



Saft Li-ion energy storage plays key role in KEA's Alaskan microgrid



Kotzebue has integrated Li-ion energy storage into its off-grid microgrid. The Saft solution is enabling the hybrid wind-diesel power system to achieve its full potential, providing cleaner, more reliable and less expensive power to a remote community of 3 700 people.

Kotzebue is located 30 miles north of the Arctic Circle, far from the nearest transmission grid. Historically, KEA (Kotzebue Electric Association), the city's electricity cooperative, has relied on diesel generators. However, since the late 1990s KEA has committed to making every effort to reduce its dependence on diesel and has invested in wind energy.

Case study

But the intermittent nature of the wind meant that KEA still had to run its diesel generators, often resulting in curtailment when the wind turbines were providing their peak output. This challenge prompted KEA to seek a solution to utilize its excess wind capacity.

Energy storage maintains stability and minimizes curtailment

In general, an Energy Storage System (ESS) becomes essential to maintain grid stability when the penetration of renewables within a microgrid rises above 50 percent. In KEA's case its wind capacity of 2.9 MW is about the same as its 3 MW peak load, so the same ESS can also time-shift wind energy to help minimize curtailment.

KEA added a Saft Intensium® Max+ 20M ESS to its microgrid with two key aims:

- to achieve the full potential of its wind power by riding through fluctuations in output and time-shifting wind energy,
- to facilitate operation in 'diesel-off' mode with power provided only by a combination of wind and storage during periods of high wind and low load.



KEA microgrid - key facts

- Serves a remote off-grid community of 3,700 people
- Winter temperatures can fall to -50°C
- Combines diesel generators, wind turbines and energy storage
- 3 MW peak load
- 19 wind turbines – total 2.9 MW
- 6 diesel generators – total 11 MW
- 500 kW solar planned for the future



SAFT

Cold temperature package

The KEA ESS is based on Saft's Intensium® Max+ containerized Li-ion battery solution that integrates battery modules, battery management systems, temperature control and safety systems.

The ESS includes a 1.2 MW Power Conversion System (PCS) and grid connection transformer supplied by ABB.

To ensure total reliability in the harsh arctic conditions, Saft has fitted the battery container with a 'cold temperature package' that combines advanced insulation material with a hydronic heating coil. The coil is fed by the hot glycol

solution that maintains the diesel gensets at their operating temperature.

Maintaining stability and enabling time-shifting

The ESS provides the power that enables KEA to stabilize the network if wind generation ramps up or down suddenly. It also provides the energy capacity to time-shift excess wind output for use at times with higher demand or lower wind output.

Saft ESS solution - key benefits

- Increased utilization of wind power reduces diesel generator run time – cutting fuel consumption by 250,000 gallons in 2015 and saving \$900,000
- Avoids curtailment of wind turbines
- Ensures grid stability
- Smooths ramp rates
- Offers future potential for full 'diesel-off' operation

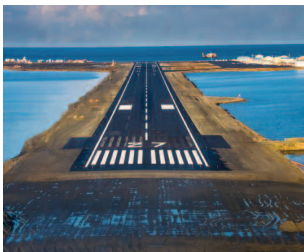


KEA Intensium® Max - key features

- Intensium® Max+ 20M Li-ion container
- 950 kWh
- 2MW maximum capability
- ABB 1.2 MW Power Conversion System (PCS)
- Control system reacts quickly to sudden changes in generation
- Cold temperature package

"Incorporating the Saft ESS now allows better utilization of our wind system. Energy storage is a vital additional tool to help increase our cooperative's efficiency and reduce our diesel dependence."

Brad Reeve, KEA General Manager and CEO



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