Messiah University

Education

The Challenge

Messiah University is a top-ranked private university nestled on a 471-acre campus in Grantham, Pennsylvania. Looking to undertake some upgrades in the spirit of both economic and environmental stewardship, the school's leadership embarked on a plan to bring natural gas to its campus, aiming to eliminate the use of propane and the associated maintenance and supply challenges.

The key goals of the $7.5 million project, which included construction of a natural gas pipeline, were to lower energy costs, increase energy reliability, and reduce the campus' carbon footprint. Capstone microturbines were selected, not just for their ability to meet each of these goals, but also for their ultra-low maintenance requirements and quiet operation.

The Solution

At the heart of the system is a natural gas fueled C1000 power package (comprised of five 200kW microturbine units). The system is configured as a combined cooling, heat, and power (CCHP) application and produces electrical power, hot, and chilled water. Installed CCHP equipment includes an exhaust gas-to-hot-water heat exchanger and a 288-ton hot water absorption chiller. The waste heat produced by the turbines passes through the heat exchanger to produce hot water that in the winter months services the campus. In the summer months

"The six and a half year pay back and long-term savings this project provides impacts our ability to manage the growing cost of higher education."

— Kathie Shafer,
Vice President of Operations at Messiah University

Power Profile

Customer
Messiah University

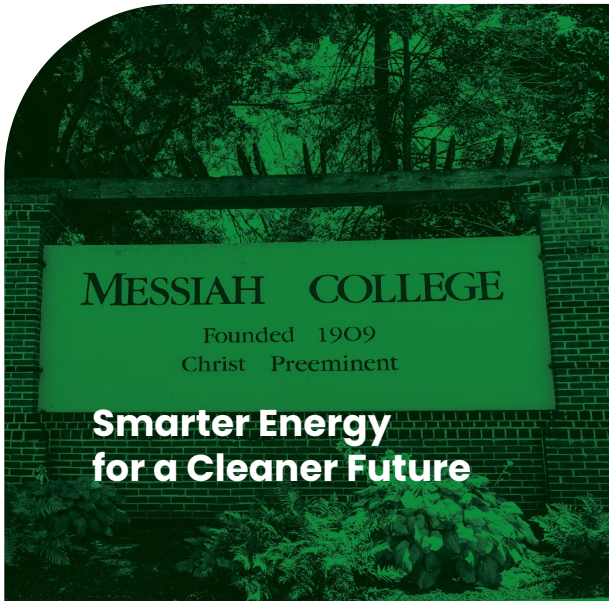
Location
Grantham, Pennsylvania, U.S.

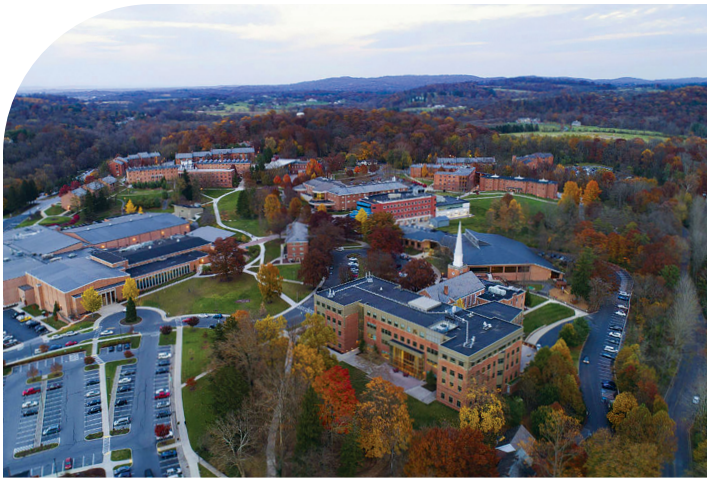
Commissioned
2016

Fuel
Natural Gas

Technologies
- (1) C1000 Microturbine

Capstone Green Energy Distributor
E-Finity Distributed Generation





One C1000S Capstone microturbine at Messiah University, in Grantham, Pennsylvania, converts natural gas into clean, reliable and cost effective power.

this same hot water is used by the absorption chiller to make chilled water for air conditioning.

Together, the system provides 1,000 KW of power, and satisfies the heating and colling requirements of several buildings on campus. The electricity is provided directly to the school's Sollenberger Sports Center and the Eisenhower Campus Center, with excess power being delivered to the local utility under the standard net metering rules. This allows the C1000 to operate at full load when the grid is available while also offsetting the need for the University to purchase additional power.

To provide essential reliability, the turbines are capable of islanded operation, which means they can run independent of the utility in the event of a power failure. This results in a reliable and efficient energy system with lower operating expenses than traditional approaches to onsite power.

The Results

The added reliability, energy independence, and reduced carbon emissions reflected a strong commitment from Messiah University leadership to the school's culture and values. The high efficiency and cleaner burning microturbine technology reduced the campus' annual emissions by about 25 percent, an amount equal to removing 1,354 passenger vehicles from the road, 723,000 gallons of gasoline, and 15,000 barrels of oil saved.

Environmental sustainability is just one part of the initiative's success. Since its installation in 2016, the new power system has provided the University financial sustainability that allows for better management of operational budgets and helps slow rising tuition costs for students.

Capstone C1000S Microturbine

A C1000S provides up to 1MW of electrical/thermal generation and can be paralleled to generate up to 10MW of clean-and-green power.

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Capstone Green Energy