



Saft enables microgrid to harness the midnight sun for Arctic Circle community



The remote Canadian community of Colville Lake is now powered by a hybrid power system that integrates solar panels with new diesel generation and a Saft Li-ion battery energy system housed in a container including a special cold temperature package.

NTPC (Northwest Territories Power Corporation) is a power utility serving 43,000 people spread across 33 communities and 1.1 million square kilometers in northern Canada.

Case study

The corporation has an ambitious strategic plan to transform the region's power supply to be cheaper, cleaner and more reliable by replacing expensive diesel generation with renewable energy, especially for remote 'off-grid' communities.

Expensive diesel generation community switches to solar power

One of the most remote communities served by NTPC is Colville Lake, which lies 50 km north of the Arctic Circle. This small community of about 160 residents is only accessible by air or by ice roads during a six-week window in February and March. For some years, electrical power has been provided by now outmoded and expensive diesel generators. But since 2015 the community has been powered by a combination of solar panels with new diesel generators and battery energy storage. The goal is to reduce the runtime of the diesel generators, especially in the

summer when the sunlight is available for virtually 24 hours a day. Any surplus solar energy is stored in the battery system.



Colville Lake PV installation - key facts

- Remote 'off-grid' Arctic community
- 150 kW peak load, 30 kW base load
- 136 kW solar panels, generating around 112 MWh a year – meeting around half of the community's total annual consumption
- 2 x 100 kW plus 1 x 150 kW diesel generators



SAFT

Saft's cold temperature package ESS

To operate the microgrid at maximum efficiency and save on fuel, NTPC needed an energy storage system (ESS) that would withstand the harsh temperature variations from - 50°C to + 35°C.

NTPC also wanted to ensure maximum value by balancing ESS capacity and size of PV panels with achievable fuel savings. Saft provided an Intensium® Max 20M and used advanced modeling to identify the optimum size of both the ESS and the solar array.

The Intensium® Max installed in Colville Lake uses a special cold temperature package that combines layers of high-tech insulation with a hydronic heating coil that makes use of the same hot glycol that maintains the diesel gensets at operating temperature. This minimizes the cost of keeping the battery in its optimum temperature range.

New power autonomy saves fuel and maintenance costs and improves quality of life

The ESS is designed to support the network frequency and voltage. This allows the diesel generators to operate at their point of maximum efficiency and to be shut down whenever possible.

Projections indicate that the hybrid system will save over 80,000 liters of fuel a year - this is particularly important for this remote community as delivering diesel via the ice road is both expensive and logistically challenging. Operating the diesel generators in combination with the ESS also leads to reduced maintenance expenses as there is lower wear and tear on plant when it is run at a steady set point, rather than ramping up and down to meet short-term load variations.

In addition to their new autonomy from total dependence on diesel, the community now benefits from increased power reliability and lower emissions that greatly improve their quality of life.

Intensium® Max Colville Lake - key features

- Containerized Saft ESS supplied fully assembled and tested with cold temperature package for year-round performance
- Saft ESS provides 232 kWh energy and 200 kW power
- Saft ESS sets the network frequency and voltage, and Li-ion batteries provide 15 year life with predictable aging

Saft ESS solution - key benefits

- Enables extended shut downs of diesel genset in summer
- Generator runtime reduced by up to 50 percent
- Diesel consumption reduced by over 80,000 liters per year
- Increased power reliability and reduced emissions

"This is NTPC's first diesel/solar/battery project, and the first solar installation that has the potential to reduce diesel generation by up to 50 percent. Saft was chosen through an RFP processes because they could meet our need for a long-life energy storage system capable of withstanding the Territories' extreme rugged environment."

Emanuel DaRosa, President and CEO of NTPC



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