

CASE STUDY

A ZERO EMISSION SOLUTION

Eemax® Tankless Electric Water Heating

FIRST NET-ZERO SCHOOL IN MASSACHUSETTS

Eemax delivers innovative, energy-saving, consistent hot water with the installation of 163 tankless electric water heaters in a new high-performance campus in Cambridge, Mass. This project was designed to be the first net-zero emissions school in Massachusetts and the largest net-zero emissions building in the state. The site consists of a middle school and elementary school, district administration offices, a public library, and a public pool. The buildings are the first project under the Net-Zero Cambridge Plan, which outlines a framework to be an emission neutral city by 2050†.

THE CHALLENGE

According to the International Energy Agency (IEA), “the buildings and buildings construction sectors combined are responsible for 36% of global final energy consumption and nearly 40% of total direct and indirect CO2 emissions.” The challenge therefore is to design buildings that balance loads—and this requires a holistic approach—every opportunity for energy generation and conservation must be considered.

HOW EEMAX HELPS

With tankless electric water heating, the only time energy is consumed is when the water is turned on; and there is no water or energy waste waiting for hot water to reach the faucet.

Another benefit of installing tankless electric water heating at the point-of-use is the elimination of recirculation loops and the energy waste (standby heat loss) generating 24/7 hot water that exists with traditional commercial boiler systems. In addition, as only one water line is necessary, a significant savings in materials and labor can be realized during the construction phase.

Just as important as energy savings, tankless electric water heating is a zero greenhouse gas emission solution. No venting is required as no fossil fuels are burned.

“It was the community of Cambridge that led the way by requesting a net-zero emission campus. Therefore, our main goal was to design a solution that reduced energy use as much as possible. With tankless electric water heating installed at the point-of-use, we were able to eliminate a lot of wasted energy.”

Kate Bubriski

Director Of Sustainability & Building Performance/Architect, Arrowstreet



WATER HEATING APPLICATIONS

Eemax products support specifications ranging from 1.8 kW to 150 kW, and flow rates from 0.2 GPM to 30 GPM. Installed on this campus are three Eemax water heating families.

- **LavAdvantage™**: 150 units support handwashing in every classroom and restroom. With active energy management, power modulating controls, and a small, compact design that can be mounted in any orientation, LavAdvantage is suitable for ADA compliant facilities. LavAdvantage is installed in the lavatories, changing rooms, and kitchens to provide safe and consistent, hot water on demand; at the same time, reducing energy and water waste, making it the ideal solution for this school or any similar facility.
- **SafeAdvantage™**: 3 units provide tepid water for eye and facewash safety equipment in school laboratories. SafeAdvantage is often specified by the plumbing engineer to meet Occupational Safety and Health Administration (OSHA) guidelines for safety equipment. In schools this tankless electric water heater can be found in chemistry and biology labs where an eyewash, facewash, and/or a drench shower is required. SafeAdvantage features Eemax proprietary Parabolic Heat Design™ (PHD) technology and is designed for low duty cycle applications where precise temperature control and low pressure drop are required.
- **Three Phase™**: 10 units provide endless hot water to support janitorial services throughout the campus. Three Phase water heaters can support capacities up to 5 GPM and deliver a temperature range from ambient to 180 °F. Each unit is thermostatically controlled, and features Self-Modulating Technology™ which provides precise outlet temperatures. All Eemax Three Phase units are custom-built for the specific application they support.



†City of Cambridge, MA, Net-Zero Action Plan:

<https://www.cambridgema.gov/CDD/Projects/Climate/NetZeroTaskForce>

BUILDING PROJECT DETAILS

This campus includes a middle school, an elementary school, a public library, pool, and administration offices for the school district.

Square Footage: 273,000

Type of Construction: New

Built for LEED v4 Schools Gold certifications

Roof-mounted PV array will generate an estimated 60% of energy on site

Geothermal heat pump system provides radiant heating and cooling

Rainwater reclamation system on site



endless
hot water



save
space



save
energy



save
time



save
money



no
venting

“Sustainability and cutting down our consumption is important for our planet and this net-zero emission school is an excellent example...it proves that you can actually do this in New England.”

Anthony DiCarlo

Asst. Professor, Mechanical Engineering
Merrimack College, North Andover, MA



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