



Ensuring every farm gets
a fair share of water and
nothing at all gets wasted

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Case study

Turkish fields harness the
power of Hitachi Energy RTUs
to keep the water flowing

 **Hitachi Energy**

Somewhere in the Turkish countryside, a small white box sits at the side of the road, quietly waiting and watching. It seems isolated and alone. It could be easily missed, if it wasn't for the pole standing alongside it. That pole stands about six feet tall and is topped with solar panels, revealing that there's more to this than just a white box.

In the ground beneath the box is a valve and monitoring equipment capable of measuring the pressure and flow of water running hundreds of kilometers through a network of pipes, delivering irrigation to fields across the Korkuteli region of South East Turkey. The valve is controlled by equipment in the box—not in response to local weather conditions, or demand from downstream farmers, but by radio control from a MicroSCADA Pro installation, which combines weather reports with supply details to ensure every farm gets a fair share and nothing at all gets wasted.

The box is part of the “Rehabilitation of Korkuteli Irrigation Project,” a plan to replace open canals with enclosed, pressurized pipes, which can deliver more water (with less waste) and allow comprehensive monitoring to improve the control of delivery. This has been achieved through the use of Hitachi Energy RTUs, an installation of Hitachi Energy's MicroSCADA Pro, and a lot of white boxes.

Many of Turkey's lowland plains are very dry, while the upland regions boast lakes and a cooler climate, so irrigation has always been an important part of agriculture in the country. Korkuteli is typical; until the 1960s, the lowlands were home to sheep and goat herders, as the otherwise-fertile ground was too dry for growing crops, but with proper irrigation farmers are now growing fruits, grain and vegetable oils, thanks to a network of open canals that were installed in the 1970s.

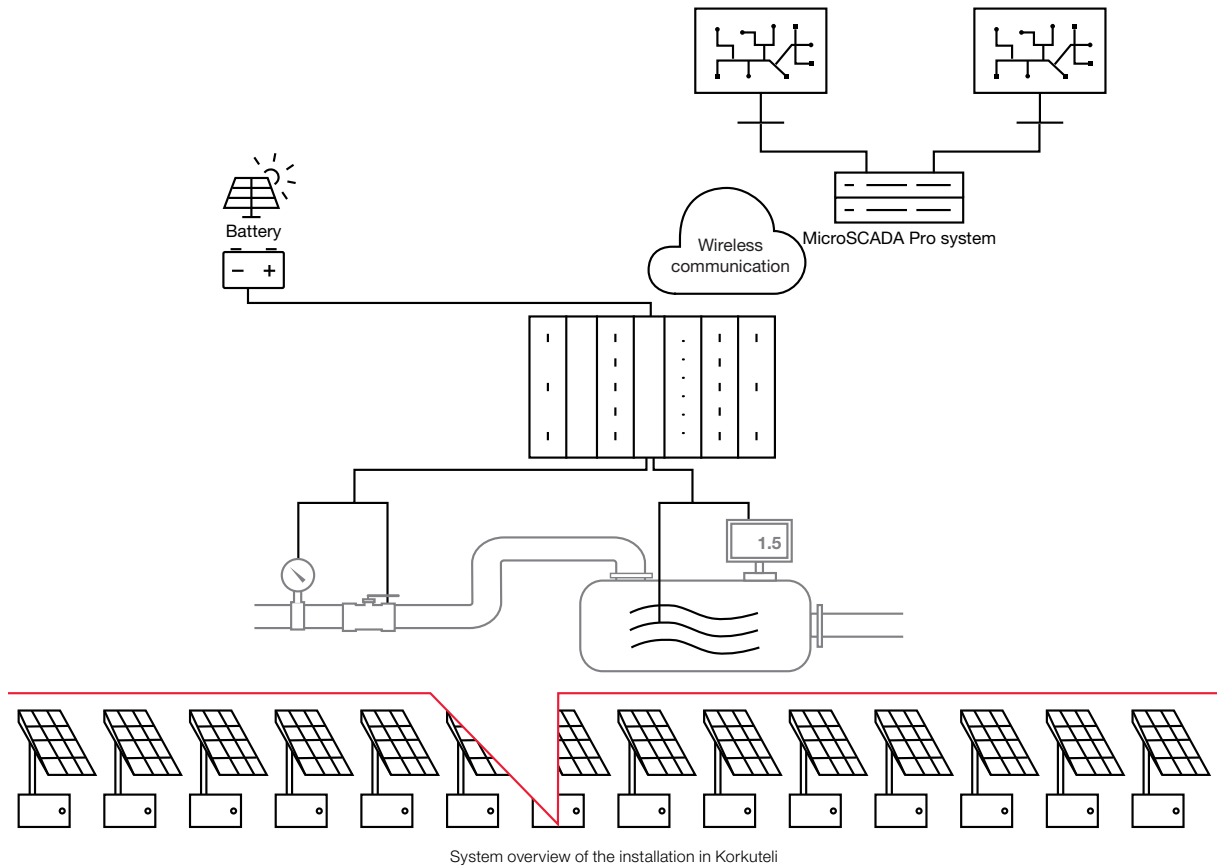
Those canals are getting old now, and suffer from leakage into the soil as well as evaporation, so the General Directorate of State Hydraulic works (known as the DSI) decided to rebuild the network. The DSI knows something about irrigation, as it's responsible for providing water to more than half of the arable land in Turkey.

