

Microturbines Provide Police Station CHP

Chicago is among the first U.S. cities to use microturbine-based CHP as a template for municipal office energy design.

By Steve Blankinship, Associate Editor

Two new \$21.1 million police stations in Chicago are the first of 12 police stations the city is building that will feature on-site microturbine power plants.

Encorp's Generator Power Control—or "Gold Box"—is the heart of power systems at the new 9th District and 7th District police stations. The Gold Box allows operators to remotely control and communicate with each building's low-emission 100 kW Calnetix microturbine, 350 kW diesel generator and Commonwealth Edison, the local utility. Encorp, based in Fort Collins, Colo., develops and markets software and hardware technology to enhance distributed energy's communication, control and networking..

The microturbine and generator supplement power that ComEd provides to the two-story, 44,000-square-foot facility. Encorp digital-paralleling switchgear and Virtual Power Plant software are key components. The package allows operators to remotely dispatch, aggregate and control the microturbine and generator, interconnect the power plant with the utility or operate it solely as back-up power.

Besides providing electricity to the building, the power plant also serves as a combined heat and power (CHP) facility in which waste heat energy from the microturbine is captured and used to help heat the building, improving the power system's overall efficiency. While a microturbine's electrical energy-out versus energy-in is roughly the same as for a reciprocating engine, in a CHP configuration microturbines are far more efficient than engines. When CHP is used, a large portion of the microturbine's waste heat is captured and used, increasing system efficiency to better than 75 percent.

A microturbine also offers lower emissions without the need for emission control add-ons. Microturbines also tend to be quieter than engines, have a smaller physical footprint,

offer longer service lives and do not require cooling fluids or lubricant changes as the original factory lubricants last the unit's lifetime. Furthermore, no additional equipment is needed for microturbines to run in parallel with each other or with the grid.

Chicago becomes one of the first cities in the U.S. to incorporate microturbine-based CHP as a template design in municipal offices. The city's energy plan specifies that distributed energy should provide 1.3 billion kWh of electricity to the grid by 2010, or roughly the amount of energy used by 25,000 homes in a year, said Michael Clark, Encorp's senior vice president.

Chicago-based energy integrator Preon Power has commissioned the power systems at the 7th and 9th District Police Stations. Preon specializes in providing power packages to installations such as emergency-response agencies, data centers, municipalities and energy-service industries.

A similar initiative is underway to install Encorp equipment and microturbine CHP plants in new Chicago area elementary and high schools. Leading Chicago area architects and engineers have met with members of the U.S. Green Building Council, which developed energy efficiency standards and criteria. The goal is to take Chicago's stance on "smart" controls and microturbine-based CHP and replicate it in other regions of the U.S. The American Recovery Act specifically includes stimulus-fund incentives for "smart grids" and microturbine-based CHP.

In addition to the two completed police stations, Encorp products may be included in energy systems in 10 new or renovated Chicago police stations scheduled to be built in coming years. The city recently awarded Encorp and Preon Power a contract for a third police-station project: the 23rd District. Bidding on a fourth project is set to be underway shortly. **pe**



Calnetix 100 kW microturbine at a Chicago police station. Photo courtesy of Encorp.