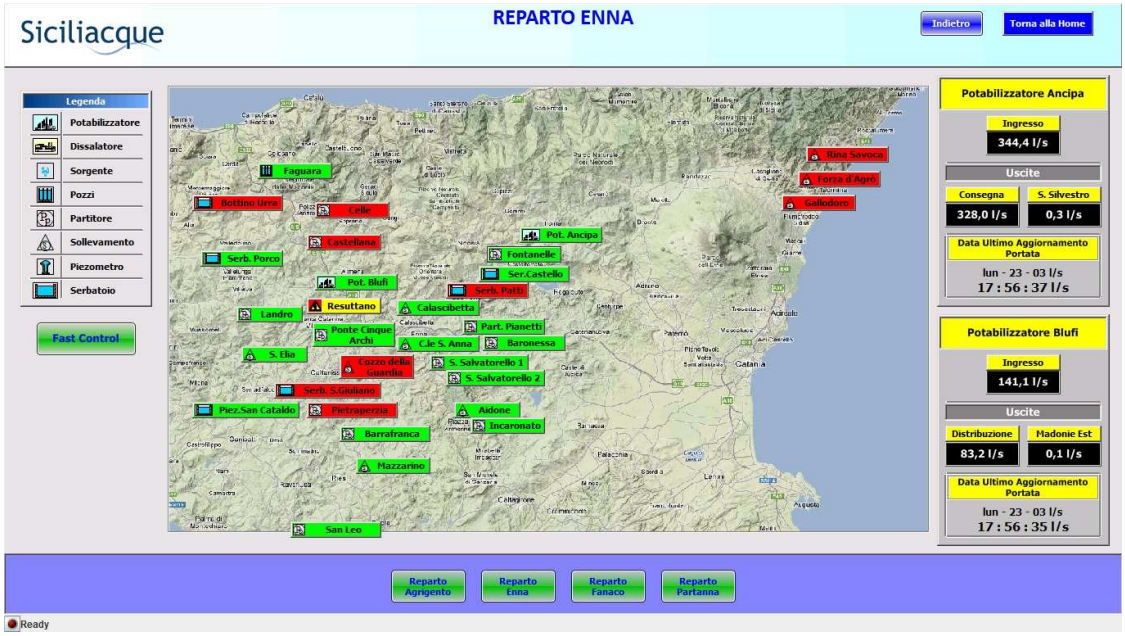
The Siciliaque remote control network.

Siciliacque's mission to unify and simplify their remote control system to support a network of several supervision systems installed in different parts of the plant has been realized. The solution they adopted is based on the Movicon SCADA.

Siciliacque is a joint enterprise which is classified as a "public company" operating in the potable water supply in the region of Sicily. The 75% of the company is jointly owned by leading industrial companies operating in the water services among which include Veolia. The remaining 25% has been taken over by the Sicilian Waterworks Corporation (EAS) as concessionaires with a forty year contract starting from July 2004 until the end of 2044 to manage the water catchment, accumulation, treatment, potability and adduction on a grand scale. This grand scale means that they manage dams and water purification systems that transfer the collected and drinkable water to big tanks in many towns by means of using a water supply network. Upon reaching these towns the potable water is then managed by

local water supply companies. It is estimated that Sicliacque supplies around 90 million cubic meters of drinking water a year to the provinces of Trapani, Agrigento, Caltanissetta and Enna and parts of Palermo and Messina.



1. Geographic screen page showing the remote controlled stations situated in different areas throughout Sicily.

Siciliacque manages a 1,743 km water supply network built of 13 interconnected domestic water supply systems: Alcantara, Ancipa, Blufi, Casale, Dissalata Gela – Aragona, Dissalata Nubia, Fanaco – Madonie Ovest, Favara di Burgio, Garcia, Madonie Est
Montescuro Est, Montescuro Ovest, and Vittoria – Gela.

This network consists of 7 artificial reservoirs:

- Ancipa (managed by Enel Green Power)
- Disueri (managed by the Consortium of Reclamation 5 - Gela)
- Fanaco (managed by Siciliacque)
- Garcia (managed by the Consortium of Reclamation 5 - Agrigento)
- Leone (managed by Siciliacque)
- Raja Prizzi (managed by Enel Green Power)
- Ragoleto (managed by the Gela Raffineries)

In addition, it is also powered by 7 well fields, 11 spring groups, and until a few years ago 3 sea water desalination plants: Gela (managed by the Gela Raffineries), Porto Empedocle, Trapani (managed by Siciliacque).

