to 96%, which is above the national average of 90% in 2013.

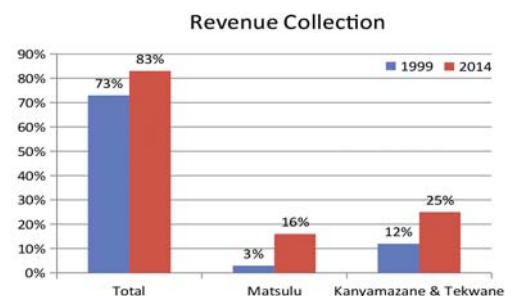


In this chart, only areas already established in 1999 are included

Securing Revenue Streams

For political reasons, the percentage of revenue collection was low in Mbombela. This was because refusal to pay for any municipal or government provided services was used as a form of protest against the apartheid government. Without the payments it was very difficult to support the development and operation of the water and sanitation systems. One of the main goals of the concession was to convert this strong culture of non-payment for water services. Among the contractual requirements to be achieved by 2009 there were targets for revenue collection for each area.

The efforts of the concessionaire to address this problem have allowed an increase in the total revenue collection from 73% of the total bills in 2000-2001 to 83% in 2013-2014. The best improvements have been in Matsulu and Kanyamazane and Tekwane as shown in the following graph.



Other significant improvements

Sembcorp Silulumanzi on behalf of Mbombela Local Municipality is an active participant in the national Department's Blue Drop (drinking water systems) and Green Drop (wastewater systems) incentive based compliance systems.

See ref. 29

Gdańsk, Poland

Population: 500,000

Beaches reopened after being closed for 16 years because of wastewater pollution.

Organising authority: City of Gdańsk, Poland.

Water and sewerage operator: Saur Neptun Gdańsk (SNG).

Location: Gdańsk and Sopot, Eastern Pomerania, Poland.

Gdańsk is a major Polish port on the Baltic Sea, the City of the late revolutionary union leader and president Lech Walesa. Gdańsk is also a major summer resort with the beaches and amenities of the Sopot beach resort attracting over 1 million visitors per year.

Public-Private Partnership

A lease/affermage contract was signed in 1992 for a duration of 30 years between the city of Gdańsk and Saur Neptun Gdańsk (SNG). SNG is a Joint Stock Company held for 51% by Saur International, a private group from France and 49% by the City of Gdańsk. This “mixed” company operates the water and wastewater services in Gdańsk and Sopot. It is responsible for operation and maintenance of the system, maintaining quality of service standards, and billing and collection. Today, it serves 500.000 people.

The city of Gdańsk remains the owner of the infrastructure through an asset-holding company GIWK – Gdańska Infrastruktura Wodociągowo-Kanalizacyjna. This company is responsible for funding and realising the new investments. The city remains also responsible for regulation and setting of tariffs (yearly tariff-setting by the Municipality).

The Gdańsk PPP contract is often characterised as the 1st major water PPP contract in Central Europe. It is a two-way public-private partnership: through a PPP contract between the local government and an operator and through a co-ownership of this operator.

Context and PPP objectives

Prior to the beginning of the PPP contract, the main problems in Gdansk were related to the quality of the water supplied which was completely unsatisfactory for the population served.

In addition, major network failures led to huge water losses (25% Non-Revenue Water in 1992) and problems with continuity of service.

As a result of under-investment, untreated wastewater seriously polluted the Baltic Sea and caused the closure of the bathing beaches of Gdansk and Sopot.

Removing pollution to protect the environment



Sopot, seaside resort near Gdańsk, has world-class beaches and spa facilities, including the longest wooden pier in Europe. However, due to pollution caused by lacking wastewater treatment and the resulting toxic sewerage effluents, these beaches had been closed since 1978.

By 1994, only two years into the contract, by 1994, SNG had overcome the failure of wastewater treatment and this led to the festive reopening of the bathing beaches in Gdańsk and Sopot. Marine environments were restored, leading to a renewed flourishing of this spa resort and a tourist boom for the whole coastal area.

Securing water safety

SNG focused on the improvement in the water treatment stations dealing with surface water. The implementation of new technology and treatment systems led SNG to rapidly achieve compliance with EU drinking water standards. In 1992, 8% of water circulating in the Gdańsk water supply network met European standards, compared to 100% in 2013.

- Removing pollution to protect the environment
- Securing water safety
- Improving acceptability of water

In 2014, 100% of water supplied met European quality standards, compared to 8% in 1992.

In 1992 the water was perceived as pretty bad by users. Today, 88% of water-users declare their drinking water of good or excellent quality.

Water losses in the Gdańsk water networks went down from 25% to 12%.



Improving compliance to EU quality standards for drinking water

In 2010, ISO 22000: 2005 certification dealing with Hazard Analysis and Critical Control Point (HACCP) was obtained by SNG, qualifying Gdańsk tapwater for food safety certification.

To monitor continuously the quality of water SNG has deployed the wisdom of nature: a biomonitoring system based on the behaviour of rainbow trouts living in the reservoir of the row water and *Unio tumidus* mussels connected to specially calibrated computer programme.



Bio-monitoring at SNG

Improving water acceptability

Prior to the PPP there were huge expectations on Drinking Water Quality improvements: "People said they would even welcome the devil if the water quality only went up!" (as reported by the WaterTime research project in 2005).

Improvements performed by SNG have reversed the perception of users.

In 2010, a Poland-wide test by Brita, a leading water filtration products brand, of tapwater provided by the largest 10 utilities, revealed some remarkable results in terms of "acceptability" of the water supplied. Gdańsk tapwater came out first in terms of odour (best smell) and taste (least detectable).

In recent customer satisfaction enquiries (2013), 88% of the customers declare their drinking water to be of good to excellent quality (source SNG).

Compared to the 1992 situation, the acceptability has dramatically improved in objective and subjective terms.

Other improvements: reduction of water losses

- Network breakdown rate decreased by 50%.
- Water losses in the Gdańsk water network went down from 25% to 12% (in 2014).
- A leakage monitoring system for the entire water supply network was introduced.
- All these efforts have led to significant water savings (334,500 m³ in 2014).

"Saur Neptun Gdańsk has done a great work to guarantee high standards of services, among them the superb quality of water." Pawel Adamowicz, Mayor of Gdańsk, Global Water Summit, Berlin 2011

Macao, China

Population: 607,500

80% of the respondents support Macao Water continuing to provide water service to the City of Macao.

Organising authority: Marine and Water Bureau of Macao.

Water operator: The Macao Water Supply Co. Ltd.

Location: Macao is one of the two SARs (Special Administrative Region) of China enjoying a fast growing GDP of USD 87K per capita in 2013 due to the rapid development of the gaming industry since the opening up of the monopolistic market in year 2000. The service area of the concession has a population of 607,500 over 31.3 km².

PPP description

In 1985, Sino French Holding (Hong Kong) Ltd., a joint venture of then Lyonnaise des Eaux (Suez Environnement today) from France and Chow Tai Fook (New World Services Holding today) from Hong Kong acquired 85% share of the then Macao Water Supply Co. Ltd. The company was granted exclusive concession right for 25 years to supply water to customers in the whole Macao and subsequently had the contract renewed in 2009 for another 20 years till 2030. At the end of 2013, the company supplies over 227,400 customers, of these 11.6% are commercial and industrial customers accounting for 46.3% of the total water demand and 87.6% are domestic customers representing 42.6% of the total water consumption.

Context and PPP objectives

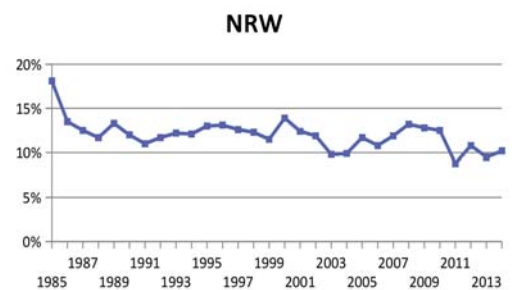
Macao Water is the very first contract of Suez Environnement operating outside the European continent in the 80's.

In the early 80's, there was no medium or long term investment plan to improve the overall infrastructure including treatment facilities, distribution network and automation equipment. The consequences were a lack of pressure in the distribution network due to aged pipeline and high physical leaks. The water quality was considered non-potable with high turbidity. Poor customer service led to dissatisfaction by customers and the government. The project objective was to supply high quality water and provide excellent services to customers. Its aim is to develop an optimum mode of operation to set a standard for other water

supply projects in the region.

Reducing leakage and water losses

The company made a comprehensive plan to reduce the Non-Revenue Water (NRW), which was more than 20% before takeover. Losses were mainly from physical leakage caused by the corrosion of underground pipelines, uneven ground settlement in the reclaimed areas, and commercial losses from under-metering. The NRW today has been reduced to 10,2% which is close to the optimum level.



Various measures were taken to reduce NRW. More than 95% of the distribution network has been renewed with premium piping materials, for example, ductile iron or steel pipe. Flexible corrugated stainless steel pipes have also been introduced in reclaimed areas in dealing with the adverse impact of ground sedimentation. A massive meter replacement (MRP) program has been implemented since 1995 to start replacing meters of different sizes based on their years of service and consumption profile. A meter resizing program has also been adopted to identify any undersized or oversized meters for all major customers and rectify the problem by replacing them with a correct meter size based on their consumption profile.



Equipment inspection

- Reducing leakage and water losses
- Improving water quality
- Satisfying users' expectations
- Improving energy efficiency

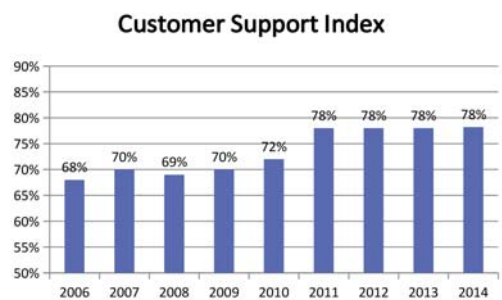
Securing water safety

With the Contract signed in 1985, Macao Water has been implementing close monitoring of water quality by performing parallel sampling with the government laboratory on a daily basis to ensure the water quality is in compliance to the EU Drinking Directives and the water quality standard set by the local government. The Laboratory and Research Centre of Macao Water has been accredited with ISO 17025 Laboratory Accreditation Certificate in 2007 meeting the General Requirements for Competence of Testing and Calibration Laboratories.

In 2012, Macao Water successfully completed the certification audit of ISO 22000 Food Safety Management System and obtained the certificate for better protection of water supply safety, demonstrating a real commitment to deliver safe and quality water to the City of Macao. Since 2004, the compliance water rate is above the IMS objective target of 99% and is continuously 100% since 2011.

Improving energy efficiency

In terms of energy saving, the company managed to reduce the energy consumption of water pumps by 6.61% -using 2009 as the baseline- through a series of measures including an overhaul of the water pumps, downsizing impellers and installation of frequency inverters to control water pumps.



Improving users' satisfaction

From autumn 2005 to spring 2006, Macao Water encountered a major salinity crisis caused by the ingress of sea water in winter in the Xijiang

River, the main source of drinking water in Macao. Macao Water had worked very closely with the SAR Government in mitigating the impact of salinity to customers. Macao Water developed a communication scheme therefore providing transparent and updated salinity information to customers during winter and dry season every year.

Regular customer satisfaction surveys have been conducted annually since 2000 to measure the customer support index toward the Company. The customer support index in 2014 is 78,2% whereas 90% of respondents rated the pricing and tariff is very reasonable and affordable and 80% of the respondents support Macao Water continuing to provide water service to the City of Macao.

Respondents also rated Macao Water as the preferred utility in Macao compared with the local electricity and telecom companies in areas of overall performance, value for money, corporate citizenship, customer care and listening to customer feedback. Macao Water is the only local utility company that provides the greatest range of payment collection services to its customers, including 24 hours 7 days collection service at all major convenience stores and online payment by all major credit cards, plus other user friendly services such as e-bill, e-application, SMS reminder etc.

Other significant improvements

Since 2010, Macao Water has published its annual independent Sustainability Report showing transparency enhancement and improvements of its corporate social responsibilities (CSR) as well as Macao Water's strategies in sustainable development. The 2013 Sustainability Report shows the performances of the company in various major areas: environmental protection, energy conservation, customer service, employees and the community. In addition, the Report has met the Global Reporting Initiative (GRI) Sustainability Reporting B+ level, and it passed an independent limited assurance performed by PricewaterhouseCoopers. *See ref. 28*

Since 2004, the compliance water rate is above the IMS objective target of 99% and is continuously 100% since 2011.

City of Saltillo, Coahuila México

Population: 823,000

From 2001 to 2014, water losses have been reduced by 27% and commercial efficiency increased by 33%.

Aguas de Saltillo transformed the water service and resolved the water issues of the city. The water service used to be the most poorly rated by the population and is now the best rated.

Organising authority: Local government of the city of Saltillo.

Water operator: Aguas de Saltillo SA de CV subsidiary of Aguas de Barcelona.

Location: Saltillo, capital of the State of Coahuila, located in north-east México.

Description of the PPP

In 2001, following a public tender launched by the city of Saltillo to operate the water supply system in the city of Saltillo, Aguas de Barcelona was selected as the company to manage the water system.

Aguas de Saltillo has been the first joint undertaking in Mexico, with the participation of the city of Saltillo, as public partner (with 55% of the shares of the company) and Aguas de Barcelona as private partner, which holds the 45% remaining. The Partnership Contract is for a period of 25 years.

Context and objectives of the PPP

For decades, the city of Saltillo had a major problem of water shortages which negatively affected the socio-economic, demographic and industrial development of the city. This was mainly due to the conditions of the old system operator which was deficient in many ways, in addition to factors such as low rainfall and population growth.

Only 10% of users had water every day, there was a high level of physical leakage: more than half the volume of water injected to the network was wasted. The revenue collection was insufficient, there was a lack of financial resources to improve service in addition to the discontinuity in the management due to the change of municipal administration every three years. The water shortage in the city worsened and the problem became a permanent demand for the State and the municipal government.

In this context, Aguas de Saltillo identified the following objectives as main actions needed to take in order to rapidly improve water supply service:

- Modernizing procedures and facilities
- Forming a sustainable water system

- Being an example of management in the water sector in Mexico

Securing water safety

Aguas de Saltillo performs rigorous analysis certifying the quality and safety of drinking water supply, thus ensuring the good quality of water. In 2014, 2,740 samples of bacteriological analysis were performed together with authorities such as the Ministry of Health. All samples are in conformity with the standards. Thus water quality in Saltillo is measured, monitored and improved to ensure optimal physical and chemical parameters in the distribution network. Aguas de Saltillo also has a program of cleaning and disinfection for 100% of the storage tanks and pumping stations.

Extending access to water to un-served people

Aguas de Saltillo provides social tariffs to allow access to a water service of quality to low-income and disadvantaged people of the city. For example, aged people are benefitting from special tariffs. Families living in irregular areas, lacking basic services and in precarious conditions are benefitting from access to drinking water through a community connection. The families concerned also benefit from subsidized cost for the connection and the monthly water consumption is divided between the beneficiary families.



With this program, Aguas de Saltillo ensures access to drinking water for vulnerable families who avoid paying high costs for obtaining water from tankers or bottled water, as well as improving health and preventing diseases by using safe sources of drinking water instead of contaminated ones.

