

## Case study

Hydroelectric Power Station  
Monfalcone, Italy

### Project Summary

**Project:** Edipower Hydroelectric Power Station

**Location:** Monfalcone, Italy

**Client:** Edipower SpA

**Application:** Revamped electrical system

**Annual energy output:** 575 MWh

### Nidec's Role

Nidec Industrial Solutions was responsible for the complete revamping of the 575 MWh hydroelectric power station.



### Scope of Supply

2 300-kW (180-235 rpm) permanent magnet generators

LV drives cabinet

### The challenge:

**To reactivate and improve the energy efficiency of a small hydroelectric plant**

A 575 MWh hydroelectric power station located at the end of a canal in Monfalcone, Italy had originally been built in the 1930s to supply electricity to a hospital located along the canal. The power station later fell into disuse when a new, more modern power station came online.

Renewed interest in renewable energy led Edipower, the power station's owner, to revamp and reactivate the plant. The energy generated by this power station – like that at hundreds of other similar hydroelectric power stations located along rivers and canals throughout Europe – is considered to be “greener” than wind and solar sources. However, the original generators at many of these power stations – including this one – are inefficient and obsolete.

In this case, the generators were designed for a steady or constant flow. But flow on this canal varies, depending on the season and the rainfall coming from the mountains above, which impacted the plant's energy efficiency during low flows. In some cases, the power station used more energy than it produced.



**The solution:**  
**Installing Nidec Industrial Solutions permanent magnet generators**

To optimize power generation, Nidec Industrial Solutions replaced the original generators with two 300 kW permanent magnet generators connected to Kaplan turbines and controlled by specially configured LV inverters. The permanent magnet generators make it possible to vary the speed of the generator to match water flow, making it possible to produce energy efficiently over a wide range of flows, including low flows. By connecting the generators to the inverter, Edipower is able to transport the energy to the grid.

Revamped power systems like this are giving new life to hydroelectric plants on canals and rivers throughout Europe. They are especially effective on power stations that seek to optimize energy production when there is wide variation in head and flow.