

# Gas conversion reduces power plant emission levels

CASE STUDY: DELIMARA POWER PLANT 3



“WÄRTSILÄ’S TEAM MEMBERS’ PROFESSIONALISM AND CUSTOMER-ORIENTED SPIRIT ARE TRULY IMPRESSIVE.”

Shanghai Electric Power needed to reduce both electricity production costs and emission levels at their D3 Power Plant in Malta. Eight Wärtsilä HFO-fuelled engines were converted to run on natural gas.

“We are very happy to be working with Wärtsilä on this gas conversion project. This project is Shanghai Electric Power’s first step into Europe, and we look forward to a long and fruitful co-operation with Wärtsilä,” says Mr. Tan Qing, Project Manager, Shanghai Electric Power Limited.

Shanghai Electric Power Limited (SEP) is one of the major listed companies of China Power Investment Corporation, and one of the most

important electric energy companies in Shanghai. Delimara Power Plant 3 (D3) is owned by D3 Power Station Ltd. where Shanghai Electric Power

## CHALLENGE

- Reducing the electricity production costs
- Reducing the emission levels
- A tight time schedule

## SOLUTION

- Gas conversion of eight Wärtsilä 18V46HFO engines to four Wärtsilä 18V50DF and four Wärtsilä 18V50SG including a new UNIC C3 engine control system.

## BENEFITS

- Reduced operating and maintenance costs
- Reduced emission levels (in compliance with EU regulations)



(Malta) Ltd. is the majority owner with 90% of the shares. Enemalta owns the remaining 10%.

### **MAIN SOURCE OF ELECTRICITY IN MALTA**

The D3 power plant is an important part of Malta's energy portfolio. After the old Marsa Power Station was decommissioned, the responsibility for ensuring a stable, safe and economic power supply in Malta was placed on the Delimara power plant, which comprises four plant units: D1, D2, D3 and D4. The Delimara power plant currently serves as the only local power plant in Malta, providing power to Malta and its neighbouring islands, together with an interconnector from Sicily.

Before the conversion, D3 had eight Wärtsilä 18V46 engines running on HFO with a gross output capacity of 149.8MW. Mr. Tan Qing explains the reason for choosing Wärtsilä for the conversion:

– As the engines were built by Wärtsilä, both the project owner

and the EPC contractor of the conversion project felt very confident in trusting the manufacturer to do the conversion.

According to Mr. Tan, the main reasons for the gas conversion were to reduce both electricity production costs and emission levels. He also emphasises that during the project, which had a tight time schedule, Wärtsilä's personnel showed an admirable service-minded attitude, teamwork, communication according to plan and a close co-operation with the customer.

– Wärtsilä's team members' professionalism and customer-oriented spirit are truly impressive.

### **BOTH NATURAL GAS AND LFO**

The gas conversion of the D3 plant concerned eight Wärtsilä 18V46HFO engines that were to be converted to four Wärtsilä 18V50DF and four Wärtsilä 18V50SG engines. In the first phase, the conversion to dual-fuel engines took place: The LFO commissioning finished in September 2016 and the natural gas commissioning finished in February 2017. The second phase with the SG-engines is estimated to be completed in August 2017.

– Wärtsilä has so far completed their part of the work as per agreement and instructions, says Mr. Tan.

Wärtsilä's delivery consisted of engineering, procurement and construction (EPC) for a specified scope of supply: gas conversion of the engines including the new UNIC C3 engine control system, construction of a 500m natural gas pipeline including a pipe bridge, valves and instrumentation. In addition, new auxiliary modules such as a compact gas ramp (CGR), purge air fan modules, rupture discs on exhaust gas ducts, and a nitrogen inertisation system were installed.

– Although some minor challenges have occurred from time to time during the conversion project, they have all been solved through negotiation and cooperation between us and Wärtsilä, states Mr. Tan.

### **EMISSION COMPLIANCE AND REDUCED COSTS**

When the power plant starts to run on natural gas, the emissions produced by the plant will be reduced, ensuring compliance with the emission regulations set by the EU. With four Wärtsilä 50DF dual-fuel engines, the engines have a high efficiency running on natural gas, but are also capable of operating on LFO as back-up fuel, in case of interruption in the gas supply.

– Our power plant will benefit from a lower heat rate for the engines, increased efficiency, higher power output capacity, and lower emissions. This means reduced operational costs and lower emissions, says Mr. Tan.

The installation work of the second phase is ongoing, but Mr. Tan says that Wärtsilä continuously supports the plant operations. He even claims that D3 Power Generation Ltd., the owner of the plant, has also expressed great satisfaction about the conversion project, as this gas conversion supports the company's business and goals.

– As this is our first project established in the European Union, we have gained experience from Wärtsilä's advanced techniques and management performance. We have appreciated all contributions from Wärtsilä and I would certainly recommend other Wärtsilä customers with similar needs to do a conversion, concludes Mr. Tan Qing.