ÁGUAS DE PORTUGAL

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© Publisher
By the Book, Edições Especiais, lda. for AdP - Águas de Portugal, SGPS, S.A.

Title
Águas de Portugal

© Text
Águas de Portugal

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© Photography
Águas de Portugal Archive

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Printer
Printer Portuguesa

ISBN
978-989-8614-07-0

Legal Copy Deposit
408214/16

PEFC Certified
Promoting Sustainable Forest Management
www.pefc.org
PEFC/13-31-011

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www.bythebook.pt

Valuing the past, anticipating the future

"Water is the primary principle" were the words of Thales of Miletus, one of the seven sages of ancient Greece, in his explanation positing the beginnings of the world. There is certainly no denying the essential nature of water to mankind's existence. Indeed, not only is water vital to life, but it is also vital to everything in life: whether for everyday usage, production processes or leisure activities, for guaranteeing health and the preservation of nature as well as for economic and social development.

The environmental sector, in particular those public services supplying water to the general population, urban wastewater treatment and waste management services, proves crucial to any society with access as well as quality key factors in the development of communities and countries.

In the case of Portugal, the intense work carried out in this sector over recent decades, especially in terms of infrastructures, service modernization, management professionalization and regulation, among other facets, has gained widespread international acknowledgement. Supplemented by the availability of funding, namely from European Union sources, this work has enabled the achievement of significant improvements in water supply, in terms of both coverage and water quality, as well as in wastewater treatment.

The sector's corporate structure dates back to 1993 with the founding of Águas de Portugal (AdP) alongside a new management model based on integrated solutions at a supra-municipal scale. Hitherto, the only business experience in the sector had been accumulated by EPAL, the company responsible for supplying water to the Greater Lisbon Area.

1993 thus marks the beginning of a genuine revolution in Portugal's provision of water supply and wastewater sanitation services including the launching of multi-municipal systems and setting up of subsidiary management companies under the Águas de Portugal umbrella and partnered by the respective municipalities served by these systems.

As a state owned business venture for the implementation of public policies and attaining of national goals in the environmental sector, the AdP Group took on a structural function that has greatly contributed towards the management of Portugal's existing natural resources.

The supra-municipal solutions implemented throughout mainland Portugal generated noticeable results: the improvements to monitoring drinking water quality, the recovery of bathing waters as well as improvements to the levels of services provided to the population and able to rank Portugal up among the countries returning the best environmental performances in the European Union.

Over a period of almost two decades, the Group has invested more than €7.5 billion in the water supply, wastewater sanitation and waste treatment and recovery systems, thereby establishing the companies as the largest Portuguese group operating in the national environmental sector.

However, in the infrastructure sector, as is the case with the AdP Group sector of operations, the nature of large, capital-intensive projects with long term returns and extended time horizons for implementation poses a particularly demanding challenge as regards economic and financial sustainability. This therefore essentially requires operational growth and profitability based on balancing the asset portfolio, on an appropriate internal organizational structure, on the management of integrated resource synergies as well as on critical performance analysis and the design and implementation of sustainable management models.

Within this context, the reorganization of the Group's operations in Portugal deserves highlighting within the scope of establishing the conditions for providing quality services at a sustainable price without ever compromising continuity, universality, quality and sustainability in the provision of these public services that prove crucial to the quality of people's lives, enhancing the environment and ensuring the development of society.

The valuing of the natural and human environment stands at the very core of the AdP Group mission. Furthermore, the preservation of water as a strategic resource essential to life alongside the sustainable utilisation of natural resources, constitute part and parcel of the set of values that has constantly guided the Group company activities within an effort to balance and improve environmental quality, to ensure equity in service access and to promote people's well-being and quality of life.

Renowned for its capacity to plan and execute, as well as for consolidating the experience built up in the operational and financial management of systems in addition to their development of innovative solutions, Águas de Portugal Group companies currently provide services in the fields of water supply and wastewater sanitation to nearly 80% of the Portuguese population.

The Group also operates in the renewable energy sector, maximizing the energy consumption of both its own assets and local resources, and in international markets where it also stands out for its contribution towards attaining the Sustainable Development Goals for water and sanitation, in particular boosting the number of people with access to safe drinking water and adequate treatment of wastewater.

We are proud of AdP's excellence of services, its high environmental performance and its levels of technical, economic and financial efficiency, achievements that we take great pleasure in sharing with you in this book.

The AdP Group pursues its mission in full awareness of the importance of taking firm steps on the journey set out on a little more than two decades ago in the direction of a positive and sustainable future.

The Board of Directors
AdP - Águas de Portugal, SGPS, S.A.

Times of change

A two-speed country

Portugal was once a two-speed country: progressive and pioneering in some areas while lagging behind European standards in many others.

Looking at the country from outside inwards, one would say Portugal entered the final decade of the 20th century taking great strides towards modernity. However, looked at from inside outwards, the country clearly still remained a two-speed country. Dynamic, progressive and even pioneering in some areas; Portugal continued to lag behind, and at some distance, the European standards in many others, in particular in the environmental area.

The country's regional asymmetries had not only failed to fade away but, in many cases, had actually become more visible. The most striking aspect of this dichotomy – even while Portugal in the 1990s, in contrast to preceding decades, experienced significant growth in its population – came with the progressive and swift depopulation of its rural and inland areas with many people abandoning them in search of a better life in coastal regions and particularly in the major cities that were nevertheless ill-prepared to take in such large streams of people.

In the field of technology, the progress proved quite remarkable with the mushrooming of new home appliances such as microwave ovens and air conditioning machines but also alongside faxes and increasingly impressive computers. The latter was no longer some heavy and complex, difficult to operate device but rather a tool that most now quickly adjusted to. Computers furthermore brought with them an abundance of paraphernalia: printers and the floppy disk drives that would soon be swept away by their CD successors, scanning equipment and speakers with ever higher sound quality. In awe at that then witnessed, few would then ever have been able to imagine that in the twinkle of an eye the computer would slot into a bag and carried around while keeping us connected to the entire world via the Internet.

Everyday appliances evolved incessantly in the 1990s. Televisions became coloured, stereo and remotely operated with the two state channels joined by private stations in 1992. Mobile phones, whose sales soared, enabled the recording of messages and soon included SMS, a means of communications no one would today renounce. Cameras became digital and the radio was practically always tuned in to FM. The old turntable, as well as the cassette player, became relics with the advent of the CD player that deepened the ease with which music might be taken out onto the streets as portable devices spread.

Cars got their own remote controls, fitted out with electric windows and would soon include a revolutionary device the size of just a matchbox stuck onto the windshield. This was Via Verde, an instant electronic tolling system installed on the brand new highways that allowed you to drive through without having to stop to pay any toll. A real revolution throughout Europe and led by Portugal where the system was up and running in as early as 1991.

In addition to technology, a strong focus was also placed science, including the strengthening of international cooperation through exchanges between Portuguese and international scientific communities thus fostering research centres in various fields, such as particle physics, biomedicine and, for the first time, also in the social sciences. A further sign of this progress came with preparations for the 27 September 1993 launch of what would prove the very first Portuguese satellite.

Were we to be indiscreet and peek inside the wallets and purses of Portuguese citizens at the beginning of the 1990s, we would see that cash had largely disappeared in favour of debit and credit cards and plastic money had taken over consumer society with e-commerce beginning to take root. Housing and car loans were accessed en masse along with many other new financial products. Hypermarkets proliferated all over the country just as did hospitals, schools and cultural facilities.

Top, left
Guimarães
Top right
Aveiro
Bottom left
Coimbra
Bottom right
Évora

The Education System Framework Law, fully implemented in 1993, extended compulsory education to the 9th grade. Portugal was then an exhibition theme at Europalia, in Belgium, with preparations already under way for Lisbon to host the European Capital of Culture in 1994. Portuguese music and literature began to make international inroads – as demonstrated by the awarding of the Nobel Prize to José Saramago in 1998; with this also the year of 'Expo 98', the World Exhibition that took place in Lisbon and dedicated to the theme of the Oceans. This global event would not only spark debate around a broad range of naturalist themes but would also demand the complete environmental restoration of the run-down riverside area of Lisbon coupled with important regional planning decisions.

Preparations were also advancing for the inauguration of Culturgest, an artistic complex run by the state-owned bank, Caixa Geral de Depósitos, while a remarkable construction was under construction in Lisbon: the Cultural Centre Belém Cultural Centre. Initially designed to house the Portuguese Presidency of the then European Economic Community, which Portugal had joined in 1986, it has since become an important centre for conferences and cultural events.

In a country brought closer together by the expanding road network, in the 1980s most journeys were still overshadowed by the sight of rubbish dumps and the stench they gave off.

In a country brought closer together by the expanding road network, in the 1980s most journeys were still overshadowed by the sight of rubbish dumps and the stench they gave off as well as by polluted rivers and lands charred by wildfires. The amount of waste per capita had in the meanwhile risen exponentially as the quality of life improved and new patterns of consumption emerged.

The expansion of the car fleet also amounted to another source of pollution as the obvious problem caused by exhaust gases got compounded by waste oil and discarded tires, requiring integrated solid waste treatment solutions.

Additionally, the increase in the building industry, in response to population growth and the consequent need for housing, would give rise to – frequently unauthorized – urban sprawl lacking in the appropriate and necessary infrastructures to underpin such demographic growth, leading to not only environmental problems but also issues arising from land use planning problems.

Top
Marvão
Centre
Tagus river
Bottom
Sagres

Times of change that triggered a genuine transformation in the way of thinking and in the management of natural resources in Portugal.

In the early 1990s, water supply networks covered a substantial percentage of households, but tap water shortages were frequent with the water commonly unfit for drinking, especially in the summer. Firefighter vehicles distributing drinkable water to households remained a common sight in those days. Sanitation networks spanned very limited areas and mostly relying on the initiatives of local government efforts to solve problems. However, the majority of the solutions that were nevertheless put into practice incorporated wastewater collection networks and lacked the necessary treatment systems, thus leading to pollution in whichever waterways those wastewaters were discharged into.

This provides a portrait of Portugal on the eve of a new century. A country that may have been sharing the environmental pressures of the so-called major modern societies, arising from the mass consumption patterns, but which simultaneously was still working on the provision of basic environmental services.

The real needs of the nation, the new environmentally friendly mind-set that was already budding in conjunction with the recent integration into the European Community, which opened up new possibilities in parallel with demands for greater legislative rigour, were driving the country through times of change, triggering a genuine transformation in the way of thinking and in the management of natural resources in Portugal.

Changing the course

Can the development of a business group influence the destiny of a country?

Can the development of a business group influence the destiny of a country? When investment priorities transform shortcomings into quality services, are we able to identify the added value of the work carried out? Should the wealth of experience and knowledge developed within the contemporary Group framework today attract the appreciation of academia and enhance the entrepreneurial development of an entire sector, might we not speak of a history of success?

The existence of water supply and wastewater sanitation services with the necessary scope and quality constitutes an essential condition to the well-being of the population and the development of all economic activities. Bearing this in mind, we need to acknowledge that in Portugal, at the dawn of the 1990s, only 50% of the water for human consumption was tested and of good quality. In terms of wastewater treatment systems, these served slightly over a quarter of the Portuguese population. Hence, despite the fact that most households were linked to sewer systems, most of the wastewaters from populations and productive activities ended up returning to the environment without any type of treatment and correspondingly resulting in increased pollution levels in the recipient waterways.

These were the circumstances in which Águas de Portugal was founded in 1993 as a corporate state entity endowed with the objective of reforming the management of the country's water supply and sanitation services. The company then started out down a pathway of change that in a little over two decades has brought about the reversal of Portugal's social and environmental prospects. The themes presented in this book do not adopt any firm chronological time sequence but instead swing between panoramic approaches and detailed perspectives. Their aim involves telling the story of the largest Portuguese environmental sector business group and particularly about how its efforts and resources combined to drive consistent improvements in the natural and human environment.

Left
Barra Beach, Ílhavo
Centre
Cresmina Beach, Cascais
Right
Ponta da Piedade, Lagos

This journey starts out with centuries of history (theme 1, pgs. 26-29) and the presentation of EPAL, the century old company integrated into the Águas de Portugal Group. Its management model and supra-municipal operations were structural contributions to the reform that the sector underwent in 1993. This ensured the adoption of integrated solutions that took into account the physical realities of the hydrographic basins and nurturing economies of scale alongside service reliability. This led to the development of the multi-municipal model, applied first to the water supply area in five of the major national regions (theme 2, pgs. 30-33) and gradually extended to wastewater sanitation firstly through the creation of the Estoril Coast and the Ria de Aveiro sanitation systems, already identifies as priority action areas (theme 3, pgs.34 to 37).

The successful implementation of these systems led, as from 2000, to the extension of the multi-municipal model to the whole country, with a special focus on less densely populated areas and inland regions (theme 4, pgs. 38 a 41) in addition to the concern to meet the demographic, geomorphological, environmental and economic specificities of each territory, a factor often requiring the application of tailor-made solutions (theme 10, pages 62 to 65).

Thus, the Águas de Portugal Group set in motion an unprecedented infrastructure plan for the sector, supplemented by the incorporation of the existing municipal infrastructures, some of which underwent renovation or conversion in order to meet the standards and requirements of the new, integrated systems (theme 5, pgs. 42-45).

The adoption of integrated management solutions, involving several municipalities and, in certain cases, several Group companies, gained greater visibility with some projects proving iconic whilst other served as the foundations for case studies on the sector, such as the integrated Tagus Estuary depollution project (theme 15, pages 82-85).

The water supply and wastewater sanitation business experiences merited recognition and the awareness of their potential led to the incorporation of Portuguese state assets in the environmental area into the Group's portfolio as was the case for Empresa Geral do Fomento (EGF), integrated as a sub-holding for the treatment and recovery of solid urban waste in 2000. In partnership with municipalities, EGF subsidiaries were responsible for closing and converting hundreds of the rubbish dump sites that still existed across Portugal in the late 20th century (theme 6, pages 46-49).

Along with constructing infrastructures for the environmentally friendly treatment and recovery of municipal waste, EGF also accounted for a major improvement in the selective collection and recovery of recyclable packaging materials (theme 7, pages 50-53) and played an important role in implementing a new waste management paradigm centred on maximizing the growth potential of waste recovery as a resource (theme 12, pages 70-73).

Through their respective activities, Águas de Portugal Group companies have contributed effectively to improving the general quality of life, which clearly reflects in the results returned both in terms of the quality of drinking water, in the coverage and standards of the water supply, wastewater treatment and municipal solid waste collection services and as well as in the improvement of bathing water quality standards.

The skills and capabilities developed within the context of setting up the multi-municipal systems and in the application of EU investment funds also turned AdP into a recognized partner for the implementation of projects in international markets (theme 19, pages 98 to 101).

Continuing the positive trends of just over two decades of activity, the Águas de Portugal Group pursues its commitment towards attaining a future vision of the water sector that, among

other aspects, implies the management of water supply and wastewater sanitation systems operating within a framework of economic, financial, technical, social and environmental sustainability.

In this sense and within the framework of the mission entrusted to the Group, Águas de Portugal has been building its activities on a philosophy of a professional management approach, based on the adoption of the best management practices and on the development of an organizational culture targeting excellence in performance through the deployment of the set of benchmark business practices mentioned in some passages of this book.

To begin with, in terms of information management, a particularly complex process in this business field, has been based both on long term investment projects and on the construction and operation of systems covering considerable territorial range. In view of the challenges, a common decision making support tool has been developed over the years to ensure operational sustainability and improve the efficiency of Águas de Portugal Group service (theme 8, pages 54-57).

The Group has also placed a special focus on adopting the appropriate asset management policies and practices able to ensure the rationalization of the investments needed to provide these services, with an emphasis on appropriately sizing the new infrastructures and on maintaining those already existing as well as on prudent risk management and the mobilization of financial resources (theme 9, pages 58-61).

Furthermore, within the scope of adopting the best management practices, the work undertaken by Águas de Portugal in the field of Water Safety Plans deserves due mention, both in terms of implementing the risk assessment and risk management methodology for their own systems and as regards the overall promotion of water safety management process with other entities in Portugal and abroad (theme 11, pages 66-69).

In order to ensure continuity, universality and quality in the provision of these essential public services for generations to come, the Group is also strongly committed to the implementation

Left
Vines growing on the banks of the Douro
Right
National Park and Palace of Pena

of measures ensuring economic and financial sustainability and bringing about the optimization of operational management costs and thus eliminating inefficiencies (theme 16, pages 86-89).

