The turbochargers belonging to power producer Empresa de Electricidade dos Açores (EDA) had reached the point where a major overhaul was necessary. However, EDA decided to upgrade their turbochargers instead. The reasoning behind this decision was to significantly reduce fuel consumption in order to improve the economic feasibility at the plant.

– I’m pleased to say that the upgrade was a success, thanks to a strong commitment from all parties involved. We achieved a 2% reduction in fuel consumption, says Alberto Cláudio Teixeira Borges, Director of the Caldeirão Thermoelectric Plant.

Empresa de Electricidade dos Açores, EDA, was founded in 1980 and the group is responsible for the public service of energy supply within the autonomous region of the Azores.

The Caldeirão Thermoelectric Plant, powered by eight engines (including four Wärtsilä 18V46 engines), is the main power plant on the island of São Miguel and responsible for 45% of the electricity produced. The rest is supplied by geothermal, wind and hydroelectric energy production.

– The renewable energy sources form the base and the rest is ensured by the Caldeirão Thermoelectric Plant, which controls the quality of the electric energy, says Alberto Borges.

Wärtsilä’s performance upgrade package is based on its modern state-of-the-art TPL77-C turbocharger, which has a higher efficiency and higher pressure ratio capability than previous models. This is a simple robust design with a low part count based on a cartridge principle. An upgrade to the latest compressor design is a much more profitable investment than conducting an extensive overhaul on an existing turbocharger.
Approximately 90% of EDA’s total operational costs at the Caldeirão Thermoelectric Plant are fuel costs. Furthermore, the turbocharger cartridges at the plant had reached the end of their life-cycle (50,000 hours) making it necessary to replace the rotating components.

Wärtsilä upgraded eight TPL77 turbochargers, from the A30 to the bigger A32 size, incorporating the latest compressor wheel technology.

– Considering that the upgrade would guarantee a significant 2% reduction in specific fuel consumption without having any substantial impact on emissions, the decision was easy to make, says Alberto Borges.

PROFESSIONAL INSTALLATION PROCESS

The geographic location of the Azores in the North Atlantic Ocean, about 1,360 km west of continental Portugal, was challenging from a logistical point of view. Hence, the project required strict planning in order to meet the established deadlines.

– I want to emphasize that the plan was fully complied with, despite these circumstances, says Borges.

The logistical as well as the on-site challenges were overcome with a great deal of professionalism and creativity.

– The compressor wall insert was extremely tight because it had been attached in the same position for 50,000 hours. But our skilled personnel and the plant’s maintenance team did a great job in removing it, says Wärtsilä Sales Manager Adriano Almeida.

Wärtsilä’s professional team followed up on the installation and participated in the engine performance and the specific fuel consumption tests.

– The participation of Wärtsilä’s personnel was essential for the success of the project. Wärtsilä has always been willing to offer us any post-project help if needed. However, to date no uncharacteristic situations have arisen at all, says Borges.

THE COOPERATION CONTINUES

Alberto Borges is convinced that the cooperation with Wärtsilä will continue. The fact that Wärtsilä are the OEM of their power plant engines is an important reason to explain why the cooperation always runs smoothly. Alberto also appreciates that Wärtsilä rapidly respond when asked, such as when providing services and supplying equipment.

– As the rotating components of the turbochargers had reached the end of their life-cycle, we took the opportunity to opt for an upgrade and consequently achieved a 2% reduction in specific fuel consumption and lowered the exhaust gas temperature. Although the installation comes with a guarantee, we are confident that the new components are reliable and long-lasting. So far, the benefits achieved have demonstrated that this is a viable and lucrative investment, concludes Alberto Borges.

“The is a viable and lucrative investment.”