# Water Heater Options

Water heaters use more energy than many people realize. They often account for 15-20% of the energy use of a home – or perhaps more if you live in a multifamily building, your household has many residents, people in your home like long showers or baths, or you often do laundry in hot water.

This document provides a basic overview of heat pump water heaters, solar hot water systems, and tankless hot water systems.

## Heat Pump Water Heaters

A heat pump water heater (HPWH) draws heat from the surrounding air and transfers it into the water. It is therefore more efficient than conventional water heaters.

Heat pumps provide heat more slowly than gas or electric resistance, so a HPWH typically includes a backup resistance electric heater. In some models, the backup heat comes on automatically if the tank runs low, while in other models you can turn the backup on and off yourself.

If you are happy with the size of the tank in your conventional water heater, it is recommended to increase the size by one or two steps if you install a HPWH. For example, if your conventional water heater is 50 gallons, you may want to install a 75 gallon HPWH. This up-sizing reduces the likelihood that the backup heat will be needed.

HPWHs come in three types:

**(1) All-in-one HPWH**: An all-in-one HPWH has a heat pump on top of the tank and draws heat from the surrounding air. The heat pump adds some height but stays within the circular shape of the tank.

A HPWH needs at least 500-1000 cubic feet of air to draw heat from. An all-in-one HPWH should not be installed in a closet, unless you also install a duct from the HPWH to a larger space to draw in more air.

When a HPWH is active, it will reduce the temperature of the surrounding space by 1-4 degrees, depending on the size of the space. It will also dehumidify the space, so it needs a way to drain condensate (a drain or a small pump). A HPWH is taller than conventional water heaters, so measure the height of your planned location.

If you are concerned about making an unheated basement cooler, see the basements tips sheet at tinyurl.com/BasementTips and/or consider a split-system HPWH or a solar-assisted HPWH (see below).

If you heat your basement and use it as a living space, an all-in-one HPWH would add to the load on your heating system, so it would not actually be as energy-efficient as its efficiency rating suggests. Some people use ductwork to supply outdoor air to an all-in-one HPWH, but New England winters are too cold for this option to work well. If you heat your basement, consider a split-system HPWH, a solar-assisted HPWH, or a conventional electric water heater.

An all-in-one HPWH contains a fan and pump, and some people are concerned about noise levels. If you are in the same room as a HPWH, you will easily hear when it is actively heating water. You might hear a quiet hum from another room, but it shouldn't be more than a quiet hum.

Most HPWH models need a 240V outlet, which should be installed by an electrician if you don't have one already.

Some HPWH models use 120V electricity and can plug into a standard wall outlet, as long as there's nothing else that draws significant electricity on the same circuit. If you have a goal of fully electrifying your home on 100 Amps of electrical service, a 120V HPWH can help you achieve this goal. There are concerns about whether 120V HPWHs will perform well enough in the depths of a New England winter, so they are currently difficult to find locally. A Department of Energy funded study of 120V HPWHs is currently in process in the Greater Boston area and should have results in 2027. If the HPWHs in this study perform well, it's likely that 120V HPWHs will be more readily available in the future.

**(2) Split-system HPWH:** A split-system HPWH draws heat from outdoors to heat the water. An indoor tank is attached to an outdoor unit that looks very similar to an air-source heat pump – a rectangular box with a fan. Some new designs combine water and space heating in a single outdoor unit.

**(3) Solar-assisted HPWH:** A solar-assisted HPWH (SAHP) is a type of split-system HPWH. A simple black panel, with a pump but no fan, attaches to the wall of your home and draws heat from outdoors to heat the water. "Solar assisted" is a bit of a misnomer, since a SAHP can work in any outdoor location, in the winter, and at night. Direct sunlight helps it run more efficiently, but it will still work when shaded.

## Financial Incentives for HPWHs

(1) Mass Save rebate: $750 for an all-in-one HPWH, $1,500 for a split-system HPWH (solar-assisted or not). You can get an instant rebate (a rebate applied to your invoice) if your plumber uses a participating distributor or at participating retailers. Learn more at tinyurl.com/rebateHPWH.