- Securing water safety
- Extending access to water to un-served people
- Managing infrastructure assets sustainability

Aguas de Saltillo created a dedicated service quality department that after 2 years has enabled the company to be recognized by the “Fundation Gonzalo Rio Arronte” for its “best practices in value for money in water services”.

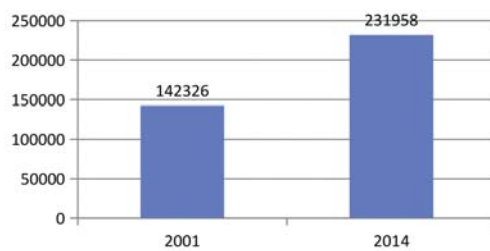
Aguas de Saltillo has received the distinction of “Inclusive and socially responsible company” and “safe company” accreditation from the Secretariat of labour and social welfare.

Improving energy efficiency

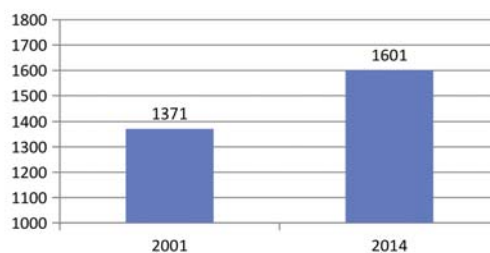
Aguas de Saltillo manages water resources in a sustainable way by improving efficiency. Aguas de Saltillo improves every year the energy efficiency rate, resulting in a significant decrease of energy consumed and a better efficiency of electrical equipment. Aguas de Saltillo also reduces water losses and leakage in the networks. To reduce them, projects of control and optimization of the network have been implemented, notably through hydraulic and pressure control, sectorization, renewal of pipes and connections. Leak detection equipment has also been modernized.

Improvements in the network management have allowed Aguas de Saltillo to face the important increase (almost 63%) of the number of customers from 2001 to 2014 with a limited water production growth.

Evolution of the number of Customers



Evolution of Water production



While a small increase in water production has been achieved, water supply has been provided to nearly 90,000 additional households.

With tariffs below the national average, the company has invested 545 million pesos (US\$ 37,3 million) and spent more than 1,040 million pesos (US\$ 71 million) in maintenance works on the installations since 2001.

Other significant improvement

Also, through agreements with civil society organizations, Aguas de Saltillo promotes the participation of the community in the conservation of the Sierra de Zapalinamé. More than 40,000 households make voluntary financial contributions through their water bills to the association “Profauna”, which carries out protection and conservation of the mountain. Sierra Zapalinamé is the main source of water for the city of Saltillo. The reforestation activities, planting endemic trees within the protected area of the forest is designed to restore it.



Reforestation Sierra de Zapalinamé

See ref. 28

Campo Grande, Mato Grosso do Sul, Brazil

Population: 843,000

Organising authority: Municipality of Campo Grande.

Operator of water and sanitation service: Águas de Guariroba, AEGEA Saneamento group.

Location: Campo Grande, Capital of the state of Mato Grosso do Sul, Center-West region of Brazil.

Description of concession

Águas Guariroba is the concessionaire in charge of public water and wastewater services in Campo Grande, the capital of Mato Grosso do Sul, located in the Center-West of Brazil. The company began its activities in 2000, after winning a competitive tender and through a concession contract with the municipality a 30 year term, extendable for 30 more years (until 2060). Águas Guariroba is currently part of the Aegea Saneamento company, which serves 36 municipalities in six states in Brazil.

Context and goals of concession

Prior to the concession, the water and wastewater services in Campo Grande were managed by a municipal company and (for less than 2 years) a state company. At that time, the water supply reached 96% of the population but the wastewater service only reached 23% of inhabitants. The rate of water losses was above the national average, at around 56%.

The main objectives of the contract were:

- Universal coverage of water and wastewater systems, through modernization and expansion of the services
- 100% wastewater collection and treatment coverage for the city by 2025

During its operations, Águas Guariroba has already invested BRL 680 million (US\$ 217 million) in modernizing and expanding the city's basic sanitation services. The rate of water supply, which reached 96% of the population in 2000, now reaches 99.7%.

Extending wastewater collection

Águas Guariroba's main goal is to achieve universal coverage of the wastewater collection and treatment service. The plan is for the entire

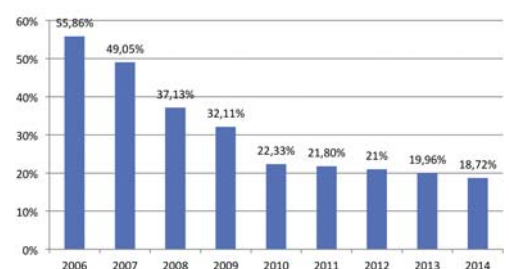
city to have 100% of its wastewater collected and treated by 2025. To do this, the concessionaire is investing BRL 636 million (US\$ 208 million) in projects that are part of Sanear Morena, the largest program of investments in basic sanitation ever executed in Campo Grande. In the first two phases (2006 to 2013), Águas Guariroba invested BRL 255 million (US\$ 81 million) in implementation of 839 km of wastewater collection networks, 67,000 home connections and two new treatment stations, the Los Angeles WTS and Imbirussu WTS.

The Sanear Morena 3 Program, begun in 2014, should benefit around 240,000 people. To do this, 2,000 km of collection networks and 12,600 new home connections will be implemented, in addition to construction of a new treatment station and expansion of the two existing stations. The entire population of Campo Grande will therefore be served by the basic sanitation service, which will positively affect health and sustainable development. In the first phase of the Sanear Morena Program alone, according to data from the Ministry of Health's Data – SUS (Unified Healthcare System) Department of Information Technology, there has been 34% reduction in cases of illnesses connected with a lack of basic sanitation at the city's health units.

Reducing leakage and water losses

Through its Reduced Losses Program (Programa de Redução de Perdas – PRP), Águas Guariroba reduced the rate of losses in Campo Grande's water supply system, going from 56% (2006) to 19% (2014) one of the best averages among Brazilian cities. The initiative has benefits for the system as a whole: it lowers operating costs, provides energy efficiency, improves quality of services provided to customers, and contributes to water conservation.

Rate of Losses %



The rate of losses in Campo Grande decreased from 56% in 2006 to 19% in 2014.

- Extending wastewater collection
- Reducing leakage and water losses
- Improving energy efficiency

Among many other initiatives, the concessionaire uses a hydraulic simulation which allows hydraulic behavior to be predicted and identifies any operational anomalies, such as a difference in simulated pressure and flow and data measured in the field. This enables greater precision in fighting water and energy losses and identifying these problems.

At the Operational Control Center, equipped with a real-time data monitoring software, 24 hour monitoring of the entire system is undertaken. This enables preventive and corrective actions to be taken immediately after any anomaly is detected (leaks, pressure anomalies, current trends, inaccurate measurements, data errors and others). It also allows for prioritization of services and management of all events in the system through mathematical and statistical modeling, in addition to providing automatic monitoring until the event is resolved.



Operational control center, Águas de Guariroba

While water production increased by 12.11% from 2008 to 2014, there was an 18.5% energy reduction in Kwh/m³.

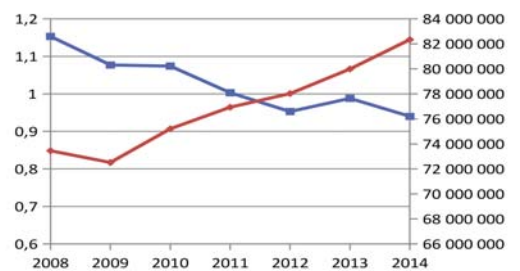
The PRP is work in progress, involving investments in technology, operational improvements and employee training, creating a culture of combating waste throughout the entire team. Actions are focused on preventing leaks, reducing fraud, improving meter readings and guaranteeing precise control of standardized water by the company, to be consumed by customers.

Improving energy efficiency

The project began in 2007 with actions like daily monitoring of electric consumption and frequent monitoring of pressure in the distribution network taken to optimize the water collection and distribution system in Campo Grande. Águas de Guariroba is also developing new projects which aim at distributed generation with alternative sources of energy (renewable resources: solar, natural gas, biomass and hydropower).

The results were significant: from 2008 to 2014, water production increased by 12.11% and there was an 18.5% energy reduction in Kwh/m³. For reference purposes, the energy saved could supply 138,777 Brazilian homes.

Energy consumption and volume of water produced



See ref. 28

When participating in an event to kick off the wastewater project, the Mayor of Campo Grande, Gilmar Olarte, said: "Everyone needs to be aware that wastewater is not an expense; it is a preventive investment in health. Campo Grande is prominent nationally as one of the nation's capitals with the best water supply and sewer rates."

Tangiers, Morocco

Population: 985,000

In 2002, wastewater was discharged untreated in many locations on the seashore. 12 years later, 95% of wastewater is collected and transferred to a treatment plant then discharged far offshore allowing the city of Tangiers to upgrade its tourist resort status.

Organising authority: The City of Tangiers.

Water and sewerage operator: Amendis, a local privately-controlled company (a subsidiary of Veolia Environnement).

Location: The region of Tangiers – Asilah on the Northern Coast of Morocco. Approximately 985,000 inhabitants.

PPP description

The Public-Private Partnership (PPP) is a concession-type contract for the supply of drinking water, management of the sewerage system and the distribution of electricity in the city of Tangiers. The operator purchases drinking water and power in bulk from state-owned producers.

The PPP contract started in 2002 for a duration of 25 years.

Context and PPP objectives

Some of the key objectives of the PPP contract were to:

- Finance and implement an ambitious investment program comprising the protection of the bay of Tangiers against the wastewater pollution that gave rise to bad odours for the neighbouring population, recurrent sewerage floods and direct disposal of the wastewater in the vicinity of tourist areas.
- Complete the access to basic services to the whole population of the contract area.
- Improve drainage to reduce flooding.
- Improve the quality and the efficiency of the customer service.

Protecting the Bay of Tangiers through removing pollution from wastewater

It was paramount to rehabilitate and complete the sewerage system of the city in order to remedy the bad hygiene conditions of the population and the long standing problem of odours from the rivers in the city and along the coastline, and also to improve the quality of bathing water on the beaches of the city in order to maintain its status as a tourist resort.

From the start of the contract in 2002 up to year 2014, the overall investment program amounted to 3,372 million Dirhams (€306 million) of which 54% was dedicated to the sewage service alone.



The new wastewater treatment plant

The sewage system that has been built and implemented by the operator comprises:

- 50 kilometres of main sewers to collect the wastewater that was previously disposed of in the small rivers (“oueds”) and indirectly into the bay,
- 39 pumping stations across the city,
- a waste water treatment plant (primary treatment),
- a 2.2 km long sea outfall.

Nearly 60 kilometres of rivers (“oueds”), formerly used as open sewers, have been completely cleaned, as well as 500 km of sewer lines.



Miscellaneous waste in a sewage collector before cleaning

Making life easier for users

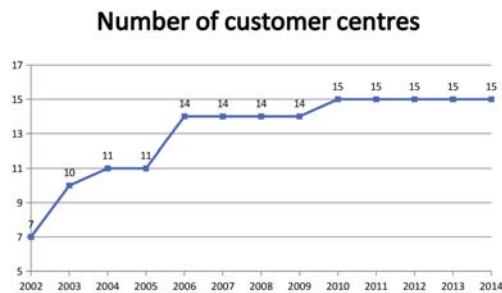
The customer service has been the focus of special attention from the operator.

The improvements implemented since the start of the contract comprise:

- Protecting the environment from wastewater pollution
- Making life of users easier
- Raising and maintaining staff capacity

The number of customer centres has been doubled to simplify the life of water-users. Remote areas are served by 3 mobile centres.

- the creation of a customer care centre (“call centre”) named “Amendis Direct”;
- the increase in the number of branches from 7 in 2002 to 15 since 2010 for customers to resolve any issues/requests,
- the introduction of 3 mobile branches to serve remote areas through fully equipped buses,
- the introduction of a new billing system as well as the redesign of the bill,
- provision of better information to customers,
- the facility for customers to pay their bill at local groceries,
- meter reading through handheld devices improving the efficiency of the reading/billing cycle.



Mobile branch to serve remote areas

Raising and maintaining staff capacity through intense training

A massive training effort for the staff has been undertaken: 195,000 hours of training between 2002 and 2014, i.e. an average of 17 hours of training per staff per year, with an overall budget of 43 million Dirhams (US\$ 3,412) for the period 2002 to 2014.

A new training center has been built with 12 specific training rooms (in a 1,300m² building) and a 4 hectare field, equipped to pro-

vide training in water, sewerage and electricity. Through an agreement with 3 universities the new training centre is entitled to deliver official diplomas.



Staff on the field

Other significant improvements

The water network has been extended by 70% since 2003 and the connection rate has improved by 22% from 73% in 2003 to 95 % in 2014. The number of customers has been increased from 111,000 to 247,000 at the end of 2014 (i.e. +119%).

Cross-subsidies allow the 32% of customers who consume less than 6 m³ per month (lowest billing block) to pay a metric charge that is lower than the price paid by Amendis, the distribution operator, to the bulk water provider.

37,000 “social” connections have been realised between 2002 and 2014 targeting poor households (partly funded through a World Bank supported Output Based Aid scheme).

The efficiency of the water distribution network has been improved from 63.3% in 2002 to 79.5% in 2014, saving the equivalent of the water consumed by a Moroccan city of 200,000 inhabitants.

The improvements to the sewerage and drainage networks have also contributed to solving the issue of recurrent floods during wet weather in some of the low points of the city (nearly 79 flooding hotspots have been eliminated), thus contributing to better hygiene of the population concerned.

The System of Quality Management is certified ISO 9001-2008. The wastewater treatment plant is certified ISO 14001.

See ref. 28

Cross-subsidies allow the operator to charge 32% of customers a price per cubic metre that is cheaper than it purchases it from the bulk water provider.

City of Cartagena, Colombia

Population: 1,000,000

Organising authority: Municipality of Cartagena de Indias.

Water and sewerage operator: Aguas de Cartagena SA E.S.P. (Acucar).

Location: Cartagena de Indias is a city located in the state of Bolivar, Colombia.

PPP description

Aguas de Cartagena manages the municipal water service of the city of Cartagena de Indias. It is a “mixed” company owned by the city (with a share of 50%), by a private operator (AGBAR group - with a share of 45.9%) and some local private shareholders (with 4.1%). PPP operations started in 1995 and the duration of the contract is 26 years.

