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Story last updated at 12:41 p.m. on September 15, 2003

Microturbines keep power humming

RESEARCHER: 'It keeps you from shutting down in a crises.'

By: **Scott Jones** | Oak Ridger Intern

Scientists want to pull power generation to the local level, which could help avoid another record-breaking blackout nationwide.

A good example of this effort is Oak Ridge National Laboratory's microturbine technology.

The microturbine, which "operates like a carburetor," uses natural gas, air, and rotation to achieve combustion and produce 30 kilowatts of electric power, said Phil Fairchild, a group leader in the heating, cooling and power division at ORNL.

The energy produced is then fed directly into a 480-volt transformer to supply energy to the local electric grid at ORNL. The excess heat is filtered through one or more devices to produce hot water, cool air for air conditioning, or dehumidified air.

In conventional power production, this waste heat is simply disposed of. In the lab at ORNL, the waste heat is recycled into useful energy, which boosts the efficiency of the power production process, saving the potential customer money while reducing their reliance on the overloaded national electric grid, said Fairchild.

Users of the technology may not be affected by large-scale outages, such as the one that occurred in the northeast and parts of Canada on Aug. 14.

"It keeps you from shutting down in a crises," said Mike Karntz, deputy director of the energy efficiency program at the lab. "Some of the technologies to help with the grid are five years off. This technology is being implemented, but if it was more cost effective, more energy efficient, it would have a bigger market penetration."

Rochester International Airport in Rochester, N.Y., which employs a system similar to the model at ORNL, experienced no power outages during that blackout.

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According to a report by the New York State Energy Research and Development Authority, "If all airports had this type of system, flights/air travel would not have been hampered." The report also listed several other beneficiaries of the new technology, such as the Central Park Emergency Center and Police Station, which it called an "oasis of light in the sea of darkness."

The lab at Oak Ridge is simply a testing ground for the technology. While Fairchild stresses that the model at ORNL isn't cost-effective on such a small scale, bigger-scale models could be, such as the one at the Opryland Hotel. While traditional power plants operate at somewhere around 35 percent efficiency, the Opryland Hotel model operates at around 70 percent efficiency.

The lab, known as the Combined Cooling, Heating, and Power Integration Laboratory, is a user facility and a response to the Department of Energy's effort to encourage large industrial and commercial users to generate some or all of their electricity on-site.


While the technology will "never replace central power stations," Fairchild said, it may help more businesses function in the event of another blackout and provide them with a more cost effective means of supplying energy.

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