AquaFed

THE INTERNATIONAL FEDERATION OF PRIVATE WATER OPERATORS

Private operators delivering performance

for water-users and public authorities

Examples from across the world

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Introduction

1.1 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 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 good results that are obtained, for all the most significant dimensions, by public authorities who have engaged private operators. 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. Not all private operators are 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.

1.2 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 people[1]. 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.

1.3 Private operation, a management option for delivering good performance

1.3.1 An option to be considered

Public authorities that are responsible for 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 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 or poor 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).

[1] See ref. 15

1.3.2 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.

1.3.3 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 a contract or a license. Usually, performance against these goals is monitored through performance indicators that are used to measure progress.

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.

1.3.4 Common misconceptions about private water operators – "The lamp post syndrome"

Many misconceptions circulate about the work of Private Water Operators. Private water operators mandated and regulated by public authorities through licenses or public-private partnership contracts (PPP) are far less numerous than public utilities. In spite of this, they 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 higher[2].

[2] See ref. 5

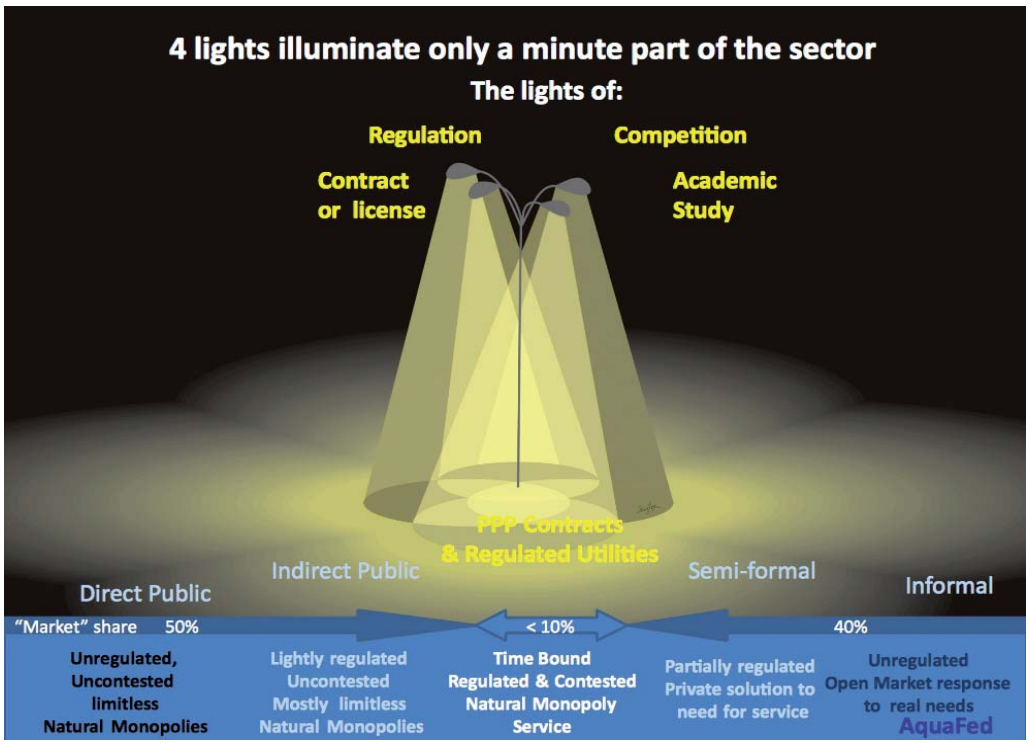


Figure 1 - The Lamp Post Syndrome

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 orPSP). 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 achieved[3].

To AquaFed's 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[4] 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.

1.4 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.

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

[3] See ref. 5 [4] See ref. 26, 28

1.5 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.

1.5.1 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 2010 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 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" diagram[5] (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.

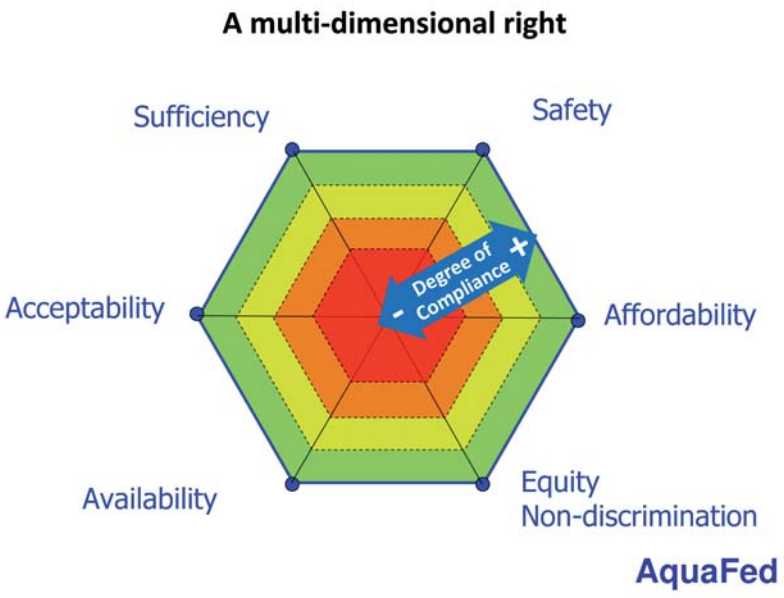


Figure 2 - Showing progress towards the criteria of the right to safe drinking water

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 decades*[6].

[5] See ref. 20 [6] See ref. 3, 18, 19

At the global level, an extensive World Bank study[7] 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 contracts[8].

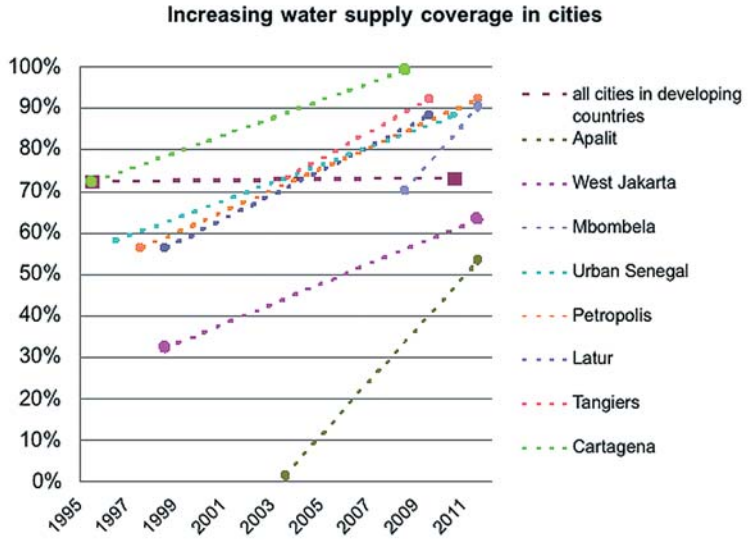


Figure 3 - Water supply: linear representation of progress of coverage in selected cities

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 2010, only 1.5% remain un-served and only 10% 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 Latur, Limeira, Mbombela, Cartagena, and Algiers are described in this brochure. At the global level, a statistical survey made by the World Bank[9] 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 people[10]. *In Apalit 50% 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 done in only 7 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*

[7] See ref. 1 [8] See ref. 6 [9] See ref. 25 [10] See example of impact in ref. 10

Apalit, Limeira, Petropolis. For new connections, subsidy mechanisms are described in the cases of small towns in Uganda and Urban Senegal. In Tangiers more than 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 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 Jakarta the number of connections to low-income users has been multiplied by 8. In 1999 in Mbombela 79% of informal houses did not receive water at all and the remainder only received water irregularly. In 2009, only ten 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.*

1.5.2 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 (Brazil), 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 86%. In Chile where only 17% of urban wastewater was treated in 1998, the proportion of urban wastewater that is treated has been increased to 87% in 2010 and should reach 100% by end 2012.*

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.*

1.5.3 Improving relationship with water-users

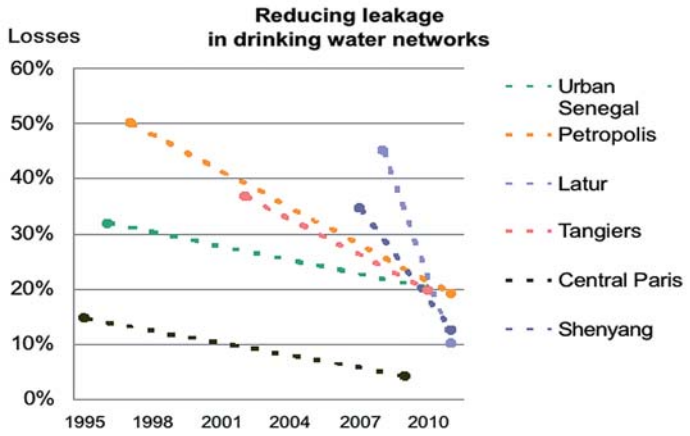
Supplying good quality water to people is not sufficient. The operator has to take care of water-users, their expectations and their interaction with the water utility.

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 75%.*

1.5.4 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.



Energy consumption is another domain where optimisation is key. *In Bucharest the annual electricity consumption has been reduced by 75% between 2000 and 2010.*

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, and small towns in Uganda 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 0operators and the average "functional" age of the distribution networks is now 21 years younger than it was at the beginning of the PPP contracts 25 years before.*

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: 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. *In Bucharest, significant cost-savings have allowed the population to benefit from the 3rd lowest water tariffs 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.*

