

Gruppo CAP

Intelligent water network management through advanced analytics and predictive asset planning

Gruppo CAP is the main public utility managing the water cycle in the metropolitan city of Milan and is recognized as a technological benchmark in Italy. The operator, which was founded in 1928, provides water supply, sewage and wastewater treatment services to Milan and other municipalities in the provinces of Monza, Brianza, Pavia, Varese and Como, serving more than two million residents in one of the country's most complex urban and industrial environments.

Every year, Gruppo CAP supplies approximately 235 hm³ of drinking water and treats around 387 hm³ of wastewater, managing over 6,500 km of water and sewer networks, along with 40 treatment plants, pumping stations, reservoirs and advanced monitoring systems. The utility committed to an ambitious €200M investment program from 2022 to 2025, supported by the European Investment Bank and NextGenerationEU funds, with a clear focus on loss reduction, network renewal and digitalization, consolidating its position as one of Italy's leading green utilities.

Challenges

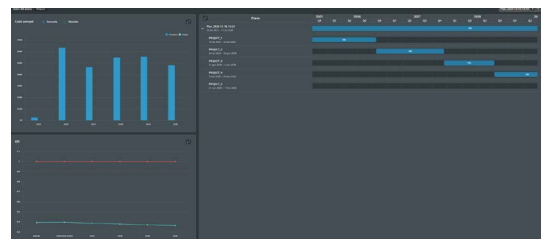
Gruppo CAP's modernization strategy had to address the challenge of significantly improving the performance of its water supply network, reducing losses and prioritizing asset renewal across an extensive, heterogeneous and aging system, as well as meeting the regulatory requirements imposed by ARERA, Italy's national regulatory authority for energy, networks, and the environment. The scale of the network made it essential to deploy tools capable of anticipating failures, minimizing service disruptions and optimizing investment allocation.

In this context, the company needed to replace its current DSS WMS, which was based on an obsolete platform, with an Intelligent Decision Support System (IDSS), capable of integrating large volumes of internal and external data, applying predictive models based on artificial intelligence, and providing the control center and technical teams with operational tools for proactive, risk-based management of the water supply network.



Program highlights:

- Centralization and standardization of asset information
- Optimized renewal plans based on predictive models and risk-based prioritization
- Reduction of breaks, water losses and service interruptions
- Increased regulatory compliance



Plan timeline and progress visualization

Solution

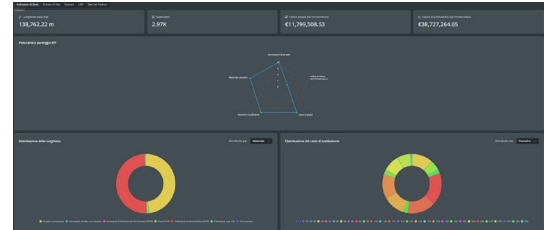
Gruppo CAP selected the [Xylem Vue platform](#) to address these challenges, implementing its Smart Water Engine (SWE) and its Pipe Planner application as the core of its new intelligent network management system. The solution covers the entire 6,500 km network, integrating GIS and ERP/CMMS data, historical failure records, and external information within a stable, scalable, cloud-based SaaS environment.

Xylem Vue's SWE acts as the system's data engine, incorporating Domain Master Data (DMD), IoT capabilities and a data science framework that enables the development, execution and maintenance of advanced analytical and predictive models. Building on this foundation, Pipe Planner provides advanced asset management and renewal planning features, including machine-learning-based Likelihood of Failure (LoF) models, GIS visualization, scenario simulation, budget planning and implementation monitoring. The solution is complemented by an Operational Intelligence layer (Power BI) for the generation of dynamic dashboards, KPIs and executive reporting.

Results

The solution's predictive models and risk-based prioritization features is helping the company optimize renewal plans, reduce breaks and make measurable progress in reducing water losses and service interruptions.

In addition, the platform is strengthening transparency, governance and accountability, facilitating regulatory compliance and monitoring PNRR objectives. The project's modular and scalable approach lays the foundations for continuous improvement, enabling the incorporation of new data, models and functionalities as Gruppo CAP's digital strategy moves forward.



Asset KPI dashboard



Asset lifecycle KPI

“Our aim is to shift from a reactive management style to a proactive approach, using tools that optimize investment decisions and improve efficiency, while leveraging our in-house technical expertise, which is essential for correctly interpreting data and guiding decisions.”



Francesca Mastromarino. Head of the Water Efficiency and Special Projects Department, Gruppo CAP