Context and PPP objectives

The city of Cartagena de Indias had significant population growth during the years before 1995. This city growth, in number of inhabitants and thus in surface area, created serious problems for the water and sewerage systems. Through a public and international bidding process, the city set up a Public-Private Partnership, aiming at the following goals:

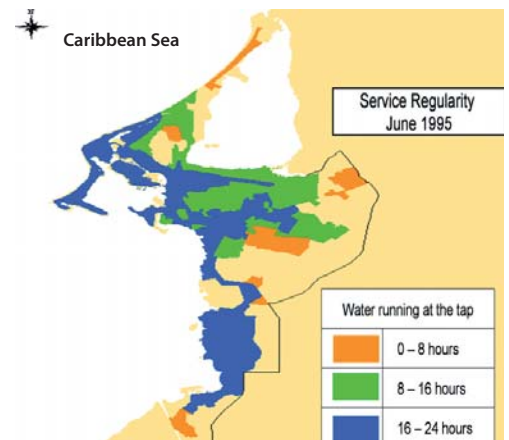
- universal coverage of water and sanitation
- water supply 24 hours a day and 7 days a week
- water quality improvement
- water loss reduction
- universal treatment of wastewater
- affordable tariffs for the whole population

Improving regularity of water supply

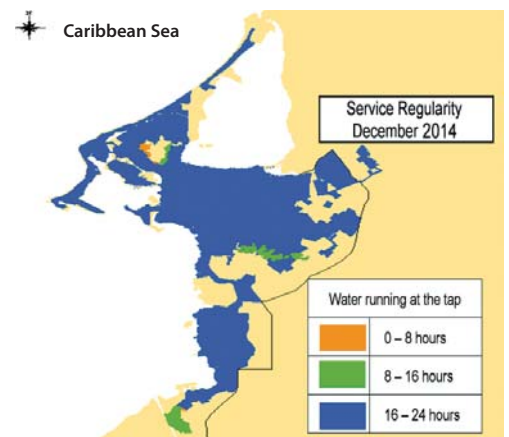
In 1995, at the beginning of the concession, there were areas where households received water supply less than 8 hours a day, other sectors where households received water supply between 8 and 16 hours a day and in some areas households received water supply between 16 and 24 hours a day. Water supply of 24 hours a day was practically non-existent. On average water was running at the tap for only 14 hours a day. The map illustrates these different sectors according to water supply regularity.

In 1995, there was running water at the tap only 14 hours a day on average. Since 2002, it is running more than 99% of the time.

86% of domestic customers newly connected to water networks are from lower income classes and receive tariff subsidies.



Thanks to efforts of rehabilitation and replacement of the existing network, the situation has been reversed and now water supply is continuous in almost all the city (99.3% of the time in average), as shown on the second map.



Ensuring more equitable supply

Cartagena has seen its population increase from 510,000, in 1995, to more than 1 million in 2014. This demographic growth has resulted in the increase of the number of connections from 94,639 in 1995 to 243,107 in December 2014.

86% of new domestic users are from lower income groups. In Cartagena water users are classified in six different bands according to their socioeconomic status, where bands 1, 2 and 3 receive subsidies and bands 5 and 6 pay an additional percentage above the regular price, which is paid only by band 4.

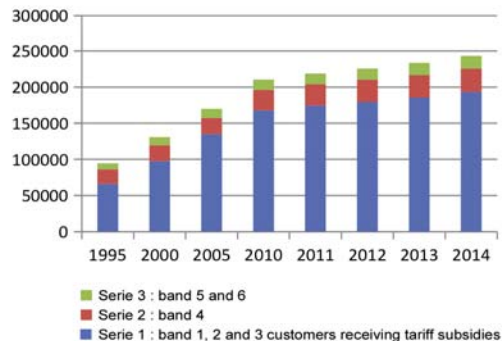
- Improving availability of water supply
- Ensuring more equitable supply
- Raising and maintaining staff capacity

The company has realised significant efforts in capacity building and workers training, which have had very positive impacts.

Despite population doubling water coverage has been increased from 72% to 99.9%.

Customer satisfaction has improved from 71% of users in 2007 to more than 85% since 2007.

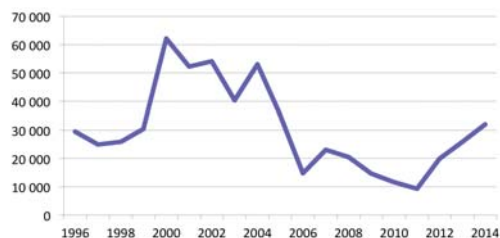
Evolution of the number of Users per band 1995-2014



Raising and maintaining staff capacity

One of the more important investments realized by Acucar has been, and continues to be, its staff training. All workers, including the General director, have received training that has allowed them to develop their talents and abilities. This has been developed through a series of Training and Management Development approaches, based on organizational strategy, key processes and continuous improvement programmes.

Training: Man/Hours



During the ten first years, the company put all its efforts into training and into the development of basic competencies for all its workers. In 2000, the number of training hours per employee per year was 125 hours. It was particularly important to achieve the professionalisation of a significant part of the operative staff and qualify them as "Technician in drinking water and basic sanitation". To do this the company increased the number of "man-hours" of training significantly.

During the later years, the company has worked on strengthening competencies, mainly for

managers. This explains the reduction in the number of man-hours of training. However, the effectiveness of the training is maintained because it has a multiplier effect and creates high levels of productivity.

In recent years, the company has worked on strengthening human and organizational skills, especially in the formation of the leaders of the organization, which has been highly efficient and provided great results in productivity.

In 2014 a further step was completed in higher staff training, Aguas de Cartagena facilities were certified as a training centre for the programme "Water and sanitation technology" led by the Ministry of National education. Currently 30 employees are being trained in basic water and sanitation services.

Other significant improvements

Despite the doubling of the population, the efforts made by the company have permitted an increase in the percentage of the population connected to the drinking water supply network from 72% in 1995 to 99.9% since 2008.

The coverage of sewerage connections increased from 60% to 93.58% between 1995 and 2014.

The company implemented mobile offices where customers can easily go to regularize their services with payment plans according to their budgets and capacity to pay. This initiative strengthens the relationship between the company and its customers.

The investments have allowed an increase in the population that benefits from a continuous water supply, improving the water quality and protecting the environment of the bay and the lake as part of the "Master Plan of Water Network, Sewer Network and Environmental Sanitation". All these elements contributed to satisfy water users expectations. According to surveys, customers' satisfaction has been increasing steadily since 2005, reaching more than 85% since 2007.

See ref. 2, 13, 14, 28, 30

"It is so satisfying to see the commitment to excellence in management that companies such as Aguas de Cartagena have. Congratulations for this achievement that contributes to the progress of our beloved Colombia." Quote from President of Colombia Juan Manuel Santos, in a letter sent to Acucar in October 2011, on the occasion of the Health and Safety certification

Bristol, United Kingdom

Population: 1.2 million

£88.5m of capital investment in 2013/2014 – highest annual investment in company's history.

In 2013/2014 93% of respondents rated the service as excellent or good.

In 2013/2014 99.97% of water samples complied with DWI standards.

Organising authority: OFWAT, a UK Government body.

Water operator: Bristol Water PLC.

Location: Bristol, south west of England.

PPP description

Bristol Water has supplied drinking water for over 167 years and today serves a population of 1.2 million people.

Bristol Water plc is currently owned by Capstone Infrastructure Corporation (50%), Suez Environnement (30%) and Itochu Corporation of Japan (20%).

Privatisation of the water industry in England and Wales occurred in 1989, although Bristol Water was one of 28 water only companies that have always been privately owned. Bristol Water currently operates as a licensed monopoly company, although in April 2017 business customers will be able to choose their retailer as regulatory changes to drive competition and improved customer service come into force.

Context and PPP objectives

Bristol Water faces a series of challenges over the coming years including population growth, the impacts of climate change, and further changes both in customer expectations and the regulatory environment in which it operates.

A number of government organisations regulate the UK private water industry. OFWAT is the economic water industry regulator responsible for ensuring Bristol Water meets the conditions of its license. It regulates by setting the price, investment and service package that customers receive and sets targets for KPIs such as leakage. This is reviewed every five years.

Satisfying users' expectations

The company measures satisfaction through an annual survey, monthly consumer surveys and the OFWAT SIM measuring the consumer experience. Bristol Water has consistently been highly ranked by customers. In February 2014 annual survey 93% of respondents ranked the service as excellent or good, this was the same figure as the 2013 survey.

It also revealed that 70% of consumers rated services as providing good value for money.

Tackling water poverty

The company assessed that 2.1% of customers were experiencing water poverty; they spend more than 2% of their income after tax on paying their water charges.

Advice is given to customers requiring assistance and support can be offered in the form of 'social tariffs'. These are currently assisting more than 6,000 customers, moving forward there will be a focus on promotion of social tariffs and working in partnership with charities, debt advice services, housing associations and local councils.

Reducing unwanted calls

Through understanding customer demands, changes have been made to the manner in which billing information is displayed. There has been a decline in customer queries in relation to billing from almost 7,000 in 2010 to less than 3,000 in 2014.

Further changes were seen within 2014/15 as an e-Billing service was introduced. There has also been investment in a new website following detailed research with consumers, and an upgrade to the CRM database, introduced to help with the management of consumer contacts more efficiently.



Staff on the field

Reducing leakage and water losses

In excess of 98% of properties in Bristol Water are monitored permanently through 378 District Meter Areas (DMAs). The remainder of the properties are covered through a programme of regular sounding. Flow and pressure data from district meters are obtained on a daily basis

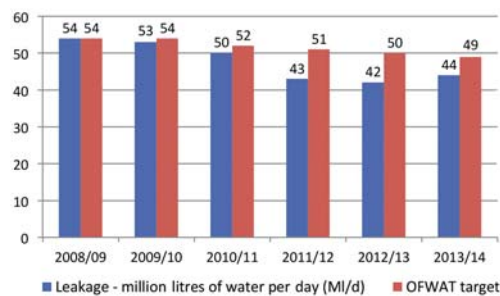
- Satisfying users' expectations
- Reducing leakage and water losses
- Improving energy efficiency

through various modes of telemetry and mobile technology.

In 1997 OFWAT introduced mandatory leakage targets on an annual basis for water companies in England and Wales. To achieve these mandatory targets a programme of Pro-active leakage management was initiated within Bristol Water as part of the Leakage Reduction Plan. A focussed active leakage control and pressure management plan was implemented alongside this strategy. As a result of this programme a significant reduction of total leakage levels has been achieved.

Due to the latest determination by OFWAT, Bristol Water will be looking to reduce Total Leakage, from 91 to 81 Leakage Litres/day (48 to 43 Megalitres/day) over the next five year period.

Bristol Water performance compared to OFWAT targets

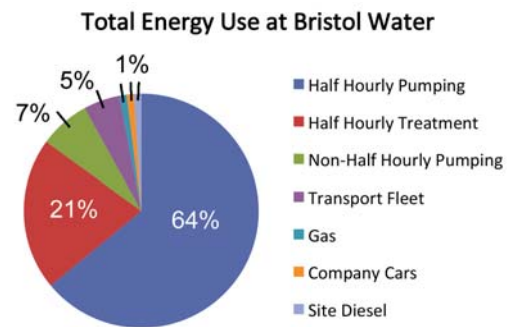


Pressure management has been successful in contributing towards meeting the corporate leakage target, but reducing system pressure has also significantly reduced the number of breaks on pipes and services. A study of pressure management schemes implemented in Bristol Water showed that on average a 25% reduction of mains breaks and 45% reduction of service pipes breaks occurred after pressure management with an average reduction of maximum pressures of 39%. This data was a major contributor to the first IWA (International Water Association) (WLTF) Water Loss Task Force international data set on pressure – burst research.

Improving energy efficiency

Energy use is high because the amount of water transported throughout the water supply network is so large (Bristol Water utilises approximately 100 million tonnes per year). Most of this energy is used for pumping (64%) and

Bristol Water uses approximately 80,000,000 kWh of electrical energy each year. The terms NHH (Non Half Hourly) HH (Half Hourly) monitored sites are referred to within the energy use graphic.



There are two main opportunities to reduce energy costs. The first is to reduce the energy required to deliver customers' needs, by selecting water sources that require lower energy for pumping and treatment. This "conjunctive use" approach allows the company to choose the best source options – matching resource management needs, treatment costs and energy consumption.

The second is to ensure that energy is consumed efficiently: this requires the largest and most energy-intensive equipment to be managed through constant monitoring systems and to have an energy management team in place to extend and develop this approach to include system modelling for the whole network.

Finally, the source of the energy is a major factor in its environmental impact. The company have installed one of the UK's largest solar photovoltaic systems at its Purton Treatment Works which produced 268,925 kWh of electricity during 2013/14, all of which was used on this site.



Photo-voltaic panel

Special payment schemes benefit 6,226 households (for 2013/14).

In excess of 98% of properties in Bristol Water are monitored permanently through 378 District Meter Areas.

Adelaide, Australia

Population: 1,200,000

Organising authority: South Australian Water Corporation (SA Water).

Water operator: Allwater Joint Venture (Allwater) is a joint-venture between Suez-Environnement, Degremont and Transfield Services.

Location: Adelaide, the fifth largest Australian city.

PPP description

In 2011, Allwater was chosen by SA Water, owned by the Government of South Australia, to operate and maintain metropolitan Adelaide's water, wastewater and recycled water systems for ten years. This performance-based PPP contract is an Alliance partnership that allows SA Water and Allwater to work collaboratively together in the delivery of water services to SA Water's metropolitan customers.

An Alliance Partnership is a form of performance-based contract where the risk and rewards are shared between the partners who work cooperatively together to achieve common goals. Features include integrated management, unanimous decision making and open book accounting. Funding is provided solely by the business owner with the non-owner partner providing the services either solely or jointly. The Adelaide contract is an outsourced alliance, whereby the majority of the workforce is provided by the non-owner partner.

Context and PPP objectives

After an Australia-wide examination of many service delivery models, SA Water chose the outsourced alliance option on the basis it would provide:

- Best value customer service through a one-stop-shop for all general, billing and service queries and a priority based field service response to faults
- Flexibility to manage future business directions and priorities, such as economic regulation and other water industry reforms

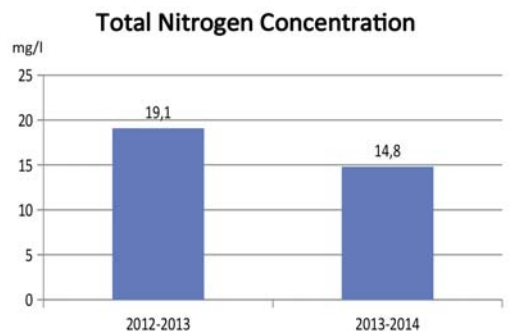
- Improved asset management through the separation of maintenance and capital works delivery, to encourage optimal life cycling costing
- Joint management of operations to ensure alignment of commercial and performance goals and utilisation of strengths from each partner organisation



Bolivar Wastewater Treatment Plant

Protecting the environment form wastewater pollution

Allwater/SA has a long term strategic goal to reduce nitrogen discharge to the sea for environmental protection. A number of innovative and operational improvements have been implemented. At the Bolivar wastewater treatment plant, the total nitrogen concentration was reduced from 19.1 mg/l in 2012-13 to 14.8 mg/l in 2013-14. Since 2011, this has resulted in 200 tonnes less Nitrogen being discharged to Gulf St Vincent, a sensitive marine environment. These results were achieved using only existing infrastructure without incurring any capital or additional energy costs.



Accreditation in AS4801 (Safety), ISO9001 (Quality), 14001 (Environmental) and 50 001 (Energy).

