

The Case Against the Tank

The Skinny on Tankless Water Heaters

By Dave Emmitt



What it would cost to leave your car running in your garage all night long just so it would be warm for you in the morning? What about leaving your heat at 75 degrees while you're on vacation just so the house is warm when you get home? Or how about leaving the lights on in your house all day just so you don't have to turn them on when you get home from work? You get the point. Tremendous and useless wastes of energy, right? These examples are not far off what it's like to have a water tank heating water while nobody is using it. The energy being used right now by your water heater to keep that water hot for you to use hours from now is being wasted. A tankless water heater can help eliminate that waste.

How do tankless water heaters work?

Tankless water heaters provide hot water on an as-needed basis. When you turn your hot water tap on, cold water travels through a pipe into the tankless unit and is heated instantaneously by either an electric element or a gas burner, then comes out your tap. Because tankless water heaters deliver a constant supply of hot water you won't have to wait for a storage tank to fill up when it runs out, however, hot water output is limited by the unit's production capacity. Tankless water heaters are rated by the maximum temperature rise possible at a given flow rate. To ensure that the tankless

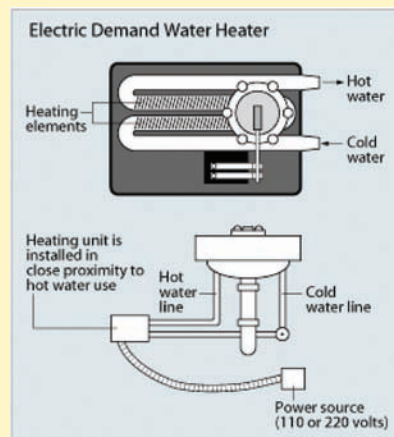
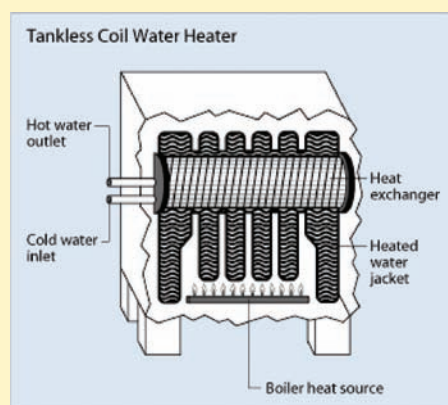
unit can deliver enough hot water, consider how many degrees the water temperature must increase to reach "domestic hot water" level (usually 120°F) and your desired flow rate (combined gallons per minute of hot water outlets to be supplied by the tankless unit). For example, in a winter climate where city water during the cold season reaches the home at 55°F, a tankless water heater must be able to heat that water to 120°F (an increase of 65°).

Tankless water heaters are available in electric, propane or natural gas models. Gas models tend to have higher hot water output than electric models. They also come in a variety of capacities from single-use, such as for a dishwasher or washing

machine, to whole house systems. They can be installed centrally or near specific uses, depending on the amount of water required for the application. Units can be installed in tandem to increase the hot water supply water available to meet higher needs.

The case against the tank:

A conventional water heater is nothing but a big metal kettle with a heat exchange tube running up the middle of it. Unfortunately, there's not much room to make them more efficient. In 2004, standards were mandated for water heaters as a result of the N.A.E.C.A. (National Appliance Energy Conservation Act). After many years of trying, the government determined the only way to increase the efficiency of hot water heaters is to thin the wall of the heat exchange tube. While this increases efficiency by 1.5%, all the manufacturers have had to "retool" and prices have gone up by more than \$100 in many places. A thinner heat exchange tube also means less longevity so the predicted lifespan of new water tanks is only 5-7 years. So, for an average yearly energy savings of under \$10, you will spend more money on a new "more efficient" hot water tank that lasts half as long as the old one did.



