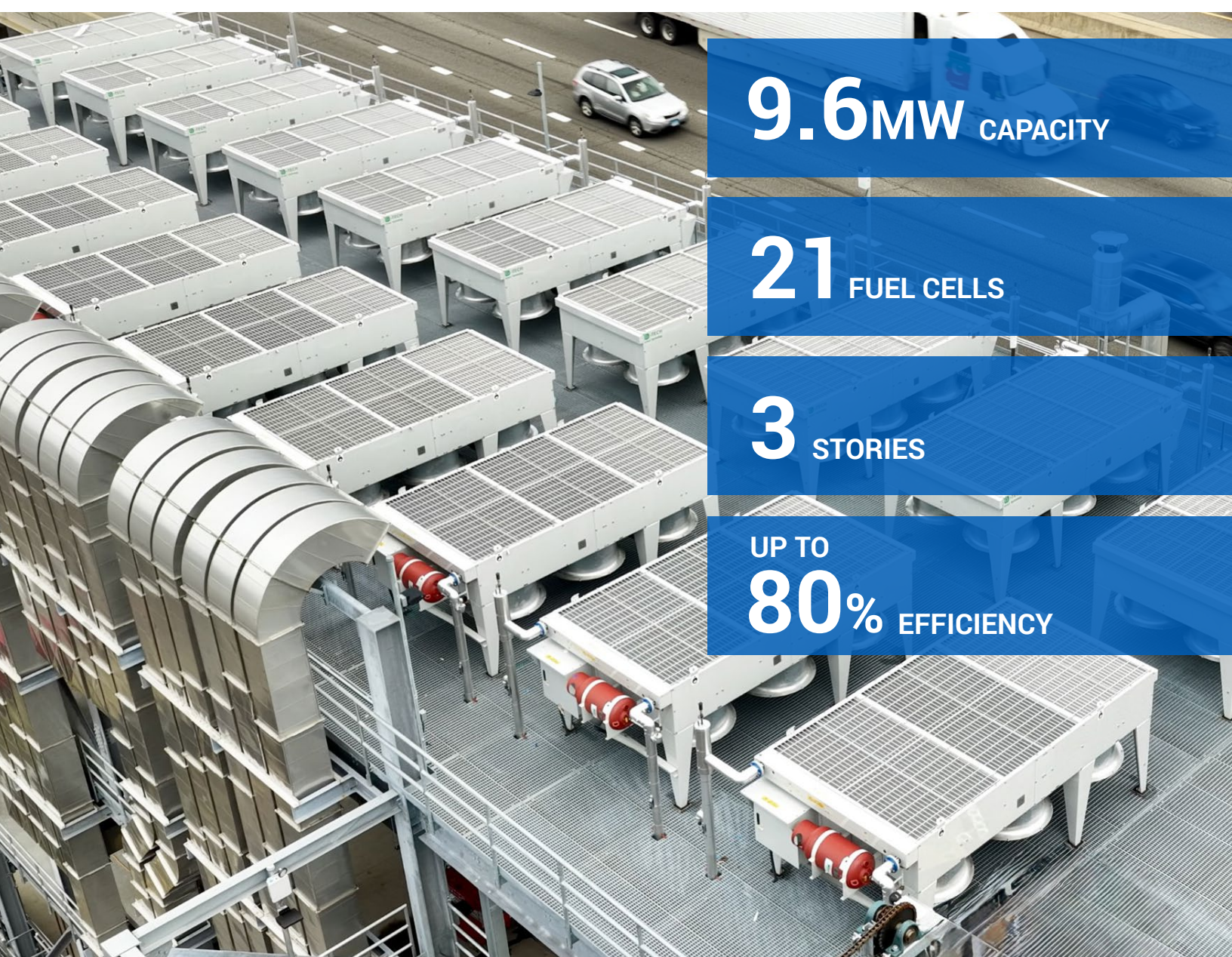


Maximizing a Minimal Footprint

Charter Oak CHP Project

How HyAxiom built the nation's first multi-megawatt, multi-story clean energy solution in a space no one expected.



