



Tankless water heaters consume less energy, take up less space, and are easier to install than traditional tanks. By Amy Fischbach

It's no wonder tankless water heaters are becoming a staple of green building.

Unlike tank-type water heaters that keep gallons of water at usable temperatures 24/7, tankless heaters provide hot water on demand, saving energy and money. In fact, the Department of Energy estimates that tankless water heaters can be 24% to 34% more efficient than tank units. According to Jack Banker, manager

of tankless sales for Rheem, homeowners can save about 20% to 25% on their heating bills.

This technology isn't new—it's been in use in Europe, South America, and Asia for decades—but the units have only recently begun to gain traction in the United States as Americans look to cut energy costs. Technology is catching up with demand, too, as vendors are

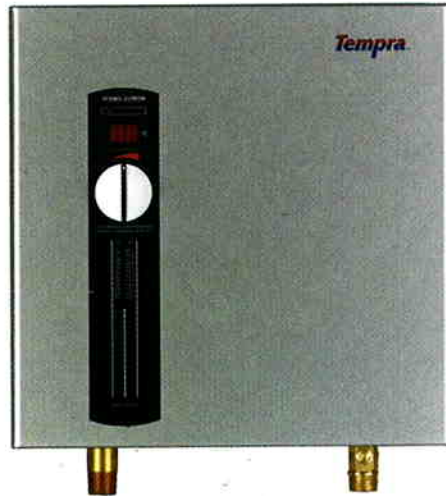
responding with whole-house tankless systems that offer capabilities beyond the capacity of early point-of-use units.

EFFICIENT OPTIONS

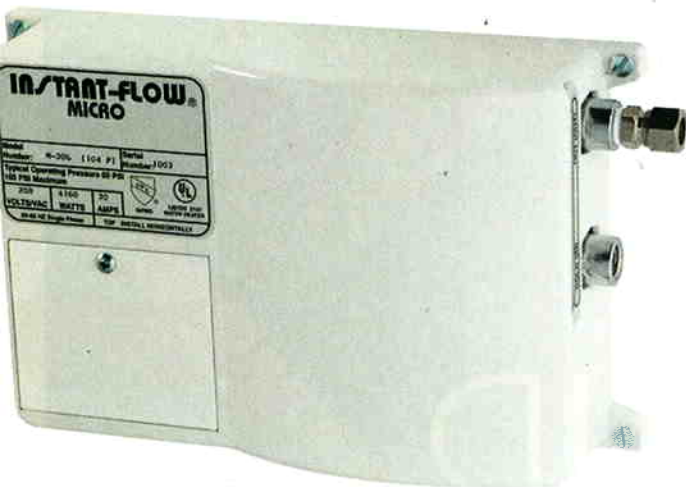
The basic operation of tankless water heaters is fairly straightforward: When someone opens the hot side of a fixture, water flows into the tankless unit and past a sensor that triggers the heater to

GRAND HALL. The Eternal GU32 hybrid water heating system combines the best attributes of tank and tankless systems, with an inverted-infrared heat burner that uses thermal activation like a tank and flow activation like a tankless. The system uses a counter-flow design and multi-pass heat exchanger technology to maintain an 86% thermal efficiency rating with consistent pressure. The unit operates at a lower emission rate than traditional tank and tankless water heaters, says the company. The system's nitrogen oxide emission is less than 5 parts per million. 877.934.7455. www.eternalwaterheater.com. Circle 328.

► **STIEBEL ELTRON.** The electric Tempra whole-house series comprises six tankless water heater models, from 12 kW to 36 kW, that can be installed in homes with one to four bathrooms. The smallest capacity unit has one heating module, the mid-range models have two heating modules, and the largest capacity units have three heating modules, which are all wired back separately to the electric panel. The temperature and flow sensors feed their readings into the water heater's microprocessor control, and the microprocessor prevents the water temperature from deviating from the set point. The tankless water heaters, which the company says are nearly 100% efficient, save 15% to 20% on water heating costs compared to a tank water heater. Energy factor: 0.99. 800.582.8423. www.stiebel-eltron-usa.com. Circle 329.