Siciliacque also runs 6 big purification plant systems:

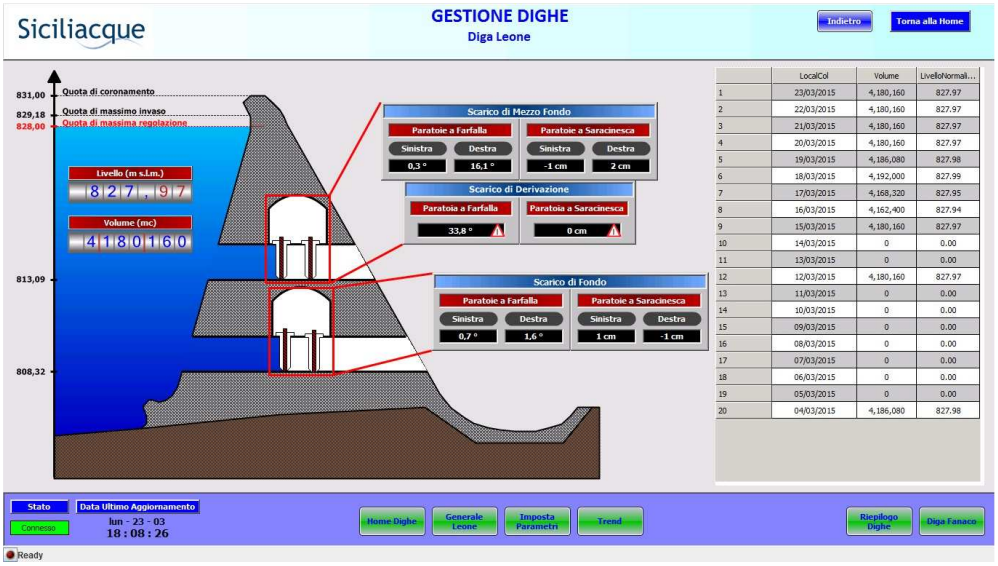
- Blufi (Imera meridionale river)
- Troina (Ancipa basin)
- Piano Amata (Fanaco, Leone and Raja Prizzi basins)
- Sambuca (Garcia basin)
- Quota 905 (Imera river)
- Gela (Ragoleto and Disueri basins).

All these plant systems contribute to moving the water flow of 66 different pumping stations.

System description

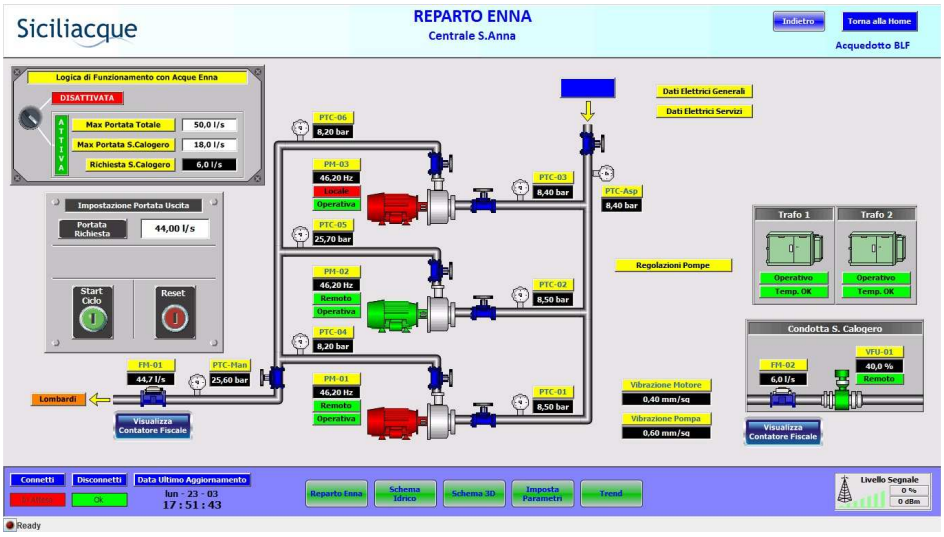
Before the remote control SCADA system was installed the primary nodes corresponding to each individual water supply network component and water purifier, had their own SCADA system. These systems were developed gradually by different SCADA system Integrators and only conveyed information to those managing that station and not to the others in the network. In order to support control operations and management activities by means of unifying the various systems, the Siciliacque remote control manager, Michele Meli Eng. assigned Bit Control (Movicon Solution Providers) to design an energy consumption dashboard for each station and one representing an overall summary with KPIs for energy consumption and efficiency. These

dashboards include data on energy production costs (KWh/m3), real times of pumps operating in groups or in parallel along with their respective efficiency calculations.

