SUCCESS STORY

INDUSTRIAL AQUEDUCT OF LAKE COMO

PcVue incorporates pump energy profile management to minimize costs.

The Como Industrial Aqueduct is a fully automated system which, via a network of approximately 60 km, reaches all its users spread across the Como area. Built in the 1980s by a consortium of industrialists in the area, it has been revamped in the last decade to overcome the obsolescence problems of the remote control system.

The pumping process (which takes water directly from Lake Como and sends it to the storage tanks is monitored by some operators in the control room during daylight hours on weekdays, while for most of the time it operates unattended, with an emergency system managed by an external supplier, always available in case of anomalies automatically detected by the supervisor.

The system, which stands out for its reliability, guarantees an uninterrupted and constantly monitored service to user companies.

The infrastructure, as well as from a technological point of view, has also been improved from an energy, eco-sustainability, management and ease of maintenance point of view.

A critical aspect that had to be addressed was the time available for replacing the infrastructure, as the system (totally automated) allows operation in manual mode only for short periods. Since it is a centralized system, its blocking would have resulted in the total shutdown of the infrastructure.

It was therefore necessary to plan well-coordinated interventions which, thanks to the intervention of multiple technicians working simultaneously on multiple sites of the distribution network, made it possible to reduce installation and execution time to a minimum.

The system has been carefully redesigned with a new structure, more open and modular than the previous one, which favors the use of easily maintainable technologies, protocols and standard hardware.

The communication infrastructure has been entirely replaced, abandoning proprietary data transmission protocols in favor of a new Ethernet network, capable of exploiting multiple protocols, guaranteeing communication between PLC (ABB products of the ACS500 series) and supervisor regardless by the control systems adopted by the chosen suppliers.

Communication between the various aqueduct systems was created thanks to a Long Range WiFi network, made up of multiple radio links, which allow communication between all sites with good bandwidth. To guarantee network security, a Firewall with the appropriate policies has been installed at each site, which filters traffic. In the event of failure of the radio links, with consequent loss of communication, this is made up for with 3G modems which ensure the essential communication for the continuous service of the system in back-up mode, until normal operation is restored and with reduced bandwidth.

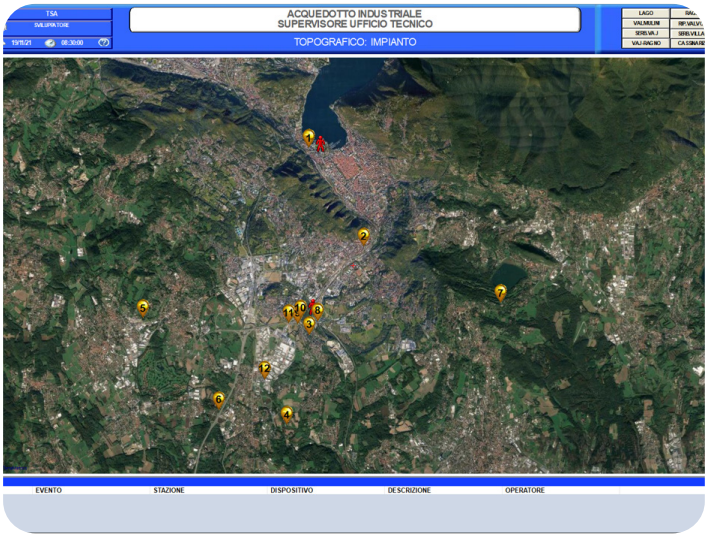
For the monitoring and management of the plant, a SCADA solution was chosen on the PcVue platform by ARC Informatique, in Client-Server mode. PcVue allows you to build user-friendly graphic interfaces with real-time animations and guarantees easy maintainability: thanks to its backward compatibility, in its ten years of service, the software has been constantly updated to the latest version available.

The system can be managed both by the server in the control room and by two “Thin Clients” connected via Remote Desktop (RDP) and positioned in the two main operational offices. With this architecture it is possible to update or modify all supervisors in a short time, since they are all present on the same physical machine. Furthermore, there is remote access software on the server, which allows technicians and maintenance workers to connect and control the system even without being in one of the aqueduct locations.