◀ **CHRONOMITE.** The electric Insta Flow point-of-use tankless water heaters are 98% efficient, says the firm. Digital microprocessor technology controls the temperature of the water, and the temperature can be pre-set to prevent scalding without mixing valves. The units come in three different capacities—Insta Temp, Insta Flow, and Insta Flow Micro—and are also available in a wide range of models to fit the desired application. 800.447.4962. www.chronomite.com. Circle 330.



bring the water to a pre-set temperature for delivery to the fixture. The quick recovery rates on tankless water heaters allow them to operate on demand, and as long as that fixture is asking for hot water, the tankless unit will continue to heat and deliver it.

Not long ago, availability of tankless units was limited to small-capacity point-of-use systems, which would only provide enough hot water for the location where it was installed, such as a for a bathroom or kitchen sink. Now the majority of manufacturers offer whole-house systems, which can provide enough hot water for large homes with multiple bathrooms. As a result, the tankless water heater industry has grown on average about 25% per year since 1999, says Mat Katz, retail marketing manager for Bosch.

Over the years, vendors of tankless water heater units have improved their products' performance by merging gas condensing and tankless technology, adding direct-vent technology, and integrating temperature and carbon dioxide sensors. In addition, the units have gotten more compact and more efficient.

The efficiency of tankless water heaters depends on a variety of factors, including the design and the fuel source. Gas units are about 80% to 85% efficient because residue heat is lost through the vent pipe, while electric units are nearly 100% efficient because they convert almost all the electrical energy they consume into heat. However, some homeowners prefer gas tankless water heaters because they are said to heat water more quickly. (A common complaint of tankless technology is that users must wait a few seconds for the ambient-temperature water to be expelled, the temperature to rise to the set point, and the hot water to flow through the sensor. Some vendors are circumventing this problem by allowing their systems to be installed with a circulating pump.)

Whether the best option is to go with a gas or an electric tankless water heater also depends on fuel prices and availability of natural gas in a particular area. The desired location of the tankless water heater plays a role as well. Electric tankless water heaters can be installed closer to the point of use, even for whole-house models, which can reduce the wait time for hot water; a gas unit must be

TIPS FOR SIZING A TANKLESS WATER HEATER APPROPRIATELY

If sized properly, a whole-house tankless water heater can supply all the hot water required for a household. But if you undersize a unit, your customers might find the water run cold in their shower, especially if they're running the dishwasher and washing machine at the same time.

Here are a few common rules of thumb for how to size a tankless water heater:

- 1. Check the inlet water temperature.** The incoming water temperature varies widely from one region of the country to another. In the colder climates, builders will need to install higher-capacity tankless water heaters in order to get the same performance as a smaller unit in a more temperate climate.
- 2. Consider the number of the fixtures and their flow rate.** When specifying a tankless water heater, you must size the unit based on the number of showers and bathroom fixtures in a home.
- 3. Use online resources.** Many manufacturers offer a variety of different models to meet different water heating needs. To help builders find the right model, Rinnai and Rheem offer sizing applications on their Web sites. Visit www.foreverhotwater.com to view Rinnai's sizing calculator, and www.rheemtankless.com to launch Rheem's energy calculator. —A.F.

installed where it can be connected to a gas line and vented outdoors. Some of these gas units offer direct-vent technology, which pulls combustion air from outside the home and discharges it through an outside vent. As a result, the tankless water heater unit isn't discharging conditioned air from inside a home to the outdoors.

A range of capacities is available for both gas and electric models. Some units are designed for homes with multiple bathrooms, while others are suitable for smaller homes with a single shower.

