

EMASESA

Data lake design and deployment to increase water and energy efficiency

EMASESA, Seville's municipal water utility, is responsible for managing the entire water cycle in the Spanish city of Seville and in 12 other municipalities in its metropolitan area. This leading Andalusian utility was set up in 1974 by the Seville City Council and currently supplies more than one million people, who each use an average of 106 liters of water per day. The utility understands that water is an increasingly scarce and valuable resource, which is why it works hard to minimize losses in the distribution network (already kept to a minimum), and to promote lower domestic consumption. It is driving this initiative through a public awareness campaign that aims to reduce consumption to 90 liters per inhabitant per day, which would be one of the lowest rates in Spain.

EMASESA manages a 3,924 km supply network and a 3,022 km sewer network, as well as six water reservoirs with a storage capacity of 641Hm³, 37 drinking water pumping stations and 24 wastewater pumping stations, 28 municipal water tanks, six wastewater treatment plants (WWTPs) and three drinking water treatment plants (DWTPs). El Carambolo is the largest drinking water treatment plant, with a maximum daily capacity of 864,000 m³. The other two facilities can treat up to 3,000 m³ per day. EMASESA also has five stormwater detention tanks with a capacity of 101,850m³, equivalent to 34 Olympic swimming pools.

The utility also operates three hydroelectric power plants that generate an average of 11,277 kW per year. It also produces almost 22,000 MWh of energy through biogas cogeneration, making it partially energy self-sufficient. In addition, it has a composting plant located in the Copero Environmental Complex, a technological and environmental area aligned with the objectives of EMASESA's Strategic Plan for Environmental Protection, Treatment Excellence, the Circular Economy, and Sustainability.

The challenge

EMASESA's aim was to reduce water consumption, increase water and energy efficiency, and enhance customer service in the municipalities it serves. This required improving the monitoring and control of its operations and assets.

In its 2030 Strategic Plan, the utility included the integration, processing and dissemination of large amounts of data from different sources, including those generated by smart meters, as a starting point for digitally transforming its processes. The use of advanced analytics, AI, and machine-learning algorithms was required to improve decision-making at the technical, operational, and production levels. In addition, it was vital to foster more responsible water use amongst the population.

The solution

The [Xylem Vue](#) platform was implemented to integrate data from over 100,000 signals from multiple sensors, 200 water sectors, over 400,000



Program highlights:

- Integration, processing, and analysis of big data in a single repository, using artificial intelligence and machine learning
- Enhanced fraud and leak detection
- Increased water and energy efficiency
- Reduction in per capita water consumption



Water catchment and adduction processes in EMASESA

water meters, 75% of which have remote reading capabilities as of mid-2025, and other types of data in a single repository, thanks to its big data capabilities and Smart Water Engine (SWE). Its data intake layer brings together information from different sources, which is subsequently acquired, digested, and stored in the data lake. The Domain Master Data (DMD) standardizes and unifies the data, which is centralized in the IoT layer of the platform for further exploitation. The company also leverages other insights generated by EMASESA, including customer management system (CMS) information and other third-party data.

The project provided EMASESA with a Data Science Framework (DSF) for controlled analysis and integration of information into the system through advanced algorithms, which can be connected to future AI and machine-learning modules. As part of its Operational Intelligence module, Xylem Vue also includes a BI panel and advanced dashboards where data can be visualized and exploited by all business areas to improve processes.

Additionally, the implementation of specific drinking water and wastewater applications gave EMASESA better control over its infrastructure. The drinking water applications deployed were **Xylem Vue's Meter Data Analytics**, for AMI/AMR monitoring; **Leak Detection**, for advanced leak location; **Real-Time What-If Scenarios**, for developing the network's digital twin, and Plant Management, for advanced DWTP monitoring and operations. Xylem Vue's **Plant Management** application for wastewater was also chosen to develop a digital twin of the Ranilla WWTP. The implementation of Xylem Vue enables the future deployment of additional applications and use cases depending on the utility's needs.

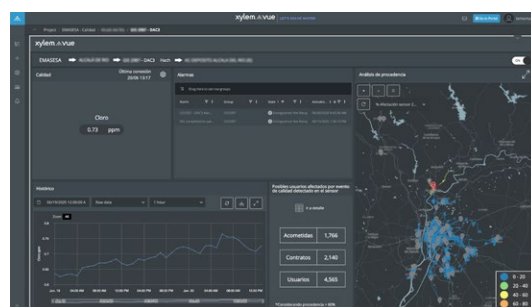
The project included a customized consultancy and training service for internal and external staff, as well as the development of new functionalities that address different areas of the water cycle, from water collection in reservoirs and distribution to users, to discharges into the environment in optimal conditions.

The results

The Xylem Vue platform has boosted digital transformation in EMASESA, centralizing information from different sources to optimize management, enhance customer service, and make data-driven decisions. Water balances are calculated continuously across the supply network thanks to the implementation of AI algorithms and automated processes. This helps EMASESA to measure network performance improvements, reduce non-revenue water (NRW), and detect fraud.

Moreover, the advanced data insights and anomaly detection capabilities have enabled the utility to reduce operational costs and comply with environmental obligations. The system also supports forecasting and preventing water quality issues, predicting consumption demand, and implementing predictive maintenance strategies, thus contributing directly to increasing water, energy, and economic efficiency.

Xylem Vue has also helped the Spanish utility to adapt to climate change thanks to its simulation and scenario modeling tools, included in its digital twin. The reduction of per capita water consumption is also bringing EMASESA closer to achieving its sustainability goals.



Water quality monitoring in the supply network