

At a glance

Location

Harrisburg, Pennsylvania, USA

Commissioned

October 2013

Fuel

High Pressure Natural Gas

Technologies

- Capstone C800 Dual Mode Power Package
- Hot Water Heat Exchanger
- 250-ton Exhaust-Fired Absorption Chiller
- (mTIM) PLC Control System

Customer

- Pennsylvania State Employees Credit Union (PSECU), one of the largest credit unions in Pennsylvania.
- Building: A 239,000-square-foot (22,203-square-meter), three-story LEED Gold-certified building on a 47-acre campus.

Results

- Reduce carbon emissions by 1,468 tons per year
- Standalone clean power for data center UPS
- 24/7 remote monitoring of site through (mTIM) PLC control system
- Provide backup power to site's data center
- Factory protection plan with 24/7 remote monitoring
- Thermal priority site
- Virtual electric metering

Pennsylvania State Employees Credit Union

Over 75 years ago, Pennsylvania State Employees Credit Union (PSECU) was started as a member-owned, not-for-profit credit union. Today it serves hundreds of thousands of members and is one of the largest credit unions in the state of Pennsylvania.

In 2013, PSECU realized it was time to invest in natural gas power generation to reduce their overall cost of operation and become more environmentally friendly. With time and budget in mind, PSECU turned to E-Finity Distributed Generation, the exclusive Capstone Turbine distributor in the area, to develop a trigeneration combined cooling, heating and power (CCHP) solution.



A Need for Improved Reliability and Energy Efficiency

As part of a major construction project, PSECU required a clean and energy efficient power generator system to power its 239,000-square-foot (22,203-square-meter) LEED Gold-certified facility and data center, while also providing space heating, space cooling and cold water. With the construction effort rapidly underway, PSECU teamed up with the local energy service provider to install an onsite power generation system site plan that would allow for the natural gas powered microturbine power plant.

The trigeneration installation, which was completed in October 2013, includes the Capstone C800 Power Package, four MMBTU heat exchangers and a 250-ton flue-gas fired absorption chiller—a system that now reduces carbon emissions by 1,468 tons per year, which is

equivalent to removing 243 cars from the road. The package also operates in dual mode, meaning it is able to communicate with and work independently from the local utility grid to maximize efficiency.

Clean-and-Green Energy Production without Interruption

Capstone microturbines are ideal for CCHP applications due to the abundant exhaust they produce, in addition to their clean electrical output. Running entirely on natural gas, the C800 system produces 800kW of electricity as well as the hot water and chilled water for the facility.

The C800 Power Package, made up of four Capstone C200 microturbines, features internal redundancy that enables each individual C200 to be shut down for maintenance without an interruption in power generation. This allows for continuous, reliable power with minimal risk to PSECU, even in the event of a power outage.

The C800 system is not the only piece of equipment that is contributing to the success of PSECU. The credit union is controlled by E-Finity's PLC-based control system (mTIM) with remote monitoring, which exchanges key energy production data between the power plant and PSECU's building automation system to maximize thermal priority performance. The mTIM monitors, diagnoses, and troubleshoots the Capstone system 24/7 and allows E-Finity's customer service department to fix the unit remotely, minimizing downtime and maximizing uptime for the end user. Energy and performance data is then made available to the customer in real time.

As a whole, the state of Pennsylvania holds a strong role in energy production, due to the abundant gas flow from the Marcellus Shale, and it is projected to grow to 5GW in total capacity within the next ten years. The PSECU project was intended not only as an investment in the company's growth but also a step towards becoming a LEED certified green building. PSECU received points towards its certification for optimized energy performance with its Capstone CCHP system and was later awarded the prestigious LEED Gold certification in October 2014. With the support of its Capstone system, PSECU is one of 352 buildings in the state of Pennsylvania that hold the LEED Gold certification, representing the importance of a sustainable community. ■



A Capstone C800 microturbine operating in a CCHP application producing 800kW of clean and reliable power for the PSECU data center UPS.

“Capstone’s CHP system powers 100 percent of our facility during the colder months and 60 to 70 percent during the warmer months. We’re able to send a surplus of clean energy back to the grid during peak hours, which is phenomenal.”

*— Pete Spicher, Facilities Manager
Pennsylvania State Employees Credit Union*