

Case study

Combined cycle thermal power plant
Italy

Project Summary

Project: Combined Cycle Thermal Power Plant

Location: Italy

Application: A medium voltage electrical system

Nidec's Role

Nidec Industrial Solutions provided the fast-track design, supply and start-up of a medium voltage (MV) system to improve the energy efficiency of a combined cycle thermal power plant.



Scope of Supply

1 Inverter SVTH (air-cooled)

1 Metal Clad Switchgear with two MV contactors to feed pumps

Cables, cable ways, installation materials

1 PLC Board and related software to manage the system and interface with existing power station electrical equipment and distributed control system

The challenge:

To deliver a new MV system to improve power plant efficiency on a fast-track schedule

A 1030 MW power plant in Italy consists of three combined-cycle units: two 390 MW natural gas-fired units and one 250 MW unit that can be fed by either syngas or natural gas. The power station's combined cycle boiler is fed by two water pumps that can be operated individually or in parallel. Because the pump motors were directly connected online by two MV feeder switches, they operated continuously at maximum speed and RPM.

This process design hurt the plant's energy efficiency and placed undue electrical stress on its motors and mechanical stress on its valves. The owner sought to address both issues in an efficiency improvement project to be completed during a brief plant outage.

The solution:**Installing Nidec Industrial Solutions' inverter following off-site system simulation**

Because many older power stations face efficiency and wear-and-tear issues similar to those at this plant, Nidec Industrial Solutions sought to develop a solution that could be scaled up or down for a variety of similar applications.

The modular solution Nidec developed replaces the original system with an MV system capable of starting and regulating a power station's motors. The solution allows the owner to synchronize the two pumps at the power station – whether they are fed directly on line or in variable speed configuration by the inverter – in a variety of configurations. The result: smooth, “bump-less” transitions. The system's flexibility increases power production efficiency, while also reducing equipment stress.

The inverter installation was completed during a brief shutdown that had been previously scheduled for plant maintenance. Due to the project's short window for completion, Nidec performed a simulation of the entire system in its test facilities prior to installation. That involved coordinating integration activities with the power station's operations staff, MV switchboard supplier and DCS supplier. The simulation helped to ensure that the MV system would integrate seamlessly when it was installed at the power station.

Final commissioning was completed on schedule. The scalable design of this modular power solution makes it possible to be adapted quickly for similar projects.