Case study
Malaga, Andalusia, Spain

EMASA

Improving water efficiency through smart water balance analysis

EMASA (Empresa Municipal Aguas de Málaga S.A.) is the Malaga City Council's public utility which has been in charge of managing the entire urban water cycle since 1987. The company **serves more than 600,000 residents and supplies approximately 42 hm³ of drinking water.** The system operates at a flow rate of up to 2 m³/s, ensuring urban water supply through an extensive pipeline network of around 2,000 km, divided into approximately 240 DMAs (District Metered Areas) and equipped with over 240,000 meters, 170,000 of which are smart devices.

The supply area is located in the driest region of Spain, where structural water scarcity converges with severe droughts. The **highly seasonal nature of demand** compounds this situation, as Malaga is the capital of one of the busiest tourist areas in the Spanish Mediterranean. EMASA has a **complex system of water sources** to guarantee constant supply, combining surface water from reservoirs in the Guadalhorce River basin, groundwater from local aquifers, and desalinated brackish groundwater from the lower reaches of the Guadalhorce River.

In this context, with average per capita consumption standing at around 170 L/person/day and a non-revenue water (NRW) rate of between 10% and 15%, **EMASA is focused on implementing technology to maintain and continuously improve network performance and ensure a high-quality service.**

Challenges

EMASA recognized the **need to transition from a legacy technology environment to a more robust, integrated, scalable digital architecture aligned with its transformation strategy.** The coexistence of legacy systems hindered the consistent integration of water data, limiting the ability to fully track water balances by sectors (DMAs) and analyze network performance.

Given chronic drought conditions and high tourism demand, it is essential to **enhance adaptation to climate variability through more efficient and predictive management,** reducing the NRW rate through early leak detection, better investment planning, and operational optimization, without disrupting supply continuity. Additionally, tools are needed to anticipate demand scenarios and resource availability.

Key aspects of the project:

- Integration and centralization of 502 variables to monitor 386 hierarchical levels across 240 DMAs and 240,000 service connections, 170,000 of which are equipped with smart meters.
- Generation of the daily water balance, enabling ANR monitoring at sector level.
- Early leak detection and reduction of NRW
- Better operational forecasting through KPIs, automatic balances and alarms
- 24/7 monitoring of supply pressure within the water network
- Simultaneous water efficiency improvements and service cost control

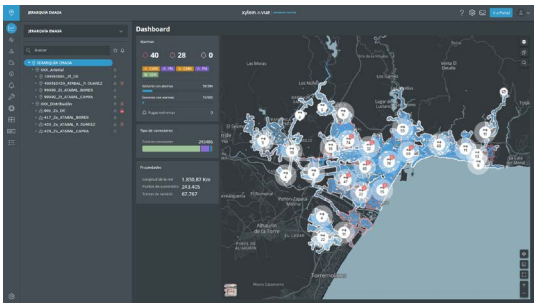
Solution

To address these challenges, **EMASA implemented Xylem Vue as a digital hub for hydraulic performance management, including the Leak Detection application** for continuous sectoral balance analysis and automatic anomaly detection in DMAs. The solution leverages the Smart Water Engine (SWE) as its core integration layer, ensuring consistent, high-quality data management and governance across data from different operating systems and meters. **Migration from previous platforms was carried out in a controlled and structured manner,** ensuring service continuity and full historical data traceability.

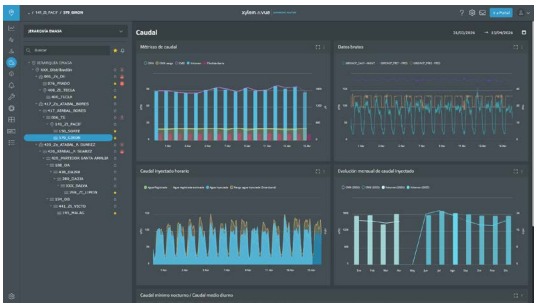
The software provides EMASA with advanced features to improve network management and efficiency. The new digital ecosystem has **standardized key indicators, automated critical analyses, and prepared the architecture for future functional expansion**. Other smart metering features include service-connection mapping, supply-type profiling (residential, commercial, seasonal), and alarms for abnormal nighttime pressures and NRW. These features help EMASA manage water efficiently and prevent losses.

