Lower energy consumption, lower costs and lower carbon footprint

AQUADVANCED® Water Supply Case Study with Metropolitana Milanese.

Metropolitana Milanese, known as MM, is the public water operator managing the water operations for the city of Milan. Considered one of the largest in Europe, it has a network of 2300 km delivering 680 MLD of drinking water to a population of over three million.

Client issue

As one of the most populated areas in Europe, Milan has a complex and complete water network system. As it is also one of the most developed cities in Italy, it is held to a standard and considered as a reference for water operations across Europe.

With its Roman heritage, the original infrastructure was built in the 15th century. Naturally the water system has continually evolved over that time, rising to each set of new challenges water quality standards, network improvements and extensions, additional assets, growing population and new compliance regulations.

For such a complex and historical water system, efficiency is key, from energy savings and resource optimisation to ensuring a smooth management of the operations. Focus includes lowering the rate of risks, reducing leaks and being able to forecast events that might affect the water production and distribution performance.

The MM water network consists of 28 pump stations pumping directly into one pressurised network. There is no storage available in the network. This is a highly unusual and difficult situation for a water operator. Most networks rely on reservoirs to create a few hours of buffer between the water treatment plants and the consumers. With no storage in the network, MM must provide water to Milan exactly at the time it is needed for consumption, requiring a sophisticated management of the network and a significant amount of energy for pumping. Water demand is managed by maintaining 17 critical pressure points within bounds.

In 2019 MM decided to source an energy management solution for their water distribution network. MM understood that digitalising the network and gaining advanced control and energy optimisation of the water network was a way for them to future proof the management of it network in their demanding operational context.

The first part of the project involved the installation of new power meters, flowmeters and pressure meters on all the pump stations supplying the water network. This allowed for improved accuracy in measurements at each station, rebuilding accurate pump curves and performing an audit on the current operational energy performance.

The next step required the implementation of an energy optimisation system in advisory mode, with operators manually implementing the pump changes as scheduled. The goal was that the solution would be moved to full real time control mode with direct control of the pumps in the network.

Solution implemented

MM decided to invest in AQUADVANCED® Water Supply (formerly AQUADVANCED® Energy) as a full monitoring, management and optimisation ecosystem that would help MM achieve their energy savings and efficiency targets.

The real time optimiser uses continuously collected data and calculates optimised pumping strategies that can be implemented automatically.

To do so, the system:
- Manages real time data acquisition, validation and computation
- Predicts water consumption demand
- Calculates optimised control strategies
- Confirms operation with a real time hydraulic model
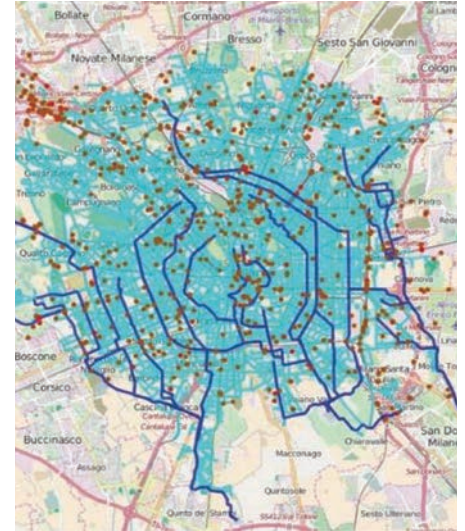- Sends commands and set points via SCADA to pumps and valves.

8%
reduction in energy consumption

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Results

Since its initial deployment in three distinct phases beginning in 2019, MM has been able to achieve energy savings right from the outset.

Energy intensity decreased 8%. The quantity of energy needed to produce and distribute each cubic meter of water reduced 8% to 0.3382 kWh/m^3.

This 8% represented a saving of:
• 6,400 MWh per year
• €410,000 per year.

In addition, this represents a saving of 2,600 t CO^2/year (at 400g/kWh).

The project achieved 8% saving in energy in 2020 compared with baseline, which was €410,000 in the first year. It is worth noting that there were sharp rises in energy prices due to the Covid pandemic and war in Ukraine (from €64 in 2020 to €120 in 2024). By installing AQUADVANCED® Energy, MM was well prepared for the future. Without implementing the tool, the utility company would have been facing an incremental charge of €768,000 per annum.

Differentiating factors

In general terms, this complete solution has helped other companies:

• Reduce their energy costs up to a 20%
• Decrease the energy use up to 10%
• Optimise and automate network operations consistently
• Predict water demand and improve water source planning
• Improve water quality operations, reservoir turnover and blending
• Friendly and intuitive interface
• Can be integrated to real time data sources (historian)
• Can function in advisory or control mode.

All in a single cloud based or on premise platform.

AQUADVANCED® Water Supply is a decision support tool that puts data at your service for decision making It optimises the scheduling of the water supply system from:

• Water sources
• Treatment
• Pumping
• Pipe network
• Reservoir and tank storage operation
• To supply water demand.

The future

The improvements should continue as MM implements complementary software to enhance the management of their networks.

MM has decided to enhance the automation and digitisation of their network to improve not only the energy cost delivered by the Water Supply option but also to reduce the time to locate, investigate and manage leaks in their extensive network implementing the AQUADVANCED® solutions.

About SUEZ

Faced with growing environmental challenges, for more than 160 years, SUEZ has been acting to deliver essential services that protect and improve the quality of life. SUEZ enables its customers to provide access to water and waste services, with resilient and innovative solutions.

With its 40,000 employees present in 40 countries, the Group also enables its customers to create value over the entire lifecycle of their assets and services, and to drive their ecological transition, together with their end-users.

In 2023, SUEZ produced drinking water for 57 million people worldwide and sanitation services for more than 36 million people. The Group generated 7.7 TWh of energy from waste and wastewater.

Managed by Sabrina Soussan, the Group generated revenues of 8.9 billion euros in 2023.

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> **We looked for a solution that could precisely give us support for the decisions we make hour after hour in our power plants and management. Less energy consumption translates into lower costs but is also advantageous from an environmental point of view as energy production equals CO₂ production.**
>
> — Metropolitana Milanese

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