1.5.5 Raising and maintaining staff capacity

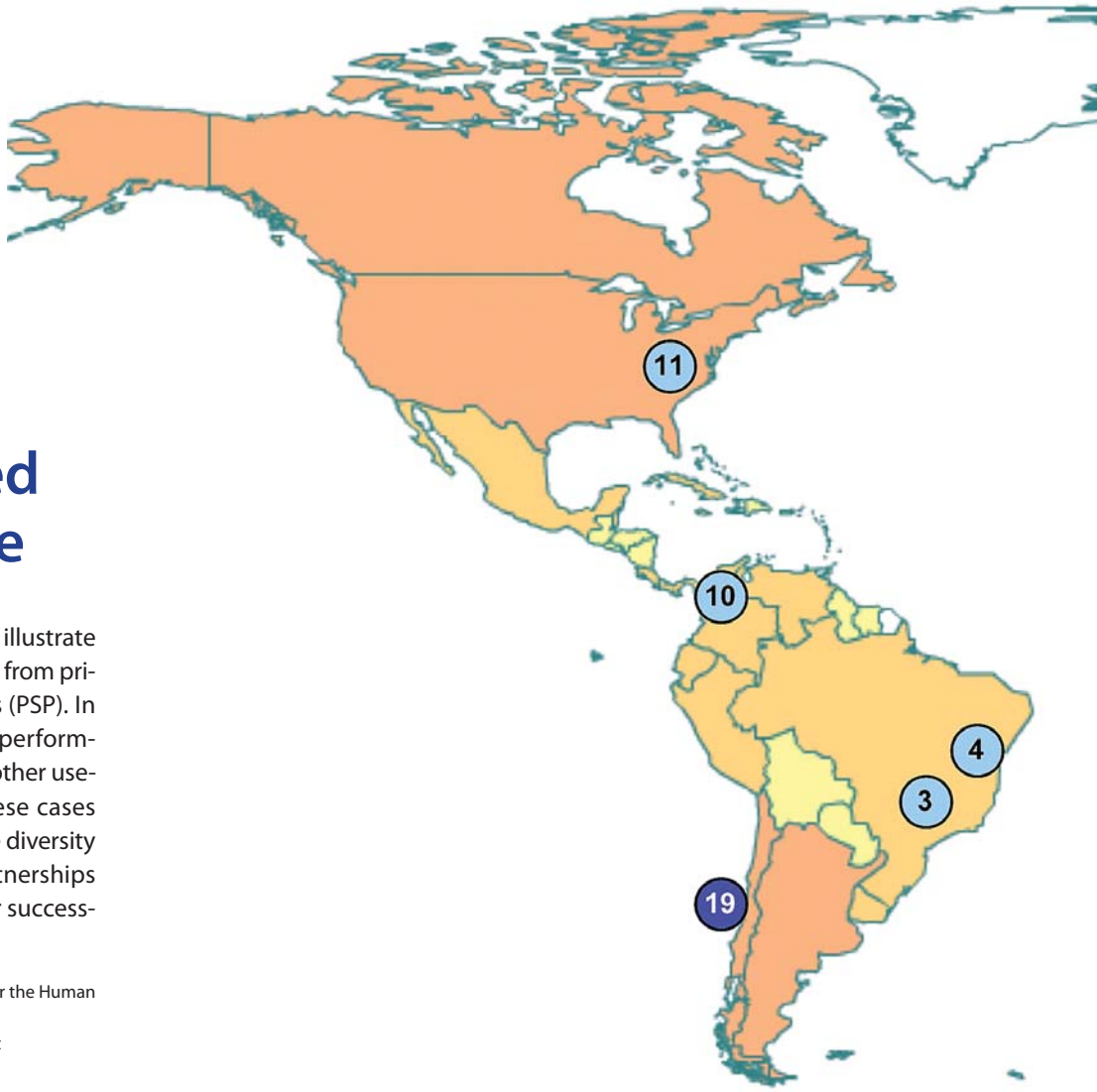
The water services can only be efficient and well-perceived by users if the staff of the water supplier has appropriate skills. This is why training the personnel to upgrade its capacity is an essential tool for delivering additional performance. Private water operators are used to organise regular training 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, 55,000 training days have been undertaken from 2006 to 2011, through trained trainers (70% of them are Algerian).*

1.5.6 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 pays.*

Field cases illustrating the many dimensions of performing water services

Implementing the human right to safe drinking water	
Extending access to water to un-served people	Apalit, Cartagena, Latur, Mbombela, Petropolis, Tangiers, Uganda, Urban Senegal, West Jakarta
Improving accessibility of water	Latur, Petropolis, Urban Senegal, West Jakarta, Bucharest, Cartagena, Uganda
Improving availability of water	Algiers, Cartagena, Latur, Jakarta, Limeira, Mbombela,
Securing water safety	Algiers, Apalit, England & Wales, Gdansk, Paris, Latur, Petropolis, Urban Senegal, Pennsylvania
Improving acceptability of water	Pennsylvania, Rostock, Limeira, Gdansk
Contributing to affordability of water services	Apalit, Urban Senegal, Limeira, Petropolis, Tangiers
Ensuring more equitable water supply	Cartagena, Mbombela, West Jakarta, Tangiers
Improving wastewater management	
Extending wastewater collection	Limeira, Cartagena, Chile, Petropolis, Rostock
Protecting the environment from wastewater pollution	Chile, England & Wales, Gdansk, Limeira, Rostock, Tangiers, Algiers, Petropolis
Improving relationship with water-users	
Satisfying users' expectations	Algiers, Bucharest, Limeira, Cartagena, Urban Senegal
Making life of users easier	England & Wales, Latur, Rostock, Tangiers, Cartagena
Improving efficiency of water utilities	
Reducing leakage and water losses	England & Wales, Latur, Paris, Petropolis, Shenyang, Urban Senegal, West Jakarta, Bucharest, Limeira, Pennsylvania, Tangiers
Improving energy efficiency	Bucharest, Pennsylvania, Shenyang
Securing revenue streams	Mbombela, Uganda, Shenyang
Managing infrastructure assets sustainably	Paris, Pennsylvania, Algiers
Optimising economics of public services	Bucharest, England & Wales, Paris, Uganda, Chile, Petropolis, Urban Senegal
Raising and maintaining staff capacity	Algiers, Apalit, Cartagena, Tangiers
Responding to natural disasters	Chile



Cases presented in this brochure

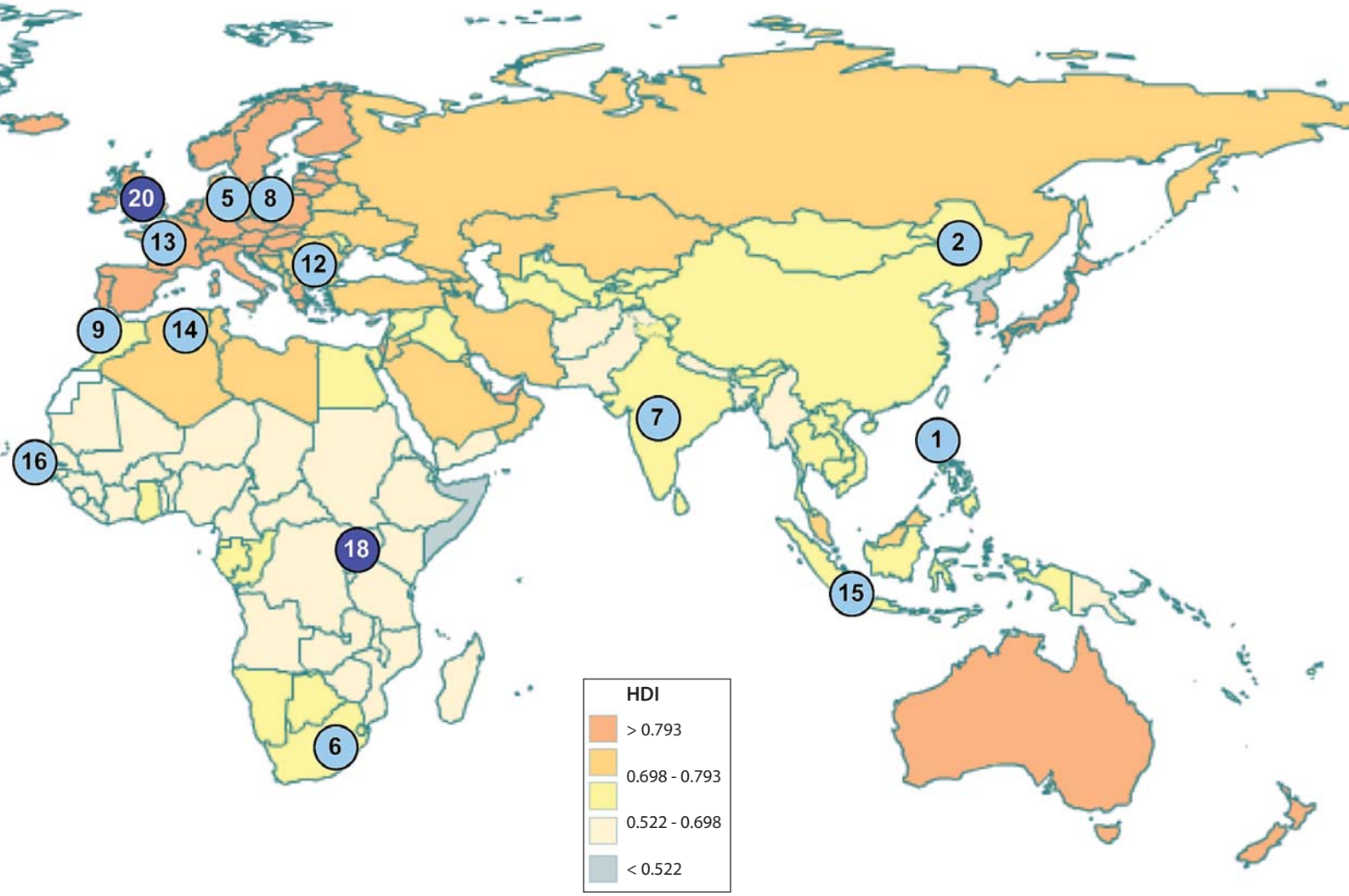
The cases presented in this brochure illustrate many types of performance resulting from private management of public services (PSP). In each field case only a few types of performance achieved are described even if other useful results have been obtained. These cases have been selected to show the wide 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	**The Philippines**	Apalit	Balibago	103,000	14
2	**China**	Shenyang SEDA	Shenyang Sembcorp Water	127,000	16
3	**Brazil**	City of Limeira	Foz do Brasil	280,000	18
4	**Brazil**	City of Petropolis	Aguas do Brasil	290,000	20
5	**Germany**	Rostock	Eurawasser	310,000	22
6	**South Africa**	Mbombela	Sembcorp Silulumanzi	440,000	24
7	**India**	Latur	SPML	500,000	26
8	**Poland**	Gdansk	Saur Neptun Gdansk	510,000	28
9	**Morocco**	Tangiers	Amendis	900,000	30
10	**Colombia**	City of Cartagena	Acuacar	1,000,000	32
11	**USA**	Part of Pennsylvania	Aqua America	1,400,000	34
12	**Romania**	City of Bucharest	Apa Nova Bucuresti	2,000,000	36
13	**France**	City of Paris (Central Paris)	Veolia Water / Suez Environnement	2,200,000	38
14	**Algeria**	Algiers (city and wilaya)	SEAAL + Suez Environnement	3,200,000	40
15	**Indonesia**	West Jakarta	Palyja	4,500,000	42
16	**Senegal**	Urban Senegal	Sénégalaise des Eaux	5,500,000	44



Country level

N°	Country	Area	Operator	Population in the area	Page
18	**Uganda**	Small towns	Members of APWO	880,000[1]	48
19	**Chile**	Urban Chile	Members of ANDESS	15,000,000[2]	50
20	**United Kingdom**	England & Wales	Members of Water UK	55,000,000[3]	52

Global level

N°	Country	Area	Operator	Population in the area	Page
21	**Developing Countries**	Locations supplied by private operators	Many private operators	160,000,000	56

[1] 79 contracts – Size range: 50 – 2000 connections
[2] 58 contracts and licenses – Population range: 1,000 – 5,200,000 inhabitants
[3] 24 private operators – Population range: 160,000 – 8,600,000 inhabitants

Apalit, Philippines

Population: 103,000

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.

Continuous 24/7 water supply has been installed for 10,128 customers in 8 years, increasing the coverage ratio from 0.89% to 52.87%.

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 barangays[1] 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 2011 the population has grown by 74% and the number of households by 77%.