- Improving wastewater management
- Improving network efficiency
- Improving energy efficiency

Improving network efficiency

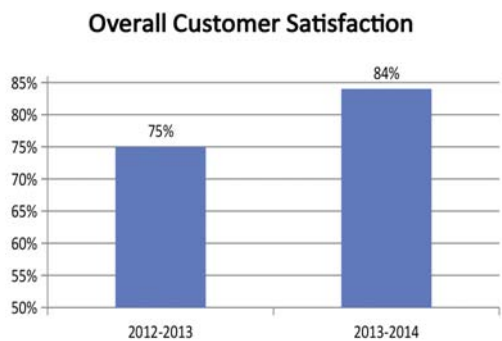
Allwater Networks are responsible for repair work to both the water and wastewater distribution networks in metropolitan Adelaide, including meters and customer connections. In 2013-14, Allwater's responsiveness to network faults has greatly improved through the introduction of an outstanding task optimisation tool enabling the clustering of jobs by suburb.

A GPS-based In Vehicle Monitoring System was installed in 117 vehicles, allowing dispatchers to see the location of technicians in real time and identify the nearest resource.

This has led to:

- 9% improvement in overall customer satisfaction from 75% to 84%
- 8% less kilometers travelled
- 4% more jobs completed with 11% less total hours worked, including overtime.

Overall customer satisfaction has risen from 75% to 84%.



Improving energy efficiency

Allwater has a strong focus on energy efficiency and is the first Australian water utility to be ISO 50 001 certified.

One of the main achievements was the reduction in the unit power usage at the two main wastewater treatment plants, despite treating an increased volume of influent:

- 7% energy efficiency improvement at Bolivar WWTP
- 11% energy efficiency improvement at Glenelg WWTP.

In 2013/14, Allwater introduced waste from food industries to boost the production of biogas at Glenelg WWTP. This full-scale co-digestion project has increased the generation of power from biogas by 25 per cent while reducing costs, with the plant now being 85% self-sufficient in energy.



"The Adelaide Services Alliance is a major component of SA Water's operations and as such the services it delivers must be both efficient and high quality. Allwater has proved to be an excellent alliance partner to assist SA Water improve its business through innovation and collaboration."
Mark Gobbie, General Manager, Operations & Maintenance, SA Water

Pennsylvania, U.S.A.

Population: 1.4 million people served by Aqua Pennsylvania

Aqua Pennsylvania has reduced its electricity consumption by almost 3.9 million kilowatt hours and its fuel consumption by roughly 28,000 gallons forms 2009 to 2010.

Algae contaminants that produce bad taste and odour are effectively eliminated thanks to a UV-oxidation system.

Responsible Authority: Commonwealth of Pennsylvania.

Regulatory Agencies: Pennsylvania Public Utility Commission and Pennsylvania Department of Environmental Protection.

Water Utility: Aqua Pennsylvania (Aqua).

Location: Pennsylvania in the Northeast region of the United States is home to more than 12.7 million residents. Aqua serves 1.4 million people in 30 counties across Pennsylvania.

About Aqua Pennsylvania

Aqua was founded as the Springfield Water Company in 1886 to supply water to a township in suburban Philadelphia. After more than a century of development and change, the Springfield Water Company grew to become a national investor-owned utility called Aqua America.

The Pennsylvania subsidiary is the company's largest and operates under the regulation of the Commonwealth of Pennsylvania.

Improving water quality and acceptability

The Neshaminy Surface Water Treatment Plant completed a multi-year, two-phase series of major upgrades totaling \$20 million. Phase I included the installation of an ultraviolet light/hydrogen peroxide treatment system, which removes up to 90 percent of taste and odor causing compounds without generating additional waste sludge. The system can be turned on and off to treat issues as they occur. The initial work in Phase II was completed in 2012 and included the construction of new equipment to help aid coagulation and reduce disinfection byproducts. Upgrades to the sedimentation tanks improve water quality and filter performance.

The final work completed in 2013 includes a newly constructed solids handling facility that mechanically removes excess water weight, which not only provides a more cost effective and sustainable way of disposing solids, but also extends the useful life of the onsite landfill.

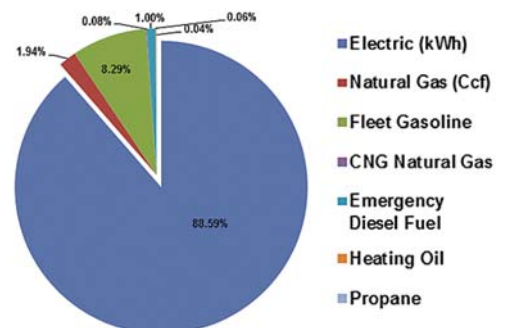
Increasing Energy Efficiency

Aqua is engaged in the enhancement of energy efficiency in order to reduce environmental impacts and energy costs.

The continued incorporation of cleaner energy sources from Aqua Pennsylvania's energy provider's energy mix, allowed the utility's net emissions to decrease. In 2013, Aqua Pennsylvania's operation created the CO₂ equivalent of 72,844 metric tons. Of that amount, more than 88 percent was electricity used for pumping and treating water and wastewater.

The electric demand of Aqua Pennsylvania's southeastern operations saw a reduction of more than 11,500 metric tons of emissions, or 4.4 million kWh compared to 2012. This was due in part to continued pump efficiency measures, power management programs, and an unseasonably wet winter.

2013 Pennsylvania GHG Sources



The company continues to lower electricity consumption through a number of innovative methods including the installation of new and larger mains, which reduce the energy required to move water through transmission mains by reducing pipe resistance.

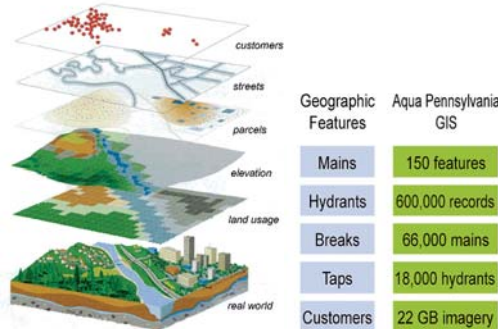
Booster maintenance programs are switching out old fixed-speed pumps with new, smarter Variable Speed Drives, or VFDs, that adjust sendout to the current system demand. Several Aqua America states have treatment plants participating in market-driven electricity demand reduction programs that help to stabilize the electric grid during peak periods of extreme temperatures.

- Improving water quality and acceptability
- Increasing energy efficiency
- Optimising asset management



Optimising Asset Management

Aqua is convinced of the importance of good asset management to ensure continued serviceability and to prolong the life of infrastructure. With this in mind, the company adopted a new asset management software at three division production facilities in 2009. The software has a detailed database of all assets (8,000 assets were included in 2011) and captures and records all preventive, predictive and corrective maintenance jobs.



With more than 5,700 miles of pipe in Pennsylvania, the ability to prioritize which pipes need improvement and when is a challenge. For nearly 10 years, Aqua Pennsylvania has used two cutting-edge technological asset management software programs to meet the challenge: the Asset Information Management System (AIMS), allowing users to electronically retrieve detailed information on pipes, hydrants, main breaks, customer taps, and plans from the past 100 years, also providing a link to more than 60,000 scanned images of as-built construction plans, providing one-stop shopping for distribution system information and Geographic Information System (GIS), that allows users to retrieve and display visual information about the distribution system network with a web-based map application.

Both initiatives were designed to meet Aqua Pennsylvania's need for a formal and efficient

means to prioritize infrastructure projects while optimizing the use of capital to replace or upgrade the company's distribution system infrastructure.

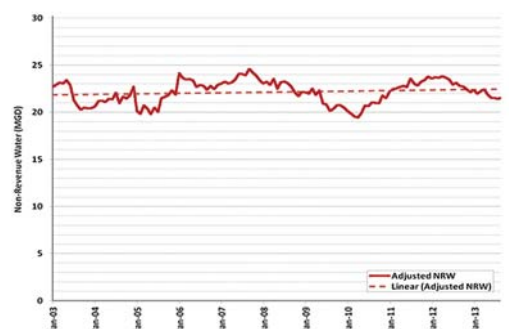
Other Significant Improvements

With the production of almost 40 billion gallons (151 million m³) annually, any kind of water loss on that scale represents a significant cost to utilities and the environment. Every gallon of water produced has an associated cost of chemicals for treatment, electricity for pumping, and manpower for operations and emergency repairs. Even small reductions in water loss can result in savings to a water utility.

In 2013, Aqua Pennsylvania enlisted a contractor to review its Southeastern operations to better understand the real environmental and financial cost of water loss and strategies for reducing it.

The goal of the project was to investigate trends for the past 10 years and validate or adjust calculations to account for any reporting errors; evaluate real, apparent, and authorized sources of water loss; and develop prioritized solutions. The study found three areas to focus efforts:

The number of main breaks has been declining for several years due to Aqua's proactive main replacement program. However, service line leaks have represented a real challenge as in most cases they fall under the responsibility of the customer. The study estimated that service line leaks could represent as much as 35 percent of the total water loss in Aqua Pennsylvania's southeastern territory. Aqua is considering the suggestions from the review, and working to further reduce water loss both in Pennsylvania and its operating states.



Aqua Southeast Pennsylvania Non-Revenue Water Amount (mgd) 10-Year Trend

The company won the management Innovation national award for its Asset Information Management System and Geographic Information System programmes.

City of Bucharest, Romania

Population: 2,000,000

Organising authority: The city of Bucharest.

Water and sewerage operator: Apa Nova Bucuresti (ANB), a subsidiary of Veolia Water - 73.7% of the shares, with 16.3% owned by the Municipality of Bucharest and 10% by the employees of the company.

Location: The city of Bucharest, covering a population of about 2 million.

PPP description

In March 2000, the Municipality of Bucharest entered into a public-private partnership contract (PPP) for the management of its water and sewerage systems. The 25-year innovative concession contract was awarded to ANB following an international competitive tendering process.

The PPP contract is output-based. Services obligations (levels of service targets) are clearly specified and have to be met by the operator in a fixed timeframe. Targets are related to water service, sewerage service and commercial relationship with end-users.

The type and amount of capital expenditure required to reach each service target are not imposed by the contract and are planned at the discretion of the concessionaire. However, the contract mentioned one obligatory investment requirement: to finance, complete and commission a 3 m³/s water treatment plant (obligation fulfilled in 2006).

Compliance with the levels of service targets is assessed annually by the local Technical Regulator, while the national Economic Regulator supervises the correct application of tariff adjustment rules.

Context and PPP objectives

In the 1990s, more than half of the population of Bucharest was not satisfied with the faltering water and sewerage utility. The water service was intermittent and unreliable, and was in a dire financial situation. The municipal objectives to be achieved through the concession contract were the following:

- Complying with EU standards for potable water and sewerage services at the lowest possible tariffs;

- Running services that are financially independent from Municipal and Governmental funding;
- Improving efficiency and operational performance;
- Avoiding monopolistic behavior and obtaining sustainable contractual arrangements;
- Increasing environmental protection and pollution control.

Resulting from the common will of the Municipality and ANB, between 2009 and 2013 5 Addendums to the contract have been concluded in order to face the new challenges of the global economic crisis and development needs of the city.

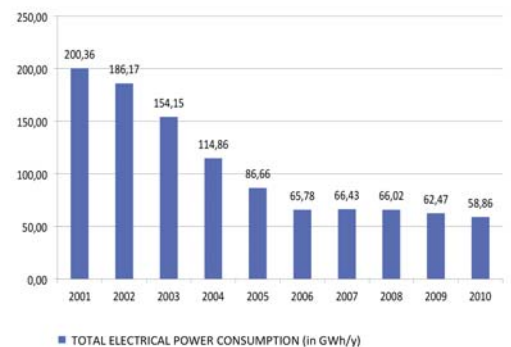
Below are some of the achievements 13 years since the start of the concession.

Improving Energy Efficiency

ANB has significantly improved operational efficiencies, including in particular increasing energy efficiency with a reduction of about 60% of annual electricity consumption between 2000 and 2013 (excluding the consumption of the WWTP that entered into operation in July 2011, the reduction would be about 78%).

Excluding the new treatment works, annual electricity consumption has been reduced by more than 75% between 2000 and 2013 on a like for like basis.

Total electrical power consumption (in GWh/year)



This is the result of the reduction of water leakages, the decrease of water abstraction as well as extensive modernization of the pumping stations and optimization of pressure management.

- Improving energy efficiency
- Satisfying users' expectations
- Optimising economics of services

Satisfying users' expectations

Client services have improved, with the metering of all the customers, new customer reception areas and a new Call Centre to deal with customers requests 24 hours a day.

With improved services (correction of all low water pressure problems, improved water quality etc.) and customer care, customer satisfaction went up substantially from 46% in 2002 to 86% in 2013 (and written customer complaints dropped from 11,462 in 2001 to 1,191 in 2013, a decrease of 90%).

Service efficiency and cost savings generating financial resources for increased investments

In the first 13 years of the concession, ANB has invested more than 360 million €, equivalent to about 24% of its total incomes since the beginning of the concession.

Unlike the other Romanian utilities, ANB financed all its operations and investment without public subsidies and the tariff has remained affordable.

In 2013, tariffs in Bucharest were in the mid-range in Romania, on the 18th place in descending order out of the 33 main Romanian operators. This is in spite of the cost of the new obligations that have been assumed by ANB but were not foreseen in the initial contract, as for example taking over of the City's main collector, followed by huge cleansing operations that have to be carried out under very difficult conditions.

Other significant improvements

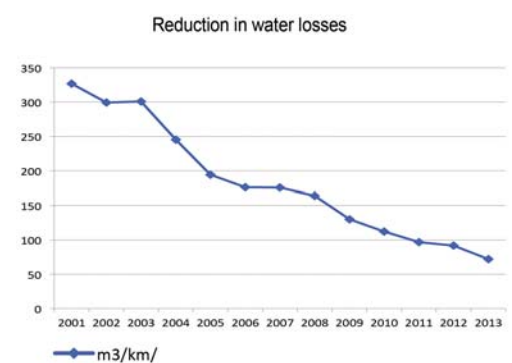
Bucharest's water quality considerably improved. Since 2005, the deadline for achieving this level of service, the technical Regulator has

reported annually that ANB met the standards for all water quality parameters included in the concession contract.



Even if water and sewerage coverage was already high when the concession started, water and sewerage network coverage in Bucharest increased from 91 to 97% in 2013. The current network extension program started in 2011 will continue until 2016. This level is higher than the coverage in other Romanian cities, which averages below 90% for water and 80% for sewerage.

Water resources have been preserved by a reduction by three-quarters in the water losses in the distribution networks as a result of both decreases in consumption and reduction of leakages.



About 60% of the wastewater (including storm water) generated in the service area is treated in the existing WWTP entered into operation in 2011, which will be extended further.

See ref. 7, 24

Apa Nova Bucharest can be considered an efficient water supply and sewerage service operator from an economic, social and environmental perspective, further demonstrating the viability and sustainability of the concession of these services in Bucharest, primarily by achieving the objectives related to service quality increase and consumer satisfaction. **Effects of the Public Private Partnership in the public water supply and sewerage services of Bucharest (2009-2012).** Authors: Prof. Ioan Radu, PhD and Cleopatra Şendroiu, PhD, Editura Universitara, 2014

Customer satisfaction went up substantially, from 46% in 2002 to 86% in 2013.

City of Paris, France

Population: 2,200,000 – Water Distribution

100% of the lead communication pipes have been replaced to comply with tightened safety standards.

More than 50% of the distribution networks have been renewed. The average age of the distribution networks is now 21 years younger than it was at the beginning of the PPP contracts 25 years before.

