Market Segment: Utility

POWER PROFILE

Hurricane City Power

POWER NEED

The recent volatility in the energy market was greatly affecting the power department budget in the city of Hurricane, Utah. Hurricane City Power serves the 12,000 residents and businesses in this burgeoning community in Utah's far southwest corner. Retirees and others looking for warm winters and breathtaking scenery have made the region one of the fastest-growing areas in the country.

Hurricane's population surged from 8,250 in 2000 to 12,084 in 2006 — an increase of 46.5 percent. That growth put stress on the municipal power system, especially in the summer when daytime temperatures often reach or exceed 110° F. This demand, coupled with high prices on the energy market, forced the city to dip into budgetary reserves to pay for power a few years in a row, according to City Manager Clark Fawcett.

SOLUTION

"Our first foray into backup power generation began as preparation for the possible power failures predicted for the Y2K changeover," said Dave Imlay, Hurricane's power director. At the same time, ongoing energy supply problems on the West Coast began to make the purchase of energy very expensive for Hurricane. To address both issues, the city installed three Cat® 3516B diesel generator sets in 1999. However, changes in energy pricing and regulations, along with rising diesel prices, made operating the diesel engines less financially rewarding.

Hurricane decided to look into natural gas generator sets in order to diversify its fuel supply options and maximize savings. That's why, three years later, the city again turned to Caterpillar for answers. Hurricane officials worked with Wheeler Power Systems, a local authorized Cat® dealer, and Wheeler's Ken Green. Caterpillar was chosen because of its ability to provide the right product solution for the city's need, and Wheeler offered a turnkey system. "We had the ability to take on the whole project, from design to build to ongoing operations," said Green.

Wheeler began with an in-depth look at the city's power situation. The city's new generator sets would have to meet Hurricane's needs — load following, summer peaking and open market price-hedging strategies. Hurricane also wanted the ability to boost end-of-line voltage and frequency for distribution system enhancement.

Six Cat G3520C natural gas generator sets with Cat Oxidation Catalysts have been installed in the last several years: two in 2004, one in 2005 and another three in 2007. Of the 2007 additions, one is dedicated to support the power needs of the nearby city of Washington and is used when supplemental power is needed there.

The generator sets are rated at 1,940 ekW at 1800 rpm, in 115° F temperatures and at an elevation of 3,000 feet. They operate together with paralleling switchgear at 12,470 V. This power is connected directly to the adjacent substation's distribution buss. The three original 3516B diesel generator sets are now used primarily as emergency standby power and run about 20 hours per year.

To meet environmental regulations, Cat Oxidation Catalysts for the stationary gas engines were included in Hurricane's generator set design. The catalysts lower emissions of carbon monoxide by 93

Hurricane City Power Plant

CUSTOMER

Hurricane City Power

LOCATION

Hurricane, Utah

CUSTOMER BUSINESS ISSUE

Hurricane City Power must increase generating capacity in response to the rising demand for power

SOLUTION

- Six Cat® G3520C natural gas generator sets producing 11.64 MW
- Cat Oxidation Catalysts

Project management, including design analysis and calculation, system installation and commissioning and site installation arrangement, and Extended Service Coverage (ESC)

CAT DEALER

Wheeler Power Systems
Salt Lake City, Utah

CATERPILLAR®

percent and decrease hydrocarbons by more than 40 percent, greatly reducing the generator sets' environmental impact.

As a member of the Utah Associated Municipal Power Systems (UAMPS), the city of Hurricane exports energy to other members, making it necessary for the switchgear to include grid relay protection. It also offers synchronizing and paralleling controls, engine/generator status, pre-alarm and shutdown fault readout, system control functions for load management and system status and alarm annunciation.

Also, Hurricane's design incorporated a JEMstar power meter from AMETEK Power Instruments of Rochester, N.Y. to ensure accurate billing. The meter registers the quantity of energy produced for Hurricane versus the amount supplied to UAMPS for export. Hurricane's power facility layout allows service trucks to access individual generator sets for maintenance. The 22-foot ceiling clearance also allows for trucks with cranes.

As the facility serves as space for utility offices as well as the generator sets, a vehicle garage and a storage warehouse, noise attenuation was a factor in the design and construction. In addition, the facility serves as a training area for the utility and other city departments. To provide insulation from the sound, an architectural wall was constructed of split-face concrete block outside the power plant. Measuring approximately 15 feet tall, this sound-suppression wall has been effective in reducing noise from inside the structure to a range of 10 dBa to 15 dBa.

Twelve swamp coolers, also known as evaporative coolers, were used to overcome ambient temperatures that can reach more than 110° F. Two coolers are dedicated to each generator, with each cooler producing 16,000 cubic feet of cooled air per minute, to keep the building temperature at about 85° F.

RESULTS

The city of Hurricane's partnership with Caterpillar and Wheeler has proved to be successful for the city, fulfilling its power needs cost-effectively. "The larger generator set capacity, added on an as-needed basis, allows the city to save money by tracking energy prices on the open market," Imlay said. "The city monitors prices throughout the day and, if the market price is above what it costs us to generate power, the generators come on board," he added.

The reliability and cost-effectiveness of this power solution even earned Hurricane City Power and Washington City Power a joint award for the "Most Improved System of the Year" from UAMPS in 2007. Each year, the 48 members of UAMPS nominate a member city for this award, which honors municipal utilities for undertaking system upgrades, capital improvements and preventive maintenance measures to modernize facilities and improve power quality.

"We've had major cost savings because of our ability to react to market prices quickly," Imlay said. "We've saved as much as $10,000 to $12,000 a day by running our generators instead of buying power on the market."

In addition to cost savings for the city, the Cat® generator sets provide peak power production support and backup power in case of a citywide blackout. During power outages, the Cat 3516B diesel generators provide the ability to block load segments of the city's distribution system and then transition to the G3520C natural gas generator sets. Then they repeat the process, one section at a time, until the gas power plant takes on full city load. There have been three blackouts in the three years since this system has been in place, and this process was utilized to get the city up and running with no outside power available.

For more information, please visit www.catgaspower.com/pp

POWER PROFILE

Hurricane City Power

Three Caterpillar G3520C High Voltage Gensets @ 2050 ekW each.

LEXE8829-01 - April 2013

CATERPILLAR®