



PERFORMANCE

Fairfield's innovative public safety microgrid

Fairfield Town Government – Fairfield, Connecticut USA

How Fairfield's successful public safety microgrid paves the way for additional energy projects.

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The Fairfield, Connecticut, town government is on a trajectory to reach 50 percent renewable energy over the next five years. Ultimately, according to Ed Boman, Assistant Director of Public Works, the town's goal is to reach 100 percent renewables — essentially eliminating the town's electric utility bills. Schneider Electric and its team of engineers are playing a large role in Fairfield's journey toward this goal. In 2015, the company completed Fairfield's first microgrid, which serves the town's public safety buildings and operations. Now, Schneider Electric is set to complete a second microgrid for Fairfield's waste water treatment facility in early 2018.

A storm: the catalyst for change

Those who live in Fairfield have a coveted address. And it's easy to see why. The town touts five miles of beachfront along the Long Island Sound. But this picturesque seaside location also leaves it vulnerable to hurricanes.

In 2012, Superstorm Sandy pummeled Fairfield, causing power outages and severe flooding. Afterward, an already innovative and environmentally conscious town government went into overdrive, searching for more ways to use renewable and reliable energy sources — in this case, microgrids.

Microgrids can island, i.e., operate independently, from the grid during power outages, and keep electricity flowing for critical services. They are a key element to Fairfield's future resiliency as it faces increasing risk from severe weather.

Goal

Reach 50 percent renewable energy over the next five years.

Story

After Superstorm Sandy pummeled Fairfield, the town installed its first microgrid. A good experience with the first has led to a second project.

Solution

Complete a second microgrid for Fairfield's waste water treatment facility.

Results

With two microgrids, the town

- Keeps its residents safer
- Protects vital services
- Increases its renewable energy supply

Remarkable for its natural beauty, this seaside town deserves recognition for its foresight as well.

The journey to 50 percent renewables

From adversity — severe storms and power outages—came innovation. Today, Fairfield is proactively using microgrid technology to protect its citizens in a crisis while becoming an increasingly green community.

Good experience with first microgrid led to second

Connecticut became an early leader in microgrid development after ice storms and hurricanes crippled its utilities — even before the 2012 Superstorm Sandy. In fact, the state was the nation's first to fund microgrid development at critical facilities. And Fairfield was among the first towns to receive a microgrid grant — \$1.1 million — from the Connecticut Department of Energy and Environmental Protection.

The town's first microgrid harnesses 350 kW from a natural gas generator. This is shared across the town's police and fire stations, emergency communications center, cell phone tower, and public shelter.

Fortunately, no crisis has presented itself yet that would require emergency operation of the microgrid. But the microgrid has successfully passed several tests of its islanding ability. Islanding is a crucial microgrid function, where it separates from the utility grid during a power outage and uses its on-site generators to power critical services.

The buildings have a 60 kW combined heat and power (CHP) system and a small 47 kW solar photovoltaic (PV) array, which are not connected to the microgrid during normal grid mode. During island mode, the buildings are all connected to the single natural gas generator.

During the project to create Fairfield's first microgrid, Schneider Electric replaced an old diesel-fired emergency generator with a 350 kW natural gas generator and installed a state-of-the-art microgrid controls system. The microgrid also connects a 50 kW natural gas generator and a solar PV rooftop system that supplies electricity to the associated buildings when the microgrid is not in use, further 'greening' Fairfield's public service department.

In all, the microgrid is designed to supply 120 percent of the town's peak demand power for the buildings it serves. An added bonus: the natural gas-powered microgrid saves the town about \$60,000 in electricity and \$10,000 in heating costs annually. These savings directly stem from the installation of the 60 kW Tecogen natural gas CHP unit located at the police department.

Fairfield's Microgrids

Public Safety Microgrid

Properties:

- Police and fire stations
- Emergency communications center
- Cell phone tower
- Public shelter

Project Details:

350 kW natural gas generator

Wastewater Treatment Plant Microgrid

Properties:

- Waste water treatment plant
- Animal shelter
- Fire safety training building
- Fleet garage
- Landfill
- Compost facility

Project Details:

- 6 photovoltaic systems
 - 54 kW and 27 kW installations at the animal shelter
 - 13 kW installation at the fleet garage
 - 21 kW installation at the fire safety training building
 - 1.4 MW installation at the landfill
 - 42 kW installation at the compost facility
- 400 kW fuel cell
- 1.3 MW natural gas generator

Fairfield invests in second microgrid

Fairfield's second microgrid is part of a larger resiliency project for its waste water treatment plant, which experienced severe flooding during Sandy. The town won a U.S. Housing and Urban Development grant of \$2.5 million for the microgrid project. It also received an additional federal HUD grant administered by the State Department of Housing for hardening projects, such as building a sea wall, that are designed to improve resiliency at the plant. The microgrid and hardening projects are being coordinated.

The microgrid uses a variety of distributed energy resources. The fuel cell will be operational during island mode. In case of emergency, the microgrid will provide power to the waste water treatment plant's five buildings, as well as an animal shelter, a garage, and a fire training center. There are a variety of solar PV installations across the buildings:

- 54 kW and 27 kW installations at the animal shelter
- 13 kW installation at the fleet garage
- 21 kW installation at the fire safety training building
- 1.4 MW installation at the landfill
- 42 kW installation at the compost facility

The microgrid is 'smart' in that it will manage its power supply so that it uses available renewable resources first.

Furthering the project's environmental benefits, Schneider Electric will be removing some of the town's older diesel generators and adding a large natural gas generator. The state of Connecticut is no longer issuing permits for diesel generators in an effort to curb carbon dioxide emission.