Organising authority: The City of Paris.

Water distribution operators: Two private water operators:

- Compagnie des Eaux de Paris, a subsidiary of Veolia Water, for the Northern Bank of the Seine River),
- Société Parisienne des Eaux, a subsidiary of Lyonnaise des Eaux, for the Southern Bank of the Seine River.

Location: Central Paris (inside the first ring road) corresponding to a resident population of 2.2 million inhabitants.

PPP description (1985-2009)

Between 1985 and 2009, the water service in Paris was split into two parts:

- The production of drinking water was under the responsibility of a publicly-controlled company, named SAGEP, that sold the drinking water it produced in bulk to the two private operators in charge of the distribution of drinking water to the city.
- The distribution of the water, bought in bulk from SAGEP, to end-users was undertaken by the 2 private operators. This “supply” part of the service represented only 15% of the water and wastewater rates charged to end-users.

The two PPP contracts came to their natural end at end of 2009. From January 2010 onwards the service was restructured into a single public entity “Eau de Paris” to comply with the political will of the new mayor of Paris, who had decided to take the whole management of the water service back in-house.

Reviewing the period 1985-2009, the outcome of the PPP contracts for water supply can be deemed to be excellent.

Context and PPP objectives

The scope of the two contracts included, management of the distribution network, maintenance of the fittings, maintenance and cleaning of the water towers and reservoirs, monitoring water quality, 24/7 supply of water to premises through the 2,000 km long distribution network, billing and customer relationship management.

Securing water safety

In 1998 the European Directive 98/83/EC on drinking water imposed more stringent standards on the presence of lead in the water supplied.

To ensure the potability and the safety of the water for the water consumers in compliance with this directive, it was found necessary to remove all lead communication pipes before the 2013 mandatory deadline. These represented 70% of the total stock of connecting pipes in the network, about 66,000 in all.



Between 1999 and 2009 the operators were able to replace all the remaining lead communication pipes still in the Parisian distribution network. The cost of this important and unexpected investment has been fully repaid by water rates by the end of the PPP contracts. This permitted the City of Paris to make rate reductions or additional investment after 2010.

Managing infrastructure assets sustainably

In parallel with the very intensive and comprehensive leak detection work, the operators have carried out a massive investment program on the network comprising both structural rehabilitation and renewal of distribution pipes. Overall 1,100 kilometres of distribution pipes have been dealt with (either renewed or rehabilitated), representing more than half the overall length of the network. The cost of this important investment was funded by the operators.

Between 1985 and 2009, the “functional” age of the network, despite a natural age increase of the 25 years of the contracts, has been reduced by 21 years.

- Securing water safety
- Reducing leakage and water losses
- Managing infrastructure assets sustainably

Water losses in the distribution networks have been reduced from 22% to 4%, i.e. a factor of 5.

Reducing leakage and water losses

At the start of the PPP contracts 22% of the water purchased in bulk from the production operator was lost in the distribution network.

Improvement of the network performance was achieved by zoning it into District Metering Areas, equipping it with GSM sensors to help to detect leaks in sensitive sectors, permanent leak detection campaigns on a rolling basis, and routine operational monitoring.

This extensive approach undertaken by the operators has enabled an increase in the efficiency of the network to a level as high as 96%, when it was lagging at a mere 78% in 1985. The leakage from the network has therefore decreased from 22% to only 4%, which means a reduction by a factor of 5 in the volume of water lost through leakage.

The leakage effort as well as the renewal investment has allowed the city of Paris to save the equivalent of three years of annual drinking water consumption (617 million m³).

Other significant improvements

The operators also equipped all the customers and connections with an innovative system of remote Automatic Meter Reading. This scheme provides gains in the accuracy of the metering as well as in the quality of service through online (internet) monitoring of the clients' water consumption.

As an ultimate recognition of the good work undertaken by the operators, regular customer surveys have shown that 80% of customers were satisfied or very satisfied by the quality of the water service provided in Paris.

See ref. 9

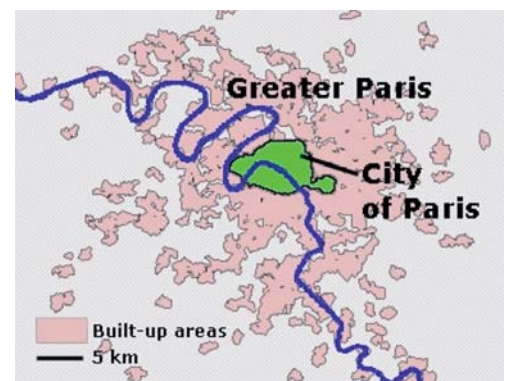
The Suburbs of Paris and the City of Paris not to be confused

The Greater Paris Region's population exceeds 10 million inhabitants. The population served by the City of Paris is therefore less than ¼ of the Greater Paris population. In the suburbs, the water supply is organised by different public authorities. They mostly use private operators through PPP contracts.

The largest responsible authority is the Syndicat des Eaux d'Île de France (SEDIF) that federates 142 municipalities. The SEDIF has chosen private operation to manage the water service for its population of more than 4 million.

In 2010, the SEDIF has renewed its trust in private management and decided to enter into a new public-private partnership contract for 12 years. The new contract started on 01/01/2011. The private operator is incentivised to further improve the performance of the service through a set of 190 performance indicators. Meeting the target values directly affects the operator's remuneration.

The stiff competition for the contract and the efficiency gains brought in by the previous contract have led to a significant 18% price cut in the average price of the water service for the 4 million people served by SEDIF.



Guayaquil, Ecuador

Population: 2,470,000 inhabitants

Organising authority: City of Guayaquil.

Private operator: Veolia through Interagua.

Location: Guayaquil is the most populous and biggest city of the Republic of Ecuador.

PPP description

In 2008, Interagua signed a 30 year concession contract to manage water services in the canton of Guayaquil. Emapag-EP the municipal body for regulation and control ensures that the concessionaire complies with the obligations of efficient drinking water and sanitation services.

PPP context and objectives

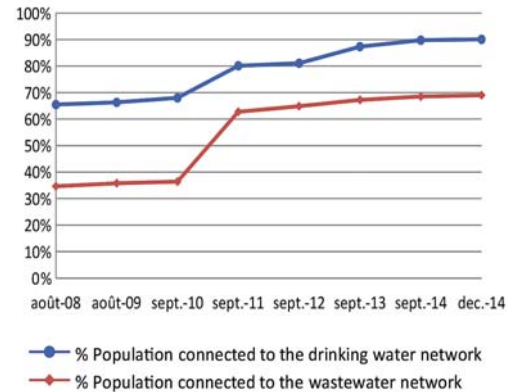
Since the beginning of the concession, there have been great challenges to be overcome to improve the service coverage. The continuity of services has faced major difficulties: major sectors of the city suffered from an irregular and discontinuous water supply. Interagua aims at achieving the following objectives:

- Supplying 24/7 water
- Complying with high quality standards
- Complying with required pressure standards
- Fighting the culture of non-payment
- Promoting relationships with the community and interest groups

Improving the accessibility of water and wastewater

In 2008, only 65% of the population of Guayaquil had access to drinking water. Interagua took up the challenge of improving the drinking water service. In 2014, the rate of population with access to drinking water has risen to 90%. Several times the city of Guayaquil was close to total water supply coverage, this has not been achieved only because of the continuous increase of the urban perimeter within the scope of the land management plan enacted by the National and Municipal Governments. This has led to the permanent needs for the City to undertake extensive new work plans.

Population Rate with access to drinking water and sanitation



The sanitation coverage has also been improved significantly. The population connected to the wastewater network has increased from 35% in 2008 to 69% in 2014. The water and sanitation expansion plan is focused on less-favored sectors of the City. In 2014, an inter-institutional agreement was signed with the regulator body (Emapag-EP) to subsidize domestic connections to the public sanitation network during municipal works. This allows the population's life quality to be maintained and prevents contamination of rivers and estuaries.

Making life of users' easier

The private operator made the choice to innovate by developing and implementing more than an information system but a whole new way of working in the commercial processes. It allows saving in time and resources and it is environmentally-friendly.

The billing system allows reading, calculation of consumption, payment and bill printing and receipt on the website. The company has changed the image of the service by investing in installations to receive customers in agencies and allow them to use services by phone. The system detects exceptional increases in consumption and localizes water consumption that is more than 100% of normal use. It charges the regular consumption for a month, or until a technical verification is conducted for the consumer, in order to establish what led to the increase in consumption.

The population rate connected to the wastewater network has risen from 35% to 69% between 2008 and 2014.

90% of the solutions provided by the "Client Ombudsman" are qualified as excellent by the users.

- Improving the accessibility of water
- Making life of users easier
- Contributing to affordability of water services



Guayaquil on-line billing centre

Interagua was also keen to strengthen relationships with stakeholders. The “Social management and local development” programme contributes to capacity building for community leaders, public and private social managers. Between October 2011 and January 2014, 1.200 community leaders have been trained. In 2009, the company created by its own initiative a “Customer Ombudmsan” who helps to resolve conflicts that may arise with customers who are not completely satisfied with the service provided. This mediation process has proved to be very effective and has demonstrated great results. This is confirmed by the good payment behavior of the customers. 90% of solutions provided are seen as excellent by them.

Interagua is the first company in Ecuador which has been fully certified ISO 1001, ISO 9001, OSHAS 18001 and complied with the Ecuadorian standard NTEINEN-ISO/IEC 17 025. Interagua is currently working to comply with ISO 50 001.

Contributing to affordability of water services

Tariffs operated by Interagua are set by EMAPAG. These include some mechanisms that aim at facilitating access to water service. Interagua applies a cross-subsidy-based tariff system where large consumers subsidize the small ones. More than 370,000 users benefit from a subsidized price. In May 2010, a social tariff has been created, it benefits almost 6,500 low income inhabitants.

Other significant improvements

With the Veolia Foundation, Interagua participates in the humanitarian aid programme Water Force. Volunteers have been trained to intervene in case of emergency. They can also intervene in other countries of the Andean zone. Moreover programmes named Sembrar Agua and Somos Agua are developed in collaboration with the Municipality. Their goal is to raise awareness about natural resource protection and especially water resources.

See ref. 28

1,200 inhabitants are trained as community leaders and social managers.

Interagua is the first company in Ecuador which has been fully certified ISO 14001 ISO 9001, OSHAS 18001, NTEINEN-ISO/IEC 17025.

For the 3rd consecutive year, Interagua has been awarded “Company with best process of customers care” of the country by the Ecuadorian Corporation of Citizen Participation.

Algiers and Tipasa, Algeria

Population: 3,800,000

In Algiers Wilaya, continuous 24/7 water supply has been expanded from 8% of the population to 100% in 4 years

Non-compliance of water supplied with bacteriological requirements (3% of samples in 2006) has been eliminated.

Organising authority: water and wastewater bodies of the Ministry of Water.

Water and sewerage operator: SEEAL with the support of a private company through a PPP contract.

Location: Wilaya of Algiers and Tipasa, Algeria, a city and its surroundings

PPP description

The Société des Eaux et de l'Assainissement d'Alger (SEAAL) is the water utility in charge of the Algiers region. It is a company 100% publicly-owned by ADE (Algérienne des Eaux) and ONA (Office National de l'Assainissement) and co-managed with Suez-Environnement that provides high level staff through a PPP contract. The initial duration of the contract was 5.5 years starting in March 2006. The contract was renewed and extended geographically to include Tipasa in September 2011 for a further 5 years.

Context and PPP objectives

This management contract was a pioneering approach and a test case in Algeria as part of the wider national policy undertaken by the Algerian public authorities targeting the modernization of water services in the main cities.

When the new management team at SEAAL took over in March 2006 only 8% of the population had water on a 24/7 basis. The motivation of the public employees of the company was very low and the customer service was particularly poor.

The main performance targets assigned to the operator through the contract were to:

- improve the living conditions of the local

population through achieving continuous 24/7 water supply ensuring 100% potability of water supplied

- improve the performance and coverage of sanitation services
- improve customer satisfaction
- organise and deliver the transfer of know-how to the 6,240 employees of the company and its 1500 managers.

Ensuring continuity of water supply

In March 2006, the majority of the population, only had water at their taps in an irregular manner, ranging from a few days in a week to a few hours per day.

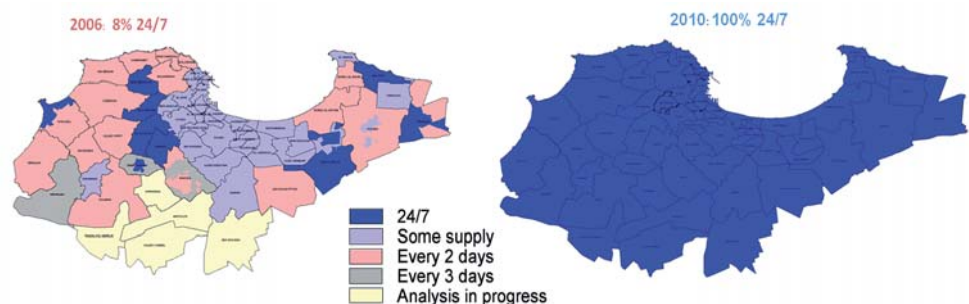
This resulted from obsolete infrastructure and serious water losses in the water network obliging the operator to supply water on a rationing basis to sector by sector in turn.

Since April 2010, SEEAL has been able to supply drinking water 24 hours a day and 7 days a week in Algiers, thus achieving one of its main objectives.

Huge efforts have been engaged in all sectors to bring the infrastructure up to standard and reduce leakage so as to supply water on a more continuous basis. SEEAL and its private partner have fixed 220,000 leaks on the water distribution network. 380 km of network mains and 95,000 service lines have been renewed. 540,000 meters have been installed.

Securing water safety

In 2006, numerous pollution events occurred resulting from polluted water infiltrating from the ground to water pipes when the water pressure was low.



In 2013, SEAAL became the "service public" most popular of the Algerians

- Improving availability of water
- Securing water safety
- Satisfying users' expectations

In 2013, SEAAL became the most popular "public service" for Algerians.

These resulted in non-compliance with potability requirements of 3% of samples of water.

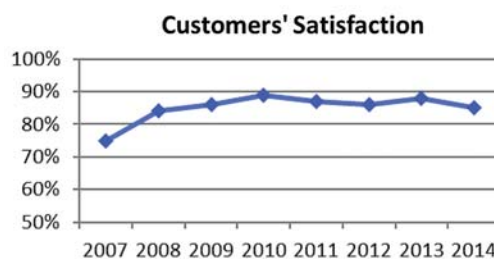
Thanks to the efforts made to reduce leaking pipes and to maintain internal pressure on a continuous 24/7 basis, these events have disappeared and the bacteriological compliance of water supplied has reached 100% in May 2008.

Satisfying water-users' expectations

Customers' satisfaction was not measured before the PPP. When the PPP contract started the monitoring of water-users satisfaction was organized through regular surveys made by an independent external survey organization. It has risen from 70% in 2007 to 85% in 2014.



These surveys include several questions to water-users selected on a random basis. A "customer's satisfaction index" is built from the answers. This has allowed measurement of the dramatic increase of customer satisfaction that has resulted from the significant improvement of the water services implemented in Algiers.



