

Performance optimisation brings savings for Enercal

CASE STUDY: ENERCAL



"IN 2016, OUR COMPANY SAVED ABOUT \$400,000."

When New Caledonian company, ENERCAL, wanted to optimise the operational cost and performance of their Népoui power plant, Wärtsilä exceeded all their expectations with a performance optimisation upgrade solution.

– The performance improvement of the power plant was much higher than we originally anticipated. Performance tests have shown savings on the specific fuel oil consumption of more than 8g/kWh, says Teddy Theodore, Operations manager of ENERCAL Népoui power plant.

The New Caledonian public utility company, Société Néo-Calédonienne d'Énergie (ENERCAL), was established in 1955. Originally, ENERCAL was set up to help the nickel industry in the region increase its competitiveness on a global scale by controlling its energy costs. Today, ENERCAL's business is to produce, transport, distribute and utilise electrical energy, among other things.

One of ENERCAL's power plants is the Jacques IEKAWÉ thermal power plant in Népoui. This plant has two Wärtsilä 16V46A engines and two Wärtsilä 16V46B engines, all originally equipped with VTR turbochargers and totalling up to an installed capacity of 55 MW.

The thermal plant is located about 250km north of the capital, Noumea,

CHALLENGE

- Maintaining the competitive edge
- Reducing the operating costs of the power plant through guaranteed lower fuel consumption.

SOLUTION

- Installation of a Wärtsilä 46 performance optimisation package consisting of engine tuning by means of unique camshaft modification to Miller timing and an upgrade to ABB-TPL76C turbochargers and other engine components & settings.

BENEFITS

- An average of 5g/kWh lower fuel consumption (in some cases as high as 8g/kWh)
- Reduced maintenance costs through less parts and more flexible service intervals.

and it is one of the most efficient means of responding to the rapid variations in electrical consumption of the New Caledonia island grid.

– Until 2008, the Nepoui plant was a baseload electrical power plant in New Caledonia, but since then it has been used as a peak load power plant, says Mr. Theodore.

SUCCESSFUL UPGRADE PROJECT

The Nepoui Power Plant is a public utility government-owned plant and optimisation of the fuel consumption is a major target. Before the performance optimisation, the specific consumption of the power plant was about 218g/kWh with a utilisation rate of 52 %, totalling the average annual consumption of fuel to about 55,000 tons/year. In 2014, the price of the fuel amounted to approximately 73 % of the global plant operational costs.

– The management of ENERCAL wanted to optimise the operational costs of the plant and decided in favour of a Wärtsilä 46 Performance optimisation, consisting of engine tuning by means of a unique camshaft modification to Miller timing and an upgrade to ABB-TPL76C turbochargers on two engines in September 2014, says Mr. Theodore.

Installation and commissioning took place during a scheduled major engine overhaul, which minimised the overall downtime. Performance tests were carried out before and after the modification.

– The two efficient Wärtsilä teams were well organised and were fully supported by Wärtsilä managers,

which – to a great extent – helped to make the project a full success. The upgrade went as planned and the minor challenges only concerned the different pieces of equipment that needed to be changed for the upgrade, says Mr. Theodore.

EXCEEDING PERFORMANCE EXPECTATIONS

According to Mr. Theodore, the results of the performance optimisation have been very clear and rewarding. Both the performance due to the overhaul of the engine and the performance due to the upgrade of the turbochargers were separated. Wärtsilä's performance warranty stated a SFOC saving of 4g/kWh. However, the performance tests managed to record savings of more than 8g/kWh. These high savings results were partly due to the engine overhaul.

– After two years of operation, and comparing to the two unmodified engines, we have been able to establish a 5g/kWh improvement for each engine, which exceeds the promised saving. So, the performance improvement due to this upgrade of the power plant is real, says a satisfied Mr. Theodore.

What does this performance improvement mean for ENERCAL as a company?

– In 2016, our company saved about \$400,000. We could have had even greater savings if the modified engine had been in baseload operation, says Mr. Theodore.

Now a couple of years after the performance improvement, ENERCAL continues to enjoy the benefits of



the upgrade and Wärtsilä's services. Mr. Theodore also appreciates the high quality of assistance from Wärtsilä and says that it is one of the reasons why he wants to continue cooperation with Wärtsilä.

– Today, we are very satisfied with this modification in terms of fuel consumption. If you have a Wärtsilä power plant running in baseload mode, I recommend doing a performance optimisation upgrade. Even for us, operating the plant as a peak load plant, it is very beneficial and fuel prices will surely rise again during the coming years, concludes Mr. Theodore.