Fairfield's second microgrid is a more complicated and dynamic project than the first public safety microgrid. This is in part because the waste water treatment plant is by far the largest consumer of electricity in the town. Adding to the complexity is



the large number of buildings that need to be connected to the microgrid. The waste water microgrid is expected to be completed by early 2018.

Why microgrids? Why Schneider Electric?

Fairfield's leaders said that after a quick, efficient, and successful deployment of the town's public safety microgrid, working with Schneider Electric on the second project was simply a given.

"We were sticking with them no matter what. We knew we could rely on Schneider Electric," said Boman.

As general contractor for both microgrids, Schneider Electric managed the projects from design and construction through training and technical support. Fairfield's public works department also teamed with Schneider Electric in submitting a winning proposal to Connecticut's microgrid program, as well as helping to secure the grant from HUD to fund the second microgrid.

The two microgrids will play an integral role in protecting Fairfield in the case of future natural disasters or power outages by keeping critical services powered and running. Not to mention their role in capturing energy cost savings to the town.

Schneider Electric accompanied Fairfield through the different steps of their microgrid journey: from design and audit services, project management, and system delivery, to technical support and optimization.

A commitment to resiliency and efficiency

The new microgrids will help ensure that Fairfield’s buildings are served by cleaner electricity in several ways. For example, the town swapped out diesel fuel for cleaner-burning natural gas at two large capacity generators. Further, the microgrids harness emissions-free solar energy by way of their solar PV panels.

It’s also important to note that the town has implemented extensive energy efficiency measures that reduce how much power is required to keep critical services operating. So during a crisis, when the microgrids island from the local utility, the distributed generation resources do not have to produce as much power as they might have otherwise. This means less use of fuel from the fossil fuel generators and cleaner air.

By installing microgrids, Fairfield has wisely taken a lesson from the past to position for the future, keeping its residents safe, protecting vital services, and greening its energy supply.

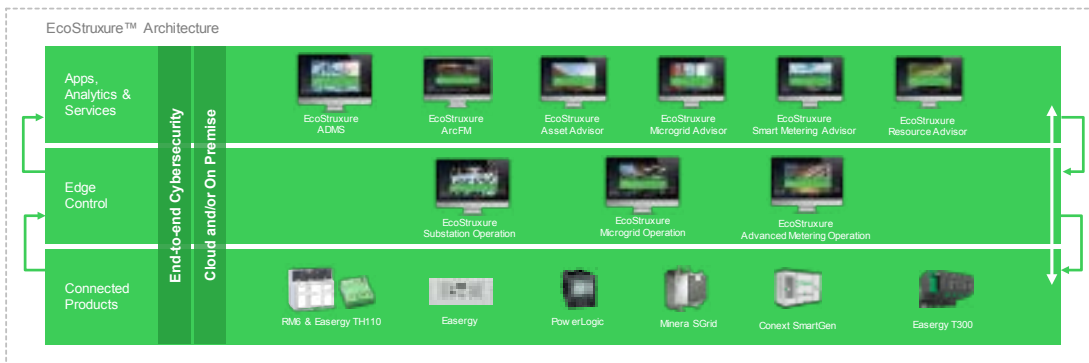


But Fairfield isn’t going to stop there. The town has plans for a third microgrid for a high school and middle school. The project is currently under discussion and will involve a fuel cell and solar-based power.

This small seaside community, remarkable for its natural beauty, now deserves recognition for its foresight as well.

“All of the projects do a number of things. They’re holistic. You are bettering the environment, cleaning the air, and helping public health.”

— Ed Boman,
Fairfield, Connecticut,
Assistant Director of
Public Works



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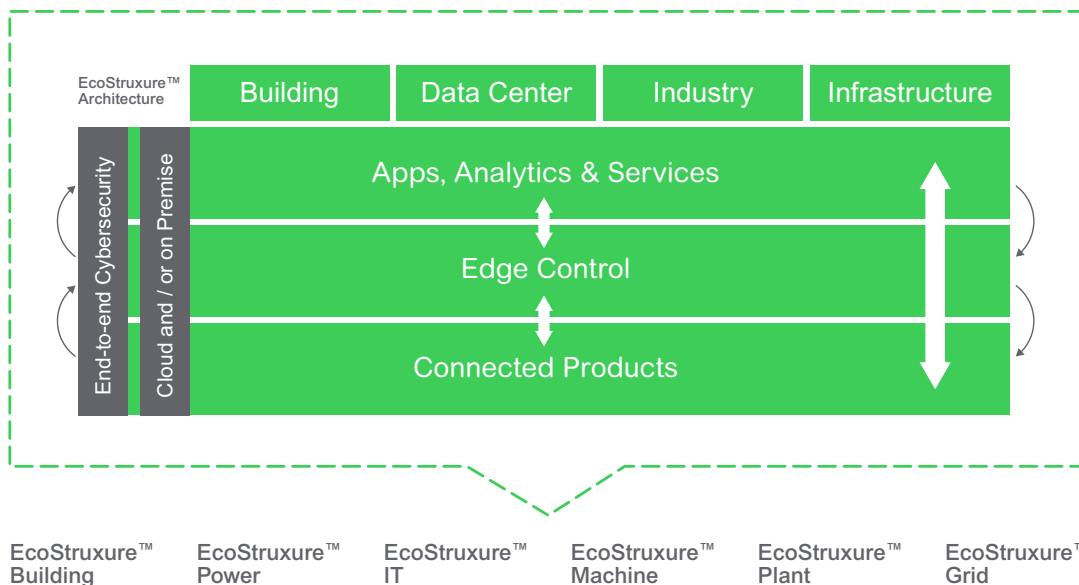
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