

Eklutna Generation Station

CASE STUDY



Pioneers powering Palmer at -40°F/-40°C

Palmer, a town some 40 miles northeast of Anchorage, Alaska, showcased the pioneering spirit of its namesake entrepreneurial founder George W. Palmer, as the cooperative utility headquartered there, Matanuska Electric Association (MEA), departed from conventional practice and decided to build its own power plant. For its clients in the Alaskan Railbelt this meant greatly reducing the costs of its supplied energy. The partner of choice for such an endeavor, providing the engineering, generating equipment and auxiliary appliances of the power plant, was Wärtsilä.

“In the event of a natural disaster such as an earthquake, these engines can switch fuels without a hiccup.”

Joe Griffith,
MEA General Manager

Having considered different technology proposals, including gas turbine-based projects, MEA's consulting engineers decided that Wärtsilä's 50DF internal combustion engines offered the best solution for the project. With loads swinging from 145 MW peaks in the winter, to as low as 50 MW during hot summer nights, turbine-based power plants with few units would have taken severe hits on their efficiency, while multiple internal combustion engines maintain high efficiency by matching the number of operating engines to the actual load demand.

The Matanuska plant, i.e. the Eklutna Generation Station, serves the Railbelt grid, which extends from the city of Fairbanks to the state's most populous city, Anchorage and on to the Kenai Peninsula– a growing member area of more than 100,000 households, which consumes up to 80% of Alaska's electricity. As the plant is the grid's largest, carries the main responsibility for maintaining grid voltage and frequency stability.

The dual-fuelled Wärtsilä plants are highly efficient even at part-loads, easily dispatchable, and able to absorb subtle grid frequency deviations thanks to high rotating inertia. Additionally, the engines are quick to start, and their maintenance needs are simple and are not affected by the number of starts and stops, a unique feature in the business. According to MEA General Manager Joe Griffith, these were some of the reasons for choosing Wärtsilä as project partner: "These engines represent a technology of substantial importance to the Railbelt electrical system".

The plant near in Palmer consists of ten Wärtsilä 50DF generating sets that operate primarily on natural gas. However, in case of interruption to the gas supply, the dual-fuel technology allows the engines to switch smoothly during operation to light fuel oil. "In the event of a natural disaster such as an

earthquake, these engines can switch fuels without a hiccup", GM Joe Griffith states.

The Alaskan climate also poses other rare challenges for power production. Temperatures in Palmer can plummet to as a low as -40°F (i.e. -40°C). The tailored Wärtsilä design allows the new plant to take charge air for the engines from inside the engine hall as opposed to from outside, as is standard practice. Finally, strict air quality permits of the State of Alaska further confine the project, introducing tough emission levels requirements. In yet another push for the balance between environmental respect and power generation efficiency, Wärtsilä generating sets meet the low emission levels required by the use of selective catalytic reduction (SCR) to drastically reduce polluting nitrogen oxides (NO_x) emissions.

The baseload plant is running every single day of the year and will compensate for any fuel supply failure by switching fuel – without any impact on operation.

Instead of buying power for members, the cooperative utility generates it.

CUSTOMER
Matanuska Electric Association (Utility)

TYPE
Wärtsilä 50DF multi-fuel power plant

OPERATING MODE
Flexible baseload

GENSETS 10 x Wärtsilä 18V50DF

TOTAL OUTPUT 171 MW

FUEL Natural gas & LFO

SCOPE Engineering & equipment (EEQ)

DELIVERY 2014



CHALLENGE	WÄRTSILÄ'S SOLUTION	BENEFIT
Ambient conditions: -40°F/-40°C	Internal combustion engines with specially designed charge air system	Reliable operation
Huge load variations: 50 MW » 145 MW	Multi-unit plant	Very high efficiency over the whole load range and no start/stop penalties
Strict Alaskan air quality permits	Use of selective catalytic reduction (SCR)	Reduced nitrogen oxide (NO _x) emissions
Need for fuel security	Dual-fuel engines	Seamless switching of fuel during operation