AI TECHNOLOGY HELPS IN DETECTING INVISIBLE WATER LEAKS IN EL PRAT DE LLOBREGAT

CHALLENGE

Spain boasts 248,245 km of water distribution networks, of which **only 17% have been renovated or constructed in the last decade**, according to the XVII National Study on Drinking Water Supply and Sanitation in Spain 2022 conducted by the Spanish Association of Water Supply and Sanitation (AEAS) and the Spanish Association of Water Services Companies (AGA).

The age of these installations, continuous aging, the decrease in the renewal rate (-0.2%), and the lack of leak control—which increases water losses—have positioned the volume of **Non-Revenue Water (NRW)** at 23.5% in 2020.

This percentage is **far from the 10% target** typical of the top 3 European countries.

The latest available report from the National Statistics Institute (INE) in 2020 **estimated real water losses due to leaks, breaks, and failures in the supply network at 652 hm³**, representing 15.4% of the volume of water supplied to urban supply networks (4,243 hm³).

The **autonomous communities with the highest percentage of real losses** over the volume of water supplied are Ceuta and Melilla (25%), Canary Islands (24.4%), and Extremadura (22%). Lower percentages are found in Madrid (4%), Murcia (11.4%), and the Basque Country (13.2%).

Spain must implement the latest technologies to maximize the detection of water leaks in the distribution network

ADASA'S SOLUTION

Adasa Sistemas has **implemented a project for the detection, localization, and sizing of water leaks** in El Prat de Llobregat (Barcelona) for the public entity Aigües del Prat.

Under an **end-to-end service model**, Adasa conducted two operations in different areas of the municipality, **deploying 165 acoustic sensors**.

The first operation took place in the main potable water distribution network in the Mas Mateu neighborhood, **where 100 acoustic sensors covered 12.5 km**, and the second in the Logistics Activities Zone (ZAL) of the Port of Barcelona, **deploying 65 sensors that monitored 6.1 km of the fire network**.

Specifically, in the ZAL, the main ductile iron network under constant pressure **presented special challenges for analysis, such as extreme ambient noise** from the proximity to the airport and constant truck traffic.

Meanwhile, the distribution network in Mas Mateu **exhibited typical issues of an old network with various section changes** and materials, complicating leak detection.

The information obtained through the implementation of artificial intelligence (AI) based on FIDO Tech technology **allowed for the creation of a map delineating leak-free zones and critical areas** where leaks could exist in the network.

FIDO Tech **applies machine learning algorithms**, resulting in continuous improvement as it:

Installation of FIDO sensors.

FIDO sensor.

- **Collects and verifies** information files.
- **Filters out noise from other urban sources** such as traffic, valves, and pumps that could generate false alarms.

AI has enabled:

- **Optimization** of the analysis of areas likely to contain potential leaks by clustering detected points.
- **Identification** of locations with potential leaks using correlation techniques and field marking.
- **Classification** of water loss sizes into small, medium, or large.

RESULT

The work performed for Aigües del Prat **detected six leaks, two of which were particularly problematic** due to their size.

Thanks to FIDO's advanced technology, these leaks, **which could not be detected previously using conventional methods**, were precisely located with FIDO Tech.

This greatly aided Aigües del Prat in its daily **management of monitoring and controlling the distribution network's operation**, especially in a sector where the physical characteristics and previous interventions complicated leak localization.

The methodology implemented in this project **has enabled**:

- **Exhaustive and organized deployment** of small sensors, identifying critical points as potential leaks and understanding leak-free areas.
- **Precise localization of found leaks with size classification**, providing valuable information for decision-making regarding corrective actions and repairs, as well as defining network sections susceptible to leaks that should be prioritized for replacement.

CLIENT

Aigües del Prat

AIGÜES DEL PRAT, S.A. is a municipal company that was created in 1988 as an efficient public management tool to improve the quality of the water supply service in the municipality of El Prat de Llobregat.

It works under the guidelines and orientation of the General Meeting of Shareholders, formed by the plenary of the City Council itself, and the Board of Directors, made up of councilors and technicians appointed by the General Meeting.

The economic results of the company are audited by the City Council which, once a year, holds a General Shareholders' Meeting in order to know and, if necessary, approve the accounts and the management.

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