

New York Industrial R&D Center

Manufacturing

The Challenge

A New York corporate industrial research and development (R&D) center was ready to add a new R&D process to its 300,000 square-foot building. "Preliminary engineering determined the new processes would require a peak power demand approximately six times what they were currently consuming at the site, ramping up over a period of just 15 months," notes Nick Hammond, Director, Distributed Generation and combined heat and power (CHP) expert.

Based in a rural area, the corporate industrial R&D center is the local energy company's largest power user.

The utility could ultimately supply 70 percent of the near-term demand needs. To bridge the gap, the company's electrical infrastructure group sought a low-maintenance, modular on-site reliable power solutions that could be deployed in less than 12 months.

The power solution needed to be brought on line in phases to meet increased electrical needs as the process was implemented in stages.

The new R&D processes would be utilizing 205°F (96°C) hot water in a significant amount. Company managers recognized an opportunity to use CHP to obtain reliable electric power while simultaneously reducing operating costs compared to a traditional energy system.

"Capstone microturbines can supply a significant amount of this temperature water using the microturbine's single source of waste heat – it's exhaust," says Nick Hammond.



The modular and flexible Capstone C1000S ICHP package enabled the process electric and heating needs to be met even at the initial unexpected low load levels. As additional R&D processes have come online, the CHP has continued to meet both the thermal and electric needs with good efficiency."

— Nick Hammond, Director
Distributed Generation

Power Profile

Customer

Corporate Industrial
R&D Center

Location

New York State

Commissioned

January 2018

Fuel

High Pressure Natural Gas

Technologies

- Capstone C1000S ICHP Microturbine

Capstone Turbine Dealer

GEM Energy, a member of the
Rudolph Libbe Group





A Capstone C1000S microturbine in a combined heat and power (CHP) application supply the industrial R&D facility's electrical and hot water heating needs.

The Solution

The industrial R&D facility managers considered all alternate CHP system options, including fuel cell, and ultimately selected a Capstone C1000 Signature Series Microturbine from GEM Energy for the company's ability to provide turnkey services within 12 months.

GEM Energy installed the Capstone integrated combined heat and power (ICHp) package for the facility's electrical and hot water heating needs, commissioned in January 2018.

The natural gas-fueled C1000S microturbine can provide year-round continuous electrical power and 4.1 million BTUs of hot water every hour using Capstone integrated heat recovery modules, exceeding the new R&D process resource needs.

Capstone microturbines were selected for their minimal overall maintenance and modular design, which enables 800 kW of the system to continue operating while servicing one of the five bays for business process continuity and reduced operational costs.

The 1 MW CHP system will operate in parallel with the utility grid and be capable of providing power to a large portion of the critical process loads during utility outages.

GEM Energy applied for an incentive with New York State Energy Research and Development Authority's (NYSERDA) CHP program and was awarded US\$997,500 toward the 1 MW CHP project, which was credited in full to the R&D center. The incentive enabled the project to meet the company's payback target.

The Results

The modular 1 MW microturbine CHP system is now in place at the New York facility, with the infrastructure to expand to up to 3,000 kW as the R&D process and other facility needs grow.

When the installation began operating, the first line of the R&D process required a relatively low amount of hot water below the minimum supply of the backup boiler that was installed. The CHP needed to operate at 20 percent load to meet the thermal demand, says Nick Hammond.

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Infrastructure to allow for easy expansion was installed during the project in the event the facility's managers wish plan to expand the CHP system in the future.

Capstone C1000S ICHP Microturbine



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