Methodology

Lisbon has invested in Green and Blue infrastructures to address water management in the city. Plans have been developed and applied to the two largest water consumption activities, city garden irrigation and street cleaning, which represent 75% of the municipal water consumption in the city. This included development of green infrastructure irrigation and design solutions for the reuse of water from the WWTPs to achieve their commitment towards the UWA2030 targets. With regard to street cleaning, the city also has established regulatory municipal procedures and agreements with the WWTPs to provide treated waste water for repute to the municipal cleaning fleet.

Cities at a Glance

Statistics sourced from EGCA 2019 Applications.

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<thead>
<tr>
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<td>Water - Total Usage:</td>
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Water Saving Benefits

- The reuse and recycling of water is important to the circular economy and has great potential for addressing current and future challenges of water scarcity. Cities can benefit from the opportunities provided by water efficiency and the application of the circular economy concept to water including the reuse of urban waste water.

Economic Benefits

- The table below (Figure 1) demonstrates the breakdown of Lisbon’s water consumption in 2014. This identifies that 75% of the city’s water use is on city garden and park irrigation and street cleaning, which represents a substantial cost of €7 million each year. The water reuse initiative is projected to generate savings of up to €3.5 million by 2020.

Social and Environmental Benefits

- The project promotes efficient management of natural resources. By reducing potable water production and consumption the city can ensure water security for the future.

Challenges

Although there is no regulatory obligation to do so, Lisbon has taken on the challenge of increasing its reuse of waste water. In 2017, the city launched its irrigation plan of public green spaces with large water consumption, working in conjunction with the Portuguese Environment Agency and the National Health Authority.

Another challenge is ensuring that there is adequate awareness of plans and projects for the management of water among citizens. To address this, the city has developed innovative awareness-raising campaigns, such as free visits to the WWTPs, creative school presentations and visits to the Lisbon Museum of Water.

As part of the project the city will provide an educational programme that will be promoted by The Lisbon Energy and Environmental Agency. This will include presentations by experts on different themes, including waste water treatment and waste water reuse in public spaces in order to engage with citizens.

Lisbon Water Reuse & Recycling

Since 2009, over 1.5 million m³/year of recycled waste water has been reused through the Lisbon’s Waste Water Treatment Plants (WWTPs) for non-potable uses. The project is aimed at creating a treated Waste Water Reuse System for non-drinking public purposes such as garden and park irrigation, road cleaning, vehicle washing and toilet flushing.

It supports the city’s sustainable development goals and provides Lisbon with an alternate option regarding water supply and savings. The project contributes towards Lisbon’s commitment to the Europe 2020 Strategy in terms of efficiency in the use of natural resources and is also a significant step in the city’s commitment towards the Urban Water Agenda 2030 (UWA2030).

Despite there being no existing Portuguese legislation regarding waste water reuse, Lisbon wants to increase the level of waste water reuse in the city. Increasing the levels of the waste water reuse will contribute to Lisbon’s sustainability and resource efficiency goals including:

- Sustainability: Implementation of a sustainable urban water management system supported by smart and resilient infrastructure for the urban water system.
- Efficiency: Closing the urban water cycle in order to increase the water efficiency of the city. Developing a circular economy in the water sector.
- Targets: Achieving a target of 50% of water reuse by 2020 in line with the city’s commitment to the UWA2030.
- Security: Developing an alternate water supply to provide water security for future generations.

Cities at a Glance

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Want to know more?

For further information on Lisbon and Ghent’s projects please see:

- Lisbon: Urban Water Agenda 2030
- Ghent: Oude Dokken - New Life in the Old Docks

Find out more about the European Green Capital Award, and its sister competition, the European Green Leaf Award on our website: ec.europa.eu/europeangreencapital/

One of the key objectives in the project is the reuse of treated waste water for green area irrigation with the installation of a complete recycled water infrastructure from the WWTPs to two important green areas, Parque das Nações and Alcântara Valley.
Future Planning

Success of the project can be assessed through measurement of the annual waste water consumption and through the preparation of an Annual Economical Assessment Report to evaluate the savings rate. Further development of the project will include enhancement of the water reuse infrastructure by promoting innovative and sustainable Green & Blue Infrastructure solutions in Lisbon like Eco-roofs and Eco-streets.

Lisbon is also participating in the UWA2030 core group, where cities will get a unique opportunity to have a say and contribute to the strategic development of the UWA2030. By participating, cities can share their commitment to sustainable urban water management and their readiness to apply innovative solutions to today’s pressing challenges on water resources, systems and services.

Parque das Nações Project
This project aims to replace underground water use with the use of recycled treated water produced by the WWTP Beirolas. Phase 1 is intended to replace the water use in the North area with 284,784 m², representing 330,000 m³/year water consumption. In phase 2 the replacement should extend to the South covering the whole area.

Source: City of Lisbon, 2017.

Alcântara Valley Project
The aim of the Vale de Alcântara Green Corridor project, with an investment of €5 million, will be to restore an area of 13 hectares. The project will improve design solutions for rainwater, drainage and for the reuse of water from the Alcântara WWTP. One network of recycled water has already been built while two others are projected and budgeted for to the amount of €1.8 million. The target in terms of water reuse is 3.1 m³/capita/year.

Source: City of Lisbon, 2017.

Ghent Old Docklands Project
In Ghent, development of the former Old Docklands area, Oude Dokken, is taking place. The development of this new district will include 1,500 new homes. In the first phase, 350 homes are being developed, as well as a primary school, crèche and sports hall. The main focus of this project is sustainable urban development.

The development will be fully climate-neutral by focusing on energy efficiency and renewable energy, sustainable mobility, quality of life and green spaces. A key part of these sustainable development plans for this project is the sustainable management of waste water.

An innovative approach has been introduced known as the ZAWENT system (Zero Waste Water with Energy and Nutrient Recovery), this sustainable energy system supplies one third of the heat for the development and allows for the purification and reuse of waste water.

This ZAWENT technology is a new and sustainable system which harvests renewable energy from waste water and organic food waste and combines different existing technologies.

If cities are to address water challenges they will need to take advantage of opportunities for smart and sustainable urban water management. These opportunities should support urban development and have economic and environmental benefits whilst ultimately improving the quality of life of citizens.

Cities will need to take action in line with the UWA2030 to address the urgent need to accelerate the development and uptake of innovative approaches, technology and governance with regard to the water sector in Europe. Sustainable and efficient water management will make cities more resilient to the future risks associated with water such as water scarcity, flooding and pollution.

Action is especially important in Southern European Cities, it is very important to develop climate adapted and dedicated solutions to provide a high resilience to urban water scarcity. By managing urban water effectively cities can take a leading role in improving the overall status of European waters, the key objective of EU water policy.

Learnings and Recommendations

The ZAWENT system not only uses recovered heat, but also purifies and recycles waste water which is in turn used by the nearby soap company, resulting in a closed loop system.

This innovative combination involves waste water from vacuum toilets being collected separately along with organic waste, which is then converted into biogas through the process of Anaerobic Digestion. This results in biogas for heat and power. The residual product from this process, struvite, can be used as fertilizer grains for green areas in the development.

The remaining two thirds of heat supply for the development will come from the residual heat generated by a nearby soap factory and transported through a heat network.

Figure 2: Vale de Alcântara - Green Corridor. Source: City of Lisbon, 2017.

Figure 3: The ZAWENT System Process Overview. Source: City of Ghent, 2017.

Figure 4: Planned Development at Oude Dokken, Ghent. Source: City of Ghent, 2017.