Leak Detection's continuous monitoring of distribution network pressure is essential to ensure the proper operation of pressure-regulating valves. These valves require stable, well-controlled conditions to operate efficiently, especially during periods of drought, when maintaining optimal pressure minimizes unnecessary consumption and reduces the volume of water distributed without compromising service.

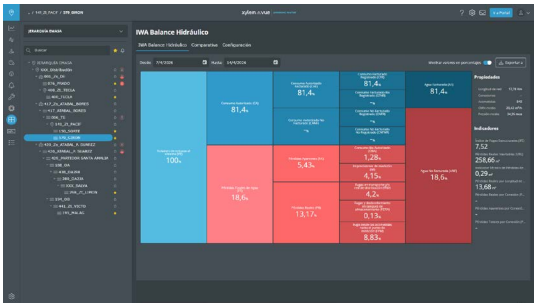
In addition, accurate pressure control helps **prevent pressure surges that can accelerate pipe deterioration and shorten the network's service life.** Detecting and correcting these anomalies in real time contributes to safer, more efficient, and more sustainable operations, reducing operational risks and improving the system's overall performance.



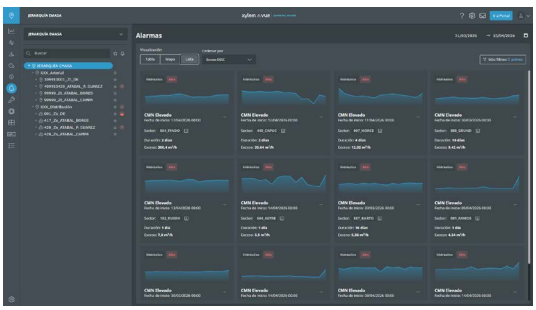
Xylem Vue dashboard



Flow metrics



IWA water balance



Alarm management

Results

The Xylem Vue platform represents a significant step forward in water efficiency for EMASA, as it improves the detection and management of leaks, fraud, and anomalies in the network. The integration of data from smart devices enables earlier, more accurate loss detection, optimizing water use and reducing the volume of NRW. Thanks to these improvements, water consumption has dropped from 250 to 170 liters per person per day, and the NRW rate has gone down from 20–25% to around 10–15%. This equates to a better-controlled network, with greater operational visibility and more proactive response capabilities.

At operational level, the platform provides a **new visual interface featuring a dashboard of key indicators, a connection map, visualization of service connections, and water balance reports,** along with administrative tools such as permission management and notifications. The International Water Association's (IWA) sector-level water balance analysis allows for a precise breakdown of each DMA's performance, identifying deviations in both actual and apparent losses. Comparing input volumes with recorded consumption in each sector enables the detection of anomalies revealing leaks, metering errors, and unauthorized consumption.

In April 2026, EMASA deployed the new Leak Detection water-sector prioritization module. This tool **improves decision-making when planning water supply network inspections by establishing priorities for action based on a range of criteria,** such as the likelihood of leaks, the associated impact or consequence, and the degree of confidence in the available information, thus delivering more efficient, targeted, and proactive management of network inspection tasks.

This detailed perspective makes it easier to **prioritize actions, allocate resources more effectively, and focus investments on areas where the impact will be greatest.** As a result, decision-making becomes more efficient as it is based on objective data. This improves both water efficiency and the service's operational and commercial management.

All of these improvements enable EMASA **to manage operations more efficiently, with greater precision and control, strengthening its ability to maintain a reliable supply under hydrologically adverse conditions** and with limited water resources, while meeting very high service standards in a highly competitive international tourist environment.

> "Leak Detection gives us total control over Malaga's supply network. Regular enhancements to the application improve our processes. It has become an essential tool in our day-to-day operations."

José Manuel Raposo, Head of the Meter Reading and Consumption Analysis Department at EMASA

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