National Fuel

Advanced Energy Solutions for New
Clarion University Science & Technology Center

(August 1, 2007) Erie, Pennsylvania: National Fuel Gas Distribution Corporation (National Fuel) has awarded Clarion University of Pennsylvania a grant valued at $163,996 to establish an advanced energy laboratory in their new Science & Technology Center. The funding is part of National Fuel's research and development program.

Dr. Joshua Pearce, physics professor and principle investigator on the grant, said "The National Fuel Energy Laboratory will not only instruct Clarion students about state-of-the-art energy technologies, but it will also produce prodigious amounts of electrical power and heat for the Science & Technology Center. It is a key component in our building design and our plan to achieve LEED (Leadership in Energy and Environmental Design) certification from the U.S. Green Building Council."

National Fuel spokesperson, Nancy Taylor, said, "The Company is pleased to sponsor this project to showcase the environmental benefits of natural gas, from the perspective of both efficiency and emissions. National Fuel applauds the University's commitment to environmental stewardship and education, and appreciates the opportunity to demonstrate the key role natural gas plays in progressive and innovative green building design. Natural gas has been supplying a significant part of the energy needs of the Clarion campus for many decades and National Fuel is pleased to partner with the University to gain insight into the future of energy technology."

The National Fuel Energy Laboratory will feature a 65-kilowatt equivalent (kWe) microturbine that will generate electricity and heat from clean-burning natural gas, which will work in tandem with the 26kWe solar photovoltaic array integrated into the roof of the $36.4 million building – the largest in the Pennsylvania State System of Higher Education. The high-performance design being used for the Science & Technology Center to demonstrate distributed generation mirrors the key focus on the environment and sustainability within the science programs at Clarion University. Faculty and students occupying the Center, whose area of study includes all of the science disciplines for Clarion University's main campus, are collaborating on a host of research projects revolving around the study of energy and the environment and solutions to environmental problems.

Dr. Pearce explains, "A gas microturbine is a rotary engine that extracts energy from a flow of hot gas produced by combustion of natural gas in a stream of compressed air. The microturbine is truly state-of-the-art technology. While spinning at incredible speeds it levitates on maintenance-free 'air bearings'. To get an idea of the speed, a car engine redlines at 5,000 revolutions per minute (rpm), a race car might get up to 15,000 rpm, but the Clarion microturbine will spin at 96,000 rpm."

(more)

"Distributed generation systems with Combined Heat and Power (CHP) such as our future microturbine can be very fuel efficient. The microturbine system, which runs on clean natural gas, is 80 percent efficient compared to only 33 percent efficiency for conventional and polluting coal-fired power plants. Despite these advantages, the use of CHP and other DG systems is currently not very widespread in the U.S., while in other parts of the world the superior technology has gained ground much faster. For example, in Denmark, distributed generation's share in the gross electricity production market increased from 1 percent in 1980 to 35 percent in 2001 using 24 percent decentralized CHP and 11 percent wind turbines. At Clarion University, we want to use and demonstrate technologies that will represent the future for clean, efficient, and safe energy," continues Pearce.

"Clarion will save a lot of money and fuel with the microturbine, while improving our environmental performance," says Pearce. Microturbines are also good for the environment as they have digital power conversion and the lowest emissions of any non-catalyzed fossil fuel combustion from burning clean natural gas. The microturbine will diminish heating load and dehumidification load, provide peak shaving to reduce electric demand costs, and offset a portion of the building's electrical energy. This project will thereby decrease both the air and water pollution resulting from operating the building.

The microturbine will form a hybrid distributed electricity generation system with the solar photovoltaic array. Both technologies will be monitored in real-time and the data will be made available to the public in an information kiosk and distributed energy exhibit in the grand entryway of the building. In addition to the display, the microturbine will be integrated into the curriculum at the University by having the system publicly accessible on the roof, including it in lectures, and using it for "micro-field trips."

Additional information about the system can be found at the distributed generation web portal: http://www.clarion.edu/energy.

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