9.6MW CAPACITY

21 FUEL CELLS

3 STORIES

UP TO
80% EFFICIENCY

A Simple Idea, A Complex Journey

The idea didn't start in Bridgeport. It started with a trip to Denmark, where NuPower founders Dan Donovan and Scott Guilmartin saw what European energy systems had been doing for years: capturing the heat that power generation normally wastes and putting it to work. Their idea? Translate this concept to a local combined heat and power (CHP) installation that services Connecticut by generating clean, reliable power locally while offering byproduct heat to warm nearby schools and businesses. It had never been done before in America. So they came home and started from a blank sheet of paper and a question—how do you combine electrical generation and a thermal loop into a single system? When they put their pencils down, the answer was clear. HyAxiom's Phosphoric Fuel Cell Technology.



From Pipe Dream to Project of the Year

That simple thought of a local CHP installation was turned into a 2018 law through an act that required the power to come from a combined heat and power system, making HyAxiom an ideal partner. From there, NuPower secured grassroots, local legislative, and federal backing to move their concept through the Connecticut Department of Energy and Environmental Protection (DEEP) and the Public Utilities Regulatory Authority (PURA). Early-stage funding from The Connecticut Green Bank added essential momentum, and led to the organization naming the Charter Oak CHP Project its "Project of the Year."



Ten Years to Success

Some good things are worth waiting for. It took until October of 2019 to get the power purchase agreement between NuPower and southern Connecticut's electric utility United Illuminating signed and another year for State regulators to approve it. Soon after, distributed energy company Scale Microgrid Solutions stepped in and by 2024 agreements for engineering, procurement, and construction were signed. HyAxiom was able to bring EPC under one company with one point of contact for a more frictionless experience.

Even the deal structure for Charter Oak is unique, as it runs on a cost-plus agreement rather than a fixed PPA. Construction and long-term service costs are transparent and reviewed annually by state regulators, keeping ratepayers insulated from surprise increases over the contract's 20-year term.



Location, Location, Location (Plus Gas and Grid Connections)

To bring this dream to life, NuPower needed a location that met very specific criteria—industrial/non-residential land, near potential thermal off-takers, with direct gas pipeline access and grid interconnection. Their ideal location turned out to have a not-so-ideal size and shape, though. Tucked in a tiny corner of Bridgeport, Connecticut, wedged narrowly between I-95, a rail line, and high-tension power lines, there was a .75 acre sliver of land that happened to check every box. They decided to take the risk, betting they could find a way to make it work.



Siting Up, Not Out

The tiny parcel posed its own unique challenges and meant things were going to be a tight squeeze. Ultimately, the project team found a brilliant solution and engineered a three-story multi-level fuel cell installation—seven HyAxiom fuel cell units on each of the three floors, 21 in total, with cooling modules mounted on the rooftop above.

The plan meant rigorous and specific coordination. Every steel beam that went up and every fuel cell that came off a truck had to be timed against I-95 traffic, the adjacent rail line, and overhead transmission lines, all while notifying every agency involved before anything was rigged into place. To achieve this precision, HyAxiom worked with some incredibly talented partners. Sirocco Mechanical prefabricated major elements offsite and rigged them in place onsite, reducing fabrication time dramatically. CE Floyd kept the broad but intricate construction on schedule. And United Illuminating delivered permanent power to the site far ahead of original projections to keep the demanding project from falling behind.

Things moved quickly. With financing in place and plans approved, our crew had the entire steel structure erected in just 30 days.

Not Just a New Resident, a Good Neighbor

At the heart of the facility are HyAxiom's PureCell® M400 fuel cells. Each unit converts natural gas into electricity through an electrochemical reaction, which means no burning and almost no air pollutants (CO, NOx, and VOCs are all negligible, and the units are CARB certified).