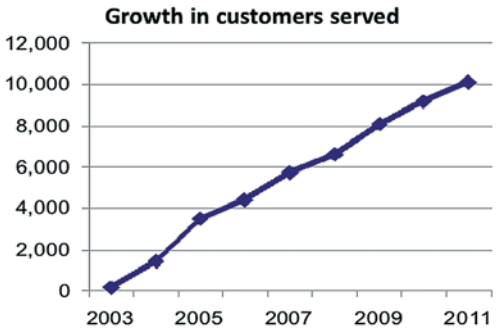
Prior to the involvement of Apalit Waterworks, the municipality was having difficulty providing water to its fast growing population, especially in outlying districts. The initial objective was to overcome this with a pilot project to show how a private company could improve the operation of the borehole 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 10,128 in 2011. In Macabebe the numbers served have risen from 258 in 2008 to 429 in 2011. This means that the overall coverage ratio has increased from 0.89% to 52.87% of the population over the period.



The number of pumps and boreholes has increased from 1 in 2003 to 9 in 2011, with three more planned in 2012.

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.

[1] Barangay is the smallest administrate unit in the Philippines

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

The length of the networks has been extended from 0 in 2003 to 60 km in 2011.

The volume of water produced in 2011 reached 2,746,751 m^3. Average consumption in December 2011 was 21 m^3/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 50% of the population of Apalit has been assured within eight years.

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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 (2011) 2,360 Pesos for a ½ inch domestic connection and 2,660 Pesos for a ½ inch 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 2011

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

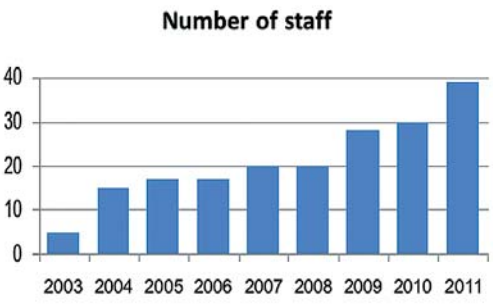
Min: 1-10 m^3	P 409.00
11-25 m^3	P 40.90 /m^3
Above 26 m^3	P 44.20 /m^3

Note: the average conversion rate Php – Euro for 2011 was 0.0177

Other significant improvements

It is notable that Apalit Waterworks has created 39 jobs directly. 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.



" 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 townsfolk." **Mayor Oscar Tetangco Jr.**

Shenyang SEDA, China

Population: 127,000

Non-revenue water has been reduced from 30% to 10% within a 3 year period.

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 127,000 over 88.5 km^2.

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 700 industrial and over 30,000 domestic customers (a population of around 77,000 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 m^3/day, and the total network length is 210 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.

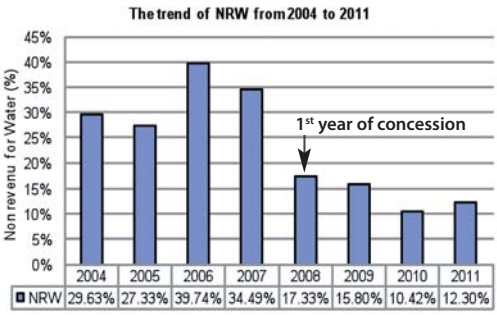
- Reducing water losses
- Improving energy efficiency

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 implemented. 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.



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.

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 Jan 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.

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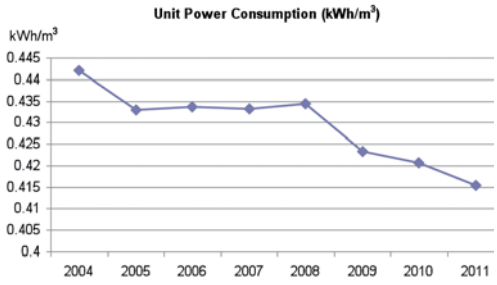


Other significant improvements

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.

"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**

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 and sewerage operator: Foz de Limeira, 100% subsidiary of Foz do Brasil.

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

PPP description

Foz de Limeira manages the municipal water and sanitation services of Limeira through a concession contract. Foz de Limeira 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

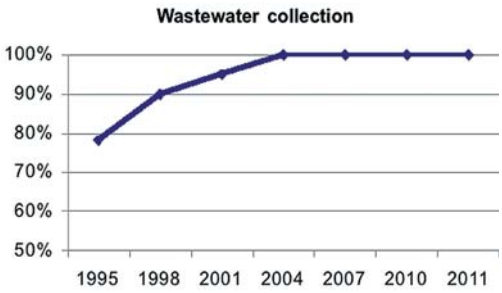
The city of Limeira had a significant population growth between 1960 and 2010. During this period, the population increased from 61,000 to 280,000. This city growth, in number of inhabitants and thus in surface area, created some serious problems for the safe water system and sewerage. Through a public 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 (Piracicaba)
- 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, Capivai and Jundai". 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 in 2011.

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

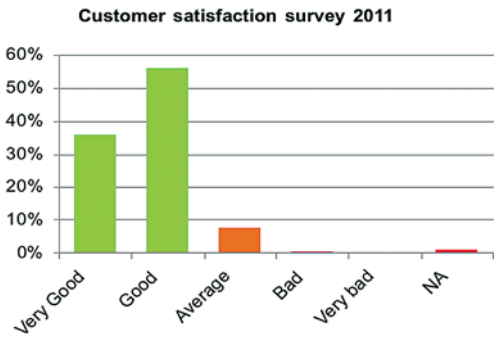
Customer satisfaction surveys show that more than 91% of the water users are satisfied.

The social tariff program allows 5,000 families to have a 50% reduction on their bills for their consumption below 15 m^3.

Wastewater treatment plant

Satisfying users' expectations

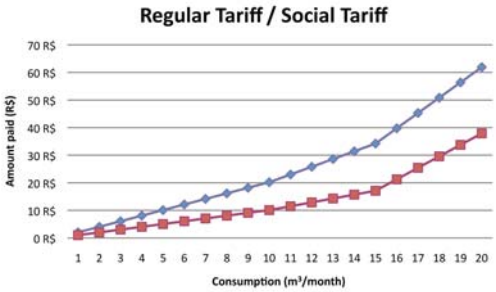
The company has proved high performance in numerous matters such as the universality of water supply and sanitation, the treatment of the total flow of wastewater, the water quality improvement – which, before 1995, suffered from cloudiness and a certain colour – the decrease of water losses from the 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.



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, Foz de Limeira has 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, Foz de Limeira received the title of "Company of the Year in the area of Social and Environmental Responsibility". **Awarded by the City of Limeira**

City of Petropolis, Brazil

Population: 290,000

In spite of the 15% population growth, the proportion of people connected to public water networks has risen from 56% to 92%.

Water losses have been reduced from 50% to 19%.

Organising authority: The city of Petropolis.

Water and sewerage operator: Aguas do Imperador, 100% subsidiary of Saneamiento Ambiental Aguas do Brasil (SAAB).

Location: Petropolis is a city located in the state of Rio de Janeiro, 65 km from the city of Rio de Janeiro.

PPP description

Aguas do Imperador manages the municipal water service of Petropolis. Aguas do Imperador was selected by a process of international competitive bidding. The contract, started in January 1998, and has a duration of 30 years.

Context and PPP objectives

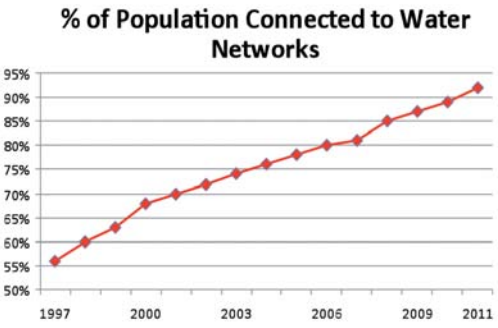
Before 1998, the city of Petropolis had serious water supply problems such as the coverage (percentage of population without access to water), continuity of water supply (some households had water supply only once a week or even once a month), and only 2% of the population with access to water received disinfected water (only by chlorination). In addition, the water losses in the system were about 50%. Only 45% of the population were connected to the sewerage system and only 4% of wastewater collected was treated.

The city of Petropolis, by a process of international competitive bidding, 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.
- 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.

Extending access to water to un-served people

The water network has been to neighbourhoods that did not have access, mostly slums. In spite of the 15% population growth, the proportion of population connected to public networks has risen from 56% to 92% between 1997 and 2011. These figures include poor neighbourhoods that are located in areas of difficult access due to the rugged landscape of the region.

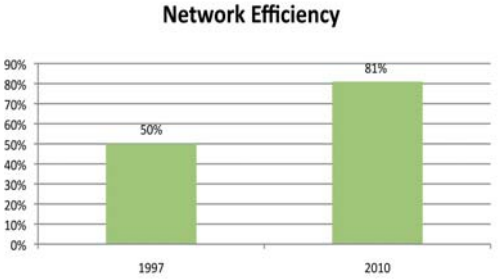


In order to supply water for this growing population, Aguas do Imperador has invested in building seven water treatment plants. These installations have allowed the system to double the production of drinking water from 300 l/s to 600 l/s. With the current installed capacity, the company is able to supply with water 95% of the population if it was necessary.

Reducing leakage and water losses

The company also invested to improve the efficiency of the network. In addition to the new pipes for the new covered areas, the company has replaced more than 300 km of existing pipes in the distribution system.

As a result of these investments, water losses have decreased from 50% to 19%, allowing continuous supply in many districts.

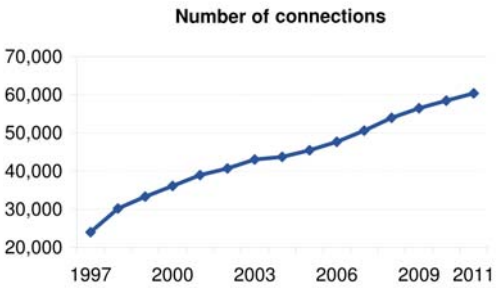


- **Extending access to water to un-served people**
- **Reducing water losses**
- **Improving accessibility of water**

The number of water connections has been multiplied by 2.5.

Improving accessibility & availability of water

More than 130,000 people have been connected to the network. To connect these people the number of connections has increased from 24,000 in 1998 to more than 60,000 in 2011. This means an increase of 150% more connections installed during 13 years.



Other significant improvements

The company itself has financed and continues to finance the different investments required. Half of the funds are from the company and the other half comes from loans that the company obtains directly. The company has not received any financial support from the public authorities (neither from the municipality, nor the state, nor the country). The only revenues the company has come from tariffs. In order to make the tariff affordable to everybody, considering the proportion of people living with limited resources, the company and the municipality have introduced social tariffs using internal subsidy. Subsidies are funded and delivered by the operator to families selected by the municipality on the basis of their low revenues.

The safety of the total supply of drinking water is now guaranteed by the operator, this makes a significant difference compared to the initial situation where only 2% of the drinking water was treated, and that only by a process of chlorination.

Progress concerning wastewater is also remarkable. The number of connections to a sewerage network has ben increased by 85% and today almost the whole population is connected to the wastewater network (97%). In addition, wastewater treatment was almos non-existant before the concession (4% of wastewater-collected). Currently, the operator manages fifteen sewage treatment plants where 64% of wastewater collected is treated.

See ref. 27

In 2006, Aguas do Imperador received the "Ouro Azul" award in the Private Company category. This award aims to disseminate, motivate and highlight Brazilian environmental projects that contribute to protect and recover water and ecosystems for future generations.

City of Rostock and adjacent districts, Germany

Population: 310,000

Extension from 28% to 86% 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).

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. 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.