Then there's the issue of what happens when your water tank decides to give up on you. It often happens without warning. In 50% (yep, *half!*) of the cases, the bottom drops out or the side splits from a faulty relief valve and the basement becomes a swimming pool, or the crawlspace a swamp, or the condo below fills up with water, or... you get the picture. Once your tank is done, it's done, whereas tankless water heaters are "component" systems. This means they have parts inside that work together to heat the water, all of which can easily and inexpensively be replaced when they fail. As a result, tankless systems have 3 to 4 times the longevity of a tank.

Water tanks also take up a lot of space. A typical size tank can take up most of a utility room. Comparatively, a tankless takes up no space at all; it just hangs on the wall waiting for someone to turn on a faucet. Outside of the U.S., tankless technology is the most common, perhaps only, method of heating water. Most places in the world don't have the space or energy to waste on constantly heating a tank of water.



Side splits from a faulty relief valve can cause serious problems in your home.

Tanks vs. No Tanks

For homes that use:

41 gallons or less hot water per day a tankless system can be 24%-34% more energy efficient

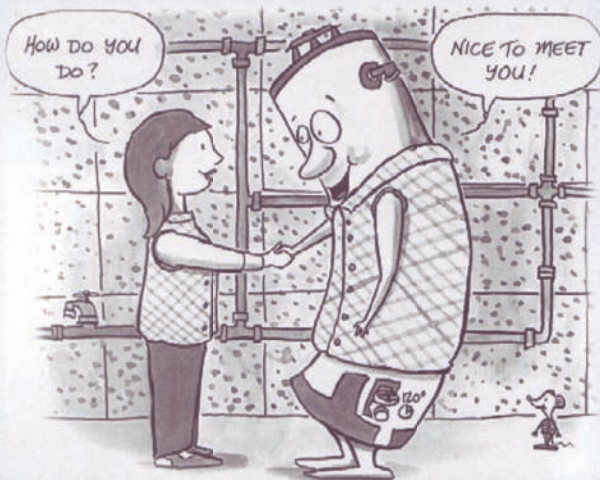
Over 85 gallons of hot water per day a tankless system can be 8%-14% more energy efficient

* Energy savings of 27%–50% can be achieved if a tankless water heater is installed at each hot water outlet.

Not just for showers and washing hands:

You can convert your gas-fired furnace into a hot water air handler with some modifications and a tankless water heater. When a furnace is converted, the burner, heat exchanger and gas valve are removed and a hot water coil, similar to a car radiator, is installed inside the box. The fan and some of the controls are retained, but otherwise the system is without any combustion gases or flames.

After the conversion, when the thermostat calls for heat, a pump moves water from the tankless system through the coil and back to the water heater where the burners kick in to bring the water temperature up to 140-150 degrees. Then the fan on the "hot



Courtesy of: David Gershon, Low Carbon Diet: A 30 day program to lose 5000 .



Water tanks take up a lot of space (outdoor units in Boulder Foothills).

water air handler” comes on and produces warm air, just not as dry as that from a standard furnace. Heat is produced with the efficiency of the tankless system and has little effect on the amount of hot water available for domestic use. Tankless systems can also be used in hydronic heating situations as replacement for old, inefficient boiler systems. The efficiency of radiant floor or hydronic baseboard systems is greatly increased over a standard boiler. In many cases, space heat and domestic hot water can be integrated into one unit. If solar or geothermal is used as a pre-heat source, the savings can be tremendous.

Considerations before going tankless:

Hot water lag time: Because the tankless system has to heat water when you ask it to, and depending on where you install the tankless unit, you may have to wait a few seconds for the hot water to get to your tap. This problem can be overcome by installing a recirculation system. Also, tankless systems require a minimum flow to activate them, which means you may not be able to “trickle” water in the sink and still get hot water.

Chose your contractor wisely: Contractors are sometimes resistant to installing systems they are not familiar with. If you are ready to go tankless be sure to do your homework first, and find a contractor who will work with you (preferably one who has experience installing tankless units). Consider consulting with the CRC’s contractor referral network to find a tankless installer.



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Units can be installed in tandem to increase hot water supply.

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