This slight shift of the curve is explained by the fact that the year 2010 is that of achieving 24/7 in Algiers. The level of expectation of the

Algiers population is now very high and the satisfaction rate still is excellent. In 2013, SEAAL became the most popular "public service" for Algerians, when SEEAL launched a new billing system, supported by users.

Other significant improvements

The asset management skills have been reinforced as part of the wider know-how transfer program. This has been a catalyst for enabling the successful management of a massive investment program (\$ 800 millions) committed by the public authorities in support of the actions undertaken by the operator.

115,000 training days have been undertaken from 2006 to 2014, (53% of them are realized by internal trainers).

The sanitation system has been dramatically improved. 60% of the wastewater of Algiers is now treated before discharge to the environment against 6% in 2006, with the objective to reach 100% in 2020.

These objectives are ambitious because of technical and land difficulties in the realization of major large collectors of Algiers, in a dense urban site.

Current 2015, the treatment rate will reach 85% which is in line with the 2020 forecasts.

6000 km of sewerage pipes have been cleaned. 72 out of the 72 beaches of Algiers have been permitted and reopened to the public for swimming during the summer 2014 against only 39 in 2006.

This success has been made possible by closely coordinated and complementary action by the different parties involved, based on a well-structured PPP contract that defines precisely and clearly the respective roles. The State has undertaken significant investment; the Water department of the Wilaya has completed major new infrastructure works. Suez has effected a significant transfer of operational and managerial know-how to SEAAL and finally the local teams of SEAAL have engaged strongly in the project.

"In Algeria, we do not have any a priori nor dogma concerning Public-Private Partnerships."
"In Algiers, results are entirely correct." Quotes from Minister Abdelmalek Sellal

Shanghai Pudong, China

Population: 3,7 million

Organising authority: Shanghai Municipality.

Water operator: Shanghai Pudong Water Corporation Limited (Pudong Veolia), a 50-50 joint venture established in 2002 by Veolia and Shanghai Water Assets Operation and Development Co., Ltd.

Location: Pudong, Shanghai's fast-growing business district.

PPP description

Operational since 2002, the Company is the first sino-foreign joint venture providing integrated water services including production, distribution and customers services in China. Revenues of the joint venture are based on water sales to customers and investments (OPEX and CAPEX) are held 50% by Veolia and 50% by its Chinese local partner.

Context and PPP objectives

In early 2000, there was an unsustainable quantitative and qualitative pressure on water resources due to the fast growing needs and changing environment. The City of Shanghai had a strong will to improve and increase the supply of water to match rapid economic and population growth (+60% from 2000 to 2010) of the district of Pudong. In order to face the main challenges, Pudong Veolia has developed and implemented a dedicated information system to manage its network, with an advanced GIS centric integrated platform, collecting reliable real-time data from the field, called the Octopus.

This has helped to meet the main challenges which were:

- High level of water losses (>35%)
- Low water tariff limiting investments
- Limited health & safety awareness
- Fast growing and changing urban environment
- Inherent resistance to technical and management changes
- Paper based work flow and activity records

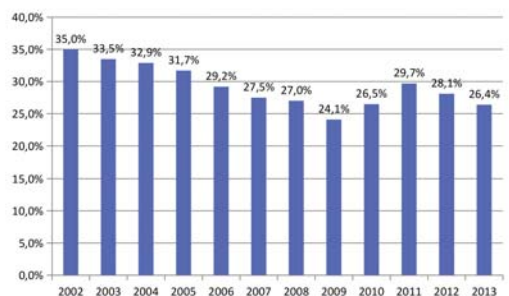
	2002	2013
Service Area(km ²) +110%	319	672
Network Length (km) +134%	1,975	4,624
No. of Water Meter +117%	573,000	1,240,907
Sales Volume (Mm ³) +56%	277	433
Employee Number -8.6%	1,136	1,038
Network Efficiency +13.8%	65%	74%



View of Pudong in 2014

Reducing leakage and water losses

In early 2000 water losses were up to 35%. The information system is able to track the state of the network and interventions. The leak detection, in particular, can be allocated more precisely to the critical and most failing parts of the network. It is the same for pipe renewals. Thus Octopus contributes directly to the reduction of losses in the network. The good water infrastructures in Pudong have already reduced water losses by 10% despite the continuous integration of large additional areas with networks that perform poorly.



- Reducing leakage and water losses
- Improving energy efficiency
- Improving water quality

At the beginning of the joint-venture, the surface covered by the contract was 320 km² and is now more than double at 670 km². This explains why the reduction of water losses has not been regular: large rural areas have been integrated, degrading significantly the overall performance of the network.

Improving energy efficiency

The information system ensures the collection and the availability of all the data related to works, hydraulic simulations and operational data. This data is used by an optimization tool that reduces the energy consumption of the contract.

Modeling enables optimized energy expenditure by indicating where to pump taking into account all the parameters in order to optimize pressure.



Operator on site with Octopus mobile consultation equipment and information capture

Improving water quality

Heritage information, environmental and operational data in the information system ensure the maintenance and network renewal in a most rational way. Water quality is one of the determinant criteria used in the models. 106 drinking water quality parameters are now compliant with local and international standards. Octopus integrates all water quality information allowing an enhanced decision process. Water quality information is combined

from various sources:

- Pudong's first-class central laboratory
- Self-control plan dedicated to water quality surveys
- Aquadiag mobile diagnosis truck



Aquadiag mobile diagnostic truck

Some examples of improvements :

- Average turbidity at plant outlets has been reduced from 0.20 NTU (2002) to 0.06 NTU (2013)
- Average turbidity in the network has been reduced from 0.41 NTU (2002) to 0.15 NTU (2013)
- Manganese compliance has improved from 61% (2002) to 10% (2013)

Other significant improvements: satisfying water users' expectations

This is the first time that a private operator through a joint venture is in a direct relationship with the Chinese consumers and issues bills directly addressed to them. Thus it was very important to create a great customer relationship: new customer services (management system, call center, meter GPS localization and barcodes) have been implemented.

A strong policy related to training has been implemented, and the percentage of trained employees has raised from 62% (2004) to 99.6% (2013). In 2013, 25,345 hours of training have been provided both locally and through Veolia Asia trainers and facilities.

106 drinking water quality parameters are now compliant with local and international standards.

Country cases

- 25 - Armenia
- 26 - Niger
- 27 - Rural Benin
- 28 - Urban Senegal
- 29 - Urban Chile
- 30 - England & Wales, UK



Armenia

Population served: 1,230,000

Organising authority: The State Committee of Water Economy (SCWE).

Public service company (société de service public): Armenian Water and Sewerage Company (AWSC).

Water and sewerage operator: Saur Sevan Services, a local, privately-controlled company (a subsidiary of SAUR) established in 2005.

Location: More than 330 collectivities throughout Armenia.

PPP description

After an international consultation, a management contract has been implemented by the World Bank in 2004 with two priority objectives:

- Restructure the state company AWSC, on the model of a private company.
- Coordinate and manage the realization of investments (100 million US dollars) related to the rehabilitation of the drinking water production and distribution infrastructure.

Among many performance criteria (24 KPI), 4 include a bonus/malus:

- The daily availability of drinking water
- The amount of annual receipts
- The quality of water supply
- The reduction of water losses.

Between 2005 and 2011, a first programme of 114 million US\$ has been invested to restore water and wastewater infrastructure. It was co-financed by the World Bank, the European Bank for Reconstruction and Development and the Asian Development Bank. Since 2012, new international donors (KfW – Kreditanstalt für Wiederaufbau – and the European Investment Bank) have financed another 100 million US\$ programme.

Context and PPP objectives

In 2005, water supply was provided for only 6 hours a day on average. Many cities had water supply only twice a week. Infrastructure – network and treatment plants – were not main-

tained. Water pipes – more than 80 years old – were repaired using wooden wedges. The drinking water network was full of illegal connections, breakages happened every day. Without a metering and billing procedure, only 20% of households paid for water. In terms of safety, only 61% of the water provided was subject to a disinfection treatment. Finally, the systematic use of pumps, without any gravity alternative, generated disproportionate energy expense (72% of gross sales).

The objectives of the PPP were to:

- Improve daily water supply availability and water quality
- Rehabilitate and modernize the infrastructure
- Reduce water losses
- Restore water bill collection

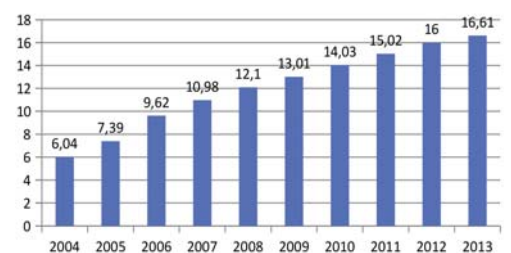


Malishka tank

Improving availability of water

Thanks to the rehabilitation of networks, the average water supply availability has risen from 6 hours to 15 hours a day between 2004 and 2013.

Weighted Average Number of Daily Hours of Drinking Water Service



- 40 towns with over 5.000 inhabitants
- 282 villages
- 1.230.000 inhabitants served
- 10.000 km of drinking water networks
- 2.155 km of wastewater networks
- 1.550 staff members

In 2014, 100% of supplied water meets the European standards.

Praised by the international Donors, AWSC received in 2012 the "Global Water Intelligence" award in the category "Best performance of the year."

At the end of the contract in 2016, the objective is to provide water 18 hours a day, on average: 24/24 in towns and 15/24 in isolated rural zones.

Improving energy efficiency

It was a priority to reduce energy expenses that were presenting a heavy burden to the operator. Technical studies have been carried out and existing mechanical installations have been replaced by new gravity water distribution networks. Pumping plants have been modernized, and equipped with more energy efficient pumps. In 10 years, the energy consumption has decreased by more than 40%.

Improving water quality

With the establishment of laboratories and multiplication of disinfection points, the quality of the supplied water meets the European standards and 100% of the supplied water has been submitted to a disinfection treatment.

Securing revenue streams

In 2004, of the 170.000 documented water-users, only 35.000 paid their bill and only 40% of the individual connections had a water meter. In 2014, 90% of the 180.600 active connections were metered and 100% of customers receive a water bill.

Several actions, including the creation of a central call center in 2011, allowed an efficient service relationship with customers and local collectivities.

Between 2004 and 2014, the annual volume of receipts increased by 100%, excluding the impact of rate increases.

Other significant improvements: management

Saur Sevan Services has paid particular attention to the human side. Concern for the welfare and staff training accompanied the organizational changes. Renovation of the headquarters and buildings welcoming staff members, training, sports tournaments, summer camps for children of employees: all actions that have strengthened the pride, motivation and sense of belonging to a modern Armenian company.



Call center Team

"Saur has met our expectations. Tangible improvements are visible, whether the distribution of water or level of treatment." **Hovic Abrahamyan, Premier Ministre, mai 2014**

Rural Benin

Population: 2,100,000 inhabitants

In the village of Koundokpoe, the collection rate has risen from 85% to 96,87% at the household connections.

Organising authority: Municipalities in rural areas of Benin.

Private operators: 150 water operators known as “farmers”, 80 of which are members or supporters of the Association fédérative des gestionnaires privés des réseaux d’eau du Bénin (AFEB – Federation of private of Benin’s water networks managers).

Location: Rural areas in Benin.

PPP general model description

In the framework of the public service delegation, private water operators and municipalities of rural areas can enter into affermage (lease) contracts. Farmers operate and maintain the water network, collect revenue from water sales and pay charges to the municipality.

Context and PPP objectives

Under the community management which operated until 2003 water services suffered from many deficiencies: lack of suitable management tools, insufficient management staff training and water waste at the standpipes. Revenues were very low due low revenue collection rates from water sales and theft. This was also because of financial mismanagement. This led to a poor water service and serious difficulties to repair breakdowns that inconvenience the population.

In 2003, the administrative decentralization in the country led to the creation of Municipalities, the new key players in the drinking water supply’s governance. According to the legislation, the Municipality is in charge of the project management of the drinking water supply within its territory. A new national village drinking water supply strategy (2005-2015) was conceived to take account of this sectoral approach. In accordance with this strategy, drinking water services must be addressed in consideration of the promotion of the private sector in water supply in rural areas. Emphasis is also given to the support of the professionalization of staff and the Millennium Development goals. Municipalities must delegate water supply management to water users’ associa-

tion or POP. The affermage process started in 2007 in pilot areas and was generalized to every department and all municipalities in 2008.



Water “Farmers” at a training session

In order to improve the benefits of the public service delegation of village water supply to private operators, the Government of Benin asked for the support of the World Bank’s Water and Sanitation program and the International Financial Society to implementing a corporation pilot project. This project, implemented in 2014 in 10 pilot areas, aimed at introducing a more formal structure (concession) for the village water supply networks between municipalities and private operators with a longer contractual term than in the affermage contracts.

Special examples of the PPP model

The public service delegation aims at improving water services for the consumers in the form of village water supply by private operators in the village of Koundokpoe (around 9,500 inhabitants, in the Municipality of Zè) and in the village of Gonougou (around 11,400 inhabitants, in the Municipality of Gogounou) show.

The village water supply in Koundokpoe is managed by Canal-Eau SARL. A 3 year affermage contract was signed in 2010 between the private operator and the Municipality of Zè. It has been renewed in 2013.

In Gonougou, COGEFI signed a 5 year tripartite affermage contract in 2007 with the Water users association and the municipality of Gogounou to supply water services. This has been renewed in 2014. Gogounou is one of the pilot villages of the government project: the contract is now an 8 year concession contract.

- Improving accessibility of water
- Improving availability of water
- Securing revenue streams

Main objectives are:

- Improving accessibility of water
- Improving availability of water
- Securing revenue streams

Improving accessibility of water

In Koundokpoe, 23 household connections and 21 standpipes are now connected to the village water supply, this means 12 household connections and 2 standpipes more than before the beginning of the contract in 2010. The drinking water supply to the population has risen from 42.12% in 2010 to 59.78% in 2014. Canal-Eau SARL brought drinking water to 3,000 additional people and supplies 9,500 in 2014.



Villagers collect water at a safe standpipe

In Gogounou, only 1 household was connected to the network, the population had to go to standpipes where the waiting time was long. COGEFI connected 62 households of which 9 community connections, which group several households around a single connection. This shows the great interest for household connections from the population.

Moreover household connections have been installed by the two private operators in unreserved or under-equipped areas. For example, Canal-Eau SARL installed connections in Wédjamè, Dokota, Médébaho, Aklouzountikon, Waga, Aklouzountikon, Waga, Togbonou, Avossa, Tangnigbadji and household connections have been installed by COGEFI in unreserved

localities: 2 household connections in an area far from the village centre and 9 in Kirikou, a less-favored area.

Improving availability of water

In Gogounou and Konoukpoe, drinking water is always available at the household connections and at the standpipes during the hours determined by mutual agreement with the municipality: 24/7 for the household connections and 11 hours a day at the standpipes. Network outages have decreased and arbitrary shutdowns at the standpipes disappeared. Moreover, the shut downs of the drinking water supply at the household connection by the private operators due to the non-payment of bills on the due-date have declined significantly. The availability of water as scheduled in the contracts has reduced water-related drudgery especially for women who do not need to walk long distance anymore.

