Case study
A Coruña, Spain

EMALCSA

Implementation of a digital twin to support decision-making in water supply network operations

The Empresa Municipal de Aguas de La Coruña (EMALCSA) manages the water cycle in the city of A Coruña and seven neighboring municipalities, serving a total population of 400,000. The utility collects, treats and distributes over 36 million cubic meters of drinking water to 138,000 customers each year, via a network of over 560 kilometers, 26 storage tanks and six pumping stations.

In the city of A Coruña, it supplies approximately 50,000 m³ of water daily to end users, while also providing wholesale drinking water to Arteixo, Bergondo, Cambre, Carral, Culleredo, Oleiros, and Sada. This water comes primarily from the Cecebre reservoir, which has a capacity of 22 hm³, and is treated at the La Telva and Cañás treatment plants. In addition, EMALCSA manages wastewater services in the municipality of Carral.

The company is a benchmark for its achievements in sustainability, delivering outstanding efficiency rates in Spain and promoting efficient water use in homes, industries, and public areas.

Challenges

EMALCSA had implemented remote management and numerical modeling systems prior to this project, as well as an IT platform designed to integrate data from the multiple sensors installed across its key assets. This initiative had already provided the utility with information on operational parameters, enabling it to optimize certain strategic aspects, such as the energy costs of pumping, reservoir levels, sales management, and water quality.

However, the complexity of the production, storage, and transmission system called for taking things a step further. Enhancing operational performance and service quality required the deployment of a digital twin as a decision-making support tool. The goal was to ensure a more efficient, transparent, and reliable water supply that was tailored to users' needs.

The company also aimed to increase water and energy efficiency, in line with the SDGs, and to promote sustainability, innovation, operational excellence, and social commitment. The latter was part of EMALCSA#120, an initiative commemorating the utility's 120-year history.

Solution

The deployment of the **Xylem Vue platform,** including its IoT Core and Smart Water Engine (SWE) modules, has been key to integrating data from sensors and other information sources, such as GIS, into a common

Project highlights

- Better understanding of the system's status through hydraulic simulation
- Support for short-, medium- and long-term network operation planning
- Reliable, efficient and high-quality supply, thanks to real-time monitoring of key parameters

repository. The system's holistic view enables EMALCSA to perform advanced strategic planning through centralized analysis, predictive algorithms, and interactive dashboards.

Xylem Vue's Real-Time What-If Scenarios application builds on this data integration to provide real-time, historical, and future hydraulic simulations via its digital twin, enabling the evaluation and planning of multiple operational scenarios while minimizing risks and costs. This improves day-to-day operations by enabling the utility to detect anomalies faster, anticipate problems, virtually simulate solutions before implementation, adapt to potential changes in demand, and optimize network operations.

Xylem Vue also facilitates long-term planning and crisis management, such as potential supply disruptions and extreme weather events. The project includes technical staff training to ensure the system's long-term sustainability.

Resultados

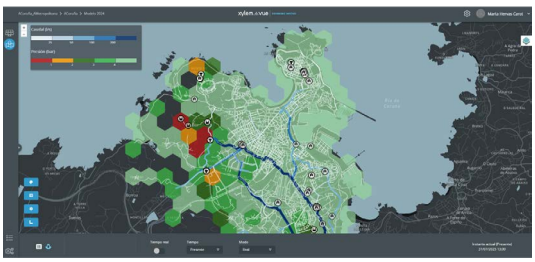
The project has delivered significant improvements in operational efficiency by providing a holistic view of the network and supporting scenario analysis for planning, maintenance, and decision-making. Hydraulic simulation has provided greater real-time insight into system conditions, including areas without sensors, helping operators anticipate potential issues and ensure more sustainable, uninterrupted service. Proactive network management has led to both greater customer satisfaction and cost reductions.

Xylem Vue also identifies the ideal time to schedule operational tasks without disrupting the water supply. Furthermore, in the medium term, it helps optimize the sizing of new infrastructure and assess the system's future performance once that infrastructure is in place.

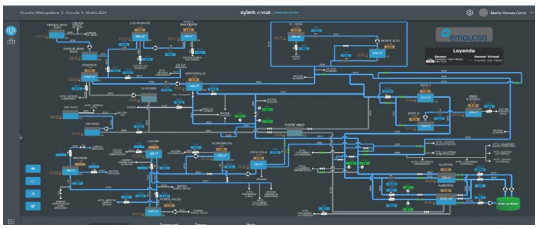
The project also takes energy efficiency into account by simulating different pumping operation strategies, prioritizing the times when energy costs are lowest to reduce consumption and cut electricity bills.

The digital twin implemented is a valuable tool to secure safe, efficient, and high-quality water supply through real-time monitoring of key parameters. For example, it can track the age of the water by providing information on its source and how long it has been in the network.

In short, the Xylem Vue platform has boosted the resilience and efficiency of EMALCSA's water supply system through data-driven decision-making and digital transformation. The project reinforces environmentally sustainable management, aligned with the utility's strategic objectives and the SDGs, and effectively addresses the challenges of climate change.



Results of the EMALCSA digital twin simulation on the map view



Results of the EMALCSA digital twin simulation on the synoptic view

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