Seeking to reconcile the management of the urban water cycle with the cycles of nature, the Group grounds its corporate responsibility strategy in the concept of symbiosis and on developing interventions across several different fronts. In the environmental field, implementing measures for the protection and recovery of the environment surrounding the infrastructures (theme 14, pages 78-81) particularly stand out but also alongside the preservation of the quantities of available water sources, the reduction of water losses in the production and transportation processes, the adoption of savings and reuse measures in addition to promoting environmental education (theme 17, pages 90 to 93).

This contribution to sustainable development further involves the development of solutions that improve the Group's overall energy performance, specifically by promoting energy efficiency through optimizing consumption and by recourse to the energy potential present in the assets and the local resources arising from company activities (theme 13. pages 74 to 77).

Alqueva

As regards the social dimension, Group companies engage in their activities in close relationships with the local populations, playing relevant roles as active agents for environmental information and education, in an open-door policy and working together with the community (theme 18, pages 94 to 97).

Focusing on the future and the new paths required, the final theme details the ongoing innovation and research and highlights the Águas de Portugal Group goals in terms of developing solutions that produce smarter and more efficient processes, whether in the management and operational practices or the relationships prevailing with customers and consumers. After all, customers and consumers represent the core focus of our dedication and who we exist and work for (theme 20, pages 102 to 105).

On course for sustainability

01

A mission with centuries of history

Finding ways of transporting water is a challenge dating back many centuries. The construction of the first aqueducts took place in Roman times. In Portugal, the most important infrastructure is the Águas Livres Aqueduct, built by royal order in the 18th century to supply the capital and proving such a successful business experience that it became the default choice for organizing the country's water supply services.

Truly impressive, the Águas Livres Aqueduct, spanning the Alcântara Valley, is a remarkable work of hydraulic engineering and one of Lisbon's postcard landmarks. More than 14 kilometres traverse the distance from the Águas Livres spring located in Belas-Sintra and the Mãe d'Água reservoir in Amoreiras, Lisbon, the recipient of the water supply for Portugal's capital by means of gravitation ever since the mid-18th century. Flocking from all over the country, the population settled outside the walls of the medieval city, which had become an important political and economic trading post in the wake of the Voyages of Discovery and correspondingly raising the demand for publicly supplied water. Although situated by the Tagus River, Lisbon could not rely on the Tagus to provide water to its citizens because the river's wide mouth, tidally interacting with the sea, contained excessive levels of salinity with the only spring, located in the Alfama district, insufficient to meet the needs already prevailing.

Opening in 1748 with 127 arches, 21 of which are perfectly round and after having survived the devastating 1755 earthquake, the Águas Livres Aqueduct, with its construction commissioned by King João V in 1731, became the ultimate symbol of the progress in water supply services in Portugal.

The management of the water services, taken over in 1868 by a private company, CAL - Companhia de Águas de Lisboa, proved just as innovative. Through a contract signed with the government, this company became responsible for providing sufficient water to cover the minimum daily consumption of Lisbon's population and also for completing and improving the distribution network in the streets of Lisbon as well as carrying out the work necessary to supplying the fire-fighting services.

In 1910, CAL accompanied the transition from monarchy to republic and in 1932 began focusing its activities on providing water to other municipalities beyond Lisbon and starting to consume water extracted from the Tagus River. In 1940, the Tagus aqueduct carrying water from Azambuja to the Olivais pumping station went into operation and the water supply network was extended to the municipalities of Oeiras, Cascais, Azambuja, Vila Franca, Sintra and Loures. Another prominent improvement took place in the 1970s, when the waters from the Zêzere river arrived in the capital via the Castelo de Bode subsystem. To convey a sense of its sheer importance, this subsystem accounts for nearly 75% of the company's current production capacity.

Left
The Águas Livres Aqueduct stands as a symbol of the history of water supply in Portugal.

Top left
The new EPAL Central Laboratory facilities fitted out with cutting-edge equipment and highly qualified human resources, this provides a critical piece of the analytical water quality control process and indispensable to the safety of the water supplied for human consumption.
Top right
The Castelo de Bode subsystem, which takes the Castelo de Bode reservoir, on the Zêzere river, as its main water intake point and accounting for nearly 75% of EPAL's production capacity.
Bottom
The water extracted from the Castelo de Bode reservoir is treated in the Asseiceira WTP, in the municipality of Tomar. Inaugurated in 1987, this facility was expanded in 1996 and increasing its capacity to 625,000 m^3/day.

After the expiry of the city of Lisbon water supply concession contract in December 1973 and, following the decision to henceforth provide these services by a public company, EPAL - Empresa Pública das Águas de Lisboa was established in 1974, with its name changed to Empresa Pública das Águas Livres in 1981.

When EPAL was restructured as a limited liability company in 1991 and gradually taking over responsibility for a wide-ranging system that produced, transported and distributed this precious liquid to more than 20 cities, the 19th century aqueduct with which it had all started was, by then, a mere piece of the company's museum heritage.

Indeed, building on the success of a single action format and on the definition of the rules resulting from Portuguese membership of what was then the European Economic Community in 1987, the first major water sector reform act came in 1993 with the amendment of the water service management legal framework by means of corporatization.

The configuration of the multi-municipal water and sanitation system was then set out and the sector opened up to private companies in the state-owned municipal service sector through concessions, segmenting the sector into its 'high' and 'low' dimensions. The aim of establishing these multi-municipal systems sought to overcome the existing fragmentation in the water supply and sanitation sector and foster the conditions for development that reached beyond administrative boundaries, and taking advantage of the Cohesion Fund, a new European source of funding intended for major environmental sector projects.

On the occasion of the founding AdP – Águas de Portugal with the mission to develop multi-municipal water supply and sanitation systems in 1993, the already centennial EPAL, a success in terms of its business management model, was incorporated into the aforementioned business group.

Two decades later, the positive results of this entrepreneurial approach to water service management are patent, particularly concerning the percentage of the population served, the rise in quality of public consumption and bathing water and the general quality of the environment in Portugal. This development proves all the more important as it involves factors shaped by several positive externalities, particularly in terms of economic development, regional cohesion, public health and the population's quality of life.

Today, the water sector in Portugal also stands out on account of the improvement in the service quality provided by the managing bodies, a result of the substantial investment in infrastructures and the equipment essential to rendering these services, the high levels of training and know-how of its staff and the innovative solutions designed and implemented in these areas in Portugal and often representing pioneering initiatives at the international level.

In addition to these results, the valuing of the natural and human environment has greatly contributed to the activities engaged in by the AdP Group, which is today the largest operator in the Portuguese environmental sector. Through its portfolio of companies, the Group provides services, directly or indirectly, to more than 80% of the Portuguese population.


Laboratório Central

02

Water with quality

Some of the priority measures identified to solve the problems related to water quality and supply reliability afflicting numerous municipalities a little more than two decades ago included the reduction in the great dispersion and vulnerability of the water sources as well as building the technical and technological capacities necessary to ensuring compliance with the standards required for water intended for human consumption. The solution stemmed from the founding of the first multi-municipal water supply system developed and implemented by Águas de Portugal.

"With bottles and buckets to the nearest well" was the headline of a May 1991 article published in one of Portugal's leading national newspapers to describe the situation experienced in Oporto, where, in some cases, there were frequent interruptions and disruptions in the mass water supply, a situation that even in those days already got classified as a "public pre-disaster".

At the problem's source, and not exclusive to that region, was the failure to collect and produce enough water to meet the needs of the population and the productive activities ongoing.

At the level of water intake, the water supply sources allocated to this end lacked the capacity needed to store in the wet years the amount of water then needed to cope with consecutive dry years and leading to seasonal water shortage. The wide dispersion of water sources, some of them with insufficient levels of production, such as wells and boreholes, also resulted in the vulnerable quality of the extracted water with treatment in some cases carried out at water treatment plants (WTP) that did not possess the required technical or technological capacities to meet the standards set for water intended for human consumption.

In the Algarve region, it became increasingly difficult to meet the water needs both of the resident population and of tourists, especially during the summer season. The pressures incurred by this increasing demand had seen the overexploitation of water sources that had hitherto been almost exclusively subterranean driving a deterioration in water supply quality, worsened by saline intrusions and the diffuse pollution resulting from intensive agricultural practices.

In a country striving to be modern and sustainable, change was both imperative and pressing, in addition to being crucial to complying with various Community directives on water quality to which Portugal had been committed since its accession to the European Economic Community in 1986.

The Lever WTP treats the water provided to nearly 1.5 million inhabitants of the Greater Oporto area.

To address these problems, the state had put in motion, prior to the 1993 legislative reform, a set of pilot projects through protocols established between EPAL and groups of municipalities identified as priority for intervention given their inclusion of the most densely populated towns located along the coastal region, particularly in the Algarve and in the Greater Oporto Area.

The rationale behind these experiments derived from the adoption of integrated supra-municipal solutions that would take into account the physical realities prevailing in the river basins and return substantial economies of scale as well as service reliability.

In 1993, the partnerships then started would, in most cases, be converted into the first multi-municipal water collection, treatment and supply systems providing for demand in their respective municipalities, thus Eastern Algarve, Western Algarve, Northern Greater Oporto, the Southern Greater Oporto, and in conjunction with EPAL's own system (in the Greater Lisbon Area).

Now part of the solution to the water supply problems in Portugal had been found, the launch that same year of Águas de Portugal then provided an answer to the lack of business solutions, besides the case of EPAL, needed to ensure reconciliation between the huge investments involved and the appropriate application of the grants and loans made available by EU sources of funding.

The first multi-municipal water extraction, treatment and supply system concessionaires were founded in 1995, with Águas de Portugal holding a 51% stake in the share capital with the municipalities served by the system holding the remaining 49%.

An unprecedented infrastructural plan for the sector was then initiated, supplemented by the incorporation of existing municipal infrastructures, some of which underwent restructuring or conversion work in order to meet the requirements of the new integrated systems.

The investments made through to 1999 (the first period of the Cohesion Fund) amounted, as far as water supply is concerned, to €383 million of which €325 million came from co-financing, benefiting close to 64 municipalities home to close to 6.4 million inhabitants.

Top

The Areias de Vilar WTP, designed for treating water taken from the Cávado river and which entered into operation in 1999, was one infrastructure built under the auspices of the first multi-municipal system investment plan.

Bottom

Due to the fluctuating characteristics of the population served, the Alcantarilha WTP, in the Algarve, consists of three parallel treatment lines enabling the meeting the peak season water supply demand and avoiding overcapacity during the low season.

Deployed in the construction of WTPs, pumping stations, intake pipes, reservoirs and other equipment, the investments returned a significant impact in terms of increased service standards with a very clear improvement in the percentage of good, quality controlled water, rising from 50% in 1993 to 75% in 1999.

Among that first generation of water extraction and treatment infrastructure investments, the following WTPs stand out as milestones: the Lever (in Greater Oporto), the Areias de Vilar (Northwest), and the Tavira and Alcantarilha (Eastern and Western Algarve, respectively). They all displayed a particular impact on reducing the number of water sources, thus allowing for greater control over the water quality standard.

The success of the first generation of Multi-municipal Systems (1993-2000) would lead to the extension of the multi-municipal model both to the whole country and to wastewater treatment systems, resulting in the founding of ten new multi-municipal systems between 2000 and 2006.

03

Diving into good waters

In keeping with its expansively long coastline, the sea constitutes not only one of Portugal's main tourist attractions but also the source of a wide ranging set of natural resources of great economic value and requiring environmental preservation and sustainability. In partnership with the municipalities, the Águas de Portugal Group has focused a significant part of its activities on integrated domestic and industrial wastewater treatment projects in order to ensure waters are returned to the natural resources in conditions that make them safe both to the environment and to public health and correspondingly contributing to higher standards of bathing water and the decontamination of the country's major river basins and beaches.

A prestigious seaside resort, very popular among European royalty since the mid-19th century, in the 1950s, the Estoril Coast boasted some of Europe's most attractive beaches.

However, the rapid population growth then experienced by the municipalities of Amadora, Cascais, Oeiras and Sintra, quickly led to high levels of beach pollution, affecting local residents and driving away tourists. The existing sanitation solutions were not scaled to meet the unusual extent of population growth and resulting in a significant portion of the effluents getting discharged untreated into the waterlines flowing to the coast.
And the quality of the seawater, more than just a problem for tourism, became an environmental and public health problem that urgently needed dealing with.

Then, as now, the Aveiro Estuary in central Portugal, represented an important social and economic pole due to the abundance of the natural resources in its waters and surrounding areas essential to undertaking various activities, from fishery to industry. However, rapid development in the 1980s also reflected in higher pollution loads that soon fed into the Estuary and, to such an extent, it soon proved crucial to clean up and foster its recovery, across all levels but especially as a wellness and leisure environment for both sustained and sustainable development.

These two examples convey the situation Portugal faced in the 1990s in terms of the efficient disposal of the wastewaters generated. Low service levels, both in terms of extraction, with only 60% of the national population supplied with drinking water, and particularly concerning wastewater treatment, serving only close to 30% of the population, mean the pooling of state and municipality efforts was especially pressing so as to ensure a territorially integrated response able to both increase the extent of coverage and curb the environmental deterioration of the existing water resources.

Installation of the São Jacinto ocean outfall, located in the secondary dunes of the São Jacinto beach, Aveiro municipality, in 1999. This ocean outfall is responsible for discharging the treated effluent from municipalities 3.3 km from the shore.

The multi-municipal solution, as advanced by the sector reform carried out in 1993 and already implemented for the water supply in five major regions, was thus also extended to wastewater disposal treatment through the founding in 1995 of the Estoril Coast Multi-municipal Sanitation System, followed two years later by the Aveiro Estuary Multi-municipal Sanitation System. The two regions were both identified as had been considered priority intervention areas.

On the Estoril Coast, the system concession resulted from the "Everything to Guia" solution designed in the 1970s consisting of intercepting all the region's domestic sewers through a general gravitational collector-interceptor. The lower areas were pumped by lift stations before drainage into the Guia WWTP in Cascais and final disposal of the treated effluent in the sea, three kilometres offshore and at a depth of 45 meters. In 1996, the solution under development since 1985 became the responsibility of the then created Multi-municipal System, which managed to complete all the works planned in less than three years and thereby attaining exceptional results in terms of the improved water quality of the streams flowing to the Estoril Coast.

The positive impacts of this intervention on the life and economy of the region, as well as the effectiveness of EU support fund implementation, led the European Commission in 1997 to consider the Estoril Coast Sanitation System a "story of success."

The initial Aveiro Estuary project involved ten cities and, by the end of 2001, had made investment amounting to almost €84 million, with the Community support component comprising 85%, particularly focused on the construction of infrastructures for the collection and processing of wastewaters and an ocean outfall for the offshore discharge of the treated effluents. Following the completion of only these initial works, the Simria began discharging into the sea in conditions that proved sustainable to the recipient environment, cutting by nearly 50% the effluents that were formerly discharged untreated into the Estuary.

The success of these initial experiments determined their extension to other cities and regions of the country, particularly to the inland areas where the Águas de Portugal Group focused a substantial proportion of their activities on developing and implementing solutions that would allow for the gradual depollution of the country's major river basins and beaches, both along the shore and along the inland waterways. Standing out among these are the actions carried out in the catchment areas of the Ave and the Lis rivers, in Western Portugal, in the Tagus Estuary and along the Algarve coast.

Achieving the expected results required investment in infrastructures whether for the collection, transportation, treatment and disposal of wastewater. Thus, over a period of 20 years, more than three billion euros were invested by Águas de Portugal Group businesses.

With operations spanning close to 80% of the mainland territory and covering almost the entire extent of the Portuguese coast, where they provide for the treatment of domestic and industrial wastewaters ensuring these can be returned to the natural environment in conditions that are safe both to nature and to public health, Águas de Portugal Group companies have contributed to the consistent improvements in the quality of bathing water, as demonstrated by the classifications awarded by the European Environment Agency and by the corresponding increase in the number of Blue Flag beaches.

The treatment of wastewaters to ensure their return to recipient environments in environmentally safe conditions has represented an essential step towards improving the quality of bathing waters.

Top

Viana do Castelo WWTP

Bottom

Guia WWTP, Cascais

04

Through hills and valleys

2000 saw the beginnings of the expansion of the multi-municipal model, with a special emphasis on the less densely populated areas and inland regions. To the advantages driven by territorial integration, the second generation of systems added a new and also integrated vision of the urban water cycle, which now included both water supply and wastewater disposal activities in the same system.

Ensuring the desired levels of service and service quality in terms of water supply and wastewater disposal in areas characterized by their challenging orography and low population density constitutes a complex task whether in technical, human or financial terms.

