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 Midwestern 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

There are several kinds of water heaters available on the market, including conventional, combination, heat pump, instantaneous, and solar.

Conventional

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

Electric water heaters are 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.

Two types of combustion heaters are available—conventional and direct-vented. Conventional water heaters vent out the chimney. Direct-vented models use a fan to vent exhaust out the side of the home. They come in two varieties—power-vented and sealed combustion units. Sealed combustion units draw outside air to feed the flame and vent exhaust air outside. Power-vented models vent exhaust air outdoors but use house air, rather than outside air, for combustion.

Direct-vented water heaters are safer than traditional venting methods. In tightly sealed homes, traditional chimney venting can lead to backdrafting of the exhaust gases into the home—a hazard which direct-vented water heaters avoid.

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.

Combination

Combination units are primarily large-capacity water heaters, providing space heating as a secondary benefit. 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.

Heat pump

Heat pump water heaters work much like a refrigerator. They use warmth from exhaust or house air to heat water using compressors and a refrigerant fluid. Because heat pump water heaters move heat from one place to another, they use less than half as much electricity as a standard electrical unit (though they may be more expensive to operate than a natural gas water heater). Though more efficient than standard electrical water heaters, heat pump water heaters cost more up front.

Instantaneous

Instantaneous water heaters are designed to heat a continuous stream of cold water on demand. They do not have a storage tank and, thus, do not lose heating energy to standby losses. Often located at the point of use, such as the kitchen sink or bathtub, these devices require large amounts of energy to quickly heat cold water. Demand water heaters can supply an unlimited amount of hot water, but the flow rate is limited—you may need more than one unit to meet your needs. Recently, whole-house models have become available.

Solar

Solar water heaters use the sun's energy to preheat cold water before it is sent to a conventional water heater. 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 on hot water costs in Wisconsin. These heaters have a life expectancy of up to 20 years and meet nationally established industry standards. As an investment these systems can pay for themselves in as little as four to six years.

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.
- What is your budget for purchasing and operating a water heater? There is often a tradeoff 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 heats your home? This will help you decide what kind of water heater to buy. If you have both electricity and natural gas, switching to a water heater that burns natural gas (or other fossil fuel) is much cheaper in the long run.
- If you already have a direct-vented high-efficiency furnace, choose a direct-vented or power-vented water heater and close your chimney for increased energy savings.

Focus on Energy recommends that you contact a qualified 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	$58	$131
Bath	20	15	$115	$262
Laundry (top loading)	12	6	$28	$63
Laundry (ENERGY STAR front loading)	5	6	$12	$26
Automatic dishwashing (older)	12	4	$18	$42
Automatic dishwashing (ENERGY STAR)	7	4	$11	$24
Hand dishwashing	4	5	$8	$17

*BASED ON 65 CENTS/THERM AVERAGE GAS COST, 8 CENTS/KWH ELECTRICITY RATE, 0.55 GAS WATER HEATER ENERGY FACTOR, 0.85 ELECTRIC WATER HEATER ENERGY FACTOR, 75ºF DIFFERENCE BETWEEN COLD AND HOT WATER TEMPERATURE

LEARN MORE

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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.

howstuffworks.com/water-heater1.htm

This top-rated science and technology site shows how conventional water heaters work.

eren.doe.gov/erec/factsheets/eewtrhtr.html

Get tips about getting the most for your energy dollar through this Energy Efficiency and Renewable Energy Network fact sheet.

Focus on Energy is a public-private partnership offering energy information and services to energy utility customers throughout Wisconsin. The goals of this program are to encourage energy efficiency and use of renewable energy, enhance the environment, and ensure the future supply of energy for Wisconsin. For information about the Focus on Energy services and programs, call 1.800.762.7077 or visit focusonenergy.com.

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