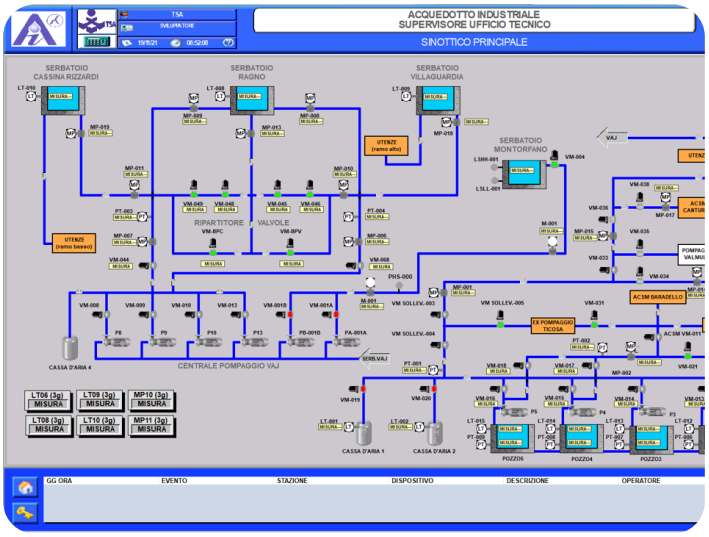
About a thousand alarm conditions are set in the system, divided into priority levels: from simple signals to serious faults that can compromise the entire functioning of the system. All alarm states are stored and tracked in the “Log” files. The occurrence of a critical alarm situation generates the sending of notifications via SMS and e-mail to maintenance workers and operators to guarantee the minimum intervention time.

The need for the Aqueduct is to monitor the actual consumption of water by each individual user on an hourly basis. For this purpose we chose to use sensors with LoRa communication protocol, which allow communication over long distances with low energy consumption. Each user has a flow meter, which counts the cubic meters withdrawn from the network.

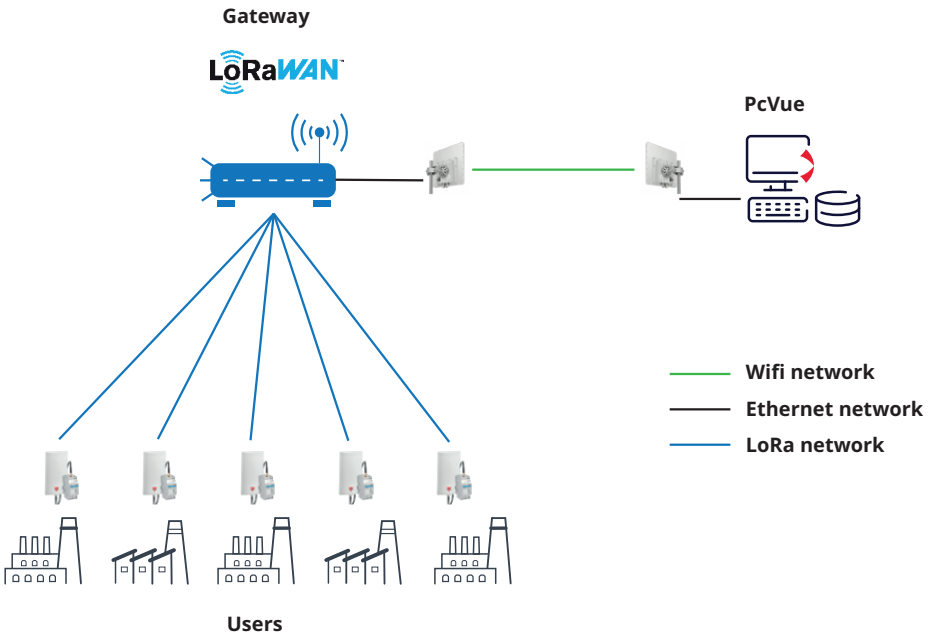
Every hour the LoRa sensor transmits the updated data to the receiver, which forwards it to PcVue, which makes it accessible via dedicated pages. Furthermore, the system is able to generate automatic reports (compiled in Excel, PDF or other formats) which are shared on the company network via a back-up on the server.



Plant topography



Main mimic



Architecture

KEYS TO SUCCESS

- System reliability
- Intuitive and easy-to-use graphical interface
- Reduced commissioning times

RESULTS

User friendly human-machine interface

It is possible to reach each device remotely, guaranteeing a first intervention to evaluate the event or carry out diagnoses on the functioning of the process

The monitoring system allows you to collect all the significant data of the system with continuous recordings of all physical quantities, pressures, levels, flow rates and meters

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