Utility

Southern California Edison Co. at Catalina Island

The remote island of Santa Catalina, which sits off the Southern California coast, in the United States, commonly known as Catalina Island, is renowned for it's scenic ocean views, distinctive Mediterranean charm, and picturesque island paradise. Fortunately, absent from this popular tourist destination are California's frequent "brown outs" thanks to Southern California Edison and 23 C65 Capstone Microturbines.

With an isolated power grid that relied on dirty diesel internal combustion engines for electricity, Catalina Island needed to upgrade its outdated grid to meet California's strict air quality standards. In addition, the utility needed to improve system voltage and frequency to accommodate large shifts in energy consumption.

Located approximately 22 miles (35 kilomoters) off the coast, the island is home to 4,000 full-time residents. Primarily a tourist destination, the island's population swells to over 10,000 energy consumers on weekends and throughout the summer. The stunning island has served as the backdrop to over 500 motion pictures, documentaries, television programs, and commercials.

"What the Capstone microturbines do for Southern California Edison on Catalina Island is allow us to meet the island's electrical demand and frequency moment by moment perfectly," said Ronald Hite, Southern California Edison's District Manager.

Southern California Edison, the largest subsidiary of Edison International (NYSE: EIX), is the primary electricity supplier for much of Southern California. The utility operates the island's Edison Pebbly Beach power station near Avalon where the Capstone C65s supplement the utility's electrical power supplied by a few diesel engines and help offset peak power loads.

At a glance

Location

Catalina Island, California, USA

Commissioned

December 2011

Fuel

Liquid Propane

Technologies

- 23 C65 Capstone microturbines

Results

- The C65 microturbines supply approximately 1.5MW supplement electricity produced by the diesel engines to help provide prime power to the island's 25,000 electrical meters
- Power can be dispatched in increments from 65kW up to 1.5MW
- C65 microturbines reduce diesel fuel usage by about 10%, or 200,000 gallons, annually
- The Island's overall emissions profile improved with annual reductions of smog-forming nitrogen oxide emissions by about 8% and diesel particulates by about 9.5%

For decades, the island's 25,000 electrical meters were powered by diesel internal combustion engines when California's tightening air quality standards required a fresh approach. When selective catalytic reduction (SCR) units were installed on the engines to reduce nitrogen oxides (NOx) emissions, power output from the engines dropped.

"The fact that this is an isolated microgrid on an island means I have to meet demand continuously, 24/7, with voltage and frequency," Hite added.

He added that because of the island's fluctuating power demand and inability of the SRC-equipped diesel engines to consistently meet demand, the island required an additional form of generation that is quickly and easily dispatched in small increments. "The Capstone microturbines were able to do that, and at the same time displace how much diesel emissions we were emitting, so it improved our overall emissions profile on the island," Hite added.

Fueled by vaporized liquid propane, the microturbines power a diverse marketplace year-round, that includes a full complement of tourist activities like shopping, dining, hiking, fishing, and camping.

"I have the variability of being able to dispatch power in increments from 65 kilowatts up to 1.5 megawatts of cleaner propane powered generation," Hite said.

"The addition of the microturbines to Southern California Edison's electrical system on Catalina Island increases power capacity to approximately 1.5 megawatts, and reduces the consumption of diesel fuel by 200,000 gallons annually", said Caroline Choi, Southern California Edison's Vice President for Regulatory Policy.

In their first year of operation, the microturbines generated 2.5 million kilowatt-hours of energy, or roughly nine percent of total power produced on the island. This in turn reduced smog-forming nitrogen oxide emissions from the facility by about eight percent and diesel particulate matter by about 9.5 percent.

Training was critical to the success of the installation. "This site's island location is two hours from Long Beach by ferry, which means our service-response time is impacted," said Mark Parriott, Vice President of Customer Service for Capstone distributor Regatta Solutions, which installed the system. "We minimized the chance of service issues by training onsite facility operators to provide first-responder service if a rare unscheduled outage occurs. As a result, we expect this site to provide the clean, secure and round-the-clock power the island needs."

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23 Capstone C65 microturbines provide prime power to Southern California Edison's Avalon site on Catalina Island.

In addition to working with Capstone's Regatta Solutions to train technicians and operators for the project, Southern California Edison worked closely with the Southern California Air Quality Management District (AQMD), which is the air pollution control agency for Orange County and major portions of Los Angeles, San Bernardino, and Riverside counties.

"These microturbines are helping to reduce smog-forming pollutants and diesel particulates from Catalina's power plant," said William A. Burke, Ed.D., AQMD's Chairman. "This will help improve air quality not only on Catalina but also on the mainland as prevailing winds can carry pollutants onshore." ■

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