CASE STUDY

New Construction
Manchester Schools
Manchester, Connecticut

HIGHLIGHTS

» **Buckley**
Target EUI: 18.3
Incentive: $266,700
CO_2 reduction (tons): 778

» **Bowers**
Target EUI: 15.25
Incentive: $253,700
CO_2 reduction (tons): 823

» **Keeney**
Target EUI: 19

BACKGROUND

Voters in Manchester, Connecticut, a town of 60,000 people about 10 miles east of Hartford, recently approved a referendum to fund an ambitious, sustainability initiative for public buildings. The goal was to make town-owned buildings, some more than a century old, more energy efficient. Of these, three elementary schools were selected to become fully net zero energy consuming schools: Buckley, Bowers and Keeney. Net zero energy construction involves building or significantly renovating structures to generate and consume an equal amount of energy over the course of a year. This is achieved by employing energy-efficient design strategies and incorporating renewable energy sources to meet the building's energy needs.

CHALLENGE

All three schools were built in the 1950s and required some necessary updates. To identify the right path forward to transforming these buildings into a zero net energy status, Eversource provided technical assistance to each school's facilities team though our Energy Efficiency (EE) programs to help them transform the existing structures into net zero energy buildings with optimal Energy Use Intensity (EUI) ratings. The lower the EUI rating, the more energy efficient the building. A typical school's EUI, based on a 2020 study conducted by Eversource, is around 65. Manchester's three school projects targeted significantly lower ratings.

SOLUTION

Manchester school management chose to fully gut the existing structures, due to the age of the buildings and rebuild up as net zero energy facilities utilizing the Energize ConnecticutSM commercial new construction and major renovation program. This program guides new buildings and significant renovation projects to use as little energy as possible and ensure buildings meet their energy use targets. Eversource provided technical assistance to support the schools' net zero design and construction plans. The first step for each school included the completion of an energy model throughout the project's design to ensure the building design was on target to meet its EUI goal. School leaders selected Buckley to be completed first; scheduled Bowers the following year; and moved Keeney through the design process with its energy model currently under review and anticipated construction completion to be in the next two years.

EVERSOURCE

#1 Energy Efficiency Provider in the Nation

> **We are proud that these net zero school projects showcase the ambitious and immediate action we're taking as a community to transition our schools away from fossil fuels and towards a renewable energy future. Eversource's support and expertise in new construction and decarbonization solutions for municipal buildings helped us make confident decisions while implementing such significant projects for the town of Manchester.**
>
> - Chris Till Facilities Manager for Town of Manchester, Connecticut

Each of these schools will incorporate some or all of the following solutions:

- Ground source heat pumps for heating and cooling, which draw heat from the earth's internal temperature.
- Water-source heat pumps on geothermal loops, another type of ground source heat pump.
- Domestic hot water heat pumps, which use similar technology to remove heat from the ground to provide water heating.
- High efficiency building envelope, which included spray foam insulation.
- LED lighting solutions to achieve a low Lighting Power Density of 0.26 watts per square foot.
- HVAC controls including variable speed fan controls for all systems and demand control ventilation which increases or decreases a system's power depending on how much output is actually needed.
- Energy recovery on outdoor air intake, which makes using outdoor air for good circulation more energy efficient.

The town of Manchester also invested in several renewable solutions, including photovoltaic (solar) rooftop panels and a rotating, pedal-fanning solar "smart flower" to self-generate electricity for the building. While renewable energy is an added benefit for the schools and helps the school achieve its net zero energy objective, it does not lower the overall energy intensity of the buildings.

In addition to the technical assistance provided by Eversource, financial incentives were also provided to help offset some types of equipment costs and verification fees.

RESULTS

If, in its first year of occupancy, Buckley can meet its design EUI, it will become the first net zero energy public school in the state of Connecticut. Together, all three schools represent the tremendous investment and commitment of the town of Manchester to a clean energy future for its students. Each school serves as a model of sustainability and energy savings netted from these projects can eventually be reinvested back into education. Manchester also continues to invest in its public infrastructure, which involves undertaking retrofit projects in seven schools total and upgrading numerous other municipal buildings, including the Senior Center and Police Station.

For more information, visit eversource.com

The information in this case study is an accurate representation of this customer's experience at the time of publication. Results, including cost savings, from energy efficiency measures can vary based on each individual customer's situation.