The constraints then common to most inland regions and that at the beginning of this new century placed the servicing goals established by the 1994-999 Regional Development Plan (95% water supply coverage and 90% provided with drainage and wastewater treatment) well beyond the reach of the performance results returned in those days.

In the case of water supply reliability, one of the dominant concerns when first launching the multi-municipal systems, there were more than 3,300 supply systems then existing served by more than 6,500 sources.

For example, in the Trás-os-Montes and Alto Douro regions, 60% of the population was served by very small systems (with an average of 154 inhabitants per system), depending on close to 1,000 sources and resulting in high vulnerability levels in case of draught.

In the wastewater sanitation sector, despite the huge leap in the population served by sewer networks (from 32% in 1993 to 75% in 2000), the levels of wastewater treatment services did not exceed 55% compounded by the further disadvantage that in some cases the installed capacity provided by new urban wastewater treatment plants could not yet be activated because the respective municipal drainage networks had still not been concluded.

It was within this context that, as of 2000, the national rollout of the multi-municipal model commenced targeting the less densely populated inland areas and regions within the scope of completing and improving national coverage.

The advantages arising from territorial integration and the new generation of systems added a new vision to the urban water cycle, as outlined in the Strategic Water Supply and Wastewater Disposal Plan (2000-2006), integrated equally so as to include both water supply and wastewater disposal activities within the same system and also comprising the recycling and reutilisation of treated effluents.

The Vilar de Mouros Reservoir, with its water flows by gravitation from the São Jorge WTP, supplies an area spanning part of Caminha, the whole of Vila Nova de Cerveira and the southern areas of Valença municipality.

Through to 2006, ten integrated systems were established across the north to the south of Portugal: Minho-Lima; Vale do Ave; Trás-os-Montes e Alto Douro; Zêzere e Côa; Raia, Zêzere e Nabão; Baixo Mondego-Bairrada; Oeste; Norte Alentejano; and Centro Alentejo, following which the Águas de Portugal Group took on responsibility for ensuring the upstream water supply and wastewater disposal activities (networks and operating extraction, treatment and large scale water supply infrastructures and the final collection, treatment and disposal of wastewater) to more than 80% of the Portuguese population.

In addition, considering the particularly demanding challenges of wastewater disposal, especially in coastal areas where the largest Portuguese population centres and economic activities are concentrated, therefore placing greater pressure on the water resources due to the resulting pollutant loads, this period also saw the constitution of the multi-municipal wastewater disposal systems of the Baixo Cávado e Ave, Greater Oporto, Lis, Tagus and Trancão Rivers and the Setúbal Peninsula and Algarve.

The second generation of multi-municipal water supply and wastewater disposal systems represented an exponential growth both in the amounts invested and in the operational scale; between 2000 and 2013, over €2.5 billion were invested with Community funds supporting nearly €1 billion of this estimated total.

These figures drove very significant progress in the most important indicators for these activities, with positive impacts on the areas of health, the environment, economic development and quality of life, among which we would here highlight: the level of service coverage, with 95% of the population served by water systems and 79% by waste water treatment systems; the level of the quality of water for public consumption with 98% of the water tested proving of good quality; and attaining an above European average performance in terms of the quality of bathing waters.

The Alto Rabagão WTP, in Montalegre municipality, located on the bank of the reservoir with the same name, on a site of outstanding natural beauty, framed by the small Nordic pine forests that reach all the way down to the lake.

The Caldeirão WTP, located in the city of Guarda, was inaugurated in 2006 and resulting from investment of close to €11 million; provides one example of an infrastructure serving a mountainous territory with a sparse, dispersed population.

05

Let's get to work

Within the scope of implementing the multi-municipal solutions defined, from North to South and from coastal shores to the inland border, the Águas de Portugal Group carried out an unprecedented infrastructure plan for the water and sanitation sector in Portugal. Involving municipalities in the new solutions meant it proved possible to design a plan that, from the perspectives of both investment rationalization and the economic and financial sustainability of the solutions, whenever possible favoured the recovery and remodelling of pre-existing facilities, supplemented by any new infrastructures necessary to system operation.

One of the underlying criteria of the infrastructure plan developed by Águas de Portugal within the implementation of the defined multi-municipal solutions consisted of, whenever possible, integrating pre-existing municipality operated facilities, ensuring their technical, environmental and economic appropriateness to the overall economic solution designed for each system.

In individual cases, especially those involving infrastructural construction or upgrades recent to the date of the founding of the systems, the investment plan of the company managing the new multi-municipal system did not foresee significant interventions.

Conversely, in many cases, the state of conservation and integrated facility operation required "rehabilitation" with few substantive technical changes or even "restructuring" that implied a certain degree of technical redesign and reconfiguration. Other situations encountered needs to "expand" the infrastructures, which often involved remodelling an underlying core component.

However, there were also cases of certain infrastructure that were only subject to those interventions strictly necessary to enabling them to remain in operation for a few more years until their scheduled decommissioning coincided with new infrastructures entering into operation.

In two decades of activity, 13% of the investments made targeted rehabilitation interventions, restructuring or expansion, mostly addressing operational shortages and the under-scaling of the infrastructures existing in view of project requirements.

The Nazaré WWTP underwent major intervention with a view to its restructuring and modernization and consolidating an investment of close to €7 million euros of which 85% was co-financed by the EU Cohesion Fund.

We should here bear in mind that despite the rehabilitation needs, the restructuring or expansion of infrastructures was most pressing at the beginning of the concessions, which coincided with the building of new infrastructures from scratch. A significant percentage of the improvement investments stemmed from the need to undertake further interventions due to changes in the factors impacting on the context with examples including the enactment of addition national and EU legislation in the field of the environment and public health.

In this context, the new solutions adopted for the treatment of effluents were particularly relevant, with recent higher quality technologies responding to the appropriate treatment level, whether secondary, tertiary or tertiary with added disinfection in accordance with the classification standards of the recipient waters.

The Guia WWTP in Cascais represented a test case for the expansion and upgrading of the treatment carried out with a dual purpose: on the one hand to meet the European Commission's decision to stipulate advanced primary wastewater treatment throughout the year, supplemented by disinfection during the bathing season; and, on the other hand, to improve the efficiency of the treatment process via recycling some of the treated flows, reducing the volume of sludge generated and investing in energy recovery. The intervention enabled the conversion of the old WWTP into a new liquid phase Treatment Plant, which has been in operation since 2010, supplemented by the construction of a treatment plant for the solid phase and the conduit connecting the two complexes.

Completed in 2009, the investment in the expansion and restructuring of the Monte Novo WTP, in Évora municipality, aimed at increasing the production capacity and enhancing the treatment process in order to ensure compliance with the new requirements for the quality of water for human consumption.

Increasingly exacting environmental legislation also led to the adoption of new solutions in terms of the treatment and recovery of the sludge resulting from the treatment of water and wastewaters. Accordingly, AdP Group companies invested heavily in new sludge dewatering equipment and the means of sludge quality control with the aim of reducing the transport and disposal costs and their dispersion on farm land.

The intervention scope similarly extended to water transport, both the large adduction pipelines as well as the distribution networks, with a view to strengthening system efficiency, particularly by reducing water loss and the ability to distribute flow through the resizing of new pipelines and by reducing maintenance costs.

Implementing interventions of this kind becomes particularly complex when performed in urban areas where the infrastructures are often located under buildings or roads or in protected historic boroughs.

Also worth noting is the rehabilitation of dams, particularly in the north, with the intervention focused on safety, the rehabilitation of water intake towers and on strengthening the foundation's waterproofing curtain.

More recently, water supply energy efficiency has been an investment area for priority rehabilitation by AdP Group companies, notably by increasing water reserves whether by the construction of new reservoirs, the expansion of the existing cells and pumping systems, by replacing equipment or by implementing automation.

The new Boavista WTP, in operation since 2010, allowed for the replacement of the water extraction operation in effect since installation in 1969 with a scale sufficiently to serve the populations of the cities of Coimbra, Miranda do Corvo, Mealhada, Condeixa-a-Nova, Lousã and Penela.

06

The end of rubbish dumps

In 1997, the sites of over 300 rubbish dumps were inventoried in Portugal. The country's historical heritage required urgent resolution, which mobilized efforts and investments that returned excellent results: in only five years, all rubbish dumps were closed and the percentage of appropriately disposed municipal solid waste increased from 26% to 100% in 2001. The EGF, a sub-holding of the Águas de Portugal Group for the waste sector, alongside the municipalities, was the major driving force in this process relegating serious environmental and public health issue to issues of a past that now seems so far away.

Waste is a result of mankind's development evolution and that of their respective societies. In nature, there is no waste with everything getting transformed and re-naturalized. Only mankind and the activities humans carry out leave a polluting trail harmful both for the planet and for humans themselves.

In the 1990s, uncontrolled rubbish dump sites still proliferated in Portugal, a country undergoing modernization and experiencing rising levels of waste production. Small, medium and large rubbish dumps piled up across slopes, roadsides, forested areas and in hidden, out of public sight nooks and crannies.

Permanently or sporadically self-igniting, when not deliberately, emanating foul smells and harmful, toxic and hazardous fumes that seriously affected the surrounding area and with very significant negative consequences to the environment, these dumps were sources of insalubrity, posing clear risks to public health in general. These risks were aggravated by the run-offs originated by wastes deposited without any form of control, such as oils, fuels, battery acids, etcetera, both contaminating the soil and infiltrating water courses and water tables when mixing with rainwater and subsequently concentrating in wells used for irrigation or even for human consumption. Furthermore, industry contributed to the exponential increase in environmental liabilities, accumulating rising quantities of difficult to dispose of industrial wastes.

Here and there, where environmentally sensitivity and the necessary economic and social conditions prevailed, local solutions were tried out but, in the end, these were overwhelmed by yet another dump site springing up in the immediate vicinity. These problems were clearly and visibly on the rise and required the urgent mobilization of efforts and investment.

When, in 1997, the first Strategic Sector Plan for Urban Solid Waste (PERSU) was published, there were more than 300 inventoried dump sites in Portugal with their closure defined as a priority along with the construction of infrastructures for the processing and recovery of urban waste and the reinforcement of selective collection and the recycling of packaging materials.

The majority of the PERSU stipulated goals were then entrusted to Empresa Geral do Fomento (EGF), a company selected by the state in conjunction with Águas de Portugal to lead the environmental service business sector (water, sanitation and waste), founded in 1993. In 2000, EGF was integrated into the Águas de Portugal Group as a sub-holding for the waste area.

Similar to the precedent set by the water supply and wastewater disposal sectors, reform of the waste sector was also structured around the establishing of systems built on a supra-municipal scale (multi-municipal or inter-municipal). In the case of the multi-municipal systems, specific, majority publicly owned companies were then set up and including both municipal and EGF representatives.

In 1994, Lisbon was undergoing preparations to host the 1998 World Exhibition with an urban redevelopment project spanning the area of the capital now known as Parque das Nações and for which the implementation of an organized waste management system played a crucial role. This also led to the founding of the first Multi-municipal Solid Urban Waste Recovery and Treatment System, the Lisboa Norte, involving the municipalities of Lisbon, Loures, Amadora and Vila Franca de Xira.

In the years immediately following, new multi-municipal waste systems emerged from the north to the south of Portugal: Vale do Minho, Vale do Lima e Baixo Cávado, Sul do Douro, Litoral Centro, Alta Estremadura, Oeste, Margem Sul do Tejo and the Algarve.

Efforts were thus mobilized that, coupled with investment of close to €500 million implemented between 1997 and 2001, attained absolutely exceptional results: in just five years all the identified rubbish dump sites were closed and deactivated with the percentage of properly disposed municipal solid waste jumping from 26% to 100%.

Sanitary landfills began construction. These were modern engineering works features all the conditions necessary to confining waste in environmentally safe conditions, in particular waterproof cells, the drainage, collection and treatment of leachate waters resulting from the decomposition of organic matter, as well as capturing the biogas, nowadays mostly used for producing electricity.

Simultaneously, the foundations were being laid for the process of material recycling: setting up recycling points, collection centres, transfer stations, sorting centres and selective collection circuits, without overlooking the need to raise public awareness over the importance of appropriately sorting and depositing such materials in the recycling recipients.

In the Lisboa Norte Multi-municipal System, covering some of the country's most densely populated municipalities, a waste to energy plant was opened for the combustion of waste that is not otherwise recoverable. The centre receives about 2,000 tons of waste per day and produces enough energy to power a city of 150,000 inhabitants.

The excellent results achieved by these projects led to invitations for the Águas de Portugal Group to participate in the resolution of other environmental liabilities, including the removal of the oily sludges generated by industrial activities ongoing at the Sines petrochemical plant alongside soil decontamination projects in various parts of the country, such as Barreiro Business Park and the site of the former national steel works.

The Batalha rubbish dump - Porto de Mós, was closed on May 22, 1997. It is today used as a runway for model aircraft.

Landscaping of the Santa Iria da Azóia Sanitary Landfill, serving the municipalities of Loures and Vila Franca de Xira until its closure in 1996. This site is now the Urban Park of Santa Iria de Azóia.

07


obrigatório no
ecoponto amarelo
RECICLAR É RESPEITAR.
obrigatório
proibido

In the recycling bin!

With the boost resulting from setting up waste management systems, the conditions were in place for proceeding with waste recycling processes. Along with the added environmental value, specifically the recovery of materials then reintegrated into the production chain thus reducing the depletion of raw materials, the diversion of recyclable landfill materials also aimed at boosting the useful life of these infrastructures and generating new revenues, with a positive impact on the economic and financial sustainability of the systems.

In 1994, in the same year the first multi-municipal waste management system was set up, Directive 94/62/EC of December 31 stipulated waste recovery as a priority, with objectives and actual targets for the recycling of specific flows of packaging waste, such as glass, paper/cardboard and plastic and metal containers. Besides driving a reduction in the amount of waste forwarded to landfills for final disposal and boosting the operation lifespans of these infrastructures, the aim also involved cutting back on the usage of natural raw materials and thus targeting the recovery of different recyclable materials and reintegrating them into the production chain.

Although the technology in effect for waste treatment and recovery currently allows for the recovery of material for recycling from mixed waste, selective collection provides the backbone to recycling, i.e., separation at source, with disposal into specific containers for each type of material and their transport and processing via dedicated lines. The materials obtained are then sent on to recyclers thus giving rise to new products.

In this sense, recycling constitutes a demanding process, not only as regards the network of necessary infrastructures coupled with the installation of recycling points, recycling centres and establishing selective collection circuits but also from the citizen participation point of view through information and awareness raising campaigns, encouraging sorting at home and the correct disposal in the respective recycling recipients.

In 1995, selective collection was still irregular, focusing primarily on glass and paper. Since then, following the boost provided by the establishment of waste management systems, with 60% multi-municipal based, systems for the selective disposal of packaging waste – commonly known as "recycling points" – were installed all over the country, to which were then added the waste flows from plastic and metal containers. These recycling points, comprising specific containers for each flow – green for glass, blue for paper/cardboard and yellow for plastic and metal packaging –, were placed on public sites within the scope of enabling citizens to drop-off the respective waste materials.

Left

Recycling points are an essential link in the selective waste collection process and usually include three container recipients, in which paper and cardboard packaging (blue containers), glass (green containers) and plastic and metal (yellow containers) waste is dropped-off.

Right

The materials recovery facility is where the sorting operations take place, separating the waste gathered from selective collection, recycling points and recycling centres. The Automatic Packaging Waste Sorting Unit, of the Coimbra Municipal Integrated Solid Waste Treatment Plant, has a processing capacity of four tons per hour for plastic and metal containers and eight tons per hour for paper and cardboard.

Other infrastructures also complemented the selective collection systems, such as recycling centres and material recovery facilities.

Along with the added environmental value, selective collection and the routine recycling of packaging materials represents significant economic and social potential as demonstrated by the exponential growth in its contribution to company turnover, with a positive impact on the economic and financial performance of the waste management systems. In the EGF systems, after contributing €10 million in 2004, recycling surged to €43 million in 2013.

However, despite the investment in equipment and infrastructures, which enabled the nationwide expansion of the selective collection network, the recycling of packaging waste has otherwise only somewhat slowly evolved, with people's motivation and collaboration a key factor in this process.

Within this framework, the waste collection, treatment and recovery system managing bodies have devoted a very significant part of their resources to designing, implementing and promoting campaigns to raise citizen awareness on sustainable waste management issues and making the sorting and deposition of recyclable waste a part of their daily lives.

In terms of environmental education and in partnership with the respective municipalities, the companies themselves have fostered close relationships with school environments by providing content and staging initiatives that, in coordination with the subjects taught, address environmental issues and waste management.