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

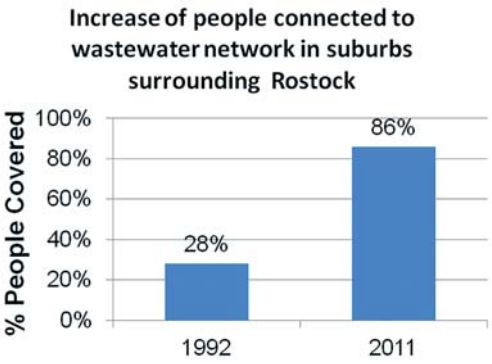
Eurawasser Nord GmbH has extended and operates wastewater systems in the service areas, and has realised the following system upgrades and network rehabilitation:

- 55 wastewater treatment plants with the Rostock central wastewater treatment plant as one of the most modern in Europe.
- 2,028 km of sewers and stormwater lines.
- 7,863 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 300 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	10.9
Modernization of the Rostock Waste Water Treatment Plant	84.7
Extension of the drinking water system	63.9
Increase of access to the wastewater network for the people in the surrounding suburbs (from 28% to 86%)	141.5

The extension of the wastewater network in the suburbs surrounding Rostock has resulted in an increase from 28% to 86% of the number of people that have their wastewater collected.



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

An environmental commitment

Eurawasser Nord has always been strongly committed to environmental protection in Oder to attain the objectives of the Helsinki Convention.

In obtaining a modern wastewater treatment plant, Rostock succeeded in complying with the new environmental requirements in effect 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.

80,000 customer contacts a year. 94% of water-users find that water is of excellent quality.

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 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 m^3, and in Niederhagen, with a capacity of 5,600 m^3, guarantees a high degree of safety of supply for the city of Rostock and 19 municipalities in the Bad Doberan district.

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

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 80,000 customer contacts a year). In the last survey, a total of 2,000 customers were asked about Eurawasser Nord. 94% of the sample thought that the company provides for a very good drinking water, an excellent water quality, and very good wastewater services. 76% appreciated that the WWAV and Eurawasser Nord have kept prices on the same level, complying with customer wishes and keeping them informed as well as offering the latest technology and improving drinking water quality.

Mbombela, South Africa

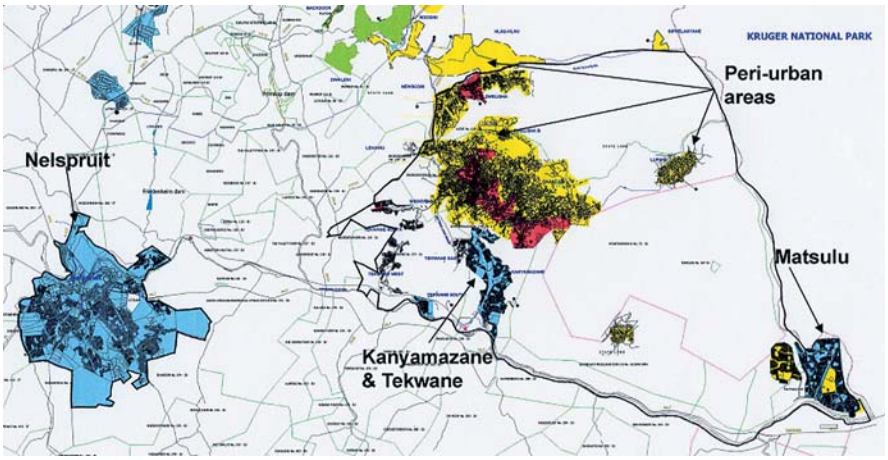
Population: 440,000

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 (2011).



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
- Ensuring more equitable water supply
- Securing revenue streams

Basic water supply has been expanded from 56% of the population to 89% in only 5 years.

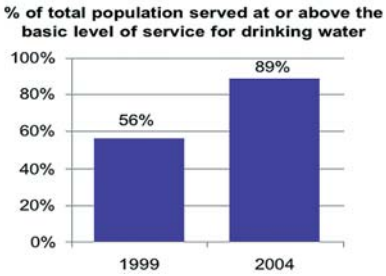
The proportion of informal houses with no access to a water service reduced from 79% to 9% from 1999 to 2009, in spite of the increase of informal houses.

The proportion of revenue collection out of the total bills increased from 73% to 78%.

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

Extending access to water to un-served people

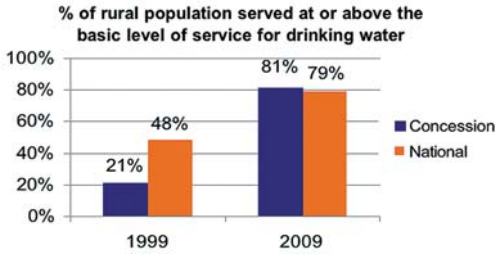
The company achieved the first target: areas with a 100% of formal houses, such as Nelspruit and Tekwane, had full coverage of basic water supply, 24 hours a day and 7 days a week, by 2009. Over and above the 24-hours services, the operator was successful in connecting all customers in these two areas 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 89% 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 and the remainder only received water irregularly. In 2009, only ten 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.

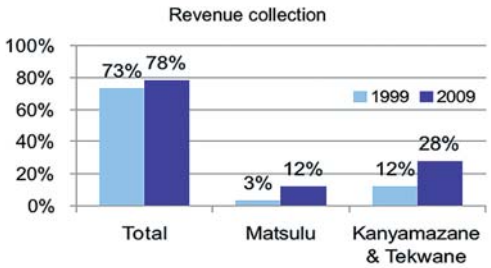
The same improvement can be seen in the statistics in rural areas. In 1999, only 21% of the rural population of Mbombela Concession was served at or above the basic level of service. This figure is far lower than the average national statistics, where 48% of rural population had access to water. After the first ten years of the concession, the percentage of rural population with at least a basic level of service increased to 81%, which is above the national average of 79% in 2009.



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 78% in 2008-2009. The best improvements have been in Matsulu and Kanyamazane and Tekwane as shown in the following graph.



Other significant improvements

One of the main improvements is the water quality. The Sembcorp Silulumanzi systems obtained the South African Department of Water and Environmental Affairs's Blue and Green Drop awards. This was due to the good condition of infrastructure. thanks to a good mainteance program, including efforts and investment spent to upgrade the existing infrastructure. All that having tariff levels similar or lower than comparable municipalities across South Africa.

See ref. 29

Latur, India

Population: 500,000

Access to the water supply has been expanded from 70% to 90% of population in only three years.

Availability of water has increased from 75 litres per capita per day to 100 litres per capita per day.

Regularity of water supply has improved from 1 hour once in 10 days to 3 hours every two days.

Organising authority: Latur Municipal Corporation (LMC)

Water operator: Latur Water Supply Management Company Ltd.

Location: Latur is the regional headquarters for the Latur district, located in the Marathwada region of Maharashtra. It has an area of 32.56 sq km, and a steadily growing population of over 500,000. Apart from the resident population, Latur has a floating population of about 25-30,000 people that visit the city every day for various trade and commerce related activities.

PPP description

In June 2008, Maharashtra Jeevan Pradhikaran (MJP), the state level water authority and asset owner, engaged SPML to undertake the water supply operations to the city for 10 years. A special purpose vehicle called Latur Water Supply Management Company Ltd, was established by SPML.

Context and PPP objectives

Latur is the district headquarters, an important administrative centre that houses many regional offices of the state government, and has reputed educational institutes, quality healthcare facilities and infrastructure services.

The water supply to the Latur city was previously managed by Latur Municipal Corporation (LMC) and faced major problems because of source limitations and very poor water supply accounting. During the summer season, the water supply was reduced to about 40 litres per capita per day and 30 to 40 tankers per day were engaged to manage the shortfall of water supply. The residents faced extreme water shortages and on many occasions, violence erupted over water.

The water management function was transferred from LMC to Maharashtra Jeevan Pradhikaran to infuse operational improvements and finance various capital schemes.

The main features of the project assigned to SPML were:

- take over the existing assets from source to tap
- carry out operations, maintenance and repair of the existing resources
- deploy staff for operation, maintenance and network expansion including key employees seconded from MJP and LMC
- provide minimum average water supply to residents at adequate pressure
- ensure daily and pressurized water supplies within contract period
- increase the number of new connections
- ensure meter installation to 100% of existing connections
- collect revenue based on the tariffs fixed in the management contract
- implement billing and revenue collection system
- create consumer awareness

Aeration of Raw Water at Treatment Plant

Extending access to water to un-served people

With the aim to make water available to the 100% of the population, SPML has worked relentlessly to improve the situation. These efforts have produced good results. At present water supply is improved up to 100 litres per capita per day covering 90% of the population of the city. This is significant progress from the initial situation where the city received a limited supply of 75 l/c/d during the normal season – during the summer season the water supply was reduced to 40 l/c/d – and only 70% of the population was covered.

Improving accessibility & availability of drinking water

After taking over the operations and management, SPML changed the entire situation

- **Extending access to water to un-served people**
- **Improving accessibility & availability of drinking water**
- **Making life easier for users**

rapidly. It conducted research to select and adopt world class technology to manage the water supply to the satisfaction of the residents. The water supply duration has improved significantly from one hour once in 10 days to 3 to 4 hours on alternate days.

Reducing leakage and water losses

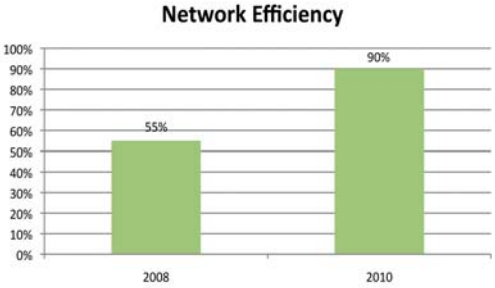
An almost complete control of water wastage has been achieved by:

- pipeline and valve replacement, repair
- development of District Metered Areas (DMA) for active leakage control, utilization of Flow Control Valves (FCV) for regulating the flow of water
- implemented Supervisory Control and Data Acquisition (SCADA) for the projected achievement of 24x7 water supply system with 100% metering to achieve reduction in Non Revenue Water

NRW losses have been brought down from an abnormal 45% to 10% within a two year period.

NRW losses have been brought down from an abnormal 45% to 10% within a two year period by using advanced technology for leak detection and repairs in transmission lines and distribution network.

Pipeline repairs	1,763
Valve repairs	844
Clearing choked pipes	273
Removal of contamination	123
Installation of new valves	24



Improved customer services

Some of the important initiatives taken by SPML to improve customer services are:

- implemented modern distribution management and reduced lost revenue
- efficient operation & maintenance by institutional strengthening, business process and distribution improvement
- implemented state of the art information technology, management reporting and audit processes
- adopted effective utility management, cost benefits and sustainable methodologies
- established adequate infrastructure like zonal offices, billing and collection centres in all zones, to enable efficient consumer service and resolution of complaints.
- implemented billing software for error free billing
- established online billing centers connected with 55 km of optical fibre cables
- used GIS & satellite images for household identification and more than 35,000 properties have already been identified
- used mobile vans for on the spot bill generation and collection
- established customer care centre with toll free number
- conducted consumer awareness programs about the conservation, supply, quality and distribution of water.

