

ENERGY
ENVIRONMENT
ECONOMY

CASE AKSA SAMSUN: GAS CONVERSION FOR REDUCED EMISSIONS AND LOWERED OPERATIONAL COSTS



With the tightening of Turkey's environmental legislation, Aksa Enerji Uretim A.S wanted Wärtsilä to convert the Wärtsilä 46 engines in their Aksa Samsun power plant to use more environmentally friendly fuel. The project was finalized in the autumn 2011.

"The level of exhaust gas emissions was accepted by the local authorities. So we are now able to produce electricity with significantly reduced exhaust gas emissions, while enjoying financial benefits through lower operating costs, which will help shorten the payback time," says the representative for Aksa Enerji Uretim A.S.

Aksa Enerji Uretim A.S, a part of Kazanci Holding, is one of Wärtsilä's biggest customers in Turkey. This energy sector company operates diesel and gas power plants, wind farms, hydro-electric plants, solar energy, biogas and landfills, as well as distributing and selling electricity. In early 2000 the company ordered the 120 MW power plant, equipped with seven 18-cylinder Wärtsilä 46 engines, to the Turkish city of Samsun by the Black Sea.

The Samsun region has industry, but it is also an agricultural area and the local authorities pay considerable attention to environmental impacts. Therefore Aksa wanted to be able to use more environmentally friendly fuel and lower the exhaust gas emissions. At the same time,

however, it was important that the rated engine output would not suffer any losses. Additionally, operating costs needed to be reduced to make the plant's operations more economical.

– We suggested our GD concept, which could cope with all the requirements with improved engine efficiency, yet still be able to provide not only back-up fuel flexibility with HFO and LFO, but also natural gas/HFO fuel sharing, says **Heikki Huhtala**, Project Manager, Services Project Centre Finland.

As the undersea natural gas pipeline from Russia already existed in the city of Samsun, the set up was clear, and the GD concept was proposed as a means of continuing the plant's operation under the tight emission laws.

SAFETY IS VITAL FOR HIGH PRESSURE GAS

Safety is imperative when using high pressure gas as a main fuel. The fuel oil system, gas detection and automation system, and the firefighting system were designed according to stringent safety regulations. Different ratings and areas of Ex-zones were determined, and even the access road to the power house had to be changed due to the compressor house design and location. Ex-proof components were considered for all electrical and automation parts, when located inside the Ex-zone.

The safety concept covers all the necessary aspects and measures included in the GD power plant concept to achieve an acceptable safety level.

– A new gas feed arrangement with double wall piping to enable proper ventilation for the safe evacuation in case of gas leaks, a new HFO injection system, a control oil system for 370 bar pressure, and a new improved engine control were added to the engine. This required only minor modifications to the engine itself, says Heikki Huhtala.

Testing and commissioning took place in autumn 2011. Engine by engine, the Wärtsilä commissioning team performed this task assisted by the Aksa Enerji team.

– When starting a GD engine you can use LFO or HFO, and then ramp up to 25% to 30% on fuel sharing mode prior to change-over to full gas operation. After a few days of tuning, we reached 17 MW with very good heat rate figures, says Huhtala.

– We have now lowered the operation costs, reduced exhaust gas emissions, and received real fuel flexibility.



NEW AUTOMATION AND REAL FUEL FLEXIBILITY

Conversion projects often present challenges or surprises of some kind, especially when something new has to fit into an existing environment. Therefore the engine and plant automation and monitoring systems were totally renewed. In addition, considerable quantities of safety equipment, including detectors, sensors, limit switches and so on, were installed based on the required safety concept.

– Through close and open co-operation with the customer, our organizations in Finland and Turkey, and other stakeholders we were able to avoid major surprises – even though

the project specifics and tailored design were developed during the project itself, says Heikki Huhtala of Wärtsilä.

– The flexibility and easy adaptation of Wärtsilä's products for utilising gas as a main fuel, made the conversion of our power plant to gas operation a very interesting alternative. Through the gas conversion we have now lowered the operation costs, reduced exhaust gas emissions, and received real fuel flexibility, with a short payback time, concludes the Aksa Enerji Uretim A.S representative.