In conjunction with regionally developed initiatives, EGF Group companies put across-cutting environmental education program into practice between 2008 and 2012 that won an award from the Portuguese Association for Corporate Communication.

The project "Waste on the Move – A Virtual Journey" consisted of a roadshow incorporating innovative technology and software that toured the 174 municipalities served. The roadshow set off on its journey in March 2008 and ended in February 2012, having recorded close to 200,000 visits over about 1,500 days of exhibition. This exhibition included several recreational and educational activities and provided information on how the waste treatment and recovery systems located in the visited municipality area were operating, exhibiting various waste treatment recovery and disposal processes as well as conveying the importance of recycling within the context of advancing with the rational use of natural resources.

The project "Waste on the Move – A Virtual Journey", a prize winner with the Portuguese Association for Corporate Communication (APCE), consisted of a traveling exhibition, incorporating innovative technology and software, that toured the 174 municipalities served by EGF's multi-municipal waste treatment and recovery systems. This roadshow took place between March 2008 and February 2012 and recorded about 200,000 visits in the close to 1,500 days that the exhibition lasted.

Other awareness-raising programs directed at the general public incorporated a solidarity component as an incentive for active popular participation. This was the case with the "Think Yellow" campaign, promoted by Valorsul, with the aim of encouraging the sorting of plastic bottles and their correct disposal in the yellow recycling point.

With the slogan "Help the environment and help a lot of people", this campaign first ran in 2007 and represented the first initiative to associate an environmental cause with social issues.

In 2008, EGF systems participated actively in the "2 causes for 1 cause" campaign launched by SPV - Sociedade Ponto Verde in support of both the breast cancer screening plan and increasing recycling rates in Portugal. The 168,000 tons of packaging waste sent off for recycling by the EGF run systems that year corresponded to the raising of sufficient funds for purchasing one of the two breast cancer screening units donated to the Laço Association and constituted an increase of nearly 20% on the amount selectively collected in 2007.

08

Own management model

With their activities based on long term concessions spanning lengths of between 30 and 50 years and involving the construction and operation of large territorial scaled systems, Águas de Portugal Group companies deal with the need to manage complex, demanding and highly rigorous information. To this end, the Group has internally developed a common decision making support tool, which guarantees operational technical and financial sustainability.

Each multi-municipal water supply and wastewater disposal system results from a general design study that produces the globally defined technical solution then adopted by the system.

This technical solution takes effect through a common decision making tool known as the Technical Model that endows the system's skeleton. Adding technical expertise to forecasting and control makes it possible to establish operational technical and financial feasibility scenarios, in particular for planning tariffs capable of ensuring the progressive recovery of costs, required for system sustainability whilst simultaneously making social adjustments to the tariff prices set.

With their obvious usefulness as management tools, in particular for ensuring high operational standards within a context of economic and financial sustainability, as the solutions were implemented and entered into operation and with the accumulated experience of infrastructure maintenance as provided for under the concession contracts, the level of detail of the information contained in these technical models also deepened.

Through its Engineering Department, the AdP Group developed a common decision making support tool – the Technical Model/ Aquamod – in collaboration with group companies, which has in the meantime gained a high level of maturity, the harmonization of variables as well as new features.

Aggregating information from all of the Águas de Portugal subsidiaries managing water supply and wastewater sanitation systems, the Technical Model/Aquamod stores, analyses and calculates information of relevance to both the supply and sanitation activities. For instance, estimating future managing body revenues and expenses represents one such feature and rendering support to decision-making in line with the actual operating conditions as well as enabling forward planning with greater understanding and robustness.

The Technical Model/Aquamod enables consideration of a very significant set of routine forecasts and their impacts on trends in flow rates over long-term periods before then generating the expected direct costs in accordance with the measured indicators.

The information entered into the tool by the management team combines system data, including data from infrastructures and the related operational and maintenance costs, supplemented by demographic background and sector information (resident and floating populations, coverage, access, losses, undue inflows and captures), thus enhancing overall information coherence.

While this also allows for breaking down the information to a level consistent with each fund/managing entity, the Technical Model/ Aquamod simultaneously provides an overview of the various skills and needs existing within the Group and, for example, enabling the identification of expansion opportunities, services, potential synergies and economies of scale as well as the range and processes key to boosting the desired and necessary system efficiency levels.

The Technical Model/Aquamod has also especially proven its worth in defining indicators, such as those incorporated into the Águas de Portugal Group internal performance evaluation system, which, in turn, ensures benchmarking analysis and the identification of best practices across the AdP Group.

Gathering baseline data from more than 220 municipalities, representing about 82% of such entities in Portugal, also provides representative information on the regional and national realities with relevance beyond the Group's own companies and representing a particularly valuable contribution not only to the definition of basic indicators for national sectoral policies but also to carrying out benchmarking exercises with other countries.

09

Asset management

The installation of water and waste systems and the completion of either the construction cycle or the improvement of infrastructures was followed up and often overlapped by operating and maintenance related investments, resulting in a permanent need for financial resources that makes this activity a paradigmatic case of a capital intensive sector. The management adopting the appropriate asset management policies and practices proves a necessary condition to ensuring high standard infrastructural system performance at the lowest cost, with the required quality and balanced tariffs in addition to the correct management of operational risks.

An integrated asset management approach is one of the most important measures for cost control and increased efficiency level in accordance with how this encourages a strong organizational strategic alignment between people, processes and technology that thus facilitates in the capture of synergies and greater business productivity.

Specifically, the management adoption of appropriate asset management policies and practices strives to become more assertive, justifying the decision to invest in construction (replacement, rehabilitation, etcetera) alongside raising the productivity and useful working life of each asset, in order to minimize total costs and maximize the service quality provided whilst permanently balancing the inherently involved risks. These all constitute key factors to increasing efficiency and competitiveness in the water sector.

The focus on asset management has been a constant present in Águas de Portugal Group companies from the very beginnings of the implementation of the infrastructure investment programs resulting in the installation of the multi-municipal water and waste systems, albeit undertaken by individual company level practices, tailored to their own respective experiences.

From 2005 onwards, the Group attributed a strong impetus to developing an internal asset management strategy and policy, with a strong emphasis on standardization and monitoring the information stemming from operational management and from maintenance through recourse to software applications as is the case with the Maintenance and Asset Management System (SMGA), based on the Maximo software package and jointly developed by Aquasis and AdP Serviços.

The amount and diversity of assets that constitute the various water and wastewater treatment steps is substantial and correspondingly reinforces the importance of paying due attention to details regarding their costs, features, functionality and performances within the asset management context.

2005 also saw, following the publication of the Water Act transposing the Water Framework Directive into national law, the laying of the foundations and the institutional framework for sustainable water management. Henceforth, and with the effective completion of the investment cycle associated to system implementation, in particular the second generation of multi-municipal systems, the execution of the major recently completed infrastructures has been a management priority, ensuring effectiveness and efficiency in the utilisation of the built assets.

This priority is especially critical in activities such as water supply and wastewater sanitation, paradigmatic of a capital-intensive sector that also proves heavily dependent on recourse to these assets; with investment needs extending beyond the initial phase of the setting up of the systems to incorporate the operation and maintenance phases, which amounts to an additional critical factor that results from the current context of resource scarcity, especially access to financing and credit.

In this context, the Águas de Portugal Group particularly focuses on the return yielded by the investments made over the last two decades, whether in the construction of new infrastructures or in improving those existing, representing a legacy of nearly 100 WTPs, more than 14,000 kilometres of water main networks, 600 pumping stations and nearly 1,500 water reservoirs deployed for water supply services, and more than 900 WWTPs, about 7,000 kilometres of drainage network, 1,700 pumping stations and 21 ocean outfalls to ensure wastewater sanitation services.

To support the operating companies in the asset management field, the Group has developed several tools, including especially the Methodological Guide to Asset Management, a corporate registration form for the inventory of assets, performance indicators and risk analysis methodologies that, among other aspects, frame and speed up decision making on budgets and investment plans and enhance the efficient management of infrastructure assets thus ensuring the required quality, balanced tariffs and appropriate operational risk management.

Covering all the companies operating in the areas of water supply and wastewater sanitation, this guide defines not only an integrated strategic approach to Group asset management but also lines of action and information standards harmonized with a set of indicators specifically designed for Group companies.

To strengthen this strategy, new information integration software solutions have been developed with the aim of enabling efficient interconnections between maintenance activities and other company areas, improving, inter alia, the interlinkages between the IMS and the SAP solutions whilst simultaneously adjusting business information components and organizational procedures in areas such as warehouse management, information gathering and systematization and periodic inspections, among others.

10

Tailor-made solutions

Spanning roughly 80% of the national territory, Águas de Portugal Group companies develop solutions that reflect the national diversity and correspond to the specific geomorphological, demographic, economic and environmental characteristics of their host regions and thus ensuring the achievement of the Águas de Portugal mission to contribute towards improving both the environment and the prevailing quality of life in the country.

The demographic context of Portugal, a country where one in nine people live on the coastline, has exerted great influence in defining the technical solutions adopted by water services, especially wastewater sanitation. In inland areas, more lacking in investment, the prevalence of dispersed population clusters (up to around 2,000 inhabitants), sometimes combined with challenging geographies that hinder and burden the construction of drainage networks, companies adopted decentralized sanitation systems incorporating usually less complex solutions and treatment levels even whilst always compatible with that stipulated by the legislation for each effluent wastewater type.

Very different realities coexist across the universe of Águas de Portugal Group companies as illustrated, for example, by the contrast between a single wastewater treatment plant located in a densely populated urban centre, capable of treating the wastewaters produced by 800,000 inhabitants and 50 small WWTPs serving populations of no more than 90,000 people.

Commonly known as SWWTPs - Small Wastewater Treatment Plants, these solutions take on very different formats, such as: conventional small-size WWTPs, built from scratch; compact WWTPs consisting of prefabricated WWT modules, normally installed on the ground and usually coupled with a more complete pre-treatment system or upstream sieve; or with septic tanks supplemented by infiltration type trenches or macrocytic bed systems. The latter are deployed particularly in rural areas generally without any limitations on the processing solution implantation area, representing a solution with lower operating and maintenance costs vis-a-vis conventional and/or compact systems and with further advantageous features from the implementation point of view, in particular easy landscaping integration.

The adoption of decentralized sanitation systems, such as the Urra SWWTP serving the small communities of Urra and Caia in Portalegre, guarantees the installation of treatment solutions in this Alentejo region dominated by small, scattered settlements.

In the demographic context, the effects of seasonality also require mentioning given the strong impact on some group companies, especially those located in seaside tourism areas with high levels of floating populations, as is particularly the case in the Algarve and on the Estoril Coast. In these cases, the wastewater treatment infrastructures are sized to meet the population peaks, adjusting and raising the levels of treatment to meet the large increases in the pollutant load arising in the summer in order not to compromise bathing water quality. These infrastructures must also operate outside the bathing season with consequent adjustments to the operational treatment lines in effect.

In addition, the origins and characteristics of effluent wastewaters have determined the adoption of specific treatment solutions in some national regions. Such is the case with the Central and Western regions, where the development of integrated solutions for treating municipal effluents and pig farm effluents was necessary and resulting in, for example, the Coimbrão WWTP located in Leiria as one paradigmatic example. Running since 2008, this WWTP holds the capacity to treat about 38,000 cubic meters of wastewater daily, 77% of which are domestic, 18% come from industry and 5% are the effluents from pig farms located in its vicinity. The resulting biogas is tapped for the combined production of heat and electricity.

There is also another similar case in the Northwest region, characterized by the presence of a deeply rooted textile industry, where the project for cleaning up the Ave basin was designed and incorporating high investment in drainage systems and the construction of a WWTP. In some infrastructures, as in the case of the Ave WWTP, tertiary treatment units were installed in which

Top
The Ave WWTP, in Vila do Conde, equipped with the most advanced technology for treating the effluents from the region's textile and clothing industries. To this end, the plant is equipped with a tertiary treatment unit in which the effluents are further subjected to UV disinfection to ensure their return to the Ave river in environmentally safe conditions.
Bottom
The North WWTP, located in Leiria, provides an integrated solution for the treatment of municipal and pig farm effluents.

the treatment effluents are subject to UV disinfection prior to being discharged into the receiving environment.

The Águas de Santo André company also stands out due to its specific nature, producing and distributing drinking-water and industrial water to the Sines Industrial and Logistics Zone (ZILS), collecting and jointly treating industrial wastewater from the ZILS and urban wastewaters from the civil parishes of Sines, Santiago do Cacém and Santo André. The company also operates in the industrial waste sector running a non-hazardous waste reception facility (RNP), located near the ZILS.

11

Safe water

The water sector closely interlinks with public health issues and involves increasingly complex challenges. This is resulting in a preventive approach to water management, most notably through the implementation of the Water Safety Plans that stipulate systematic risk analysis and the implementation of the management processes necessary to their effective control. This management safety process replaces the "end-of-line" compliance monitoring approach, in addition to structuring more systematic management of the effective quantitative and qualitative safety of the service supply, in turn, leveraging important efficiency gain.

In a period of great and global scale changes derived from the combined effects of the growth in urban populations, the impacts of climate change on water resources, the consequences of the global financial crisis, the energy crisis, increased degradation in water quality and the destruction of coastal ecosystems, the challenges of the increasingly complex process of water management only ever intensify.

With the publication of the 3rd edition of the Drinking Water Quality Guidelines (WHO, 2004), a new approach came in to effect for ensuring the management of human consumption water quality standards, which proposed the adoption of evaluation and risk management processes incorporating a methodological reference framework for drinking water safety.

This approach has paved the way for a new preventive approach to water management with the introduction of the concept of Water Safety Plans (WSPs) for water for human consumption.

The WSPs provide systematic analysis of the public health hazards in any given supply system and the necessary management processes required for their effective control and thus changing the approach from an "end-of-line" compliance monitoring process to a safety management process.

This new approach derives from the fact that any event which potentially poses a risk to public health might occur at any point in the value chain of the water supply process, at the time of extraction, treatment or distribution; and correspondingly adopts an integrated approach that encompasses all the steps and thereby enabling a more systematic and effective supply management in terms of quantitative and qualitative safety. Furthermore, new threats that potentially result in the deterioration of drinking water quality justify special efforts in monitoring the entire supply system so that the management entities are able to timely respond to these potential threats to public health.

EPAL's Water Protection Plan, adopted in 2010, includes both upstream supply components – of which the Asseiceira WTP represents a key input – and downstream components, providing an integrated view of the risks to water supply, from the source to the consumer's tap.

In addition to issues surrounding the impact on public health and the quality and quantity of water available for public supply, WSPs also act at the level of consumer acceptance of the water product, a facet of the utmost importance to systemic sustainability.

With a mission to provide reliable high quality water to the municipalities and to the population served by the municipalities, Águas de Portugal Group companies have progressively acknowledged Water Safety Plans as a useful and effective methodology. In 2004, the Areias de Vilar Water Supply subsystem was the first example of the development and implementation of a WSP within the Águas de Portugal Group, followed by the Douro e Paiva water supply subsystems in 2006, the Algarve water supply subsystem in 2007, and by EPAL in 2010.

Through an internal team of technical experts with extensive experience in the implementation of WSPs, the Águas de Portugal Group produced a Manual for the Development of Water Safety Plans based on an adaptation of the Water Safety Plan Manual: the step-by-step risk management for drinking water suppliers, published by the World Health Organization (WHO, 2009) and the International Water Association (IWA).

The Manual aims to ensure a consistent understanding of the principles of risk assessment and the methodologies associated to WSPs, putting forward standardised concepts, structuring ideas and demonstrating how best to implement the strategy, with examples illustrating effective actions and measures adopted by some of the Group's companies.

The guidelines presented in the Manual help and encourage managing bodies to reflect upon and decide which approach best suits the implementation of its WSP according to the respective system specificities.

This set of guidelines applies to any managing body regardless of system type, size or complexity, the level of experience or available resources.

The Águas de Portugal team of WSP experts has, in addition to supporting the Group's companies in the implementation of their own WSPs, also been providing external consultancy services to various other managing bodies, including training and awareness raising actions on the importance and benefits of WSPs and their subsequent implementation by the management.

12

Resources for the future

As the dump sites had been totally eradicated, replaced by the controlled deposition of waste in landfills, and as the implementation of integrated waste management systems via multi-municipal and inter-municipal systems was progressing at a good pace, Portugal introduced a new paradigm with the publication of a new strategic plan for the period 2007-2016 (PERSU II): treating waste as a resource and exploring its potential for recovery with social and economic benefits.

