Energy efficient water heaters

FACT SHEET


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Chances are your water heater is quietly performing its job making hot water. Water heaters are dependable and rugged appliances, lasting 10 years or more. However, when they wear out they usually do so suddenly. This can catch shoppers off guard and lead to emergency decisions that don't factor in the energy aspects of these appliances.

Since a water heater is the second largest energy user in a typical Wisconsin home, it pays to learn about the types of water heaters available and their energy efficiency characteristics. This fact sheet will explain some of the basics.

TYPES OF WATER HEATERS

Conventional Tank

Conventional tank, or storage, water heaters heat large volumes of water stored inside an insulated tank. Water can be heated by combustion–using fossil fuels such as natural gas, oil, or propane–or by electricity. All conventional tank heaters include thermostats, which automatically shut off the heating element once the desired water temperature is reached.

Three types of combustion heaters are available–conventional, power vented and sealed combustion units. Conventional or atmospherically vented water heaters vent out the chimney and have the greatest standby losses. Direct-vented or power-vented models use a fan to vent exhaust out the side of the home but use house air for combustion. Sealed combustion units draw outside air to feed the flame and vent exhaust air outside.

Direct-vented or closed combustion water heaters are safer than traditional atmospherically vented units which are subject to backdrafting, the hazardous exhaust gases back into the home–a problem direct-vented water heaters avoid.

Electric water heaters are typically much more expensive to operate than those powered by natural gas or other fossil fuel, making a combustion water heater a smart choice if it's available to you.

One disadvantage of storage water heaters is that energy is lost through the walls of the tank, even when hot water is not needed. However, energy efficient units minimize these standby losses by heavily insulating the tank walls. Also, adding an insulating blanket to almost any conventional water heater can increase your savings.

Combination

Combination units are primarily large-capacity boilers providing both hot water and space heating. Hot water from the water heater passes through a heat exchanger, which heats the coil in a fan-coil unit that provides heat for the home.

Combination water heaters, also called dual-integrated units, are designed to provide faster hot water recovery for larger homes and appliances such as whirlpools. Sizing these units is especially important because they provide both water and space heating. High efficiency combination units can be more efficient than separate space and water heating systems of comparable efficiency.

Instantaneous/Tankless

Instantaneous or tankless water heaters are designed to heat a continuous stream of water on demand. They do not have a storage tank and, thus, do not lose energy to standby losses. Demand water heaters can supply an unlimited amount of hot water, but the flow rate may be limited and proper sizing is very important. Whole-house models are available to serve multiple simultaneous uses while single point models typically can heat the water for only a single application such as a remote bathroom that takes a long time for the water to get hot. Typically demand water heaters operate at higher combustion efficiencies than conventional tank systems.

Solar

Solar water heaters use the sun's energy to preheat cold water before it is sent to a conventional water heater. Typically, roof-mounted solar panels collect the sun's energy, which is transferred to an antifreeze loop. The antifreeze loop heats the cold water through a heat exchanger. Solar water heaters can save 40 to 70 percent per year on hot water costs in Wisconsin. These heaters have a life expectancy of over 20 years and meet nationally established industry standards.

It is best to arrange for a certified solar site assessor to see if your home is suitable for a solar water heating installation and learn about the different solar water heater types available.

SHOPPING FOR A WATER HEATER

Before purchasing a water heater, it's important to consider the way you use hot water. Ask yourself these questions:

- How much hot water does your household typically use each day? Estimate how much hot water you need at peak times. Then choose a water heater that can meet this demand. The ability to meet hot water demand is given by the water heater's first hour rating, not by its storage tank capacity. In fact, the larger the storage tank, the more energy will be wasted due to standby heat losses.

- Are there ways that you can reduce total hot water demand by installing low-flow shower heads or faucet aerators or repairing any dripping faucets? Can you do your laundry with cold water or take showers instead of baths?

- Can you reduce the temperature of the water you use? Most applications need water to be no more that 120°F.

- What is your budget for purchasing and operating a water heater? There is often a trade-off between purchase and operating costs: the more expensive the water heater, the less it costs to operate. Energy Guide labels provide information on relative efficiency, first hour rating and operating costs.

- What kind of fuel is available for your home? If you have both electricity and natural gas, switching to a water heater that burns natural gas (or other fossil fuel) is often much cheaper in the long run.

- If you already have a direct-vent, high-efficiency furnace, choose a power-vented or closed combustion water heater and seal off your chimney to reduce whole-house heat loss through the opening in your roof.

Another tip is to look for the Energy Factor (EF). The more efficient the model the higher the EF. Look for 0.60 or higher EF on conventional tank combustion water heaters, 0.80 or higher EF on instantaneous water heaters and 0.90 or higher EF on electric water heaters.

Focus on Energy recommends that you contact a qualified contractor, plumber or reliable appliance store to help you determine the water heater that's best for you.

WHAT IS YOUR WATER USE?

It might surprise you to learn how much hot water you and your family use in a typical day. Consider the following average hot water use. How does your water heater compare? The answers can help you decide the size and type of water heater that's best suited for your needs.

HOT WATER USE AND WATER HEATING COSTS FOR VARIOUS ACTIVITIES

ACTIVITY	TYPICAL HOT WATER USE (gallons)	TYPICAL USES PER WEEK	ANNUAL COST ($) GAS WATER HEATER	ANNUAL COST ($) ELECTRIC WATER HEATER
Shower	10	15	$96	$159
Bath	20	15	$172	$318
Laundry (top loading)	12	6	$46	$76
Laundry (ENERGY STAR front loading)	5	6	$19	$32
Automatic dishwashing (older)	12	4	$31	$51
Automatic dishwashing (ENERGY STAR)	7	4	$18	$30
Hand dishwashing	4	5	$13	$21

*BASED ON 1.18 DOLLARS/THERM AVERAGE GAS COST, 10 CENTS/KWH ELECTRICITY RATE, 0.60 GAS WATER HEATER ENERGY FACTOR, 0.90 ELECTRIC WATER HEATER ENERGY FACTOR, 75°F DIFFERENCE BETWEEN COLD AND HOT WATER TEMPERATURE

LEARN MORE

focusonenergy.com
Contact Focus to learn more about smart energy choices.

aceee.org/consumerguide/topwater.htm
The American Council for an Energy Efficient Economy publishes this list of top-rated energy efficient water heaters.

home.howstuffworks.com/water-heater.htm
This top-rated science and technology site shows how conventional water heaters work.

eere.energy.gov/consumer
Click on Water Heating in the quick links section to see what the US Department of Energy says about various water heaters.