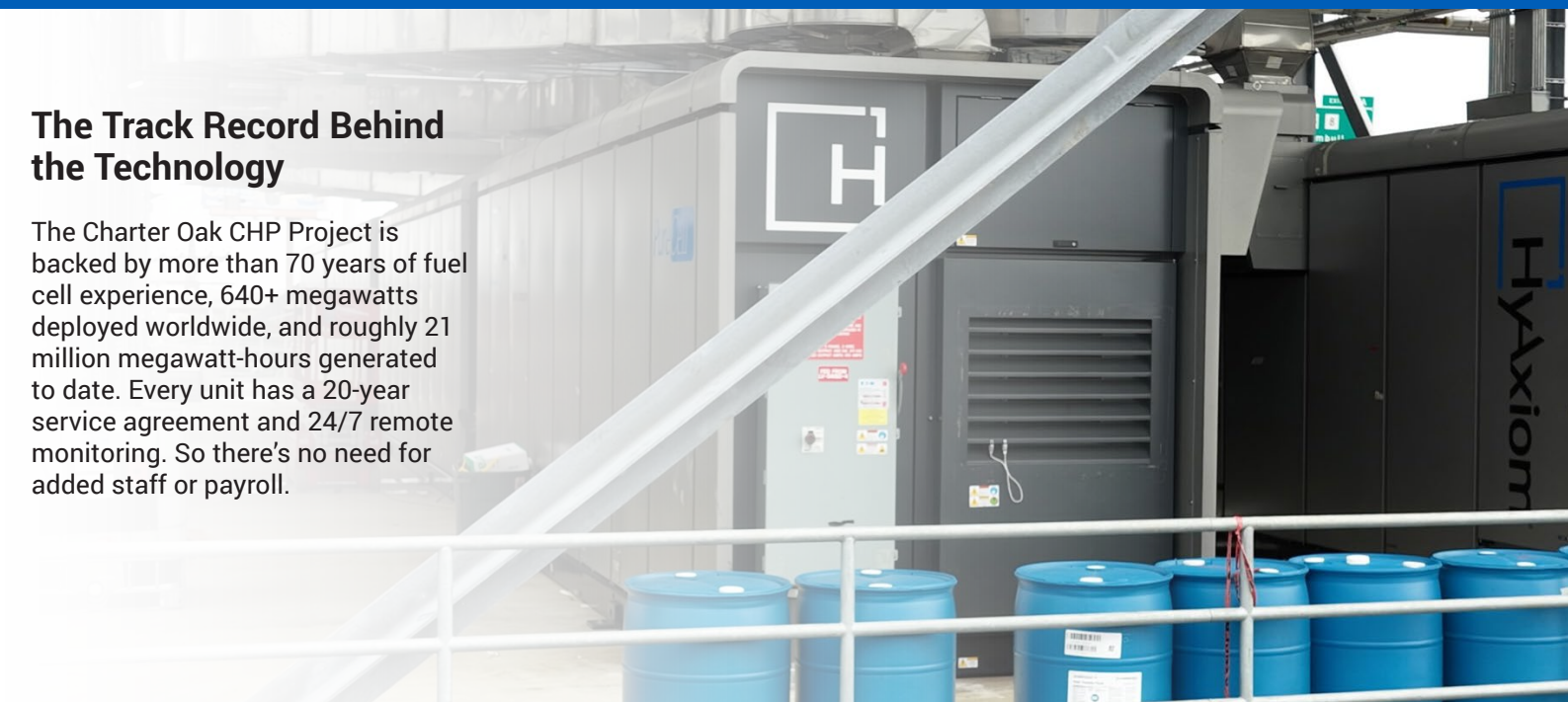


But clean, efficient power for the community is only half the Charter Oak CHP Project story. Rather than let the heat byproduct of the fuel cells drift off unused, HyAxiom runs it through a thermal loop to the University of Bridgeport and its annex buildings, Bassick High School, and Approved Storage and Waste Hauling. Current off-takers (receivers of byproduct heat) use only 40 to 50 percent of the plant's potential and Scale Microgrid Solutions is already working to bring more of the surrounding community onto the loop to heat even more schools and businesses.

The relationship with the University of Bridgeport runs deeper than a utility hookup. UB's engineering students have received sponsored, hands-on exposure to thermal loop design by working alongside other colleges with Charter Oak CHP Project as the case study.

The Track Record Behind the Technology

The Charter Oak CHP Project is backed by more than 70 years of fuel cell experience, 640+ megawatts deployed worldwide, and roughly 21 million megawatt-hours generated to date. Every unit has a 20-year service agreement and 24/7 remote monitoring. So there's no need for added staff or payroll.





Bringing Good Energy to the Community

The story of the pioneering Charter Oaks CHP Project is one of community integration, uplift, and growth. What was once an underutilized industrial parcel generating \$3000 a year in property taxes is now on track to generate more than \$200,000 annually, while hosting a one-of-a-kind and welcome addition to the neighborhood and serving as an inspiring example of what is possible for communities across the country.

"The PureCell M400® was purpose-built for exactly this kind of site. The Charter Oak CHP Project shows what's possible with creative thinking."

- Travis Douglas

"Now there's a repeatable way to put serious power exactly where a city needs it, even on the tightest site around."

-Omar Cattán

Clean, reliable power to United Illuminating via fuel cells

~100 new construction jobs

Reduced combined greenhouse gas emissions by 8,000 tons annually

Lower operating costs for recipients