SPML has been successful in convincing residents to pay for the services. It has created awareness of the importance of reducing wastage and instilled customer's sense of ownership of the city water. Things have changed as the residents have understood the difference between the previously government run water supply system and the new approach. The people now feel confident to come to SPML for their complaints and get immediate and efficient response, a most significant achievement of SPML.

Other improvements

Improvements in the quality of water being supplied have been achieved through continuous laboratory analysis, proper operation of chemical dosing system and replacement, repair and clearing choked pipelines, to maintain a uniform and consistent quality water supply to the residents.

Gdańsk, Poland

Population: 510,000

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. Population: 510,000 in 2011.

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 510.000 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-ways 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.

Untreated wastewater resulting from under-investment had led to the closing of seaside bathing beaches in Gdańsk and Sopot.

Removing pollution to protect the environment

Sopot, the beach 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.

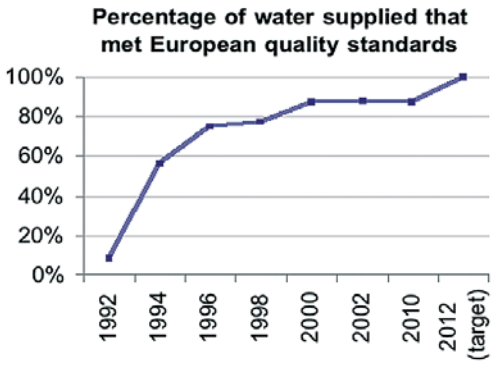
Only two years into the contract, by 1994, SNG had overcome the failure of wastewater treatment and this led to the festive reopening of the bathing beaches in Gdańsk and Sopot. Marine environments were restored, leading to a renewed flourishing of this spa resort and a tourist boom for the whole coastal 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 87% in 2010.

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

In 2010, 87% of water supplied met European quality standards, compared to 8% in 1992.



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 and Unio tumidus mussels. In 2010 the residents of Gdańsk benefited from the services of 80 trouts and 40 mussels.

In 1992 the water was perceived as pretty bad by users. Today, 70% of water-users declare their drinking water of good or excellent quality.

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. Gdansk tapwater came out first in terms of odour (best smell) and taste (least detectable).

In recent customer satisfaction enquiries, 70% 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 13% (in 2010).
- A leakage monitoring system for the entire water supply network was introduced.
- All these efforts have led to significant water savings (460,000 m^3 in 2010 in comparison with 2009).

"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**

Water losses in the Gdańsk water networks went down from 25% to 13%.

Tangiers, Morocco

Population: 900,000

In 2002, wastewater was discharged untreated in many locations on the seashore. 10 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 900,000 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 2010, the overall investment program amounted to 2,170 million Dirhams (€190 million) of which 54% was dedicated to the sewerage 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,
- 14 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

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

Making life easier for users

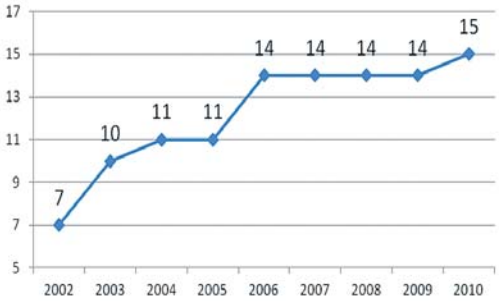
The customer service has been the focus of special attention from the operator.

The improvements implemented since the start of the contract comprise:

- 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 in 2010 for customers to resolve any issues/requests,
- the introduction of 2 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.

The number of customer centres has been doubled to simplify the life of water-users. Remote areas are served by 2 mobile centres.

Number of customer centres



Cross-subsidies allow the operator to charge 35% of customers a price per cubic metre that is cheaper than it purchases it from the bulk water provider.

Mobile branch to serve remote areas

Raising and maintaining staff capacity through intense training

A massive training effort for the staff has been undertaken: 160,000 hours of training between 2002 and 2010, i.e. an average of 26 hours of training per staff per year, with an overall budget of 25 million dirhams for the period 2002 to 2009.

A new training center has been built with 12 specific training rooms (in a 1,300m^2 building) and a 4 hectare field, equipped to provide training in water, sewerage and electricity. Through an agrement with 3 universities the new training centre is entitled to deliver official diplomas.

Other significant improvements

The network has been extended by 35% since 2003 and the connection rate has improved by 19% from 73% in 2003 to 92 % in 2009. The number of customers has been increased from 111,000 to 198,000 at the end of 2011 (i.e. +78%).

Cross-subsidies allow the 35% of customers who consume less than 6 m^3 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.

16,000 "social" connections have been realised between 2002 and 2010 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 80.4% in 2010, 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 60 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

City of Cartagena, Colombia

Population: 1,000,000

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.

Organising authority: Municipality of Cartagena de Indias.

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

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.

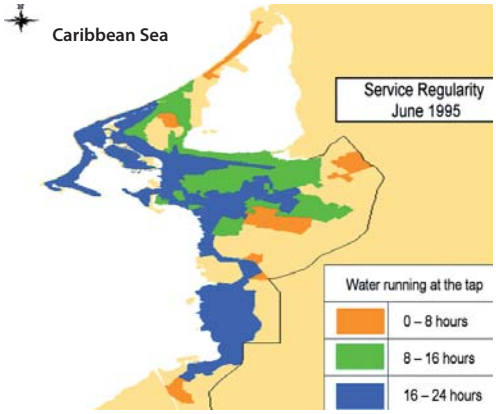
Context and PPP objectives

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:

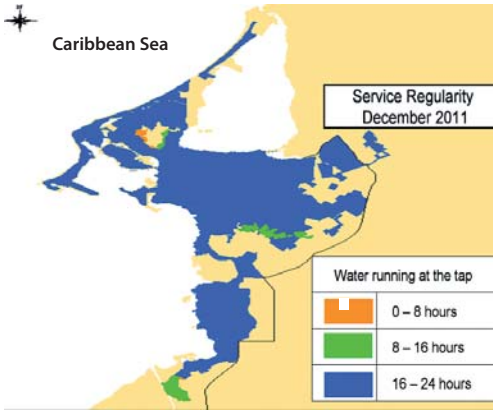
- universal coverage of water and sanitation
- water supply 24 hours a day and 7 days a week
- water quality improvement
- water loss reduction
- universal treatment of wastewater
- affordable tariffs for the whole population

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.



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



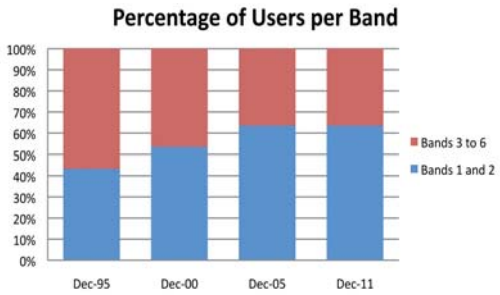
Ensuring more equitable supply

Cartagena has seen its population increase from 510,000, in 1995, to more than 1 million in 2011. This demographic growth has resulted in the increase of the number of connections from 94,639 in 1995 to 218,948 in December 2011.

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. Water connections of lower classes (bands 1 and 2) have been increased by 87,000, i.e. multiplied by 3.3.

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

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



Raising and maintaining staff capacity

One of the more profitable investments realized by Acuacar 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.

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

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.

Customer satisfaction has improved from 71% of users satisfied to 87% in 2011.

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.

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% in 2008.

The coverage of sewerage connections increased from 60% to 88% between 1995 and 2011.

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 strenghtens the relationship between the company and its customers.

Mobile office in Cartagena

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% from 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 Acuacar in October 2011, on the occasion of the Health and Safety certification**

Pennsylvania, U.S.A.

Population: 1.4 million people served by Aqua Pennsylvania

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.

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

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 one and operates under the regulation of the Commonwealth of Pennsylvania.

Improving water quality and acceptability

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

In the Neshaminy Creek, from which one of Aqua's treatment plants takes its water, algae blooms occur naturally. These algae blooms generate taste and odour problems in water. To control this, the company used to apply powdered activated carbon (PAC). From time to time, some customers still reported an earthy or musty taste and odour in the drinking water. Aqua conducted studies to find a better method to ensure a good taste and odor of its water. The company adopted a UV-oxidation system that reduces the contaminants from the algae that cause taste and odour. According to historical data, a powdered activated carbon dosage of 30 mg/l could achieve a maximum 55 percent reduction in those contaminants. The UV-oxidation method almost doubles the effectiveness of the process by ensuring a minimum 90 percent reduction.

Increasing Energy Efficiency

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

Since 2004, the company has adopted lighting control technology to reduce wasted power from lighting. Aqua's efforts included electronic dimming ballasts, more efficient fluorescent lamps, and occupancy and photo sensors. This system enables Aqua to save roughly 916,000 kWh annually. Aqua also updated laboratory equipment for water testing to increase equipment power efficiency. A new testing method also enables Aqua to do a "micro extraction", which needs 98 percent fewer testing chemicals and solvents to get sufficient data. This procedure reduces the energy consumption of the laboratory and also reduces hazardous waste byproducts.

Aqua uses alternative energy, such as wind and solar power. Solar-powered mixers that continually mix the water ensure water quality without additional chemicals. Aqua received funds from a partnership with the Pennsylvania Department of Environmental Protection and a $1 million federal stimulus grant from the Pennsylvania Energy Development Authority to help install the Ingram's Mill Solar Farm. On sunny days, the plant can sell as much as 300 kilowatts back to the local energy provider while still running the plant for free. Aqua saved $130,000 in electricity costs in 2011 in this way.

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

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

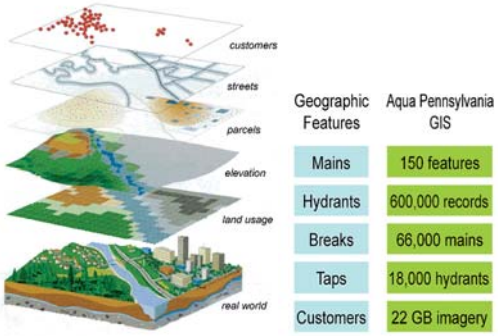
Rather than pay for certified recyclers to haul used motor oil away, Aqua installed special heating systems that recycle the waste oil and heat two of its maintenance garages.

In total, Aqua's southeastern Pennsylvania service region has reduced electricity consumption by almost 3.9 million kilowatt hours and its fuel consumption by roughly 28,000 gallons, lowering its estimated greenhouse gas emissions by about 3,250 metric tons from 2009 to 2010.

Optimising Asset Management

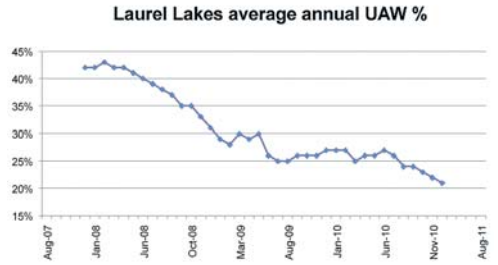
Aqua is convinced of the importance of good asset management to ensure continued serviceability and to prolong the life of infrastructure. With this in mind, the company adopted a new asset management software at three division production facilities in 2009. The software has a detailed database of all assets (8,000 assets were included in 2011) and captures and records all preventive, predictive and corrective maintenance jobs. During the first quarter of 2011, the database had generated more than 31,500 routine/preventive work orders. One important goal of the database is to be able to identify patterns in order to make informed maintenance decisions.