Arising from changes in EU waste policies, with their normative principles progressively transposed into national legislation, and having successfully and swiftly completed the mission both to eradicate rubbish dump sites and to implement integrated waste management systems across the bulk of the country, Portugal embarked on a new waste management paradigm that took effect with the publication of a new strategic plan (PERSU II) for the 2007--2016 period.

This paradigm addresses municipal solid waste from a new perspective: no longer as mere waste requiring confining in keeping with protection of both the environment and public health but rather as endogenous resources with a great potential for recovery, in particular, for generating energy and recycling and reintegrating the materials into production cycles and thus driving reductions in consumption and preventing the depletion of natural resources.

With the aim of implementing a circular economy strategy in this sector, one core aim of the new plan involved cutting the quantities of waste deposited in landfills, achieved essentially through the biodegradable waste recovery processes and collecting those materials susceptible for recycling.

In this sense, the waste management systems needed to adapt their processes to new and more modern treatment technologies, with a special emphasis on the gradual introduction of mechanical and biological treatment solutions (MBT). MBT units process municipal solid waste subject to undifferentiated collection processes with a view to its sorting according to differentiated flows and thus maximizing the recovery of recyclable and recoverable materials.

These mechanical treatment processes incorporate multiple fully automated operations that separate the waste flows into: organic matter, recyclables (glass, cardboard, plastic, ferrous and non-ferrous metals) and scrap.

The organic matter is routed to biological treatment processes that bring about their recovery in two different ways: biogas energy production resulting from waste degradation and the production of a humic substance (compound) suitable for soil enrichment.

In the Mechanical and Biological Treatment Units, the waste received is deposited into pits, from where it is routed to mechanic processing by claws mounted on cranes before multiple operation units divide the materials contains into multiple flows: organic matter, recyclables (cardboard, plastic, ferrous and non-ferrous metals), RDF (Refused Derived Fuels) and scrap.

Recyclables are then sent to the recycling industry allowing for their introduction into the new product production value chain, with the corresponding raw material savings.

Given their energy content, scrap may still be subject to additional recovery, whether in dedicated energy recovery facilities or through its transformation into RDF - Refused Derived Fuels, with the physical and chemical characteristics required for industrial processes in which RDF becomes energy source alternative to fossil fuels. In addition, in some waste management systems, the selective extraction of biodegradable waste has been implemented, such as leftover food from catering activities and markets or waste from the maintenance of gardens and green spaces. Organic recovery units have also been implemented with biological treatment processes that waive the need for any prior mechanical treatment.

Besides extending the operating life spans of landfills, energy production from organic waste recovery also produces electricity from local sources cutting back on fossil fuel consumption and thus helping to reduce greenhouse gas emissions.

With the entry into effect of PERSU II, the EGF Group companies invested more than €350 million euros in biodegradable waste recovery units, which has enabled a reduction in the direct landfill disposal by the multi-municipal waste management systems, dropping from 75.5% in 2006 to 44% in 2013.

Coupled with the energy generated by organic recovery, EGF systems have also invested heavily in the recovery of energy from landfill biogas. Currently, all EGF companies are energy independent and in fact produce far more than they themselves need, which represents an important contribution to system sustainability via the revenues generated from the sale of energy as well as the positive social impact via tariff reduction.

Under the new waste management strategy, awareness raising activities implemented by group companies targeting the population that plays an important role, in particular in areas such as reducing waste production, both through responsible consumption (less packaging, less waste) and through initiatives such as home composting.

The European Union establishing new environmental targets for 2020 determined the replacement of PERSU II with PERSU 2020. This new strategic planning tool for the municipal waste sector reinforces the focus on reduction, on selective collection and on recycling, making compliance a major challenge for the industry in the forthcoming years.

The Refused Derived Fuel replaces conventional fuels and reduces both greenhouse gas emissions and energy dependency on fossil fuels.

The energy use of biogas resulting from the decomposition of waste confined to sanitary landfills or biological treatment processes with anaerobic digestion, provides both economic yields and environmental benefits.
As a source of renewable and sustainable energy, biogas is considered an efficient and viable alternative to fossil resources. Furthermore, the consumption of methane – the main cause of the greenhouse effect – in the production of biofuel reduces the effects that result from its release into the atmosphere.

13

Water and energy

About 8% of the energy produced worldwide is consumed in water supply and sanitation related activities, in particular in the transport of drinking water and wastewater treatment. Portugal represents no exception with energy costs currently one of the components that weigh greatest on calculating the tariffs for these services. Wishing to improve their overall energy performance, Águas de Portugal Group companies have set out a strategy based on three pillars: the promotion of energy efficiency, in particular through optimizing consumption; maximising the energy production potential of their facilities and the by-products resulting from their activities, such as renewable energy sources; and through other cost-cutting actions such as centralized energy procurement.

Water and energy are fundamental both to the economy and to citizen quality of life. These resources are increasingly interconnected and interdependent, with simultaneous and complementary usages, examples of which include agricultural production, the consumption of water resources for power generation – hydro energy –, the energy required for the extraction, production and transportation of water for human and industrial consumption, and especially for the wastewater treatment and transport processes.

Across the universe of Águas de Portugal Group companies managing water supply and wastewater sanitation systems in late 2014, there were close to 5,600 energy consumption points (high voltage, medium voltage and low voltage), representing total consumption of close to 700 GWH per year, 50% of which involved transporting either water or wastewater.

As energy costs prove one of the components weighing most greatly on operating costs, with direct implications for water supply and wastewater disposal tariffs, energy management today constitutes one of the leading challenges faced by the teams managing these services.

In this context, the Águas de Portugal Group has boosted its efforts to improve the overall energy performance of companies operating in the water supply and sanitation sector, particularly in terms of energy consumption and efficiency.

The Águas de Portugal Group's energy policy is based on three main pillars: promoting energy efficiency; maximizing the energy potential of both its facilities and the by-products resulting from activities as renewable energy sources; and reducing costs through the centralized purchase of energy.

The Cávado Subsystem incorporates very significant work has resulted in important outcomes in terms of the energy savings from the pumping systems used for water treatment and transport, which in 2011 led to a distinction award from the European Commission under the Motor Challenge program.

The promotion of energy efficiency takes optimizing consumption as its main focus through carefully analysing the specific situation of each company, particularly in terms of water storage capacities, population fluctuations and the existence of an orography requiring higher level pumping capacities, among the other factors influencing company consumption patterns.

Despite the consumption optimization solutions not allowing for any one single approach, due to the specificities inherent to each system, the solutions designed for each company are then studied for widespread application across the Group.

In addition, other measures, more cross-cutting in nature gradually undergoing implementation at most companies, such as: the adoption of more efficient lighting systems, monitoring consumption for better operational equipment management, fitting some machinery with progressive starters/variable speed controls, the allocation of consumption in idle time and super idle time cycles; correcting power flows and as well as training employees in rational energy usage.

In terms of maximizing the energy potential of both assets and local resources to produce energy from renewable sources, the Group

Top
The mini solar power production plant installed in the Portalegre WWTP.

Centre
The installation of variable speed controls in the Lamego WWTP biological reactor aeration system led to an average reduction of about 25% in equipment energy consumption.

Bottom
Electricity production through hydro turbines is a reality at the Beliche WTP, in Algarve.

now leverages the solar exposure of some infrastructures for micro and mini production of photovoltaic solar energy alongside the energy potential of biogas released during the wastewater treatment processes and the potential and kinetic energy of water pipes for producing electricity through hydro turbines.

The energy produced is mostly sold onto the national grid with some cases of self-consumption, for instance, micro solar associated to flowmeters in remote locations without any access to the grid, but also in treatment plants as a means of improving their energy performance levels.

In all cases, group companies thus contribute to increasing the national capacity to generate energy from alternative sources, as alternatives to fossil fuels, with the consequent reduction in greenhouse gases.

The centralized procurement of electricity, carried out by the Group since 2012, has provided for privileged trading conditions for the various companies and additionally promoting a deeper understanding of the energy needs prevailing and in particular resulting in the identification of opportunities for reducing and optimising consumption.

14

In harmony with the environment

The correct management of the urban water cycle requires a commitment to balancing the added value provided to the population and their economic activities against the impacts generated by the services returned by the ecosystems. Closely dependent and related to the cycles of nature and approaching the depollution and conservation of aquatic and land resources as a fundamental activity, Águas de Portugal Group companies have contributed greatly to the protection of nature and biodiversity whether as a direct result of their operations or, whenever perceived necessary, by implementing preventive, minimizing and compensating measures primarily interrelated with the protection and enhancement of the natural and human environments surrounding their infrastructures.

Economies and companies generally depend, whether directly or indirectly, on the conservation of ecosystems. The loss of biodiversity and the degradation of water resources and of the soils return negative consequences that extend far beyond the environment, affecting public health, economic development and the general population's quality of life.

In the case of the Águas de Portugal Group, this relationship proves particularly close not only because of the quantity and quality of water sources influence the processes associated to water supplies, but also because group company activities in themselves represent a fundamental contribution to the depollution and conservation of water and land resources and thus contributing to the protection of nature and biodiversity.

This interdependence between the management of the urban water cycle and the cycles of nature lies at the core of the Sustainability Strategy of the Águas de Portugal Group and based on the Symbiosis concept.

In this sense, despite the positive contribution of the activities of Águas de Portugal Group companies to the environment and the quality of life, which underpins the Group's core business, there are also potential negative impacts such as those related to the extraction of large volumes of water for supply; possible changes to the characteristics in discharge zones; the areas occupied, the construction of infrastructures and their integration into the landscape; in conjunction with energy consumption and the ensuing atmospheric emissions.

In conjunction with the construction of the Odelouca Dam in the Algarve, a comprehensive program was implemented, which included mitigation measures, compensation and environmental overcompensation in the dam's area of influence, with recovery and maintenance of the habitat of the Iberian Lynx and of large birds of prey, such as Bonelli's eagle, a species with priority EU preservation status.

Aware of the inherent impacts of its operations, the Group has sought to counter these consequences by implementing measures aimed at preventing, minimizing and compensating for such effects, primarily related to the preservation and capitalization of natural resources, the protection of nature and of biodiversity and combatting climate change.

In either case, the principle applied is "think globally and act locally" and there are many examples of practices that demonstrate the environmental requirements implemented by the Group in each of its facilities.

In connection with the construction of large-scale infrastructures, such as dams and water and wastewater treatment plants, measures have been designed and developed to protect the natural and human environment within the working area, including completing environmental impact studies that define mitigation actions and environmental monitoring throughout every phase of the project's life cycle.

Identification of the protected areas and biodiversity characterization studies constitute further examples of good Group practices supplemented by dissemination and public awareness contributing to enhancing the natural wealth of each region.

Concern for the environment also translates into aspects such as the landscaping of infrastructures, take into account the visual impact, both in rural settings and within the urban context alongside needs for deodorization and noise control, constraints related to the construction phase, and among others. In this context, we would highlight here the innovative character of the new Alcântara WWTP in Lisbon, built under a close to two hectares green roof, with this solution bringing about a decrease in the landscaping impact of a large (concrete construction) WWTP in the middle of the city next to a Natural Park and also benefiting from good thermal and acoustic insulation and a reduction of the area impervious to rainwater, thus contributing to flood mitigation of floods. This roof also reduces global warming since it absorbs the sun rays otherwise reflected back into the atmosphere. Simultaneously, the plants synthesize CO_2 from the air and convert it into oxygen through photosynthesis.

Other examples of partially buried or camouflaged infrastructures are found nationwide, especially in tourism and bathing areas, for example in the Algarve, in the Vale Faro WWTP, in Albufeira, built under a tennis court and parking area; the Vale Paredes WWTP in Alcobaça, built under a football field and beach support

Top

One of the innovative aspects of the Alcântara WWTP is its green roof that reduced the landscaping impact of this large concrete infrastructure installed next to a Natural Park and with benefits in terms of the thermal and acoustic insulation of the facilities.

Centre

At the Pinhão Dam, in the Trás-os-Montes e Alto Douro region, paths were built to allow the passage of Pyrenean desmans and otters and the recovery of some sections of the riparian gallery otherwise unaffected by the water level and ensured through the planting of further indigenous species.

Bottom

On the Setúbal Peninsula, a wastewater sanitation protocol to reduce the ecological footprint was signed with the Portuguese environmental NGO Quercus. The measures involve reducing energy consumption and increasing investment in renewable energy as well as a conservation project and aquatic ecosystem improvements, implemented in Lago Piquing (an area integrated into the Natura 2000 network and interconnected with the Lago de Albufeira), in Sesimbra.

equipment, and also the new Guia WWTP (liquid phase) in Cascais, where the old structure by the sea, built in a military-style fortress architecture, was maintained and supplemented with a new building constructed inland.

The implementation of deodorizing solutions, especially relevant in the context of wastewater treatment, takes place not only in purpose built infrastructures but also in connection with improvement works, as in the case of the Olhalvas WWTP in Leiria. The restructuring project included a system closing off all sites that might potentially give off odours and installing the same ventilation systems that carry air into the deodorizing systems prior to being released, already deodorized, into the atmosphere.

15

Bringing life back to the Tagus

The conservation and management of wetlands, including estuaries, hold particular importance and today represent a global concern. The Tagus Estuary, the largest wetland in Portugal and one of the most important in Europe, plays a fundamental and irreplaceable role from the ecological and economic point of view on account of its location and high biological productivity. However, the concentration of some of the most highly populated centres and industrial clusters in the country has resulted in environmental degradation that could only be curbed through the combined efforts of many entities and the implementation of integrated solutions such as the clean-up project carried out by Águas de Portugal Group companies.

According to the American biologist Barry Commoner, founder of modern ecology, the first law of ecology states everything is interconnected in the planetary ecosystem. Hence, what affects one thus affects all, which applies both to the problems and to the solutions. Awareness of this positive logic of integration provides the cornerstone of AdP Group actions out of the understanding that there are problems requiring that all boundaries be overcome to ensure effective resolutions combining all efforts towards a common goal.

The case of the Tagus Estuary, an irreplaceable resource and profound symbol of Portuguese identity, proves paradigmatic. The final stretch of the river that finds its origins in Spain and travels more than one thousand kilometres before draining into the Atlantic Ocean, near Lisbon, corresponds to approximately 300km^2 of marshes, creeks, islets and salt pans – the largest wetland in the country and sanctuary to hundreds of animal species. Furthermore, this is also one of the areas most sacrificed at least as far as the environment is concerned. Around this area the most densely populated area of the country with the highest pollution load is located and constituting an environmental challenge for which the solutions found and deployed over a large number of years proved unable to respond appropriately to. The constant and devastating floods gave back to the earth the waste thrown into the river, in a cycle of degradation of both the soil and the water resources, of destruction of both nature and the landscape and inevitably also of a loss of quality of life. Thus, it was essential to upgrade the riverside areas, perform reforestation to combat estuarine and coastal erosion, push for regulation that would ensure flood control and depollute the water lines by removing and treating the sludge from the river mouth.

The start of the Expo '98 - Lisbon International Exhibition, whose theme was "The oceans: a heritage for the future" – generated an opportunity for change. The combination of factors such as a defined schedule, planned objectives, available European funding, political will and ecological awareness, all served to make this project both inevitable and imperative.

The sanitation intervention plan in the Terreiro do Paço square in 2010 included the construction of two interception chambers (with tidal valves) in the old 18th century drainage pipes, and the construction of interceptors and wastewater pumping stations for the routing of the flow to the Alcântara WWTP, comprising a total of 20 contracts and investment in excess of €36 million.

In terms of depollution of the waterlines, the intervention involved several Águas de Portugal Group companies and 19 municipalities. A great focus was placed on the multi-municipal models, gathering together skills, sharing management structures and rationalising investments and thereby enabling economies of scale.

The extensive set of interventions resulting include the construction of a wastewater drainage system along Lisbon's waterfront area and its routing to treatment in the Alcântara Wastewater Treatment Plant; the expansion of the Alcântara WWTP and the improvement of its treatment standards, reducing odours and landscaping; the construction of new WWTPs on the south bank of the Tagus and, on the Estoril Coast, in addition to upgrading the Guia WWTP.

