

Energy Efficient Domestic Hot Water (DHW) Systems

WHAT IS A HEAT PUMP WATER HEATER?

A heat pump water heater is powered by electricity to heat water for use with faucets, showers, and appliances. Hybrid systems have a heat pump unit mounted on top of a storage tank. The heat pump unit pulls in air from the surrounding space, extracting heat from the air and using the refrigerant cycle to heat the water. Most systems contain a backup electric resistive element to provide additional heating capacity when demand for hot water is particularly high. One consideration when exploring heat pump water heaters is that they do require some open surrounding space for airflow while operating. Another technology called a solar-assisted heat pump water heater uses a solar collector to absorb radiant energy, which is transferred into refrigerant that heats the domestic hot water supply. The panel can be mounted on the side of the home rather than the roof, if helpful. This technology over the course of the year uses 50% less energy than a traditional water heater.

WHAT IS A SOLAR THERMAL SYSTEM?

A solar hot water heating system uses the radiant energy from the sun to heat water for use in one's home. If you're not familiar with this technology, you've likely seen it before on a roof and mistaken it for a solar photovoltaic (PV) system. Solar thermal, also known as solar hot water, similarly collects solar energy using roof-mounted panels or tubes, but rather than converting that energy into electricity as with solar PV systems, solar thermal systems store the energy in water, heating it. That heated water is then fed into the home and used for hot water in faucets, showers, and appliances. A well designed system typically displaces around 70% of energy used in heating hot water throughout the year.

Clean Heating and Getting to Net Zero

Clean heating and cooling technologies are a great way to increase home comfort and decrease our carbon footprint. Buildings in Cambridge are responsible for over 75% of our carbon emissions, and heating and cooling our buildings with clean energy will be an important part of getting to net zero. The technology is here, it is market ready, and it is affordable. Cambridge Clean Heat is here to support you along the way.

WHAT IF I ALREADY HAVE AN ELECTRIC RESISTANCE HOT WATER SYSTEM?

Electric resistance systems are great in the sense that they do not burn fossil fuels directly within the home; this makes them safer and healthier than gas- or oil-fired systems. However, electric resistance systems are much lower efficiency than heat pump water heaters, meaning that you get less “bang for your buck” with electric resistance systems than with heat pump water heaters. Additionally, most of the electricity (today) powering electric heating systems still comes from burning fossil fuels at power plants. Solar thermal systems and solar-assisted heat pump water heaters have the benefit of sourcing energy directly from the sun, therefore decreasing reliance on fossil fuel-generated electricity.

WHEN SHOULD I UPGRADE MY EXISTING DOMESTIC HOT WATER SYSTEM?

All home heating and cooling systems have a lifespan after which they need replacement. Cambridge’s water supply is slightly “hard,” meaning that it contains a higher-than-average concentration of dissolved minerals. This does not make the water unhealthy but it does impact the lifespan of domestic hot water systems and can make it less desirable to adopt other “energy efficient” technologies like tankless gas-fired water heaters (that are still problematic for climate goals). A bonus of energy efficient electric technology is that some models have lifetime warranties on the storage tank. When it comes time to replace your system, rather than installing fossil fuel-burning equipment, consider adopting clean electric technology.

ABOUT ABODE

Abode Energy Management is an energy consulting firm driving efficiency improvements for New England’s built environment. We are passionate about helping our industry grow through a training-based, collaborative approach. Our collective experience in building performance, renewables, clean energy financing, utility program implementation, community engagement, and workforce development form the foundation that enables us to deliver data-driven results for our partners and clients.