In 2008, Aqua had already set a precedent by winning the "Management Innovation" award for an Asset Information Management System (AIMS) coupled with a Geographic Information System (GIS). AIMS allows users to retrieve detailed information on pipes, hydrants main breaks and customer taps, including thousands of scanned images of as-built construction plans. Both programs enable Aqua to prioritise infrastructure projects efficiently while optimising the use of capital to replace or upgrade the system. In day-to-day operations, AIMS and GIS can be used by emergency crews.



Other Significant Improvements

An important Key Performance Indicator to measure network efficiency is the amount of unaccounted water (UAW), which is water that the utility has no way to track, including unknown leaks and breaks, malfunctioning meters and theft. Compared to the national figures, Aqua maintains its level of UAW below the average. However, Aqua has to make significant efforts to maintain those values because it has acquired operating systems that contain many water mains well over 100 years old. One example of an inherited high-loss system that has reduced water loss is Laurel Lakes. This system had an average UAW of more than 50 percent two years ago. Thanks to careful monitoring, research, more efficient equipment and targeted infrastructure investment, Aqua reduced the UAW to 25 percent in only two years.



More information in Aqua America Sustainability Report

City of Bucharest, Romania

Population: 2,000,000

Annual electricity consumption has been reduced by 75% between 2000 and 2010.

Organising authority: The city of Bucharest.

Water and sewerage operator: Apa Nova Bucuresti (ANB), a subsidiary of Veolia Water with 16.7% 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 (with the exception of the Crivina-Ogrezeni water treatment plant) and are planned at the discretion of the concessionaire.

Compliance with some specific service targets is a mandatory condition before triggering the tariff increases set out in the contract.

The national competition office (ANRSC) supervises the correct application of tariff setting rules.

Context and PPP objectives

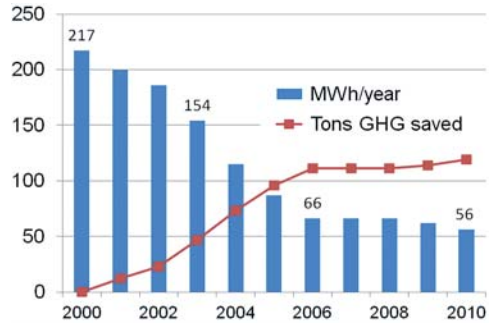
In the 1990s, more than half of the population of Bucharest was not satisfied with the faltering water and sewerage utility. The water service was intermittent and unreliable, and was in a dire financial situation. The municipal objectives to be achieved through the concession contract were the following:

- 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.

Below are some of the achievements 10 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 75% of annual electricity consumption between 2000 and 2010, allowing a cumulated decrease by 800,000 tons of indirect greenhouse gas (GHG) emissions for the period 2000-2010.



Annual electric energy consumption and related reduction of annual greenhouse gas emissions per comparison with year 2000

A pumping station after modernisation

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) and customer care, customer satisfaction went up drastically from 46% in 2002 to 75% in 2008 (Gallup measure) and customer complaints dropped from 11,462 in 2001 to 1,056 in 2008.

Customer satisfaction went up drastically, from 46% in 2002 to 75% in 2008.

Service efficiency and cost savings generating financial resources for increased investments

In the first 10 years of the concession, ANB has invested US$258.8 million, equivalent to 30 percent of its total revenue over the period (2000-2009).

Unlike the other Romanian utilities, ANB financed all its operations and investment without public subsidies, and the tariff has remained affordable. In 2011, tariffs in Bucharest were in the low range in Romania, on the 42nd place in descending order out of the 44 operators with 1st Class License in Romania as of April 2011 (according to the Romanian Water association)…

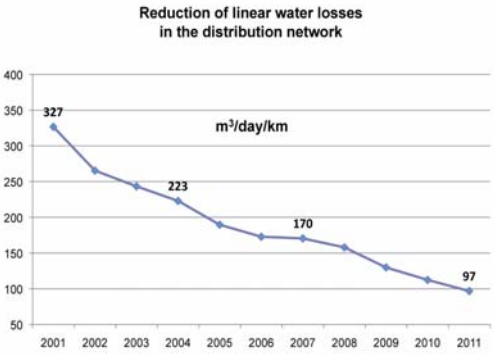
Significant cost-savings have allowed the population to benefit from the 3rd lowest water tariffs out of the 44 main Romanian operators although most other operators are subsidised to implement their investment programmes.

Other significant improvements

Bucharest's water quality considerably improved. In 2009, the technical regulator reported that ANB met the standards for all water quality parameters included in the concession contract. In comparison, according to Bucharest's Public Health Department, only 69 percent of samples taken from other Romanian distribution networks complied with the required standard for residual free chlorine in 2000.

Even if water and sewerage coverage was already high when the concession started, water and sewerage coverage in Bucharest increased from 91 to 93 percent between 2000 and 2009. This level is higher than the coverage in other Romanian cities, which averages 86 percent for water and 73 percent for sewerage.

Water resources have been preserved by a reduction of two-thirds in the water losses in the distribution networks as a result of both decreases in consumption and reduction of leakage.



See ref. 7, 24

"[…] PPP concluded between Bucharest Municipality and Apa Nova Bucureşti S.A. […] by its performances and restrictions […] represents a guide for good practices which can be generalised to other cities in Romania or in the European Union." **Effects of Public-Private Partnership in Water Supply and Sewerage Public Services, Radu, Lefter, Şendroiu, Ursăcescu, and Cioc. The Bucharest Academy of Economic Studies, 2009**

"The concession of Bucharest's water utility has brought its citizens higher-quality water and sewerage services, at a lower cost, than they could have had under continued municipal provision." **"Water in Bucharest - A Utility's Efficiency Gains under a Concession" Earhardt, Rekas and Tonizzo, 2011**

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 m^3)

Other significant improvements

The operators also equiped 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

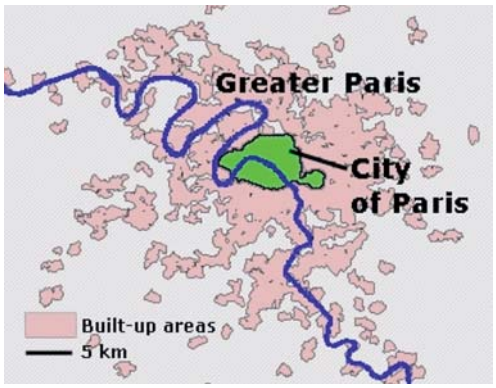
The Suburbs of Paris and the City of Paris not to be confused

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.



Algiers, Algeria

Population: 3,200,000

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, 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 in September 2011 for a further 5 years.

Continuous 24/7 water supply has been expanded from 8% of the population to 100% in 3.5 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 modernisation 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 within 3,5 years, ensuring 100% potability of water supplied
- improving the performance and coverage of sanitation services
- improve customer satisfaction
- organise and deliver the transfer of know-how to the 4,500 employees of the company and its 1,000 managers.

Ensuring continuity of water supply

In March 2006, only 8% of the population had continuous water supply. The others, the majority of the population had only 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 sector by sector on a rationing basis.

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 130,000 leaks on the water distribution network. 250 km of network mains and 50,000 communication pipes have been renewed. 350,000 meters have been installed.

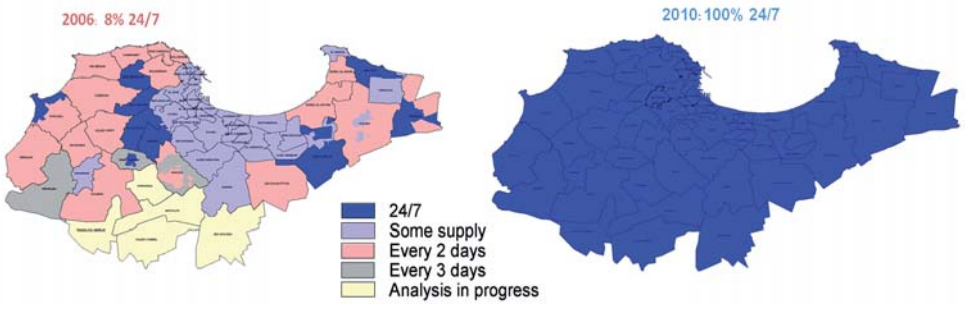
After 3.5 years, SEEAL has been able to supply drinking water 24 hours a day and 7 days a week in all sectors, thus achieving one of its main objectives.

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.

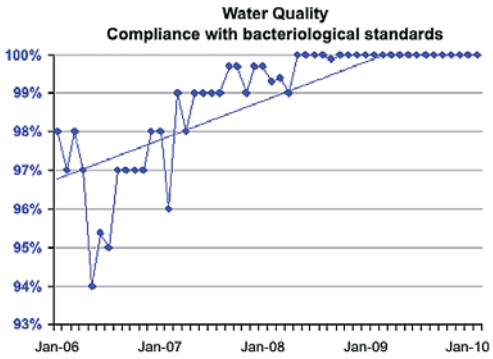
These resulted in non-compliance with potability requirements of 3% of samples of water.

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



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

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%.

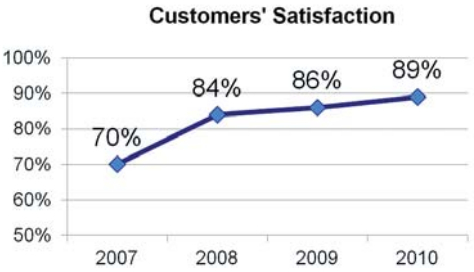


Satisfying water-users' expectations

Customers' satisfaction was not measured before the PPP. When the PPP contract started the monitoring of water-users satisfaction was organised through regular surveys made by an independent external survey organisation. It has risen from 70% in 2007 to 89% in 2010.

Customers' satisfaction was not measured before the PPP. It has risen from 70% in 2007 to 89% in 2010.

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, as shown in the following graphic.



Other significant improvements

The asset management skills have been reinforced as part of the wider know-how transfer programme which has been a catalyst for success enabling the management of a massive investment program ($ 500 millions) committed by the public authorities in support of the actions undertaken by the operator.

55,000 training days have been undertaken from 2006 to 2011, through trained trainers (70% of them are Algerian).

The sanitation system has been dramatically improved. 53% of the wastewater of Algiers is now treated before discharge to the environment against 6% in 2006, with the objective to reach 70% in 2012. 3,300 kilometres of sewerage pipes have been cleaned. 64 out of the 72 beaches of Algiers have been permited and reopened to the public for swimming during the summer 2011 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 defined 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 management, modernisation and project management 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

West Jakarta, Indonesia

Population: 4,500,000

213,000 customer connections have been installed which has doubled the number of customers served.

The service coverage ratio from 32% in 1998 to 63.5% in 2011 and has increased the number of people connected by 1.3 million.

Organising authority: PAM Jaya has the overall responsibility for the water services for the Jakarta Provincial Government (DKI).

Water operator: PALYJA has a 25 year contract for the operation, maintenance, customer services and investment in the infrastructure for West Jakarta.

Location: Jakarta, the capital city of Indonesia. The population of the Jakarta City territory is 9.6 million and forms part of the 26.3 million of Jabotabek (Greater Jakarta). It has one of the highest population densities in the world.