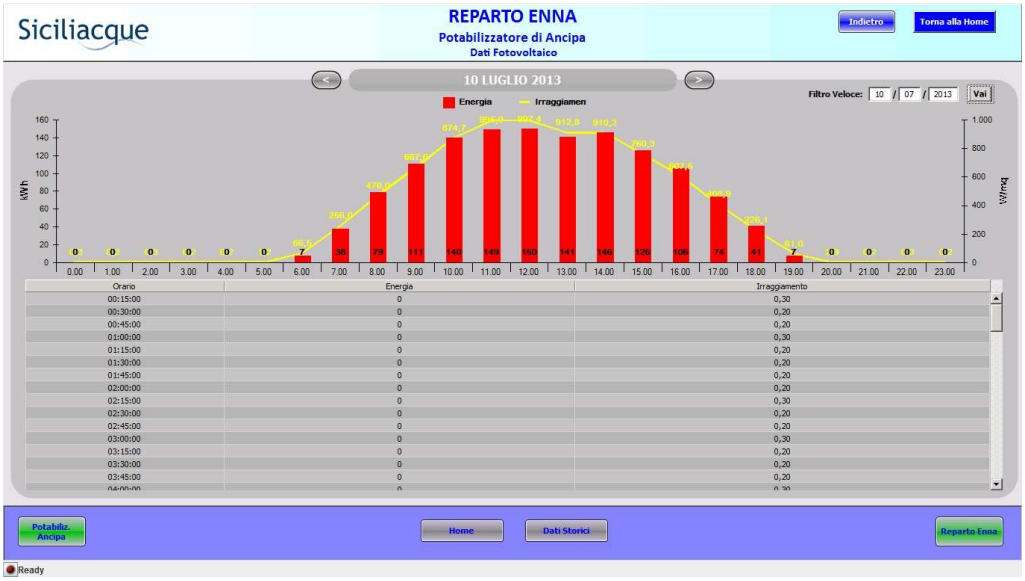


2. Sinottico di Movicon relativo alla Diga Leone, gestita da Siciliacque

In order to achieve this remote control system, Siciliacque divided the remote controlled stations with the various systems, located throughout Sicily, into four sections based on their geographical locations and waterworks systems. Each section manager has been enabled to control and automatically enable logic to operate their assigned water supply network. The system has been designed to collect data from all the different types and makes of field devices that can be accessed by operators to manage each station and water supply network zone properly. Based on the information collected from the primary nodes, operators can perform specific operations for their assigned areas accordingly.
In addition, an alarm system has been implemented to manage anomaly and emergencies that are alerted to staff by email and SMS according to alarm priority using the supervisor's inbuilt Alarm Dispatcher.
In order to realize a supervision system of this scale, Siciliaque carried out a market research and found Progea's Movicon 11 SCADA to be the most appropriate. They then commissioned Bit Control Srl, experienced Movicon solution providers, to install and develop the supervision system at their Siciliacque headquarters in Palermo. The system was developed according to their requirements to visualize and remote control the water supply systems, pumping stations, tanks and diversion chambers. By using the Movicon Web Client technology, all enabled system operators can access and control data of the various stations over the web using their user authentication with the privileges and restrictions assigned to them. Bit Control have completely reached the goal set by their clients, Siciliacque, to establish one unique remote control SCADA system to collect data from the various nodes.



3. Movicon screen showing the BLF acqueduct - Enna section



4. Photovoltaic data of the Ancipa water purification system. Energy and irridation data recording.

This application has also provided enormous advantages on the managerial side which deals with quality and data collection; thanks to the datalogger system, data from all the system nodes can now be recorded in a SQL Server database and made available to perform various types of system analysis as well. The analysis includes various types of algorithms that have been created to calculate energy efficiency of the stations and calculations of water throughout the water supply network.

The remote control system

Today, the remote control system consists of 70 various types of devices for controlling the stations and tanks and 5 water purifiers. Data is collected from the local systems and transmitted to the main server in Palermo using private VPN. Communication between the RTUs, water purifiers and the Movicon SCADA, which is installed in the Palermo headquarters, is established using GPRS, radio and ADSL systems. The current situation today sees the use of a Movicon 11.4 server as a one only centralized supervision system. This is the end result of the gradual unification and standardization process involving the substitution and running alongside the different supervision products installed in various points of the water supply system using Movicon. Although different SCADA systems have been installed in some of the water supply systems, they are all collected and redundant on the Movicon system which is installed in the Palermo headquarters. This application has been designed to run on a Windows 2003 server. The choice of using a SCADA to enable system control unification was determined by various requirements that included:

- Safe remote accessing
- Centralized storage of all system information
- Accessibility from all points of the private VPN network without needing to install licences on PCs.

The integration flexibility ensured by Movicon consents the autonomous management of diverse communication networks and protocols, such as Modbus, DF1 and Profibus. Furthermore operators working on shift or call duty can now access the system remotely using the Movicon Web Client technology thus relieving the need of operators to be physically present to man workstations in the headquarters continuously. Call duty personnel have been provided with smartphones or tablets equipped with the Movicon Web Client app to connect to the various systems using remote control. This enables them to get continuous updates and solve problems if emergencies should occur in the shortest time possible while on the move.

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