

## Case study

Combined cycle thermal power plant renovations  
Multiple locations throughout Italy

### Project Summary

**Project:** Combined Cycle Thermal Power Plants  
**Location:** Multiple locations in Italy  
**Application:** Container-based medium voltage electrical systems

### Nidec's Role

Nidec Industrial Solutions provided the fast-track design, supply and start-up of modular, container-based medium voltage (MV) systems to improve the energy efficiency of combined-cycle thermal power plants located throughout Italy.



### 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
1 7000mm X 3000mm X 3660 mm container with auxiliary internal power distribution, lighting, air conditioning, fire protection sensors and dedicated alarm system

### The challenge:

**To deliver new container-based MV systems that can be installed quickly on constrained power plant sites**

An Italian power company that operates multiple combined-cycle thermal power plants has historically used water pumps, operating individually or in parallel, to feed their combined-cycle boilers. The pump motors, which are directly connected online by MV feeder switches, operate continuously – and unnecessarily – at maximum speed and RPM.

This process design negatively impacts the plants' energy efficiency and places undue stress on their motors and valves. To improve efficiency and extend service life, the power company sought a MV replacement system for each of these plants. In each case, the challenge was to find a solution that could be completed during a brief plant outage and could be installed on a tightly constrained site.



**The solution:**

**Nidec Industrial Solutions' container-based MV system**

Drawing on a modular solution it originally developed for the power company, Nidec Industrial Solutions improved energy efficiency at the various power stations in Italy.

The solution Nidec developed replaces each of the original systems with a more efficient MV system capable of starting and regulating the power station's motors. It includes one inverter that allows the owner to synchronize the operation of two power station's pumps – whether they are fed directly on line or in variable speed configuration by the inverter -- in a variety of configurations with smooth, "bump-less" transitions. The flexibility in the system increases power production efficiency, while also reducing equipment stress.

So that it could be installed and connected during an outage of just 10 to 12 days, the entire solution is housed inside a compact container customized to fit on the power station's space-constrained footprint. The "plug-and-play" modular solution requires no on-site civil construction work prior to installation and is equipped with redundant air conditioning and fire protection systems that are connected to the main plant systems.

With movable panels inside and out, Nidec designed the modular system so that system components can be easily accessed for maintenance. The solution's design also makes it possible for cables to enter and exit the container to meet individual power station needs. Because of its compact configuration and weight, the complete container can be transported to a power station site without any dedicated special road permits.

Due to the short project window, Nidec performed simulation of each system at its test facilities prior to installation. That includes coordinating integration activities with the power company's operations staff, MV switchboard supplier and DCS supplier. The goal: to ensure the MV system integrates seamlessly once it was installed and connected.

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