PPP description

The cooperation agreement in the form of concession contract between the public authority PAM Jaya and PALYJA came into force in 1998 for 25 years.

The contract covers the operation, management and extension of the water services to the Western part of the city, which has a population of around 4.5 million. PALYJA is also responsible for establishing an investment plan and development feasibility studies for new infrastructure every 5 years.

PAM Jaya supervises and monitors the management of the contract, while the Jakarta Water Service Regulatory Body (JWSRB) is responsible for regulating the services, ensuring the balance between different stakeholders' interests, and proposing the tariff grid to the City's Governor.

Context and PPP objectives

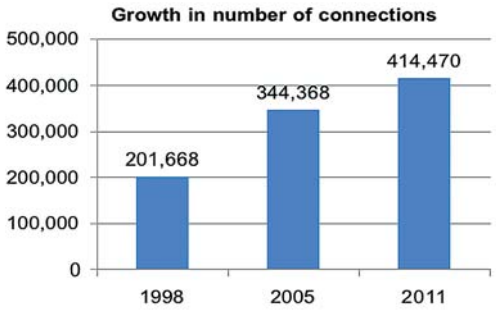
Prior to the contract starting, water service performance in Jakarta was very poor, with limited financial resources, a low service coverage ratio (32%) and very high water losses (57%). About 70% of customers did not receive a 24/7 water supply. Large parts of the service area were un-served.

The high levels of water losses and intermittent service provision exacerbated the difficulties that arise from limited and vulnerable supplies of raw water.

Rehabilitated Pejompongan water treatment plant

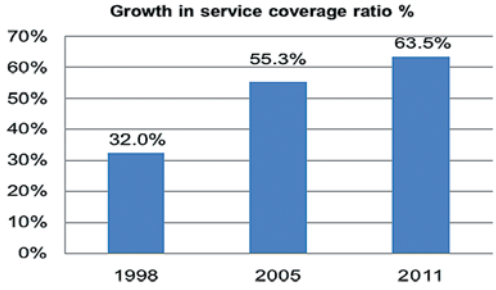
Extending coverage of water supply

In spite of serious constraints and many difficulties, the operator has made significant improvements in the situation by the mid-term of the contract.



It has extended the network length by 1,300 km and rehabilitated a further 950 km, bringing the total length of the network in Wes Jakarta, within the PALYJA scope, to around 5,300 km. About 213,000 new customer connections have been installed which has doubled the number of customers served.

This action has improved the service coverage ratio from 32% in 1998 to 63.5% in 2011 and has increased the number of people connected by 1.3 million.



- **Extending access to drinking water**
- **Reducing losses to improve availability**
- **Ensuring more equitable supply**

Reducing losses to improve regularity

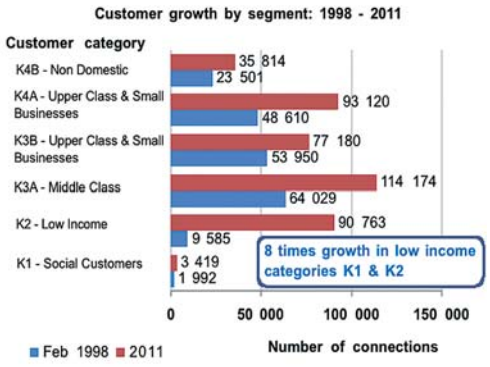
The volume of water sold has risen by 57% since 1998. Since limited additional sources of raw water were available this has been largely achieved by reducing the non-revenue water by 34%. In 2011 alone, using innovative intensive leak detection methods, the company has been able to detect and repair 58,000 leaks significantly reducing water losses.

The improvement in access to water supplies is clearly demonstrated by comparing the diagrams opposite, which show that the situation of water coverage in 1998 dramatically increased as shown by the second map.

Using OBA, PALYJA has provided a further 30,000 people connections to the network.

Ensuring more equitable supply

Particular effort has been made to reach low income domestic customers. The number of customers in the low income category has been increased 8 times compared to a doubling for middle and upper-class clients. This is demonstrated in the diagram below.



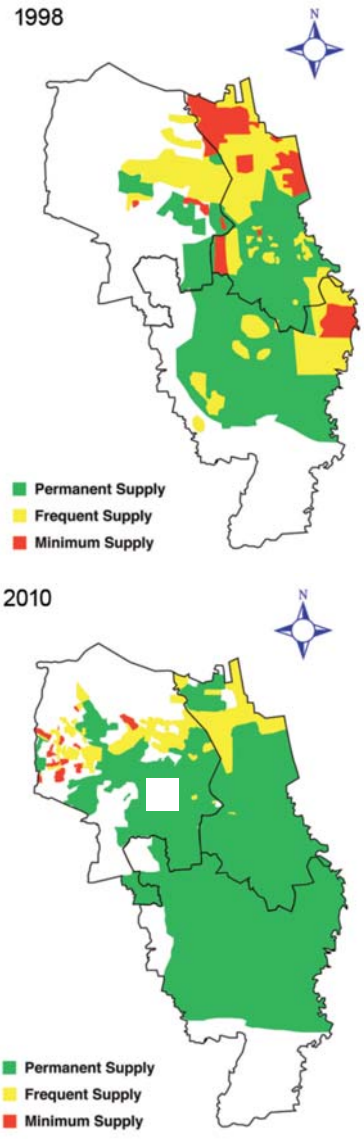
Pro-poor activities

In addition to the emphasis on connecting the lowest income category of users where the tariff is highly subsidised (one twelfth of the commercial tariff), the operator has also engaged in additional pro-poor activities. These focus on the low income population and people living in deprived areas without access to clean water.

They include:

- the construction of 52 water kiosks that provide clean water to around 16,000 inhabitants
- Master meters providing additional clean water to around 580 inhabitants
- the use of output-based aid in a scheme with the global partnership on output-based aid (GPOBA) to provide over 5,000 additional customer connections that serve approximately 30,000 inhabitants.

16,000 people beyond the reach of existing networks have been supplied by installing water kiosks.



See ref. 11, 28

"The community gets reliable access to an affordable water supply, while Palyja supplies a large number of houses with water at much lower overhead and administrative costs" **UNEP 2011, Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication**

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 cities across the whole country as well as 400 villages close to the main distribution network, covering an overall population of 5.5 million.

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 extended until the end of 2012.

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 Finagestion 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.

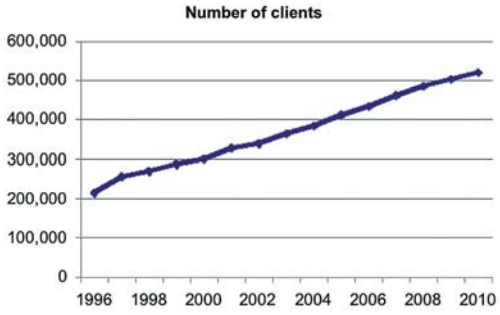
While only 80% of urban dwellers had access to public water networks through private taps or public standpipes in 1996, the overall connection rate is now 98.5%.

The proportion of population using public standpipes has been reduced from 22% to 10% only thanks to 220,000 new household connections.

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 98.5%. 88.3% of the population is supplied through private household connections and 10.2% through stand pipes. The total number of customers that benefit from this improved access is now 536,540 (2011).

This 98.5% 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

Contributing to affordability of water services

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

The majority of newly-connected households have benefited from subsidised "social connections" funded by SONES and installed by SDE. Over 15 years 155,000 such social connections have been installed free of charge for the benefiting customers reaching a population of about 1.7 million. 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 30% 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 Increasing Blocks Tariff comprising a first "social" block for a monthly consumption of less than 10 m^3. This targets the most vulnerable customers with a significantly discounted rate as illustrated by the following table :

Domestic Increasing Blocks Tariff	Monthly consumption	Price per m^3 (FCFA)
Social block	From 0 to 10 m^3	191
Normal block	From 10 to 20 m^3	630
Deterrent block	Above 20 m^3	789

The domestic tariffs have been kept unchanged in the past 9 years.

This household tariff has been kept unchanged for almost 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.

Over the first ten years of the contract (from 1996 to 2005), the production of water has increased by 16% while at the same time the water supplied to the connected population has increased by 22%. 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% now) has allowed an annual saving of 17 million m^3 of water. This is 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 reaches now a rate of 99.4% against a contractual target of 96%.

The customer satisfaction rate regarding the quality of the water supplied now stands at 99% against 45% in 2005.

The presence of a professionnal 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

Country cases

Uganda, Small Towns with private operators

Population: 880,000

The number of active customer connections has risen from 4,700 in 2002 to 34,631 in 2011, an increase of 640%.

Water supply in Uganda: public water supply is organised in two ways. In large cities it is operated by a national utility, the National Water and Sewerage Corporation (NWSC). In the small towns the water systems are initially built by the central government (Ministry of Water and Environment and Local Water Authorities). These systems are then transferred to municipalities who contract the operation and maintenance to private operators.

Organising authorities for small towns: are the Municipalities through Water Authorities.

Water operators: 18 local private companies, members of the Association of Private Water Operators (APWO). They operate in small towns where the total population is 880,000.

Location: small towns throughout Uganda that have been "gazetted" for Public-Private Partnership. About 92 such towns exist, of which 79 are currently operated by private operators.

In small towns and rural areas of Uganda, where 90% of the population lives, water shortages are part of daily life. In these areas, 60% of the population lacks access to safe water, and waterborne diseases and infant mortality are widespread (see ref. 25).

PPP description

The private operators engage in short-term (3-5 year) management contracts under which they operate and maintain the infrastructure provided by the Water Authorities and conduct the billing and customer relations of the services. They are also responsible for providing new customer connections and tertiary distribution networks. The operators have performance obligations and an incentive based management fee, which is calculated as a percentage of the water sales/revenue. In more recent contracts the responsibility for providing and funding has been increased and some contracts now run for 7-10 years.

Context and PPP objectives

Faced with high levels of population growth in the small towns and high levels of poverty in the country, the Ugandan Government embarked on the Small Towns Water project in 2000.

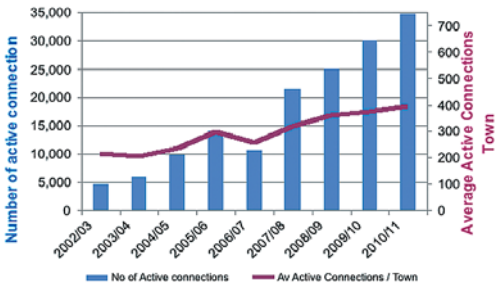
The Ministry of Water and Environment invests in providing basic infrastructure for water abstraction, treatment, storage and distribution for the small town municipalities throughout the country.

For the "gazetted" towns, private operators are invited to submit competitive tenders to operate the system, to connect new customers and to conduct the billing and cash collection for the services.

Over the last decade regulation has been developed and the skills of the operators increased. This demonstrates how capacity can be developed as experience grows and the benefits of external capacity building efforts of development agencies start to pay off. The results stand out in the graphical presentations below, which point to a clear step change in performance from around 2007.

Extension of urban water supply

One of the best measures of the contribution that the private operators have made to improving access to the population is the progression in the numbers of active customer connections managed. This has risen from just 4,700 in 2002 to 34,631 in 2011 (blue bars in graph below).



