



## Performance and discretion: a successful plant modernization at the heart of the French Alps

FRÉDET-BERGÈS PLANT - VILLARD-BONNOT, FRANCE

### NIDEC POWER PARTICIPATES IN THE FRÉDET-BERGÈS HYDRO PLANT NEW DEVELOPMENT FOR GEG - GAZ ÉLECTRICITÉ DE GRENOBLE.

Located in south-eastern France, the Rhône-Alpes region is a favorable area for hydroelectric power development thanks to the Alps mountains and the presence of many rivers. The strong industrial development of the 20th century led to the creation of over 465 operating sites in the region, many of which are micro plants. 10 of these plants belong to GEG (Gaz Electricité de Grenoble), which is the sixth largest French electricity distributor with a global capacity of approximately 24 MW and a production of 90 GWh/year.

In 2009, GEG and the Villard-Bonnot City Electric Authority joined forces in the Société Hydroélectrique Frédet-Bergès (SHFB) to start a project to replace three production plants in Brignoud and Bas-Laval (Loury). These installations were erected there over a century ago by local hydroelectricity pioneers, Mr Frédet and Mr Bergès. Located on the Laval stream providing a 336 meters drop height and a flow of 1 m<sup>3</sup>/s, the new Frédet-

Bergès hydro plant was expected to provide a power of 3.6 MW, against 1.6 MW for the three legacy plants combined. Annual production was also targeted to rise from 8.500 MWh to 13.500 MWh, to meet the electricity needs of 2650 households.

#### THE PROJECT WAS SUBJECT TO SEVERAL CONSTRAINTS

- Electrical performances had to be optimized
- The target lifespan of the new equipment had to match with the legacy installation
- The noise level of the plant was to be reduced as the installation was in an inhabited area

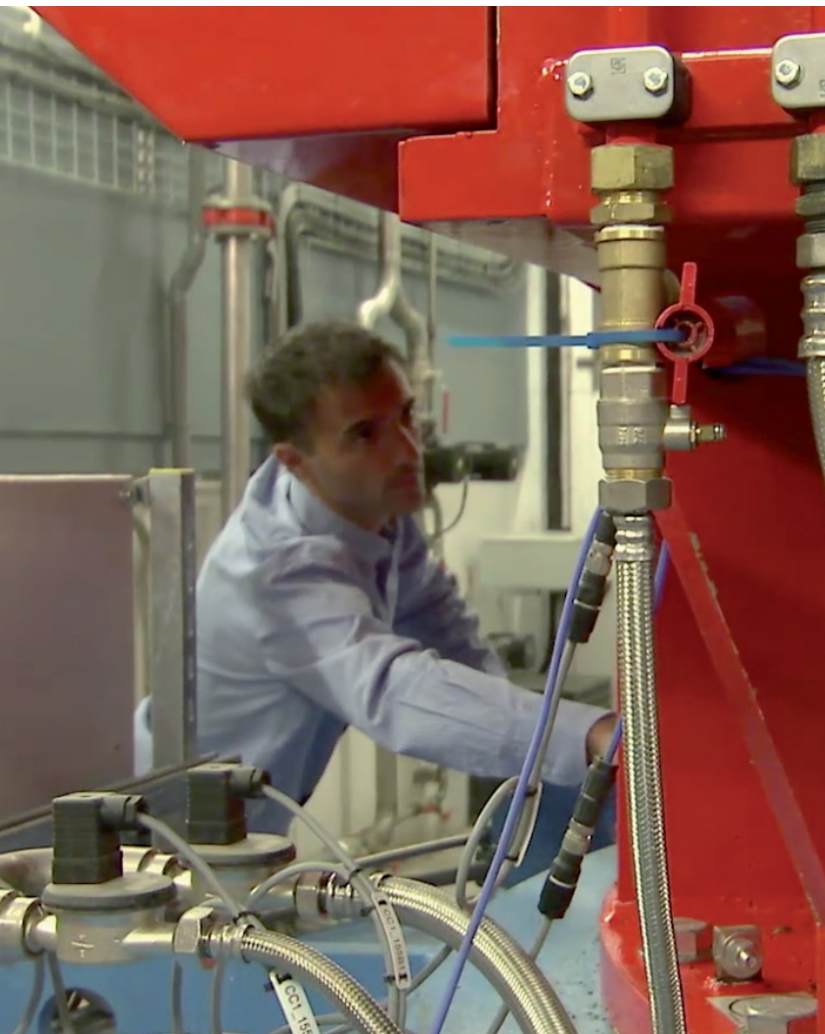
To address these challenges, Nidec Power recommended a closed circuit water cooling system with a dual tube air/water exchanger to equip the alternator.

This configuration helps reducing the noise level of the installation, and allows for a significant optimization of the alternator output, with a maximum power of 4.5 MW at 750 rpm.

For this project, Nidec Power worked in collaboration with Desgranges for the turbine and EREMA for the command control. Operating as true partners - based on previous successful collaborations - these three stakeholders have

been able to offer a global solution in response to the tender, optimizing all components of the power generation system.

Finally, in response to expectations about the longevity and sustainability of the installation, Nidec Power was picked due to its reputation as a designer and manufacturer of alternators.



## KEY FACT

- Substantial noise reduction
- Optimal plant performance
- Long planned lifespan

## TECHNICAL INFORMATION

- **Product:** Leroy-Somer™ LSA 56 UL90  
8 poles alternator, sleeve bearings,  
vertical mounting
- **Cooling:** air/water (IC81W - IEC 60034-6)
- **Insulation / temperature rise class:** H / B
- **Rated output:** 3,492 kWe
- **Operating speed:** 750 rpm
- **Efficiency:** 96.7 % at full load - 0.9 cos  $\phi$
- **Excitation:** brushless auto-excited,  
AREP + PMI
- **Regulation:** digital automatic voltage and  
cos  $\phi$  D610 regulator featuring ModBus  
Ethernet communication
- **Weight:** 17,500 kg