In Korkuteli, it was decided that a pressurized pipe would be more efficient and that regional control should be centralized to permit efficient monitoring and delivery. That means laying more than 200 kilometers of pipe: 25 kilometers as a main supply and another 180 kilometers of secondary pipes running to the fields. This distribution network needs 700 hydrant control points—our white boxes—each of which can monitor the state of the network and control the flow of water into branch pipes to ensure everyone is getting a fair share.

The project was handed to YEO, a Turkish company providing automation solutions across utilities, and with experience in all aspects of water delivery and management. YEO is a Hitachi Energy Authorized value provider, gaining from access to Hitachi Energy support in terms of training and sales assistance, but even with that relationship, our RTUs had to demonstrate their ability to meet the challenge.

The 700 control points in the network require 700 RTUs to control them. Adding in 40 control points for the main transmission line, the project combines a total of 740 RTUs. That's more RTUs than have ever been connected to a single MicroSCADA Pro installation before but, fortunately, Hitachi Energy software is every bit as robust and powerful as our hardware.





The RTU520 was selected for the white boxes, connected to a magnetic flowmeter (which measures the water flow by a process of induction), pressure meters (to monitor for leaks or blockage), and humidity sensors (providing local weather conditions, and leak alarms) the RTU520 can collate the flowing data and report it back to the MicroSCADA Pro controller.

The data is sent back over a proprietary RF network, but every box is also fitted with a GPRS (General Packet Radio System) modem connected to the cellular network from Turkcell, should the proprietary system fail for any reason. This kind of redundancy is vital when the commodity being controlled is of such importance, and is well supported by Hitachi Energy systems.

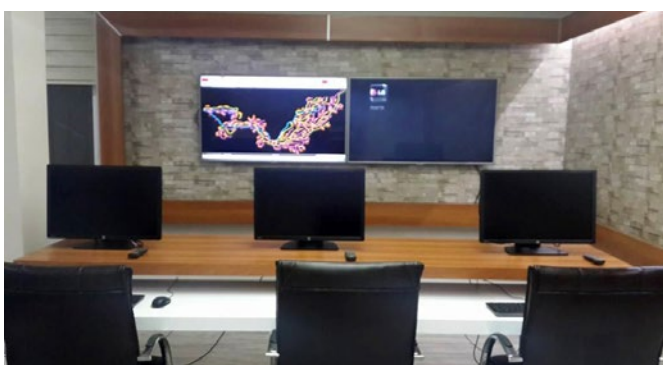
The data is gathered into the MicroSCADA Pro system, from where each valve can be managed to permit measured quantities of water into each branch pipe, but it's not just network information which feeds into the SCADA system. Metrological sensors around the region also report in, providing a real-time view of the weather.

Changing weather not only impacts the amount of water immediately available, but predictions allow the husbanding of resources against possible shortfall in the future – if it's not going to rain tomorrow then water needs to be conserved today.

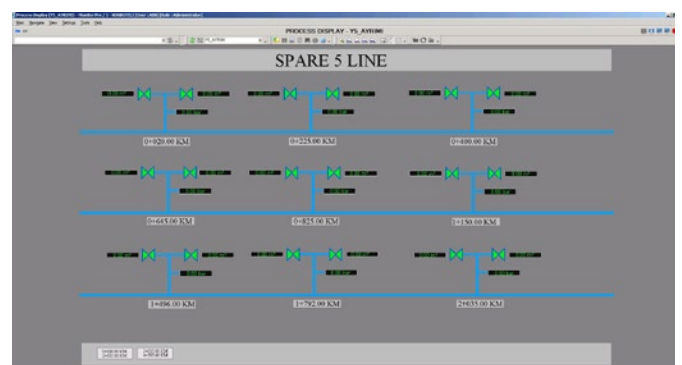
The network provides irrigation across 6,000 hectares of farm land, and the weather within that region can vary widely, so by knowing what is happening, and working out what's going to happen, the available water can be fairly divided up.

The RTUs can also alert the MicroSCADA Pro system when anything goes wrong – immediately alerting the controllers if a pipe is leaking or blocked, and allowing remedial work to be quickly undertaken. Locating network problems, and getting them fixed, is common to all utility networks and the RTUs from Hitachi Energy excel at such functionality.

The white box at the side of the road might not look like much, but underneath it rushes the water the plains need to blossom, and inside the box is the Hitachi Energy technology making it happen.



The control room with MicroSCADA Pro display



MicroSCADA Pro system line overview display

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