Growth in number of connections served and average active connections per town

In the same period, the coverage in the towns has grown from an average of 215 to 394 active connections per town (red curve in graph above). This represents a significant increase in the "density" of the services provided.

- **Extending access to drinking water**
- **Securing revenue streams**
- **Optimising economics of services**

Improved billing and cash collection

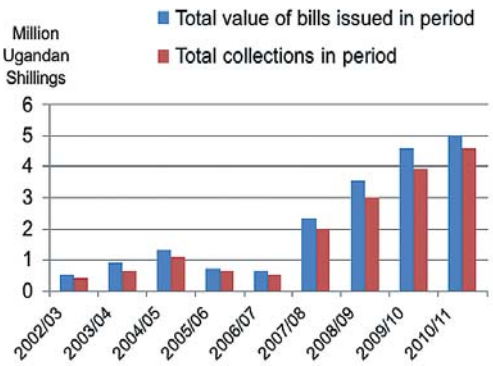
One of the main objectives of the Government of Uganda was to ensure that the economic sustainability of the water services was improved. A key to this is to ensure that users are billed for the services they receive and that these bills are collected. The graph below shows the significant improvement in billing and recovery that has been achieved since 2007.

Amounts billed and cash collected by private operators have been increased 8 times in half a decade.

The Challenge of Financing

The contracts in the small towns have faced financing challenges for a number of reasons. These include:

- difficulty for small operators to obtain finance from overcautious commercial banks,
- unreliable power supplies causing loss of production or very high alternative fuel costs,
- inability of poorer customers to pay the connection charges,
- relatively high level of outstanding bills,
- slow growth of services resulting from the low levels of initial government investment, making the towns remain un-viable.



With output-based aid and pre-financing by private operators the central government subsidy per person gaining access is significantly lower than for traditional input-based projects.

One of the approaches to overcome this financing challenge is Output Based Aid (OBA).

Output Based Aid is a results-based funding mechanism designed to improve access to basic services to the poor. The operator pre-finances the services delivery and is only reimbursed once the quality of the agreed on outputs has been verified by a third party.

Starting in 2005, 10 pilot schemes were initiated with the help and guidance of the Global Partnership on OBAs (GPOBA), which offered a $3.2 million investment grant. These pilots involved both contracts to extend existing infrastructure (Brownfield sites) of 5 years duration and 7-10 year contracts to design-build-operate new infrastructure (Greenfield sites). The contracts were signed in 2008 and are now well on track and are expected to benefit around 45,000 people.

Contracts are awarded on the basis of the lowest subsidy required. This tendering process has resulted in a 20% efficiency gain. The central government subsidy per person gaining access is significantly lower than for traditional input-based projects.

Comparison of subsidy requirements per new connection

Project type	Brownfield	Greenfield
OBA	$ 0 - 36	$ 83 - 108
Input based	$ 30 - 138	$ 37 - 250

The leveraging of private sector financing has been between 10-30% of the capital costs, thus reducing the subsidy required from the central government, which under the traditional approach would be 100%.

The OBA projects have had an added benefit in that they have helped the private operators to develop competence in accessing finance and at the same time increased the willingness of local banks to lend to water projects. In the past banks were unwilling to lend and asked for 100% collateral.

All these factors are helping the Ugandan government towards its objective of 65% coverage of "improved water supply" by 2015 and 100% by 2035.

See ref. 15, 25, 32

Collection efficiency has continued to improve over the last five years, from 85% in FY2009/10 to 92% in 2010/11. This improvement is attributed to the increased vigilance of private operators managing the small towns. **Government of Uganda, Ministry of Water and Environment, Water and Environment Sector Performance Report 2011**

Urban Chile

Population: 15,000,000

The proportion of urban population that has its wastewater treated before discharge has been increased from less than 17% in 1998 to 87% in 2010 and should reach 100% by end 2012.

Organising authority: Government of Chile.

Regulator: Superintendencia de Servicios Sanitarios (SISS).

Water operators: 58 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 58 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, the percentage of households connected to sewers was less than 10%, which meant a population inferior to one million. The country had no experience of wastewater treatment. 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

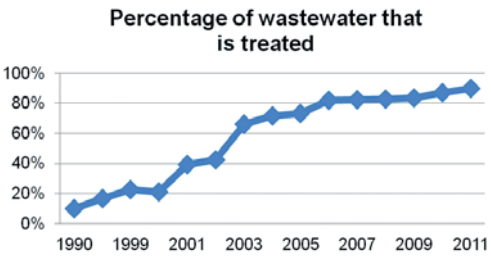
[2] A mostly via stabilisation ponds

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 87% by the end 2010 and was close to 90% at the end of 2011. It is estimated that the sector will reach its goal of treating 100% of urban wastewater in 2012.



This growth means that the sewage of more than 10 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 m^3 per year of sewage that is being treated through 266 treatment systems in the whole country.

Urban Chile	2010
Drinking water coverage	99.8% of population
Wastewater collection	95.9% of population
Wastewater "treatment" [3]	86.9 % of population

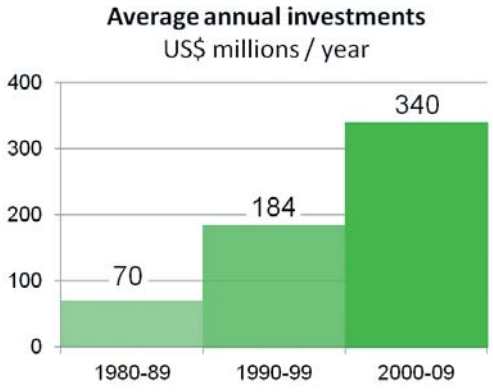
[3] Mostly secondary wastewater treatment plants

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 2000-2010 the total invested was more than US$ 3,900 million, fully financed by the operators without any subsidy.



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.

40% of this amount has been used for wastewater treatment plants and wastewater outfalls while 50% has been used for upgrading and maintaining drinking water and sewerage infrastructure.

The largest new wastewater treatment plant

Restoring service after an earthquake

Private water operators proved their professionalism during the critical task of restoring water supply after the devastating earthquake on February 27, 2010. In spite of the magnitude of the earthquake (level 8.8) 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. 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. 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.

Damages suffered by the industry are estimated up to US$ 120 millions. Yet, thanks to the insurance contracts of the private operators in charge of the affected areas, these losses have not represented any cost for the government and have not had or will not have any impact on the tariff that population in the affected areas pays.

See ref. 12, 16, 27

"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

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.

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

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).

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

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

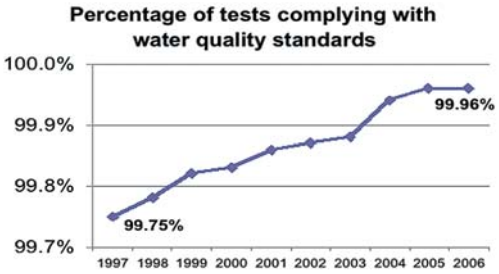
The regulated water industry post-privatisation has been successful in service and operational terms. It has been possible to finance and complete the investments in capital works anticipated. Efficiency in operation has been increased. The levels of the services delivered to water-users and to ecosystems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

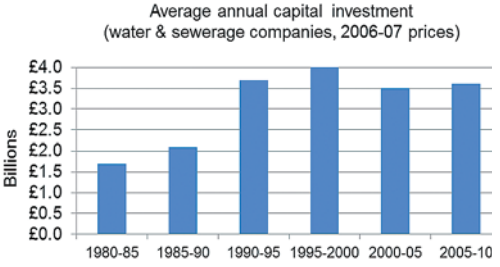
In 2008, overall compliance with the drinking water standards in England and Wales was very high at 99.96%.



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 relinied 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.

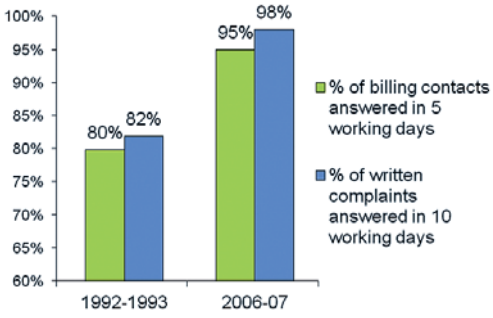
Making users' lives easier

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.

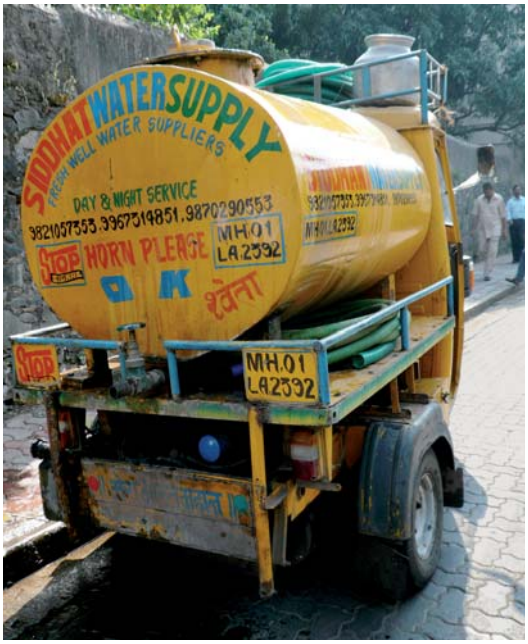
Water bills have gone up, but nearly 70% of the additional cost resulting from new investments has been covered by the water companies' efficiency savings. This means that if the government had funded the same programme itself and had implemented it with its own internal means, water bills would be higher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

See ref. 17, 31

"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**

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 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

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

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.

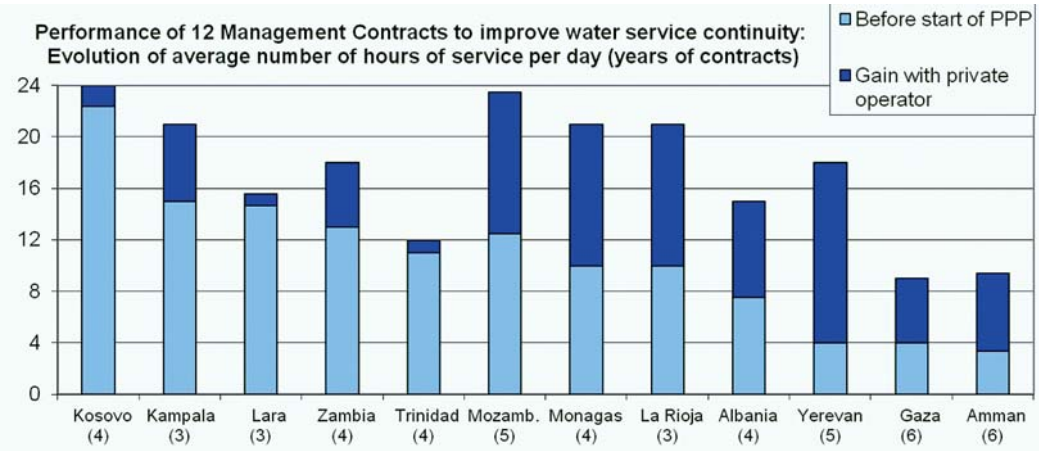
Ensuring more equitable water supply

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



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

Significant reduction of water losses.

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.*"

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

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)**

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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.