Securing revenue streams

The low collection rate under the community management was one of the main factors of water supply's deficiencies. Since the affermage, the collection rate has improved significantly. For the village water system of Koundokpoe, Canal-Eau SARL increased the collection rate from 85% to 96.87% at the household connections and from 70% to 87.90% at the standpipes. Through a better management and money available to face expenses, a reduction in the number of interruptions and their duration have been made possible.

Other significant improvement: securing water safety

In order to improve water quality and safety, water is treated once a month by chlorination and the private operators conduct regularly the cleaning of the water towers. Moreover the farmers carry out a follow-up on water quality. For instance, in Gogounou water samples are collected and sent to the laboratory IRGIB AFRICA to be analyzed.

Niger, 54 urban centers

Population: 2,922,000

The rate of drinking water supply increased from 65% to 87% in 12 years.

Organising authority: Société de Patrimoine des des Eaux du Niger (SPEN).

Water and sewerage operator: : Société d'Exploitation des Eaux du Niger (SEEN), a subsidiary of Veolia.

Location: Niger, 17, 8 million inhabitants.

PPP description

The tender for the lease contract of the Niger water service was initiated in June 2000. The contract was awarded to Veolia in January 2001. The Société de Patrimoine des Eaux du Niger (SPEN) is a state-owned asset holding company which outsourced the operations of water production and distribution in 54 urban centers across the country for 10 years to the Société d'Exploitation des eaux du Niger (SEEN) through a performance-based lease contract associated with key performance indicators (KPI). The contract was renewed for 10 years in 2011.

PPP context and objectives

Located in sub-Saharan Africa, Niger is regularly hit by drought and has long suffered from a very unreliable drinking water supply. In the early 2000s, the government decided to implement a reform in the urban and semi-urban water sector to ensure drinking water of quality in sufficient quantity, at a reasonable cost for all populations of urban centers through a PPP contract.

To accompany the Reform, the government applied for funding from several international donors and drew up an investment plan that defined the rehabilitation and extension works needed to achieve the production and distribution facilities (wells, water abstraction, networks, water treatment...) The total of \$ 80 million was mainly covered by the World Bank (60%) the BOAD (13%), the AFD (9%) and the state of Niger (13%), all of which renewed their contribution in 2011.

Like other Western African countries, Niger pledged to meet the Millennium Development Goals and adopted a National Strategy on Poverty Reduction in January 2002, aiming at reducing poverty from 63% to less than 50% by

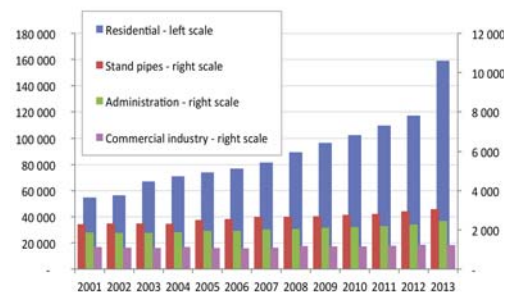
2015. In terms of the access to water, the goal was to increase the water supply coverage from less than 31% in 2001 to 59% in 2013.

Improving accessibility of water

In almost 15 years, SEEN has extended the water supply coverage, including access to the poorest, through the upgrading of water production and distribution infrastructure:

- The total length of the network has been extended by over 77% since 2001
- 57 886 social connections and 448,662 ordinary connections have been installed
- 805 standpipes were provided
- The total number of customers increased by over 170% since 2001
- The population served by connections increased by 55%

Growth in number of clients



Much progress has been accomplished through the years: from less than 60 000 residential clients in 2001, there are almost 160 000 twelve years later, and much still remains to be done to meet the challenge of supplying access to drinking water for all. Fully aware of the water access-related issues, tariffs set by the organizing authority and charged by the SEEN are particularly low in comparison with prices in the region. The first social block (10 m³/month) is billed 127 FCFA (US\$0, 21) in Niger.

Improving network efficiency

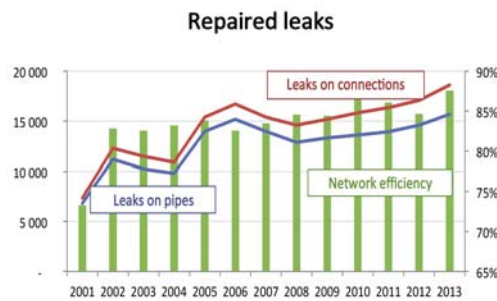
Upon signing the lease contract, and with the support of its mother company Veolia, the SEEN developed its professional expertise and know-how to improve rapidly and sustainably the

- Improving accessibility of water
- Improving network efficiency
- Improving water quality

technical management of the water supply production and distribution infrastructure.

The network efficiency which was evaluated on a very loose basis, has been significantly improved through better organization of field teams and changes in working techniques. Thus, the number of leaks detected and repaired that were only 7,770 in 1999, has almost doubled, reaching 18,595 procedures in 2013.

Thus the overall performance of the network that was only 78% in 2001 increased by 9.6 percentage points to 87,6% (2013) for all units managed by SEEN.



Since 2001, an additional 1.5 million Nigerians have access to water.

Improving water quality

Increasing the frequency, expanding the scope and improving the quality of controls were the priorities of the SEEN. Bacteriological, physical and chemical analysis which were very irregular in provincial centers have been systematized.

In addition to the upgraded central laboratory, the two new regional laboratories established in Maradi and Zinder in 2005, have improved the monitoring of remote centers. A measurement campaign on all installation is also performed each year. Episodic water quality problems are resolved or about to be, even in centers like Loga Keita which present high levels of iron. Today, 98% of the water supplied complies with microbiological standards.

The importance attached by the SEEN to the respect of water quality is reflected in the rigor,

frequency and quantity of analysis performed, and in the increase in the size of the Quality Monitoring Department, which has doubled since the beginning of the contract from 5 to 12 agents.

Other improvement: raising and maintaining staff capacity through training

Veolia has also worked to improve the social conditions of employees, particularly through the development of their skills and better access to health.

Veolia Health & Safety Direction and the SEEN decided to train all 550 employees in partnership with Veolia Campus in 2007-2009, to enhance the awareness about Water, Sanitation & Hygiene, also to ensure the employees would become Hygiene ambassadors towards local populations: neighbors, clients and external workers.



Staff of SEEN

This training policy is based on a skills development plan tailored to business needs as conceived by managers. The amounts paid by SEEN for the training of its employees have grown from 8.5 million FCFA (US\$14,535) in 2003 to 173 million FCFA (US\$295,830) in 2013, currently representing 5.57% of payroll. Staff productivity increased from 8.6 to 3.6 staff per connection.

Urban Senegal

Population: 5,500,000

Organising authorities: The State of Senegal and the Société Nationale de l'Eau du Sénégal (SONES), its assets-owning company.

Water operator: Sénégalaise des Eaux (SDE).

Location: Urban centres of Senegal, i.e. the main 56 urban cities across the whole country as well as 400 villages close to the main distribution network, covering an overall population of 5.5 million.



While only 80% of urban dwellers had access to public water networks through private taps or public standpipes in 1996, the overall connection rate reaches 98%.

The proportion of population using public standpipes has been reduced from 22% to 8,6% only thanks to more than 220,000 new household connections.

PPP description

After an international competitive bidding process a tripartite Public-Private-Partnership contract was signed in 1996 for ten years. It was renegotiated in 2006 and 2013 and extended until the end of 2018.

The scope of the private operator is to produce and supply water on a daily basis using the infrastructure that is owned by SONES. It is an "affermage" since major investments are funded by SONES.

The main shareholder of SDE is ERANOVE with 57% of the shares. The population currently supplied by the contract is close to 5.5 million inhabitants.

Context and PPP objectives

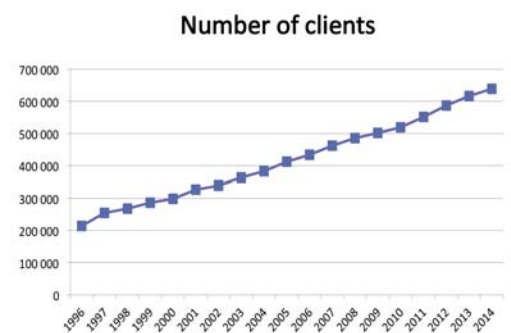
The contract is a performance-based contract. The outputs targeted are monitored by a very comprehensive "performance contract" signed with SONES. The numerous performance indicators cover all operational processes including, the quality of water supplied, the quality of services (speed of reaction to customer complaints and requests and to service interruptions), technical aspects as well as financial performance.

SDE with its partner SONES has managed to deliver significant improvements to the water supply service.

Improving accessibility to water

The main improvement is the coverage of the population. At the start of the contract, in 1996, the connection rate was less than 80%. This comprised 58% of the population supplied through private household connections and the remaining 22% supplied through stand pipes. The total number of customers was 241,671. The overall connection rate is now 98%. 89.4% of the population is supplied through private household connections and 8.6% through stand pipes. The total number of customers that benefit from this improved access is now 638,629 customers (2014).

This 98% connection rate is the highest in Sub-Saharan Africa for urban dwellers according to the World Bank. The reduced use of standpipes is a significant improvement in the accessibility of water.



- Improving accessibility of water
- Contributing to affordability of water services
- Reducing leakage and water losses

1.9 million people, mostly poor, have gained access to tapwater through fully subsidised connections.

The domestic tariffs have been kept unchanged in the past 12 years.

Contributing to affordability of water services

The majority of newly-connected households have benefited from subsidised “social connections” funded by SONES and installed by SDE. Over 18 years 187,478 of such social connections have been installed free of charge for the benefiting customers reaching a population of about 1,925,000. At the same time more than 600 stand pipes have also been installed. The population targeted has been mainly in the poorest parts of the cities, in particular the slums of Dakar. This newly connected population represents 13.33% of the population that is supplied today.

This social connection program has been funded through the support of many international donors and by revenues raised from customers.

The domestic tariff scheme has been designed as an Increasing Block Tariff comprising a first “social” block for a monthly consumption of less than 10 m³. This targets the most vulnerable customers with a significantly discounted rate as illustrated by the following table :

Domestic Increasing Block Tariff	Monthly consumption	Price per m ³	
		FCFA	US\$
Social block	From 0 to 10 m ³	191	0,33
Normal block	From 10 to 20 m ³	630	1,08
Deterrent block	Above 20 m ³	789	1,35

This household tariff has been kept unchanged for more than 10 years since 2003.

Reducing leakage and water losses

SDE has also demonstrated an excellent record in leakage reduction limiting the increase in production required to supply the newly connected population.

Since the beginning of the contract, the production of water has increased by 71.15% while at the same time the water supplied to the connected population has increased by

117.58%. This has been possible thanks to a significant reduction in leakage.

This improvement in network efficiency (from 68.2% at the start of the contract to an average 80,34% in 2014) has allowed to save annually 17 millions m³ of water available to the connected population, equivalent to the daily consumption of a population of 900,000 people.

This outcome has been achieved in spite of the fact that the number of leaks on communication pipes and on the network has remained constant since 1996 (respectively 30,000 and 6,000 per year on average). This is mainly due to the investment needed to renew the network, which is the responsibility of SONES, being behind schedule. SDE has become very efficient at monitoring and fixing new leaks very quickly to avoid water being lost.



Women at a standpipe in a slum in Dakar

Other significant improvements

Quality of water supplied: the microbiological compliance of the water supplied now reaches now a level of 98.54% against a contractual target of 96%.

The customer satisfaction rate regarding the quality of the water supplied now stands at 83% against 45% in 2005.

The presence of a professional and efficient private water operator as well as the governance framework have been instrumental in reinforcing the trust of international donors and catalytic to attract their financial support.

See ref. 1, 2, 28

Urban Chile

Population: 17,000,000

The proportion of urban population that has its wastewater treated before discharge has been increased from less than 10% in 1998 to 100% in 2012.

Organising authority: Government of Chile.

Regulator: Superintendencia de Servicios Sanitarios (SISS).

Water operators: 57 Chilean companies providing water and sanitation services to the urban population (87% of total population).

Two types of private operators

In the 90's, the Chilean government sold the majority of the shares of 4 main water and sewerage companies to the private sector, keeping a minority stake in the capital. In 2011, the Government sold most of its shares in these companies keeping only 5% in order to be able to appoint one director in every company, thus having the right to veto any possible transfer of water rights. A few other companies were privatised in the following years.

In 1998, the central government put out on tender concession contracts for nearly all the other water companies for a period of 30 years.

Today there are 57 companies supplying water and operating sewerage networks in the urban areas. Most of them are privately-controlled (except a mid-size municipal company in Maipú).

Some operate publicly-owned infrastructure under PPP contracts, others own the water infrastructure and operate under a license. All are regulated by SISS, the national regulator.

Context and objectives

In 1989, less than 10% of households connected to sewers had their wastewater treated, which meant a population inferior to one million. The country had no experience of wastewater treatment plants. A significant amount of wastewater was dumped into rivers, lakes and the ocean. Numerous beaches and the coastline suffered from pollution. The same occurred with water used for agriculture in many regions. There was even a cholera outbreak due to crop irrigation with wastewater at the beginning of the 90s.

Ecosystems received thousands tons of garbage. Not only did this pollution affect water quality, but also the sea bottom. This pollution altered fauna and flora, affecting biodiversity and sometimes causing migration or extinction of species.

Urban Chile	1998
Drinking water coverage	99.2% of population
Wastewater collection	91.6% of population
Wastewater "treatment" ²	16.7% of population

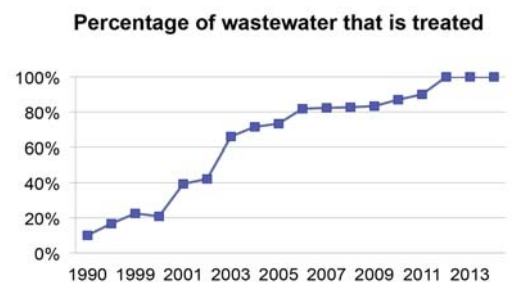
² A mostly via stabilisation ponds

In 1998, the central government decided to improve wastewater management and adopted a huge investment programme based on infrastructure to be built in all cities with more sophisticated technologies than the very basic ones used previously. Secondary treatment was decided for inland cities (80% of wastewater) and primary treatment + sea outfalls were planned for coastal cities (20% of wastewater). The target was to "treat" all urban wastewater flows in these ways.

Access to private capital and private management through partnerships with the government provided the necessary funding and allowed the new infrastructure to be built. This represented a major change in the way of managing water companies with a lot of innovations. A social policy was designed to protect the poorest against the increases of water & wastewater bills needed as a result of the massive investment programme. These initiatives have had positive impacts in the quality of life of people.

Removing pollution from wastewater

The percentage of the population that has its wastewater treated before discharge or reuse reached 100% by the end 2012.



This growth means that the sewage of more than 17 million Chileans has been incorporated into the wastewater treatment systems.

- Removing pollution from wastewater
- Optimising economics of water services
- Responding to natural disasters

The increase of wastewater treatment coverage represents around 1,000 million m³ per year of sewage that is being treated through 280 treatment systems in the whole country.