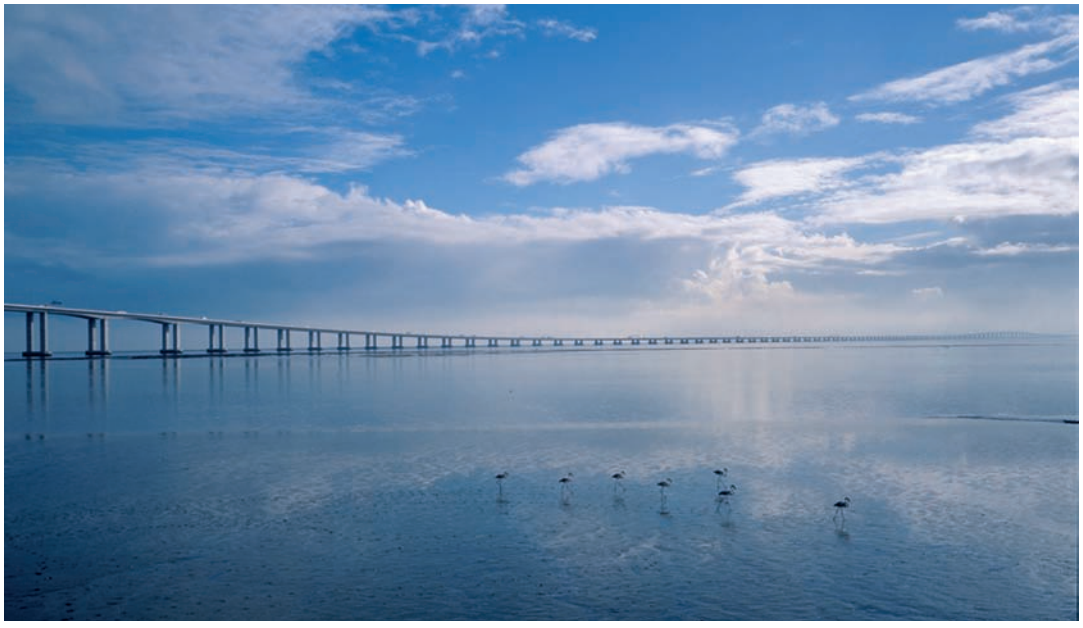
Taken together, the main objective of these interventions involved ensuring the appropriate interception of domestic and industrial sewage and its transport, treatment and return to the receiving environment in environmentally safe conditions. In addition, the plan also included the de-pollution of the Trancão, an affluent to the Tagus and, on the date of intervention, considered the most polluted river in Europe. Among the interventions carried out, the particularly emblematic initiatives saw the transferring of the wastewaters produced by close to the one hundred thousand inhabitants of the Lisbon riverside area for treatment at the Alcântara WWTP.

Today, the Tagus Estuary is served by sanitation systems that rank among the most modern and innovative in Europe and represent an international case study highlighted by the complexity of the work carried out in recent years on both shores of the Estuary, as well as by the excellent results achieved in terms of the reduction of pollutant discharges, the recovery of streams and biodiversity conservation.

As part of the dissemination of the indicators for bathing water quality, in 2013, the Tagus Estuary appeared for the first time with a properly classified beach (the Ponta dos Corvos beach) where bathing is now allowed.

No less important is also the validation coming from nature itself: the Portuguese oyster that had disappeared in the 1960s – reappeared, although still small and of no commercial value – and dolphins can now be seen crossing the waters of the Tagus in search for food, under the watchful eyes of birds, such as the flamingos that had also stayed away from the Estuary for many years.

The Barreiro/Moita WWTP, inaugurated in 2011, is of the utmost importance, locally and regionally, since it treats the sewage of about 90% of the population of two municipalities, discharging it afterwards into the Tagus River estuary in technically and environmentally appropriate conditions.



The largest concentrations of flamingos, one of the most emblematic of wild birds observable in Portugal, are found in the Tagus Estuary.

Intergenerational commitment

The universality, continuity and quality of water supply and wastewater sanitation services are vital premises for any society. Ensuring future generations access these essential services in similar or improved conditions constitutes the great challenge of sustainability. In this context, maintaining the economic and financial sustainability of operations plays a major role based not only on efficient, transparent and innovative management but also on a commitment to quality, equity and long-term outcomes.

Ensuring sustainability, regardless of the industry in question, represents an imperative duty to future generations and especially relevant in an area of activity that involves managing such life critical resources as water.

In the water sector, the work is never over and not even after the implementation of the planned investments. We must necessarily continue to work on renewing and maintaining assets and on improving their operational management to fostering the sustainability required for these critical public services whilst ensuring they continue to be provided to our children and grandchildren with the same standards of quality and reliability.

The intergenerational commitment assumed by the companies managing the water supply and wastewater disposal services involves numerous different aspects, all interconnected and ranging from technical and environmental issues related to infrastructures and equipment management; technical know-how; good environmental practices and compliance with legal obligations; through to economic and financial issues with a further emphasis on the investment financing necessary, the recovery of cost, citizen income levels, among others; and social aspects related to equity in service access as well as positive externalities stemming from boosting employment and community involvement.

To pursue the objectives of continuity, universality, quality and sustainability in the provision of these public services, the 19th Constitutional Government initiated a water sector restructuring process incorporating several major facets, in particular the PENSAAR 2020 – the New Sector Strategy for Water Supply and Wastewater Sanitation; a financial instrument package under the Operational Program for Sustainability and Efficient Resources Use; the enactment of a new regulatory framework, including an independent regulating authority and fostering the implementation of cost recovery mechanisms and greater transparency in consumer issued invoices coupled with the reorganization of the state-owned sector, put into practice in the territorial and corporate restructuring of the AdP Group.

The AdRA - Águas da Região de Aveiro stores were the first in the sector to achieve Leader in Customer Service certification, recognition of the service excellence they provide their clients.

As far as the AdP Group is concerned, this reorganization aimed to promote equity in access to essential public water supply and sanitation services as well as social cohesion through mitigating the tariff disparities resulting from the specific characteristics of the different national systems and regions. This also aims to raise the efficiency of the water supply and urban wastewater sanitation systems and successively reduce the expenses arising from the provision of these services whilst ensuring both tariff containment as well as the economic and financial sustainability of the managing bodies.

The reorganization was implemented particularly through solutions with greater territorial range and functionally integrating systems in order to maximize economies of scale and scope, with resulting economic-financial and environmental gains.

The setting up of these broader zones of intervention, covering areas from coastal to inland regions, in addition to capturing operational efficiency gains and eliminating certain inefficiencies, enables cost rationalization to be borne by consumer through a greater uniformity of tariffs, which constitutes an essential condition to greater equity and justice in the access to water supply and sanitation services.

In this context, the Águas de Portugal Group has, in recent years, studied territorial aggregation solutions for the multi-municipal systems that return considerable gains as a result of pooling efforts and resources with positive effects on prices. One example of the reorganization of the Group's water and sanitation operations carried out in 2015 was the creation of three new multi-municipal aggregates alongside their respective managing bodies, namely Águas do Norte, Águas do Centro Litoral and Águas de Lisboa e Vale do Tejo.

The Group has also participated in other institutional solutions for business management systems, such as the public partnership model for the integrated management of the urban water cycle, launched in 2009 and based on the signing of partnership agreements between the state and the municipalities.

This applies to the AdRA - Águas da Região de Aveiro, the managing entity of the Águas da Região de Aveiro system, a territorially integrated structure emerging from the aggregation of municipal systems for the supply of water intended for human consumption and urban wastewater sanitation services to the municipalities involved in the partnership and the infrastructures and equipment to be built.

A further example of public partnerships for the integrated management of the supply of water intended for public consumption and wastewater sanitation in Portugal comes with AgdA - Águas Públicas do Alentejo, a company that spans 21 municipalities in the Alentejo and held by AdP - Águas de Portugal, SGPS, S.A., and AMGAP - Associação de Municipals para a Gestão da Água Pública do Alentejo, a public water management association of local municipalities.

The AgdA - Águas Públicas do Alentejo operates over a vast geographical area (about 18% of the Portuguese mainland) and is characterized by special requirements mainly due to the shortage of water resources. The Monte da Rocha WWTP, in the municipality of Almodôvar, is one of the infrastructures integrated into the company's investment plan, having received investment that doubled its treatment capacity whilst improving the respective treatment process.

Additionally in this regard, we would mention the first partnership in the North to implement a vertical integration process, bringing together both upstream and downstream services into one single management body.

17

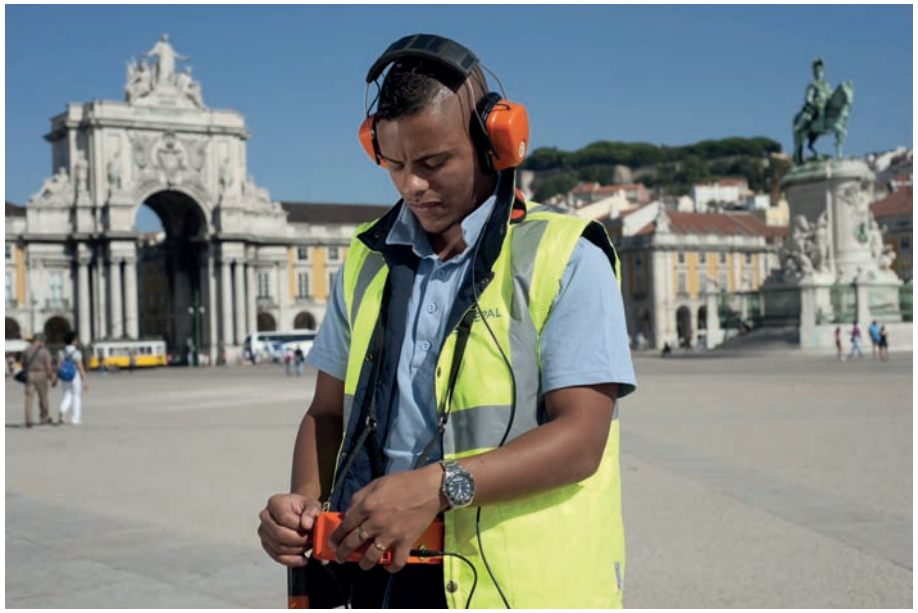
In dribs and drabs

Striking the balance between public services and the preservation of the environment constitutes a huge challenge, especially when involving the management of a resource so essential to life as water, which, although renewable, is limited and needs preserving and using responsibly. Thus, this demanding mission needs addressing on several fronts: preserving the amount of water at the source, combatting waste during the production and transport phases, adopting the technical solutions able to reduce consumption, losses and enhance reutilisation as well as getting citizens involved in environmental education actions.

In 2005, Portugal experienced an unprecedented drought that was both the longest (with 100% of the territory affected) and the most intense (consecutive months of severe and extreme drought) in the last 65 years. As an active participant in the Drought Committee that was then set up, Águas de Portugal collaborated in the development of an awareness campaign promoting rational water usage under the slogan "Water. When properly used, more people will have it."

The nationwide and widely disseminated campaign sought to get advice across on how to save, reuse and rationally use water aiming to influence people and make an active contribution towards reducing the effects of the drought.

The particularly serious situation experienced that summer brings out the importance of responsibly managing water resources that, although renewable, are not unlimited. However, concerns over the sustainable use of water increasingly reach beyond sporadic or emergency actions. This rather represents an omnipresent issue in day-to-day management in first and foremost ensuring that public supply water is extracted without ever jeopardising its future availability. In this sense, the AdP Group, with its preferential usage of surface water from higher capacity sources to the detriment of groundwater extraction, has increasingly contributed to ensuring high levels of replacement and the safeguarding of groundwater sources.



Left
The award-winning WONE®, the leakage control system developed by EPAL which has already gained international recognition.

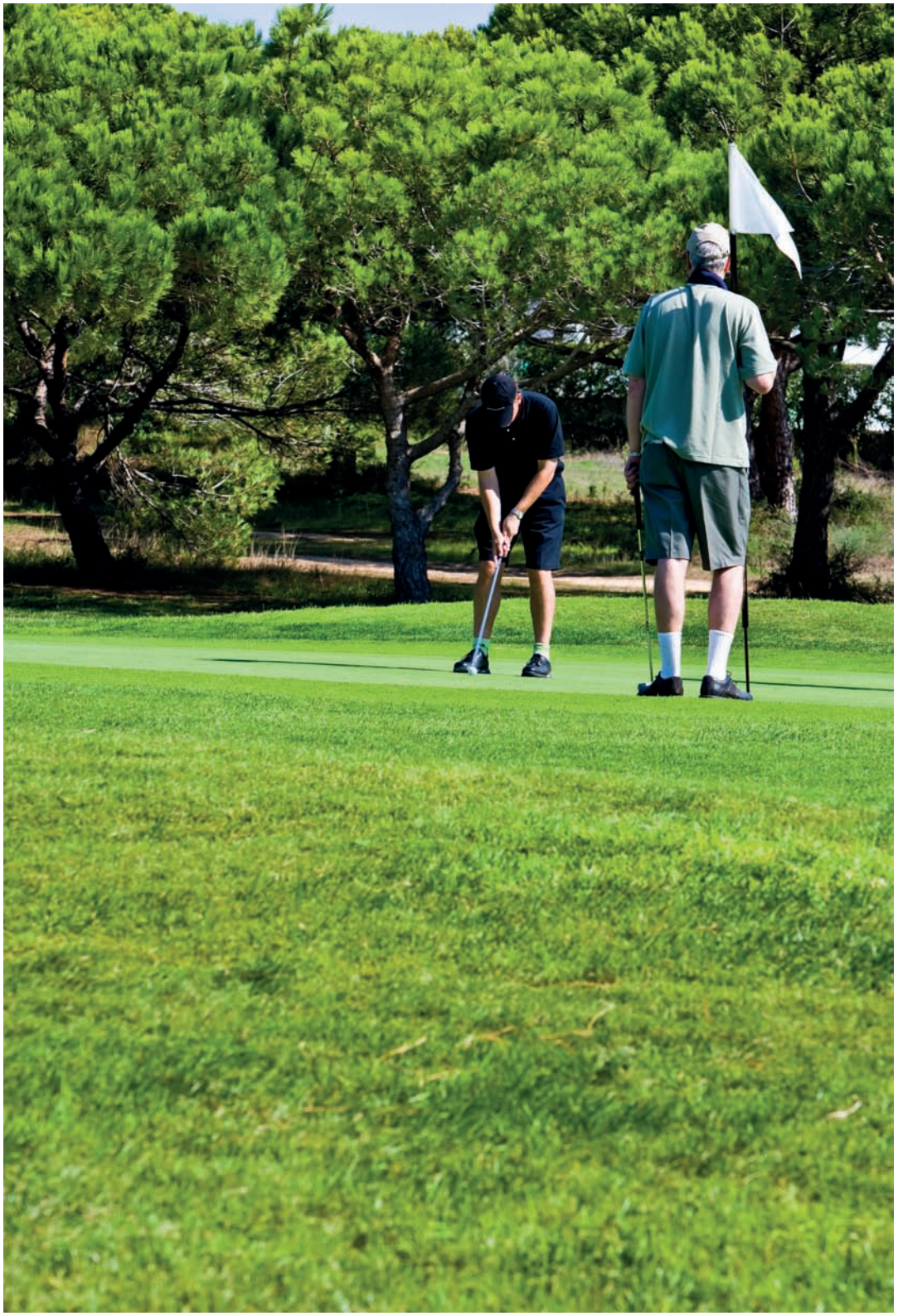
As regards the transport and distribution of water, the Group strives to minimize inefficiencies, in particular combatting water losses, with noteworthy advances: from measures such as continuous flow and pressure monitoring (by remote management), by conducting load tests on pipelines and reservoirs, periodic inspection routines of pipelines and reservoirs, the verification and calibration of flowmeters and the rehabilitation of reservoirs and replacement of end of life pipelines, among others.

Fighting water loss is a theme increasingly perceived as an opportunity for gains in terms of both service efficiency and quality. EPAL clearly illustrates this aspect through, given the need to increase network efficiency, developing an internal loss control system – the WONE® - Water Optimization for Network Efficiency – which brought about a reduction of about one-third in distribution network water losses. In the early 2000s, the water losses of this century-old company's distribution network ran above 35 million m^3, which corresponds to over 25% of the total water intended for distribution.

In 2013, the 8% level of loss ranked Lisbon as one of the world's cities with the best performance in terms of leakage control, at levels comparable to cities such as Tokyo and Vienna.

Internationally recognized and having picked up numerous awards and distinctions, the WONE® allows constant monitoring based on the data collected and processed, applying information technology and mathematical models to calculate performance indicators for each monitored zone, analysing trends and generating intervention alerts triggering actions by intervention teams in the field. The computer application that supports the system automates the complex process of integrating monitoring relevant data within the framework of a very flexible and objective system with a simple graphical interface. The versatile nature of the entire WONE® approach ensures its application and utilisation by any water supply system management entity striving for distribution network efficiency to save water, energy and financial resources.

