



Case study

SOLAR-POWERED IRRIGATION FOR CITRUS TREES IN MOROCCO

Under the Moroccan sun, irrigation is needed during most of the year to safeguard any harvest. However, irrigation is expensive – too expensive for many farmers. Vacon has helped a citrus farmer to water his citrus trees in a cost-efficient way and to put bread on the table for his family. Solar-powered pumps driven by VACON® 100 X AC drives provide an environmentally friendly, economical and robust solution.

In Morocco, rainfall fluctuates sharply from year to year, and especially summer months are hot. On a citrus tree farm located between Marrakech and Casablanca, the farmer had used a gas engine to power the irrigation system. Replacing the gas tank regularly with a new one required labor work, time and money, and was dangerous due to a high explosion risk. It was also necessary to supervise that the system is working properly. Moreover, irrigation was needed for 5–6 hours a day, and gas is not cheap in Morocco!

VACON 100 X runs exactly how you want in any environment

An efficient way to cut costs in irrigation is to use renewable energy and AC drive technology. Edil 9, an Italian system integrator in the construction business, visited Vacon's factory in Merano, where they were introduced to the VACON 100 X AC drive:

"We had heard positive news about other customers using the VACON 100 X in demanding application environments, and we were impressed by these references. That's why we thought that the VACON 100 X would be the right choice also for solar-powered irrigation systems, and we were right! Designed for tough environments, the VACON 100 X truly is very robust and is provided with the IP66/Type 4X outdoor enclosure with a die-cast metal frame. It can be installed outdoors without a problem! It also has highly advanced control capability which guarantees that processes run exactly how the end customer wants them to run in any environment or climatic condition," explains Paolo Mossali, Technician and Designer, Edil 9.

The VACON 100 X was selected for the solar-powered irrigation system for the citrus farm. "Cooperation with Vacon ran smoothly and Vacon engineers are very competent in explaining the functionality of the drive in the solar-powered application," Mr Mossali concludes.

A better harvest, clear savings and improved safety

The solar-powered water pump system is reliable and enables an increased harvest and cost savings. The new system requires less work and brings also many other benefits:

- **Cost-efficiency:** the new system requires only three hours to bring the necessary water to the trees. This is half the time the old system required.
- **Clear savings:** buying expensive gas tanks, storing and replacing them and supervising the system are no longer needed
- **Improved safety:** no gas explosion risks
- **Environmental friendliness:** the new system is powered by solar energy

The solar-powered irrigation system is able to pump water at a rate of 10 m³/h and includes the following components:

- 250 W Sunerg solar (PV) panels
- 21 panels/string, 2 strings, total of 10.5 kW without tracker
- 11 kW VACON 100 X AC drive
- 7.5 kW submersible pump (Caprari E6X) at a depth of 66 m to pump water from a well with a depth of 150 m (static level of 38 m and dynamic level of 44 m)

Solar-powered pumps are ideal for remote areas

Solar-powered applications are increasingly being employed in environments where electricity supplies are scarce or unreliable. They are used to power:

- water pumps, to provide clean water for drinking and cooking or for irrigation
- compressors, for refrigeration of food and dairy products
- other applications including fans, for ventilation and air conditioning

VACON AC drives are able to utilize the maximum available energy from the photovoltaic solar panels in all situations. The drives start to control the speed of the motors in the pumps, compressors or fans as soon as the sun starts to shine in the morning, and continue to do so until the sun sets in the evening.

“AC-drive-controlled solar pump systems are ideal for irrigation, especially in remote areas. Proper irrigation will increase harvests which will provide farmers with a better livelihood. VACON 100 X and VACON 20 X AC drives have dedicated functionality to drive the solar-powered pump with an optimized efficiency,” says Nicola Gomiero, Product Manager, Vacon Italy.



VACON 100 X installed outdoors to control solar-powered water pump system. VACON 100 X has dedicated functionality to drive the solar-powered pump with an optimized efficiency.



10.5 kW Sunerg solar (PV) panels installed on a roof top. Photovoltaic solar panels absorb sunlight and convert it into electricity which can be used to power electrical devices. Once installed, the system has very low maintenance costs and the solar power is basically available for free.