



Soft energy storage in Bermuda nets \$1 million in fuel savings within months

As part of a long-term plan to improve power plant efficiency, the Bermuda Electric Light Company (BELCO) commissioned Saft to deliver and install a turnkey battery energy storage system (ESS). The system provides 10 MW steady state power for spinning reserves and frequency response to maintain grid stability and up to 15 MW for the first minute if required.

OVERVIEW

One of BELCO's single most significant operating expenses is fuel for its generators. Like many island communities, imported fuel is very costly compared to the North American mainland and sudden changes of frequency can cause up to ten load-shedding events per year.

- BELCO is the vertically integrated energy utility in Bermuda, managing the grid and **servicing 35,000 customers**
- **The utility is the largest generator** on the island where the peak is **approximately 110 MW**
- **Total annual power generation amounts to roughly 600 GWh**, consuming close to 130 million liters of fuel
- The BESS is adjacent to the new North Power Station (NPS) at Pembroke, which comprises **four 14 MW dual-fuel engines providing 56 MW of power**

THE NEED

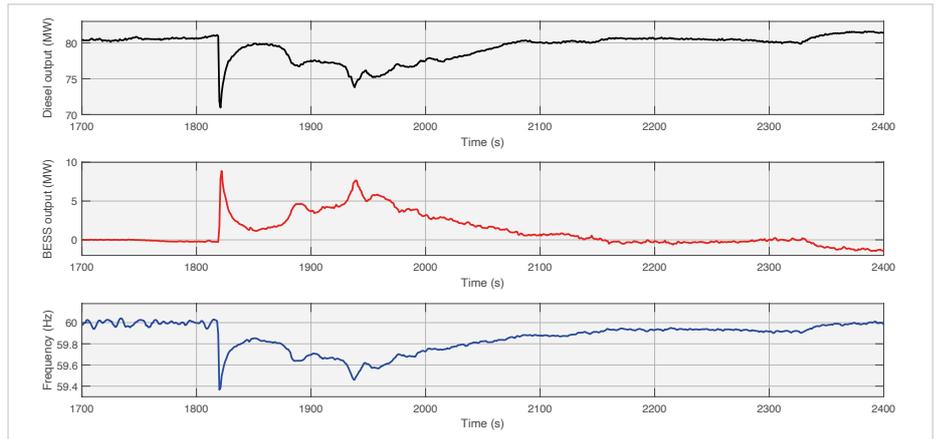
The operator had two objectives for the project. The first was to reduce fuel costs by using the ESS to provide spinning reserves, estimating that an ESS could save 2% of OPEX costs by reducing the number of running diesel

generators and allowing the remaining units to run at optimal load. The second objective was to provide ultra-fast frequency response to support power quality, maintain grid stability and avoid load shedding events. Additional ESS

benefits include enabling more units on light fuel oil (LFO) to be switched to units operating on heavy fuel oil (HFO), which is around 18% cheaper and contains 6% more energy, and reduced diesel maintenance.

Protecting Bermuda from load shedding

The energy storage system is ready to respond to sudden changes on the network. So, when a genset producing 10 MW tripped, the ESS immediately kicked in and prevented the frequency dropping below the load shed point of 58.2 Hz. A similar trip before installation of the ESS would have resulted in load-shedding and loss of supply to customers.



The ESS stabilized the frequency after a generator tripped

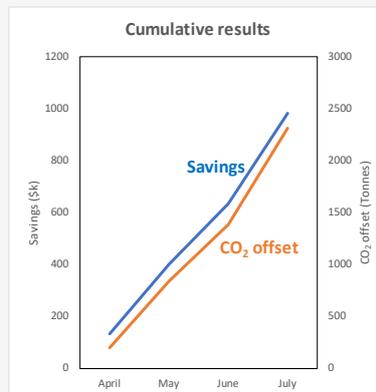
« Not only has the Saft ESS been extremely beneficial in preventing under-frequency load shedding, but the experience gained with this technology is invaluable. Utility-scale battery systems are an indispensable asset to cope with the ever-changing grid. We've been delighted with the ESS so far. »

Stephanie Simons, BELCO BESS Project Manager

Saft ESS and power conversion package

- Saft's turnkey solution included design, delivery, and installation of the lithium-ion (Li-ion) ESS, power converter, transformers and MV switchgear
- Six Intensium Max+ 20M containers provide a combined rating of 10 MW power for spinning reserves with 5.5 MWh storage capacity
- Responds within milliseconds to ensure grid stability
- Batteries housed in standard 20 foot containers shipped fully assembled and tested at Saft's facility in Jacksonville, Florida

Key benefits



Belco has experienced \$1M of fuel savings and over 2,000 tonnes of CO₂ offset in just a few short months

- ✓ Spinning reserves with ultra-fast frequency response
- ✓ Savings from reduced fuel usage and reduced maintenance thanks to lower number of running generators
- ✓ Modular approach for standard factory tested building blocks enable **fast and de-risked installation**
- ✓ Proven battery and system technology ensures **high availability, operability and optimal maintainability of the ESS**
- ✓ **Saft partnership from inception to execution:** a single responsibility for optimum system design, supply and services
- ✓ Designed for **optimized Life Cycle Cost (LCC)**

Want to know more about Intensium Max+ 20M containers?

Contact Experts

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