Urban Chile	2014
Drinking water coverage	99.9% of population
Wastewater collection	97% of population
Wastewater "treatment" ³	100% of population

³ Mostly secondary wastewater treatment plants



The largest new wastewater treatment plant

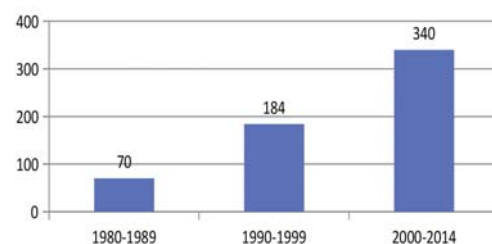
The huge 2010 earthquake disrupted a lot of networks. They were repaired very fast at no cost to water-users.

A very important investment programme

The annual amount of investment had to be increased significantly in comparison with the previous decades to allow for this important enhancement of wastewater treatment, the improvement of water and sewerage coverage as well as the operational modernization.

Investments have risen to an average of US\$ 340 million per year. This amount represents almost double that of the previous decade and means that during the period 2000-2014 the total invested was more than US\$ 4,700 million, fully financed by the operators without any subsidy.

Average annual investments
US\$ millions/year



38% of this amount has been used for wastewater treatment plants and wastewater outfalls while 52% has been used for upgrading and maintaining drinking water and sewerage infrastructure.

Responding to natural disaster

For the last five years, Chile has suffered severe drought (particularly between Coquimbo and La Araucanía. This is having serious economic, social and environmental consequences impacting many towns and small farmers.

Water operators have been taking initiatives to overcome the difficulties. In the summer of 2014-2015 they instituted a plan of US\$ 62 million to ensure continuous supplies of good quality water. The cumulative investment in draught measured for 2011-2014 is close to US\$ 210 million.

Private water operators already proved their professionalism during the critical task of restoring water supply after the devastating earthquake (level 8,8) on February 27, 2010). Only 72 hours after the disaster, 87.5% of the water supply was restored and operating in the areas affected, between Valparaíso and La Araucanía. The restoration of infrastructure of great importance such as aqueducts, sewage ponds and wastewater treatment plants was not an easy task. However, the engagement of the industry and the cooperation with authorities made it possible to restore the high quality standards that existed before the tragedy without occurring any cost for government nor tariff increase for the population in the affected areas. Damages suffered by the industry are estimated up to US\$ 120 million.

See ref. 12, 16, 27

In the last decade the annual amount of investments in water and sanitation infrastructure has been nearly 5 times higher than before the 1989 privatisation.

"The restructuring of the water service sector has been quite successful and can be regarded as a model case." OECD/UN-ECLAC, Environmental performance Review, Chile, 2005

England & Wales, UK

Population: 55,000,000

Overall compliance with the drinking water standards in England and Wales has increased up to 99.96%.

Annual investments for water and wastewater infrastructure have more than doubled in England and Wales since the 1989 privatisation.

Organising authority: UK Government.

Regulators: Water Services Regulation Authority, Drinking Water Inspectorate, Environment Agency.

Water operators: 24 private companies operating according to licenses awarded by the central government.

Location: England & Wales, urban and rural population.

Privatisation

Up to 1989 water and sewerage services were delivered in England and Wales by 10 large public bodies, the Regional Water and Sewerage Authorities (RWAs) and 28 private companies supplying drinking water in part of the territory.

End 1989 the 10 RWAs were privatised and replaced by 10 companies listed on the London Stock Exchange. These private companies own and operate the water infrastructure according to licenses awarded by the government. They are regulated by several regulators. Their tariffs are regulated by an economic regulator, the Water Services Regulation Authority (OFWAT).

One major aim of this privatisation was to implement a huge programme of investment partly financed through significant savings of operational costs.

The success story of the water industry revitalisation

The regulated water industry post-privatisation has been successful in service and operational terms. It has been possible to finance and complete the investments in capital works anticipated. Efficiency in operation has been increased. The levels of the services delivered to water-users and to ecosystems have been significantly improved. Substantial cost-savings have limited the growth of water bills that would have resulted from the numerous invest-

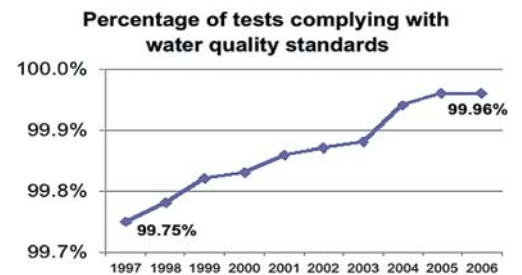
ments required to enable the U.K. to become compliant with European Union regulations.

Some factual achievements are summarized below. They are average results at the country level which may not reflect the diversity of local situations.

Improving water safety

In 1990 only 99% of water quality tests met the required standards. Since then water quality has increased regularly.

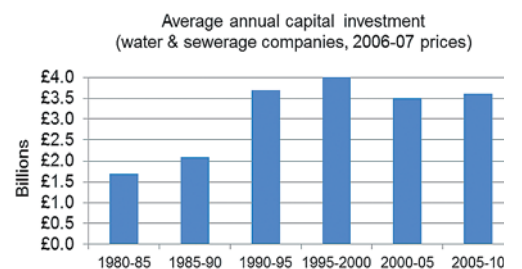
In 2008, overall compliance with the drinking water standards in England and Wales was very high at 99.96%.



Realising the huge investments needed

Between 1990 (the date of the industry privatisation) and 2010, the industry has invested around £80 billion in improving drinking water quality, the water environment and customer service.

That is almost £3,500 for every household in England and Wales. Investment is now running at some £3 to £4 billion each year, well over the £1.6 – £2bn before privatisation, delivering real improvements at no additional cost to taxpayers.



- Improving water safety
- Realising huge investments
- Protecting the environment

- Making users' lives easier
- Reducing water losses
- Optimising economics

After the 1989 privatisation the percentage of English rivers where water has either good or excellent quality has increased from 55% to 72%.

Huge efficiency savings have avoided nearly 70% of the cost of new investments from being reflected in water bills paid by water-users.

Leakage has fallen by about one-third, enough to supply the daily needs of more than ten million people.

Protecting the environment

In 2007, 72% of English rivers were rated either good or excellent compared with 55% in 1990; 87% in Wales compared with 79% in 1990. Successes include the River Mersey, where breeding salmon have returned after a more than 80 year absence in what was once known as Western Europe's most polluted river.

The number of beaches in England and Wales recommended for excellent water quality by the Marine Conservation Society's (MCS) Good Beach Guide has increased by almost 90% between 1998 and 2008. 380 beaches were recommended by the MCS in 2008.

Protecting the environment	1990-1995	2006
Good river water chemical quality	47% ¹	70%
Good river water biological quality	62% ¹	72%
Coastal bathing water compliance	66% ²	99.4%
Sewage treatment works compliance	90%	99%
Unsatisfactory combined sewer overflows	31% ³	8.8%

¹ 1990 ² 1988 ³ 1994-1995

Reducing water losses

Between 2005 and 2010 water and sewerage companies in England and Wales have laid, renewed or relined approximately 20,000 km of water mains – more than enough pipes to stretch from London to Auckland.

Since its peak in 1994-95 leakage has been reduced by about one-third, enough to supply the daily needs of more than ten million people.

"Really the success is down to the companies – and their technical staff rising to the challenge and of course all those enterprises including consultants that support them." William Emery, OFWAT Director, 2003

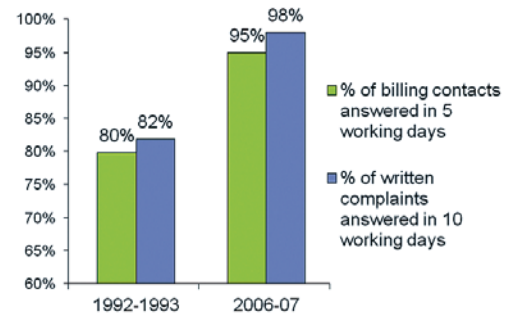
Making users' lives easier

Customer service has also been improved with service levels now at their highest level since 1990.

Improvements lie both in the way water services are delivered physically and in the contact with customers.

For example, fewer than 1 in 1,000 properties is now likely to experience low water pressure compared with 18 in 1,000 in 1991.

The proportion of properties at highest risk of sewer flooding has been reduced by more than 75% in the last 10 years.



Optimising water economics

This huge investment programme has been initially financed by the private companies. Through water bills, the water-users will only pay for it progressively over several decades.

Water bills have gone up, but nearly 70% of the additional cost resulting from new investments has been covered by the water companies' efficiency savings. This means that if the government had funded the same programme itself and had implemented it with its own internal means, water bills would be higher than they are today.

See ref. 17, 31

Developing countries

All locations
with private operators



Developing countries

Population: 5.5 billion – Evidence on 160 million served by regulated private operators

In a decade increase of 50% of population connected to public water networks in the territories of the 36 largest PPP contracts.

Private management has brought a 41% increase of the number of hours a day that water is running at the taps.

Private water operators mandated and regulated by public authorities through licenses or public-private partnership contracts (PPP) are far less numerous than public utilities. However they are more visible (the “lamppost syndrome”, see paragraph 1.3.4.) than other options because of the concentration of commentary on them. The many research reports on individual PPP cases show a broad diversity of results and illustrate the challenges of ensuring that public-private partnerships are successful. However, they are not sufficient to give a fair and true vision of the impact of private management of public water services (PSP). Some commentators have tried to present a global vision of water PSP, however with methodological limitations since they systematically omit the good results.

To our knowledge, the only serious global assessment of the impact of private management of public water services that has a statistical value has been made by the World Bank. Its 2009 research (*ref. 26 & 28*) provides evidence on the average performance of PPP contracts in developing countries, a part of the world where these kinds of contract have developed regularly since the eighties to reach 3% to 4% of the population (160 million people served in 2007 according to these reports).

The World Bank’s global assessment

In 2009, the World Bank released two complementary reports entitled *Does Private Sector Participation Improve Performance in Electricity and Water Distribution?* and *Public-Private Partnerships for Urban Water Utilities, A Review of Experiences in Developing Countries*. The first provides statistical evidence from data on a thousand water utilities. The second undertakes a thorough review of some performance indicators in all the PPP contracts that the World Bank was able to identify in developing countries.

These reports show that overall local and international private companies deliver much more benefit to the populations and governments of developing countries than is generally recognised.

Extending access to drinking water

Improvement in the access to safe drinking water is particularly impressive. The extensive World Bank study makes a detailed examination of the 36 largest PPP contracts in Africa, Latin America and Asia.

Initially these contracts supplied drinking water to 48 million people. After less than 10 years the population served had been increased to 72 million people. This represents an increase of 50% in the number of people benefiting from a good public water service.

The statistical study found an average 12% increase in domestic connections to water networks between the pre-PSP period and the post-PSP period.

Ensuring more equitable water supply

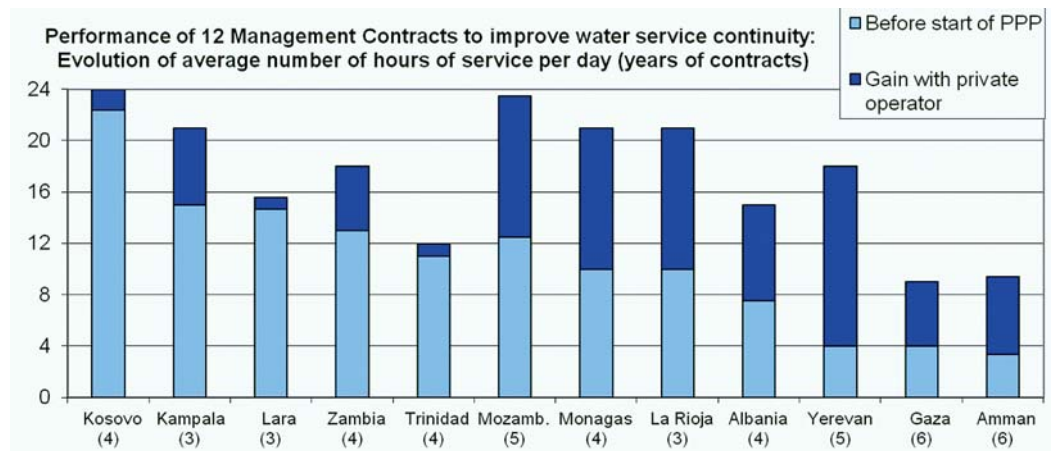
World Bank report (*ref. 28*) page 134: *“There is circumstantial evidence that poor households significantly benefited from the increased access and reduced water rationing that was achieved by a significant number of PPP projects. This was notably the case in cities with high poverty rates, and where access was improved significantly by expanding the water network to poor neighborhoods that were previously unserved, as in Côte d’Ivoire; Senegal; Cartagena, Barranquilla, and Monteria (Colombia); Guayaquil (Ecuador); Manila (the Philippines); and even La Paz–El Alto and Buenos Aires (Argentina).”*

Improving regularity of water supply

The continuity of service has been significantly improved. The World Bank statistical survey (*ref. 26*) found an average increase of 41% of the number of hours a day that water is available at the taps between the pre-PSP period and the post-PSP period.

- Extending access to drinking water
- Ensuring more equitable supply
- Improving regularity of water supply
- Reducing water losses
- Securing revenues
- Optimising cost

Significant reduction of water losses.



Source: figure 3.6 of World Bank report, ref. 28

Reducing water losses

In many cases private operators are called to make water savings as well as cost-savings. The World Bank survey presents detailed results. It identified significant progress in reducing Non Revenue Water in the vast majority of PPP contracts (more than 80% of cases studied).

Securing the revenues necessary to finance the public water services

Private operators are often requested to make the revenue stream from users more reliable. The World Bank research found evidence of many cases where the rate of billing collection has been increased. These are the vast majority of cases in comparison with the few cases where no change was observed *“The most spectacular improvement was achieved in Yerevan, with the collection rate going up from less than 20 percent to 80 percent in five years. This was achieved through close collaboration between*

the operator and the government, and in parallel with sizable improvements in service quality.”

Optimising cost

Anti-private activists habitually present increases of water rates as supposed proofs of alleged excessive costs brought by private operators. However, substantial rates increases always result from investment in new infrastructure or from changes in public policy. If a private operator is mandated by the public authority it is to limit the necessary rate increases. A Public authority would not enter into a Public-Private Partnership contract for the implementation of its water policy if it was a more costly option than public management. The global survey made by the World Bank provides evidence of this economic behaviour. Despite broad statistical research it was not able to identify any statistically relevant difference between the costs of private and public operators.

“The analysis of the four dimensions of performance (access, quality of service, operational efficiency, and tariff levels) suggests that the overall performance of water PPP projects has been generally quite satisfactory.” Excerpt from World Bank report on PPPs in developing countries (Ref. 28)

Private management does not cause price rises that are higher than for public management under the equivalent conditions.

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Most water-users need drinking water and sanitation services to be organised for them by public authorities. These services must be of good quality, reliable and cost-optimised to suit both consumers' and authorities' needs. Hiring a private company to deliver them is among the options that these authorities can choose. This brochure illustrates the many achievements that can be obtained by using the capacity of private professionals in the delivery of public water and sanitation services.

Public services that perform well are those that are able to deliver good results simultaneously for many dimensions. For example, improving access to drinking water and improving the level of service to the population are equally as important as managing the utility in an efficient way.

This brochure collates a wide sample of field cases of private management of water or sanitation services that illustrate the outstanding results achieved by public authorities who have engaged private operators. The cases come from all around the world and illustrate the wide diversity of sizes of private companies.