In addition to internal uses, a fraction of the volume of treated wastewater is transferred or sold to third party for reuse in street and container cleaning, golf course watering and the cooling of refrigeration systems, among other purposes.



Furthermore in the context of efficient water usage, company management teams have been carrying out best practices in terms of reducing consumption in buildings and operating facilities and in reusing treated wastewater, water from the supply process, water from the network and rainwater. In the case of treated wastewaters, for example, these are commonly, reused for washing floors and equipment for watering green spaces and for the preparation of reagents.

Other pilot projects were developed in parallel, such as those studying the transfer of treated wastewaters for municipal usage in large urban centres, for washing streets and containers, watering golf courses and filling cooling refrigeration systems, among others.

Popular general awareness also represents a constant within the scope of group company activities which, through regional based operations, have developed proximity initiatives covering a wide variety of audiences in order to raise awareness about the sheer importance of rational use and water conservation as a key strategic resource for life along with the inherent value of the activities developed by the respective companies.

18

Open doors

Águas de Portugal Group companies develop their activities in close connection with the host population. This relationship reflects in the contribution their activities make to improving both the environment and quality of life as well as the impact on boosting local business and creating jobs, knowledge and skills. Furthermore, their role as active agents of environmental education and information proves highly relevant in an open-door policy of working with the community.

Every year, an average of about 100,000 people visits an Águas de Portugal Group infrastructure. Most of such visits originate in local school communities and take place under the scope of programs that were themselves developed in partnership with the municipalities with group companies playing an active role as agents of information and education for sustainable development. The actions undertaken in this area have focused on raising awareness about the importance of water supply activities, wastewater sanitation and treatment and waste recovery for the quality of both life and the environment and thereby fostering rational water consumption habits.

However, in recent years, interest in urban water cycle related topics has expanded to other publics with increasingly frequent visits, whether private or organized by associations and groups with cultural, recreational and political or other such aims. Group companies have sought to stimulate this interest by organizing open-door actions, such as that held in 2013, on the occasion of Águas de Portugal's 20th anniversary, which simultaneously involved close to 80 infrastructures nationwide.

This growing interest also reflects on the close relationships with host communities and in particular with populations living in the vicinity of infrastructures and which group companies have specifically sought to reach out to. Part of this relationship naturally stems from the positive impacts of the activities ongoing in each territory and in ensuring an increasingly comprehensive high quality public service, benefiting the well-being of the population and driving greater regional development.

This comes in addition to the contribution made by each company in terms of local employment, with a particular impact on inland regions. Furthermore, at the level of local businesses, provided that this complies with competitive practices and subject to compliance with the legislation in effect and the group's own procurement policy, Águas de Portugal attributes preference to local suppliers, which translates into added socio-economic value for the region.

The EPAL Water Museum consists four branches in Lisbon and all buildings related to supplying the city with water dating back to the 18th and 19th centuries: the Águas Livres Aqueduct, the Mãe d'Agua Reservoir, in Amoreiras, the Patriarcal Reservoir and the Estação Elevatória a Vapor dos Barbadinhos, a steam pumping station. In 2014, the museum opened a new permanent exhibition at the Barbadinhos pumping station with contents dealing with water across its many forms and interlinkages: Water on Planet Earth, the History of Water Supply, Water: Science and Technology and Water: Education and Environmental Awareness.

In designing the awareness raising and environmental education programs, great emphasis was placed on the specific characteristics and needs of each region. In coastal areas, where tourism is a major factor, group companies often enhance their awareness raising programs during the summer season with campaigns on the beaches. In inland areas, the school term becomes the focus of actions, either through the participation of technical staff in classes and holding and running inter-school competitions or through guided visits to infrastructures. In the large cities, where some of the Group's largest and most technologically advanced infrastructures have been implemented, guided tours play a central role in seeking to diversify their audiences from the youngest to the more specialized interest groups. Some companies have in the meanwhile set up spaces in their own facilities dedicated to environmental education, with a continuous workshop program and initiatives targeting both the school public and the general population.

Regionally focused campaigns have demonstrated their success, in the field and in practice, with their effectiveness extended to other group companies in a genuine sharing of best practices. This proves the case with the "I drink tap water" campaign that began in the Oporto region with the aim of instilling popular trust in consuming tap water whilst simultaneously addressing this consumption as a sustainable practice (tap water = quality + accessible to all + low price) and later rolled out to several other regions served by Group companies.

However, some other environmental awareness actions were centrally designed and applied across all Group companies, including the rational use of water awareness raising campaign during the serious drought in the summer of 2005, with its motto of "Water. When properly used, more people will have it" and the roadshow "Waste in Motion", which toured 174 municipalities between 2008 and 2012.

Standing out in the field of corporate responsibility was the internally developed 2009 project to reduce paper consumption and Christmas card related costs with this program coupled to a social component. Employees from all Group companies were encouraged to replace paper Christmas cards with e-cards with the resulting savings donated to supporting socially relevant projects. In the first three years, this initiative provided support for Paralympic swimming athletes training program for the 2012 London Paralympic Games and, from 2012 onward, oriented towards projects and social support institutions operating from the north to south of Portugal. Also worth noting in this context is the scholarship program for higher education and special education for employee children.

Top

The Environmental Education Centre located in the Lever complex, in Vila Nova de Gaia, that produces the water supplied to Greater Oporto and part of the Vale do Sousa. The Centre began operating in June 2007 with the objective, among others, of raising local community awareness over issues of environmental protection and enhancement. The Centre receives an annual average of 4,000 visitors and also provides traveling educational programs especially produced for schoolchildren.

Centre

The main feature of the "I drink tap water" campaign was the roadshow "Tap Water", which toured municipalities across various regions, from Greater Oporto to the Algarve. During this campaign, people were contacted with information on water quality and tap water was distributed.

Bottom

The Environmental Education Project "Water is a Fantastic World," released in 2003, included anniversary and event celebrations, visits to infrastructures or awareness raising activities in schools, among others.


GSL

Partners for development

The development of skills and competences resulting from the implementation of the multi-municipal water supply, wastewater sanitation and treatment and waste recovery systems, as well as the recourse to EU funding, has underpinned international group expansion as a recognized partner for project design and development in the environmental field.

Historical affinities and a common language naturally ensured the first international projects undertaken by Águas de Portugal were in Angola, Brazil, Cape Verde, Mozambique and East Timor, beginning a relationship that has been consolidated over almost two decades of cooperation on projects, technical assistance and the overall management of water and waste concession services.

The focus on ensuring mass access to drinking-water, sanitation and hygiene as goods critical to the health and well-being of the population, has prevailed over the majority of the projects the Group has participated in, framed by the backdrop of attaining the targets set by the Millennium Development Goals.

In this context, Águas de Portugal has been called upon to participate in a growing number of technical assistance projects involving the rendering of support in the design and implementation of institutional models; ensuring the operability of systems within a context of economic and financial sustainability; defining the investment programs necessary to raising system coverage rates and ensuring high operational service standards and in addition to defining recruitment and human resource development strategies, as well as identifying the key training needs necessary to independent and accountable system management.

To streamline the international market presence, the sub-holding Águas de Portugal Internacional was founded in 2001 with the mission to establish strategic partnerships with key players in the environmental sectors in different countries. In developing its activities in conjunction with strong and close involvement from local partners, essential to good project performance itself dependent on knowledge about the intrinsic realities prevailing, AdP Internacional also ensures the effective empowerment of local human resources, an essential factor to sustainable water management.

In Angola, in as early as 1997, the first projects consisted of water supply technical assistance for the cities of Luanda and Benguela, under a contract financed by the World Bank, followed by support for the expansion of Luanda's network of standpipes in the period between 2005 and 2007, and technical assistance to EPAL, EP (Luanda) from 2005 to 2009, involving the commercial and maintenance departments and support for developing geographic information systems.

The Águas de Portugal Group partnership agreement with the East Timor government runs for the period 2013 and 2017 and resulting in the installation of drainage and wastewater treatment systems in the capital, Dili, with a major impact on improving the prevailing sanitary conditions and, in turn, on public health and the economic and social development of that region.

In the Democratic Republic of Congo, in 2012, Águas de Portugal initiated a project aimed at improving the water supply service in the city of Matadi, with support from the World Bank.

With the consolidation of group activities in Angola, the AdP Angola subsidiary was established in 2010 to expedite responses to increasing requests for support in that country, in particular arising from tenders launched under the scope of multilateral and bilateral financial institutions (World Bank, African Development Bank, European Union, Portuguese Cooperation, German Cooperation), as well as Angolan government funding for water and sanitation projects.

Within this context, the contract won by a consortium led by Águas de Portugal, for rendering technical assistance to the National Water Supply and Sanitation Directorate of Angola, took on particular importance between 2010 and 2014 as part of a support program for the institutional development of this sector in Angola, financed by the 10th European Development Fund under the cooperation framework agreement between the European Union and the Republic of Angola. This program was structure around attaining four main objectives: the training of human resources, improving water quality for human consumption, implementing a decentralized management system for the provision of water services in rural/municipal areas implemented in target provinces, and support for regulating the dissemination of information, tendering procedures and specialized studies, among others.

The Group's presence in Mozambique began with the launch of Aquatec, in 1998, then the result of a partnership between three Portuguese companies and a Mozambican company, seeking to

AdP Angola provided technical assistance to the National Water Supply and Sanitation Directorate of Angola. This intervention aimed to reduce the prevalence of poverty in Angola, through the achievement of the Millennium Development Goals for water and sanitation (general goal) with the specific objective of supporting the organization and structuring of water services so that they operate effectively and sustainably.

provide water supply, wastewater sanitation, waste collection and treatment services. Just one year later, the consortium in which Águas de Portugal participated was selected to ensure the provision of water supply services to Maputo and the contracts for managing the water supply systems to the cities of Beira, Quelimane, Nampula and Pemba. This, in turn, led to the founding of Águas de Moçambique, which remained integrated into the Águas de Portugal Group up until 2010.

Aquatec, currently wholly owned by AdP Internacional, is still present in the Mozambican market, having played a particularly important role as the group's platform for attracting new business, such as the contracting of municipal solid waste collection services by Maputo Municipal Council between 2008 and 2009.

In East Timor, where the group holds a local subsidiary – AdP Timor-Leste – the Águas de Portugal role dates back to January 2000 with the implementation of fieldwork ensuring water distribution to almost the entire population of Baucau and Aileu, in an intervention that lasted until 2002. In 2004, Águas de Portugal carried out the rehabilitation and construction project for the extraction and water supply system on the island of Atauro, one of the poorest regions of East Timor, where the lack of water represented a major problem. More recently, the company was also responsible for providing technical assistance on the Dili Sanitation and Drainage Master Plan. Other geographies featuring on the AdP Internacional itinerary include Algeria, Cape Verde, the Democratic Republic of Congo, Morocco and São Tomé and Príncipe.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A smart future

The development of R&D and Innovation projects across Águas de Portugal Group companies spans the entire value chain of its activities, covering not only management processes and operations but also customer relations. Developing solutions that endow greater process intelligence (smart technologies) remains a core group focus and also in keeping with the European innovation and investment priorities of the Europe 2020 Strategy.

Raising the proportion of public and private investment in research and development (R&D) and innovation to 3% of the EU's GDP is one of the goals enshrined in the Europe 2020 Strategy, the plan launched by the European Commission in 2010 with the aim of nurturing the conditions for smarter, more sustainable and more inclusive growth.

In pursuit of this objective, the R&D Funding and Innovation Framework Program – Horizon 2020 – which allocates roughly 60% of its total budget to areas related to sustainable development, was launched so as to meet the urgent need to reconcile increased European competitiveness with responsible usage of resources and reducing the impacts of human activity on the environment.

Hence, water management was identified as a resource both essential to all life forms and to the progress of societies and thus taking centre stage in addressing the major challenges of the future, focusing on the issue of adaptation and resilience to climate change and to the efficient and sustainable utilisation of resources in order to balance exponential population growth with the preservation of the planet's natural resources.

In parallel, other policies, economic and technological frameworks, as well as the consumers themselves, wield increasing pressure on the activities of water supply and wastewater sanitation management entities, demanding the harmonization service quality guarantees with greater efficiency in terms of processes, requiring intervention strategies increasingly based on R&D and innovation solutions. A member for various years of the official ranking of the 100 Portuguese companies investing most in R&D and possessing a significant track record in terms of cooperation projects and partnerships with both academia and the business world, the Águas de Portugal Group has also sought to guide its R&D and innovation policies according to the new European guidelines and correspondingly identifying water reutilisation, water and wastewater treatment, waste treatment processes, transporting water and wastewater; recovering by-products; the Water-Energy nexus; flood and drought related risk management; decision making support and monitoring systems; and smart technologies as priority areas for innovation and investment up to 2020.

The Águas de Portugal Group signed a scientific and technical cooperation protocol with Higher Polytechnic Education Institutions, comprising water supply related training, technical skill development and research studies.

In this regard, the launch of the group's R&D and Innovation network was particularly relevant, regularly and systematically gathering analysis results and sharing projects developed by the various companies in order to identify opportunities that may extend to other companies or across the entire Group whilst simultaneously aligning all the employees involved in these activities with the key future challenges.

Cooperation with academia also plays an important role as part of the group's R&D and Innovation strategy, which has practically been a constant ever since the founding of Águas de Portugal in 1993, whether hosting students on internships or participating in research projects and technology demonstrations, or in support of other initiatives bringing added scientific and technical value to the environmental field.

The development of R&D and Innovation projects within the Águas de Portugal Group, with a special focus on developing solutions that afford greater process intelligence, cuts across the entire value chain of group activities ranging from more internal management based processes to treatment, management and operations and as well as consumer relations.

Among the projects in progress or recently developed under the Water-Energy nexus challenge, the project Neural AD (Neural Networks + Anaerobic Digestion) is to the fore, based on models inspired by the functioning of the human brain to better predict the anaerobic digestion of sludge in WWTP and hence maximize the energy recovery potential from the biogas produced during this process. Implemented by Águas de Portugal and four Portuguese educational institutions and involving the WWTPs of various group companies, this project was awarded the international WEX Global Awards in 2015.

In the field of consumer relations, EPAL, the company responsible for water distribution in Lisbon, designed and developed a service that allows customers to monitor the progress of their respective water consumption by consulting the billed consumption, their calculated average daily consumption as well as comparing values that are typical for Lisbon. The Waterbeep® solution also includes a warning service whenever water consumption deviates from its regular pattern, allowing the identification of potentially abnormal situations, such as unauthorized consumption, excessive consumption, including potential disruptions, thereby minimizing the associated damages. Adapting to new communication technologies, EPAL provides this service as well as other services through the myAqua® smartphone app.

In terms of system management and operation, an IT platform has been developed, the AQUASAFE, which integrates the monitoring of data collected in real time (sensors, remote management, telemetry, etc.) with forecasting tools and diagnosis (weather forecast models, technical systems models, etc.), making it possible to anticipate problems or plan operations more efficiently.

As a pilot project, AQUASAFE was developed in the context of the wastewater treatment activity, having proved to be an added value by enabling the prediction of overflow events resulting from the occurrence of heavy rainfall; the planning of maintenance operations taking into account the tide and weather forecasts; forecasting inflows into WWTPs in order to improve their operational performance; and producing reports and presenting geographically dispersed data for the control room that, when integrated with other data, generate information flows of operational relevance. Based on the results achieved in the Beirolas subsystem, located in Greater Lisbon, the AQUASAFE gained international recognition and was an IWA 2012 award winner.

In terms of solid waste, a partnership between two companies from the Águas de Portugal Group – Algar, responsible for the treatment and recovery of waste in Algarve and Aquasis, an expert in communication technologies adapted to the water and waste sector – resulted in the launch of an application for optimizing collection circuits through setting out both the dynamic routes and the shortest routes as well as through a more precise and comprehensive analysis of the values obtained through the collection of waste from recycling centres.

Left

The Neural AD project (Neural Networks + Anaerobic Digestion) aimed at optimizing energy production from biogas generated by the anaerobic digestion of sludge produced in WWTPs, was awarded the international WEX Global Awards 2015 prize in the "Water and Energy" category.

Right

The implementation of the real time information management platform AQUASAFE in the Beirolas subsystem, in Loures, gained international recognition as one of the most important projects in 2011 under the Be Inspired Bentley Awards and also distinguished by the IWA - International Water Association in 2012 under the scope of the Project Innovation Awards Europe and West Asia Regional Awards.

