urbana
SMART SOLUTIONS

Urbana Agriculture IoT Suite

Plant automation project of

irrigation and meteorological analysis

TREVISO, ITALY

Irrigation automation and meteorological analysis

Customer	Site
Tenute Tomasella	Treviso, Italy

Solution

The aim of the project is to implement a highly technological solution to simplify the management and automation of the irrigation system within a wine estate. The system is made up of two main components: field data collection and the implementation mechanisms of the irrigation system.
The field component of the system involves the use of soil analysis sensors able to accurately detect temperature and humidity values up to six levels of depth and transmitting the signal through the Urban LoRaWAN network to the management cloud platform. The devices are autonomous and equipped with a battery with an estimated duration of +5 years.

Together with these sensors, weather stations are installed that can detect environmental data such as wind speed and direction, humidity and atmospheric pressure, rainfall level, solar radiation intensity, dew point and air quality. These devices are equipped with autonomous battery power, recharged by a photovoltaic panel, and transmit all the data detected to the Urbana IoT platform.

The control and actuation component, on the other hand, consists of a series of actuators for bi-stable solenoid valves. These devices can receive instant commands and schedules from the IoT platform via the LoRaWAN network and periodically send their status to the cloud for control purposes. They are battery powered and the transmission configuration chosen provides for a duration of at least 8 years.

Thanks to this configuration it is therefore possible to create the following services:

- Analysis of soil parameters such as temperature and humidity at six depth levels to identify how the roots of the vines are irrigated and detect areas with different water concentrations.
- Analysis of the water consumption of the main meters
- Analyze the meteorological parameters (pressure, dew point, temperature, humidity, wind direction and speed, rain, and solar radiation) to make decisions on the operations to be done in the vineyard or to automate the irrigation system.
- Overall management of the irrigation system (pumps and valves) to correctly irrigate only where necessary to optimize irrigation, reduce water waste and reduce manual operations.

Automation of irrigation depends on various factors. Based on the temperature or humidity of the soil, using the automation functions of the platform, the system can automatically open the water valves to allow proper irrigation only when necessary.

Challenges

- Automation of the irrigation system (pumps and valves) so that you can irrigate correctly only when necessary.
- Use a single LoRaWAN gateway to control an area of about 50 hectares of surface.
- Configure the parameters of battery-powered devices to optimize duration and provide adequate performance.
- Prepare a cloud system for the subsequent integration of cellar process controls (filtering, storage, production, etc.).