

SUCCESS STORY

# AC500 PLC & Renewable Energy Generation

## How ABB Supports the Geothermal Industry



Promoting sustainability is at the core of ABB's philosophy. With its broad automation portfolio, ABB has positioned itself as a reliable partner for the most diverse industries, among them renewable energy. Find out how ABB supports geothermal power generation in Turkey.

01 Türkerler GPP  
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### The Customer

Türkerler Holding comprises 137 companies that specialize in real estate development, renewable energy, electricity distribution, natural gas distribution and trading, textiles, and PPP projects. It started its operations in Ankara almost 50 years ago and employs over 22,000 people, with a total investment volume of ongoing projects amounting to 6 billion USD. Türkerler's vision is to become Turkey's largest investor in renewable energy, targeting to reach 1.7 GW in wind, 400 MW in geothermal and 130 MW in hydro energy. In geothermal energy, Türkerler has 80 MW (3 power plants) installed capacity and is planning to invest in an additional 320 MW to harness its 140 km<sup>2</sup> concession area.

### The Application

Alasehir-Manisa is Türkerler Holding's third GPP and has a generation capacity of 30 MW. Below the earth's surface, brine flows at high temperature and pressure. With five production and five reinjection wells, energy production is based on binary ORC (Organic-Rankine-Cycle) technology with which brine from the production wells flows to a collector close to the central power plant. With a heat exchanger, heat is extracted in a closed loop by vaporizing the fluid at low temperature. This produces steam which drives a turbine, and a downstream generator produces electricity while residual water is fed back into the earth via reinjection wells. This way, natural geothermal heat can be

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## The Customer's Voice

“ABB has provided a tailor-made solution that enables us to control our geothermal wells both locally and remotely. One of our key requirements was to guarantee availability at all times and ABB has proved to be the best technology partner for us.”

### The ABB Technology

ABB provided a hot-redundancy [AC 800xA](#) with S800 I/Os for the application with the purpose of controlling and monitoring the balance of plant (BOP). As the wellheads are at approximately 1.2 km from the central power plant, a Distributed Control System (DCS) setup was necessary. In this context, [AC 500 CPUs](#) and [S500 hot-swap I/Os](#) are used to control the local wellheads. The S500 hot-swap I/Os are connected to differential transmitters to monitor brine pressure and temperature, and to valves to regulate the brine flow.

In between the central power plant and the local wellheads there is agricultural land, and this made local well control a principal requirement: Fibre-optic cables connect the central power plant and the local wellheads but the cables are at high risk of damage due to the farming activity. This makes interruptions in energy generation likely and it might even cause a wellhead overflow which would severely damage the soil. As a solution, an AC 500 was employed to create a closed loop. Thanks to the AC 500, the wellheads will still be working properly, even if the fiber optic cable is damaged and the connection to the DCS is lost. In addition, the AC 500 is used for feed-forward control: The AC 800xA acts as a master PID controller in the central power plant at the heat exchanger and the local AC 500s act as PID controllers at the wellheads. If there is a change in temperature or pressure of the brine underground, the outlet flow has to be regulated accordingly. This regulation reduces oscillation and, with this, maximizes efficiency. Operation of the control devices is facilitated via [800xA HMI](#) (at central power plant) and [CP600-eCo](#) (at wellheads) control panels.

Want to know more? Please contact ABB Automation Products GmbH.