Governing bodies

1993 1995

BOARD OF DIRECTORS
Chairman: Frederico Melo Franco
Member: Jorge Eduardo de Abreu Ferreira
Member: José Henrique Guimarães Simões Salgado Zenha
Member: João Antunes Bártolo
Member: Jorge Augusto Pires

1996 1998

BOARD OF DIRECTORS
Chairman: Mário Lino Soares Correia
Member: João Álvaro Bau
Member: Nuno Magalhães Silva Cardoso
Member: Paulo Jorge Oliveira Ribeiro de Campos
Member: Artur Manuel Ascenso Pires

1999 2001

BOARD OF DIRECTORS
Chairman: Mário Lino Soares Correia
Member: João Álvaro Bau
Member: José António da Conceição Neto (replaced in 1999 by Mário Amoêdo Pinto)
Member: Paulo Jorge Oliveira Ribeiro de Campos
Member: Artur Manuel Ascenso Pires

2002 2004

BOARD OF DIRECTORS
Chairman: Luís de Carvalho Machado
Member: Mário Amoêdo Pinto
Member: António Manuel dos Santos Silva
Member: Eduardo Eugénio Castro de Azevedo Soares
Member: José Carlos Athaíde dos Remédios Furtado

2004 2005

BOARD OF DIRECTORS
Chairman: Joaquim Manuel Veloso Poças Martins
Member: José Alberto Cebolo Monteiro
Member: António Manuel Lourenço dos Santos
Member: Eduardo Eugénio Castro de Azevedo Soares
Member: José Carlos Athaíde dos Remédios Furtado
Member: Caixa Geral de Depósitos, represented by António de Sousa (replaced in 2004 by Gracinda Raposo)
Member: Parpública, SGPS, S.A., represented by João Plácido Pires

2005 2007

BOARD OF DIRECTORS
Chairman: Pedro Eduardo Passos da Cunha Serra
Member: Justino Manuel Matias Carlos
Member: António Manuel da Silva Branco
Member: José Maria Martins Soares
Member: João Manuel Lopes Fidalgo
Member: Caixa Geral de Depósitos, represented by Gracinda Raposo (replaced in 2007 by Francisco Bandeira)
Member: Parpública, SGPS, S.A., represented by João Plácido Pires

2008 2011

BOARD OF DIRECTORS
Chairman: Pedro Eduardo Passos da Cunha Serra
Member: Justino Manuel Matias Carlos
Member: António Manuel da Silva Branco
Member: José Maria Martins Soares
Member: João Manuel Lopes Fidalgo
Member: Caixa Geral de Depósitos, represented by Francisco Bandeira (replaced in 2009 by José de Araújo e Silva, who ceased his duties in September 2011)
Member: Parpública, SGPS, S.A., represented by João Plácido Pires (replaced by Joaquim José de Oliveira Reis)

2012 2014

BOARD OF DIRECTORS
Chairman: Afonso José Marçal Grilo Lobato de Faria
Member: Manuel Joaquim Barata Frexes
Member: Gonçalo Ayala Martins Barata
Member: Manuel Maria Pereira Fernandes Thomaz
Member: Álvaro António Ferrão Magalhães Castello-Branco
Member: Parcaixa, SGPS, S.A., and Parpública, SGPS, S.A., (represented until October 2012 by Joaquim José de Oliveira Reis and between January 2013 to July 2013 by Joaquim Pais e Jorge)

2015

BOARD OF DIRECTORS
Chairman: Afonso José Marçal Grilo Lobato de Faria
Vice-Chairman: Manuel Maria Pereira Fernandes Thomaz
Member: Cláudio Miguel André de Sousa Jesus
Member: Gonçalo Ayala Martins Barata
Member: José Manuel Leitão Sardinha
Member: Parpública, SGPS, S.A., and Parcaixa, SGPS, S.A., represented by José Manuel Barros

Chronology

1993

- Creation of the Multi-Municipal System and opening up sector activities to private capital under concession. [Decree-Law no. 372/93 of 29 October, amending the Law on the Delimitation of Sectors].
- Creation of the first Multi-Municipal Water Supply System: Greater Oporto North, Greater Oporto South, the Greater Lisbon Area, Western Algarve and Eastern Algarve. [Decree-Law no. 379/93, of 5 November].
- Constitution of IPE - Águas de Portugal, with responsibility for the development of Multi-Municipal Water Supply and Wastewater Sanitation Systems, which received most of EPAL's capital.

1994

- Approval of the concession for the operation and management of Multi-Municipal Solid Waste Treatment Systems. [Decree-Law no. 294/94 of 16 November].
- Approval of the concession for the operation and management of Multi-Municipal Water Supply Systems. [Decree-Law no. 319/94, of 24 December].
- Founding of the Lisbon Multi-Municipal Urban Solid Waste Recovery and Treatment System and the respective concessionaire (Valorsul).

1995

- Regulation of the legal regime for granting Municipal System concessions and launching the National Observatory for Multi-Municipal and Municipal Systems for the extraction, treatment and distribution activities of water for public consumption, and the collection, treatment and disposal of effluents and collection and treatment of solid waste. [Decree-Law no. 147/95, of 21 December].
- Constitution of the concessionaires for the Multi-Municipal Water Supply Systems set up in 1993 (Águas do Cávado, Águas do Douro e Paiva, Águas do Barlavento Algarvio and Águas do Sotavento Algarvio). EPAL became responsible for the Multi-Municipal Water Supply System of the Greater Lisbon Area.
- Launch of the Multi-Municipal System for the Sanitation of the Estoril Coast and the respective concessionaire (Sanest).
- Founding of the Algarve Multi-municipal Urban Solid Waste Recovery and Treatment and the respective concessionaire (Algar).

1996

- Approval of the concession bases for the operation and management of Multi-Municipal Wastewater Sanitation systems. [Decree-Law no. 162/96, of September 4].
- Launch of the new Multi-Municipal systems for Sorting, Selective Collection, Assessment and Treatment of Solid Waste and constitution of the respective concessionaires in the Litoral Centro (Ersuc); Vale do Lima e Baixo Cávado (Resulima); Sul do Douro (Suldouro); Vale do Minho (Valorminho); and Alta Estremadura (Valorlis).
- Completion by the European Union of the first Cohesion Fund applications, which provided for the necessary investments in water supply and wastewater sanitation infrastructures.

1997

- Creation of IRAR - the Regulatory Institute for Water and Waste. [Decree-Law no. 230/97, of 30 December].
- Approval of the Sector Strategic Plan for Urban Solid Waste Management (PERSU I).
- Constitution of Aquapor, oriented towards participation in the municipal systems market and supporting the Group's intervention in international markets.
- Implementation of the first of the AdP Group's financing operations with the EIB.
- Establishing the Multi-Municipal System for the Sanitation of the Ria de Aveiro and the respective concessionaire (Simria).
- Creation of the new Multi-Municipal Systems for the Recovery and Treatment of Solid Waste and constitution of the respective concessionaires for the south side of the Tagus (Amarsul) as well as for the West region (Resioeste).

1998

- Aquapor's first participation in the tender process for the concession for the operation and management of the municipal water and sanitation system (Figueira da Foz), in partnership with private companies, which resulted in the creation of Águas da Figueira.
- Intensification of activities in international markets, with stakes held in the EBAL and Prolagos (Brazil) and Aquatec (Mozambique) companies.

1999

- Creation of the Multi-Municipal Sanitation System of the Lis River and the constitution of the respective concessionaire (Simlis).
- Awarding, in an international consortium, of the water supply concession for five of the main cities in Mozambique, leading to the establishment of the concessionaire Águas de Moçambique.
- Entry into the Cape Verde market with the acquisition – in partnership with the Portuguese electricity utility EDP – of a majority stake in Electra, the electricity and water utility.

2000

- Integration of the company Empresa Geral do Fomento (EGF) into the AdP Group, as a sub-holding for the waste area.
- Publication of the Strategic Plan for Water Supply and Wastewater Sanitation (PEAASAR) 2000-2006.
- Setting up of three more Multi-Municipal Sanitation Systems: Baixo Cávado and Ave, Algarve and Greater Porto.
- Merger of the companies Águas do Barlavento Algarvio and Águas do Sotavento Algarvio to found Águas do Algarve.
- Creation of the first Multi-Municipal Integrated Water Supply and Wastewater Sanitation Systems: Zêzere e Côa, Norte Alentejano, Oeste e Minho-Lima and setting up the three respective concessionaires (Águas do Zêzere e Côa, Águas do Minho e Lima and Águas do Oeste).
- Launch of the Multi-Municipal Urban Solid Waste Management Systems of Alto Tâmega and Baixo Tâmega and setting up of the respective concessionaires (Resat and Rebat).
- Awarding to Aquapor, in partnership with private companies, of the concession for the Cascais Municipal Water Supply and Sanitation System, with the establishment of the respective concessionaire (Águas de Cascais).
- Strengthening the presence in the Brazilian market with the founding of Águas do Brasil and the acquisition of the total share capital of EBAL and Prolagos.
- Beginning of the cooperation project with East Timor for the rehabilitation of the water supply systems in the districts of Baucau and Aileu.

2001

- Aquapor becomes market leader in private concessions through the acquisition of Luságua.
- Constitution of Águas do Norte Alentejano, concessionaire of the Multi-Municipal Water and Sanitation System created in the previous year.
- Awarding of the Algarve Multi-Municipal Sanitation System concession to Águas do Algarve.
- Setting up new Multi-Municipal Water Supply and Wastewater Sanitation Systems and their respective concessionaires in Trás-os-Montes and Alto Douro (Águas de Trás-os-Montes e Alto Douro) and Raia, Zêzere and Nabão (Águas do Centro).
- Creation of the Multi-municipal Sanitation System of the Tagus and Trancão River and constitution of the respective concessionaire (Simtejo).
- Founding of Águas de Santo André, the concessionaire of the Santo André System for the Extraction, Treatment and Distribution of Water for Public Consumption, the Collection, Treatment and Rejection of Effluents and Solid Waste Collection, Treatment and Final Destination, formerly managed by the Instituto da Água.
- Implementation of the Cova da Beira Multi-Municipal System for the Sorting, Selective Collection, Recovery and Treatment of Municipal Solid Waste and awarding the system concession to Águas do Zêzere e Côa.
- Founding of the new Multi-Municipal Solid Waste Sorting, Collection, Recovery and Treatment Systems and setting up the respective concessionaires: in Norte Alentejo (Valnor) and in Southern Douro (Residouro).

- Awarding of the concession for the Alcanena Municipal Water Supply System to Luságua.
- Awarding to Aquapor, in partnership with private companies, of the concession for the Gondomar Municipal Water Supply and Sanitation System, with the establishment of the respective concessionaire (Águas de Gondomar).
- Launch of the companies Ribtejo, Ecometais, Reciclamas, Netaqua and AdP Formação.
- Setting up of AdP Internacional, with itt mission to manage the AdP Group business outside Portugal.

2002

- Creation of the Vale do Ave Multi-Municipal Water Supply and Sanitation System and the constitution of the respective concessionaire (Águas do Ave).
- Acquisition of 55% of the share capital of Aquasis, a company specialized in information systems for the sector.
- Completion of the closure of all rubbish dump sites by EGF.

2003

- Constitution of Águas do Centro Alentejo, concessionaire of the Centro Alentejo Multi-Municipal Water Supply and Sanitation System.
- Constitution of AdP Timor-Leste.

2004

- Implementation of the Multi-Municipal Wastewater Sanitation System of the Setúbal Peninsula and setting up the respective concessionaire (Simarsul).
- Creation of the Baixo Mondego-Bairrada Multi-Municipal Water Supply and Sanitation System and the constitution of the respective concessionaire (Águas do Mondego).

2005

- Publication of the Water Law [Law 58/2005 of 29 December] transposing the Water Framework Directive into national law.

2006

- Restructuring of IRAR, renamed ERSAR - Entidade Reguladora dos Serviços de Águas e dos Resíduos, I.P., the Water and Waste Services Regulator. [Decree-Law no. 207/2006, of 27 December].

2007

- Publication of the Strategic Plan for Water Supply and Wastewater Sanitation (PEAASAR II) 2007-2013. [Order no. 2339/2007, Official Journal no. 32, 2nd Series, 14 February].
- Publication of the Strategic Plan for Urban Solid Waste for the period 2007-2016 (PERSU II). [Decree no. 187/2007 of 12 February].
- Approval of the National Strategy for Agro-Stockbreeding and Agro-Industrial Effluents 2007-2013 (ENEAPAI).
- The AdP Group commences studies related to projects for the downstream integration of more than 150 municipalities, including in particular the definition of the status of the municipal systems, the investment plan, the associated schedule and estimated turnover.
- Internationalization of the waste sector, through EGF, in partnership with the Mozambican company Neoquímica, with the aim of winning the tender for waste collection in the urban area of Maputo, Mozambique.
- Beginning of the disposal of companies in non-core activities (Prolagos, EBAL and Ecometais)

2008

- Sale of Aquapor and of more companies in non-core activities (Recigroup and Electra).
- Constitution of the company Resiestrela, the concessionaire for the Cova da Beira Multi-Municipal Solid Waste System.
- Acquisition of 35% of the capital of Trevo Oeste (treatment and recovery of livestock waste).

2009

- Implementation of the new operating and management regime for Municipal Water and Urban Waste Systems, the public partnerships between the state and local authorities. [Decree-Law no. 90/2009, of 9 April].
- Public partnership between the state and ten municipalities for the creation of the Águas da Região de Aveiro System and the

constitution of AdRA - Águas da Região de Aveiro, as partner-managers.

- Public partnership between the state and 21 municipalities for the founding of the Águas do Alentejo Public Integrated Partnership System and the constitution of AgdA - Águas Públicas do Alentejo as partner-managers.
- Creation of the Greater Oporto Multi-Municipal Sanitation System and constitution of the respective concessionaire (Simdouro).
- Constitution of Resinorte through the merger of Resat, Rebat and Residouro.

2010

- Constitution of Águas do Noroeste through the merger of Águas do Cávado, Águas do Minho e Lima and Águas do Ave, the concessionaire of the Noroeste Multi-Municipal Water Supply and Sanitation System.
- Merger of Resioeste and Valorsul resulting in Valorsul - Valorização e Tratamento de Resíduos Sólidos das Regiões de Lisboa e do Oeste.
- Constitution of AdP International's subsidiary in Angola (AdP Angola).
- Constitution of AdP Energias, a company which mission was to promote the efficient use of energy assets and local resources, energy efficiency and management and recovery of sludge.

2011

- Strategic repositioning in Mozambique with the sale of Águas de Moçambique and reactivation of Aquatec.

2012

- Publication by AdP Energias of the Integrated Plan for Energy Efficiency.
- Preparatory work for the aggregation of the existing Multi-Municipal systems into larger systems and the integrated management of the Municipal Systems.

2013

- Amendment of the Law on the Delimitation of Sectors, enabling the operation and management concession of the Multi-Municipal Waste Systems awarded to companies in which the majority of the capital is privately held, and of sub-concessions to private companies of all or part of the Multi-Municipal Water Systems. [Decree-Law no. 35/2013, of 11 June].
- Amendment, in particular by aggregation, of the regime for the founding, operation and management of Multi-Municipal systems for the extraction, treatment and distribution of water for public consumption, collection, treatment and wastewater disposal and the collection and treatment of solid waste. [Law no. 92/2013 of 11 July, repealing Decree-Law no. 379/93].
- Public partnership between the Portuguese state and eight municipalities for the creation of the Sistema de Águas da Região do Noroeste and assignment to Águas do Noroeste of partnership management.

2014

- Approval of the new statutes of the Regulatory Authority for Water and Waste Services. [Decree-Law no. 10/2014, of 6 March].
- Publication of the Law on detailed invoicing for water and waste services. [Decree-Law no. 12/2014, of 6 March].
- Approval of the reprivatisation process of Empresa Geral do Fomento, S.A. (EGF) [Decree-Law no. 45/2014, of 20 of March].
- Completion of the work on drafting the new strategic plans for the sector: the PENSAAR 2020 - A new strategy for the sector of water supply and wastewater disposal, and PERSU 2020 - Strategic plan for solid urban waste.

2015

- Approval of the territorial reorganization of the Multi-Municipal Systems managed by Águas de Portugal, with the creation, by aggregation, of Multi-Municipal Water Supply and Sanitation Systems in the North of Portugal [Decree-Law no. 93/2015 of 29 May], in the Central Coast of Portugal, [Decree-Law no. 92/2015 of 29 May], and Lisbon and Tagus Valley [Decree-Law no. 94/2015 of 29 May], and the respective managing bodies: Águas do Norte, Águas do Centro Litoral and Águas de Lisboa e Vale do Tejo.
- Conclusion of the sale of EGF.

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