

Microgrid for City of Hartford

Emergency preparedness and energy cost savings drive new Parkville Microgrid



DistributedEnergy



Challenge

An unusually early snowstorm—the 2011 Halloween nor'easter—caused massive power outages throughout Connecticut, surpassing those caused by record-breaking Hurricane Irene only three months before. What would have been an inconsequential storm during the winter season turned into a disaster when it struck unseasonably early in fall. Heavy snow loads combined with strong winds caused trees to topple power lines, resulting in 750,000 residential outages that lasted up to 11 days in some areas.

After this series of natural disasters, the Connecticut Legislature passed legislation to improve the state's emergency preparedness. This included a requirement for the Connecticut Department of Energy and Environmental Protection (CTDEEP) to establish a microgrid grant and loan pilot program to support local distributed energy generation for critical facilities. In July 2013, the State announced the awardees of microgrid grants, one of which was the City of Hartford's Parkville Microgrid project.

The Solution

Constellation collaborated with the City of Hartford, Connecticut Light & Power, and GI Energy to design, construct and operate a microgrid capable of providing 800kW of electricity to a collection of buildings offering core services. In the event of a major grid outage, the microgrid is able to provide emergency power to a supermarket, senior center, elementary school, gas station and library.

To power the microgrid, Constellation and the City of Hartford worked with Bloom Energy to deploy their cutting-edge fuel cell solution to generate reliable, clean power. Based on technology originally developed for NASA, Bloom's solid oxide fuel cells generate electricity without combustion through an electrochemical reaction. The energy servers convert natural gas into delivered electricity at the highest level of efficiency among commercially available technologies. Compared to the grid, these fuel cells cut CO₂ emissions by 40%, and harmful nitrogen oxide (NOx) and sulfur oxide (SOx) pollutants by 100%.

Designed to be resilient during natural disasters, the microgrid is capable of separating from the grid and operating autonomously through Bloom's Uninterruptible Power Module (UPM) solution. Bloom's energy servers are fueled by natural gas through the local gas distribution network, which is more reliable than the power grid. And because electrical conduits are underground, they are therefore less susceptible to external factors such as falling trees.

This solution will also enable Hartford to save on energy costs. During non-emergency operation, the microgrid will provide 100% of the electricity for the senior center, elementary school and library. Hartford will purchase this energy at a discount to current and forecasted market prices through a 15-year power purchase agreement (PPA). Virtual net metering allows excess electricity provided back to the grid to then offset electricity costs for four other local schools.



America's energy choice.™

Highlights

Project

- 800 kW microgrid
- 15-year power purchase agreement (PPA)
- Baseload power 24x7x365 in non-emergency mode
- Power during grid outage for core services
- Underground electrical conduits

Technical

- Bloom Energy Solid Oxide Fuel Cell (SOFC) technology
- Electrochemical reaction to convert fuel to electricity
- Natural gas fuel source
- Zero SOx and NOx emissions
- 40% CO₂ reduction compared to the grid

The project required carefully aligned efforts and contributions from a wide array of parties. Constellation and Bloom provided the equity capital for the fuel cell solution. Constellation designed and operates the broader microgrid solution, while Bloom provides all ongoing O&M for the fuel cell. Project costs were also supported by the \$2 million CTDEEP grant. Additionally, the project qualified for the state's Low-Emission Renewable Energy Credits Program, which enables the project to sell Connecticut Class I renewable energy credits (RECs) created from renewable projects to the local utility under a long-term contract. Local utilities Eversource and Connecticut Natural Gas were instrumental in integrating the solution into the distribution networks.

Now, in the event of another unexpected and unpredictable weather event, core buildings in the center of Hartford will remain with power and operational, thanks to the new microgrid.

Work With a Trusted Energy Solutions Provider

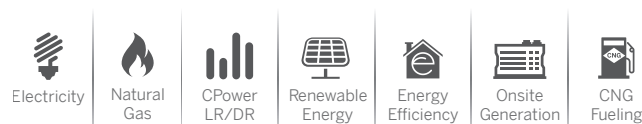
Constellation tailors its integrated energy solutions to its customers' unique needs, providing them with the flexibility to choose how to cost-effectively buy, manage and use energy to meet their business goals. Along with expertise, Constellation offers a wide range of innovative and integrated distributed energy products—including solar, energy efficiency, cogeneration, backup generation, fuel cells, CNG fueling stations and battery storage—as well as the reach of one of the nation's leading competitive suppliers of power, natural gas, renewable energy and energy management products. With more than 30 years of experience and over \$1 billion in energy-related projects financed and built, Constellation helps business, nonprofit and public sector customers achieve sustainability goals, develop energy resiliency, manage costs and capital needs, and mitigate risk.

Start the Conversation Today

For information on any of our distributed energy solutions—contact us today at distributedenergy@constellation.com or visit www.constellation.com/distributedenergy

Constellation is a leading competitive retail and wholesale supplier of power, natural gas and energy products and services across the continental United States. Constellation's family of retail businesses serves residential, public sector and business customers, including more than two-thirds of the Fortune 100. Learn more at www.constellation.com.

© 2016 Constellation Energy Resources, LLC. The offerings described herein are those of either Constellation NewEnergy-Gas Division, LLC, Constellation NewEnergy, Inc., Constellation Energy Services - Natural Gas, LLC, Constellation Energy Services, Inc., Constellation Energy Services of New York, Inc. or Constellation CNG, LLC, affiliates of each other and ultimate subsidiaries of Exelon Corporation. Brand names and product names are trademarks or service marks of their respective holders. All rights reserved. Errors and omissions excepted.



constellation.com