(2) Federal tax credit: 30% of the cost, with a cap of $2,000. This tax credit cannot be carried over to future years, so it is fully usable only if your federal tax bill is $2,000 or more. This tax credit cannot be combined with a tax credit for an air source heat pump in the same year. It is part of the Inflation Reduction Act and was expected to end in 2032. As of the tax/budget bill of July 2025, **it is now available only for equipment that is in operation by December 31, 2025**.

(3) Mass Save HEAT Loan with 0% interest: up to $25,000 per household (lifetime cap), with a pay-back period of up to 7 years. Learn more at tinyurl.com/MassSaveHEATLoan.

Mass Save will pay for 100% of all recommended energy-efficiency measures for low-income households and their landlords, including in some cases heat pump water heaters.

The Mass Save program for moderate-income households is expected to expand later in 2025. The plan is to include larger rebates for heat pump water heaters, but the status of the federal funding for this program is uncertain. Email ElectrifyArlington@town.Arlington.ma.us to ask questions or be added to a list of people to be notified of changes in Mass Save's moderate-income program.

**A Note about Energy Efficiency**

The efficiency of water heaters is rated by UEFs (Uniform Energy Factors), which reflects how much of the energy a water heater uses becomes heat in the water. Most conventional water heaters have a UEF between 0.63 and 0.95, since they always produce waste heat. Currently, the best HPWHs have a UEF of 4.1. Mass Save will provide a rebate for an all-in-one HPWH if it has a UEF of 3.3 or higher, and for a split-system HPWH if it has a UEF of 2.2 or higher.

Learn more about HPWHs on the Massachusetts Clean Energy Center website: tinyurl.com/MassCEC-HPWH

## Solar Hot Water (a.k.a. Solar Thermal)

In Massachusetts, a solar hot water system can be an efficient way to provide up to 80% of a home's hot water needs, with an electric resistance back-up heater in the tank for those short cloudy winter days. Solar hot water panels are more efficient than photovoltaic (PV) solar panels (which generate electricity), so they cost less, use less roof space, and may work well even if your roof doesn't receive enough sunlight for PV solar panels. If you do have a good exposure for PV solar, though, it may be simpler and more cost-effective to maximize your PV solar panels and use them to power a HPWH.

**Financial Incentives for Solar Hot Water**

(1) Federal tax credit: 30% of the cost. No cap, and can be carried over to future years. **This tax credit is now available only for equipment that is in operation by December 31, 2025.**

(2) Massachusetts tax credit: 15% of the cost, up to $1,000. This tax credit is available only to homeowners, not for rental properties.

(3) Mass Save HEAT Loan with 0% interest: up to $25,000 per household (lifetime cap), with a payback period of up to 7 years.

(4) Alternative Energy Certificate (a one-time payment): probably between $400 and $1,000.

Learn more on the Massachusetts Clean Energy Center website:
tinyurl.com/MassCEC-SolarHotWater

## Tankless Water Heaters

Tankless water heaters use energy – either gas or electricity – in small intense bursts to heat water when it is needed.

A tankless system may be more energy-efficient than other options if you use hot water only occasionally – for example, in a second home that you visit on weekends, or if you are a solo person who takes brief showers.

If your long-term goal is to make your home all-electric, though, a tankless system may make that more expensive, since the short and intense spikes of the tankless system's demand often mean you have to install a larger electrical system. The energy demands of a water heater with a tank are more spread out, since the water in the tank is kept hot.

There are no financial incentives for tankless water heaters.

## Conventional Electric Tank Water Heaters

A conventional electric tank water heater will cost 2-3 times as much to operate as a heat pump water heater. Electricity rates are relatively high in New England, so it will also cost more to operate than a gas water heater. A conventional electric water heater might be cheaper to install than a heat pump water heater or solar hot water – but it might not, after one includes the financial incentives for these two technologies.

There are no financial incentives for installing a conventional electric water heater.

**Questions? Email Arlington's Energy Advocate:**

**ElectrifyArlington@town.Arlington.ma.us**