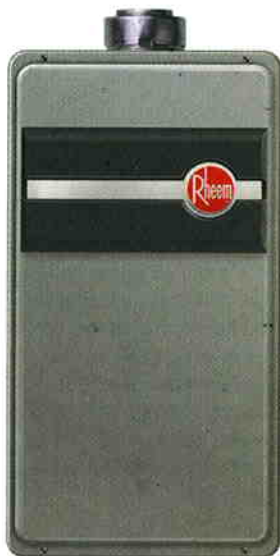
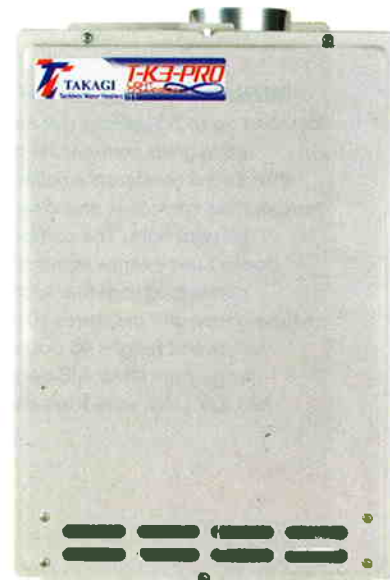
Green builders also can select the most efficient models based on national recognitions and standards. Energy Star recently established a residential water heating program to recognize gas, whole-home tankless water heaters with an energy factor (EF) of 0.82 or better, gas condensing units with an EF of 0.80, and electric heat pump water heaters with an EF of 2.0. So far, however, Energy Star has not recognized electric tankless water heaters, which typically have an EF of 0.98 to 0.99 compared to 0.91 to 0.95 for an electric tank unit, because it is still a small market and the energy savings are too low, according to Energy Star.

Builders also can earn two points toward LEED certification if the gas unit has an EF of at least 0.80 or an electric tankless unit has an EF of 0.99. The National Green Building Standard awards points for whole-house tankless units that are either direct-vented or power-vented to improve indoor air quality and minimize contamination from combustion byproducts.

All of that efficiency, however, comes at a price. Banker estimates that most tankless water heaters cost two to two-and-a-half times more than a traditional tank model. Federal and local tax incentives and rebates, along with incentives available from many utilities, can help offset the sticker shock.

While the return on investment depends heavily on water usage and energy prices, homeowners can expect to recoup their initial investment in about four to six years. In addition, the life span of a tankless water heater is two to three times longer than a traditional water heater.

► **TAKAGI.** The gas-fired TK-3 Pro is designed to withstand space-heating and domestic recirculation systems in residential applications. It starts heating water at flow rates as low as 0.5 gallons per minute, but it can generate an unlimited supply of hot water at a maximum flow rate of 7 gallons per minute. The unit measures 13.8 inches wide and weighs 40 pounds. It can be installed inside or outside and can be direct-vented. Energy factor: Natural gas: 0.827; LP: 0.833. 888.882.5244. www.takagi.com. Circle 331.



◀ **RHEEM.** The RTG-66DV gas direct-vent, tankless water heater is designed for homes with two or three bathrooms. The unit measures 25½ inches high, 13½ inches wide, and 10 inches deep. The concentric venting system simplifies installation by expelling the byproducts of combustion through a 3-inch exhaust pipe inside the 5-inch intake run. The unit can deliver water at a rate of 6.6 gallons per minute. Installers can connect multiple units to meet the needs of high-demand applications. The product uses either natural gas or liquid propane. Energy factor: 0.82. 334.260.1500. www.rheem-tankless.com. Circle 332.

► **NORITZ.** The Energy Star-rated N-0841MC tankless water heater yields 93% energy efficiency versus 60% of a typical tank water heater due to its Hybrid Super Heat Exchanger—a stainless and copper heat exchanger fused into one. The unit, which uses gas or propane, delivers up to 11.1 gallons per minute at a 35-degree temperature rise and 8.4 gallons per minute at a 45-degree temperature rise. Energy factor: 0.94. 877.986.6748. www.noritz.com. Circle 333.



HOW A TANKLESS WATER HEATER SYSTEM WORKS

Tankless water heaters heat water directly without the need for a storage tank. A gas tankless water heater senses water flow when a fixture is opened and triggers its gas burner to fire. The gas burner heats the water instantly, and raises the temperature from its entry temperature to the pre-set user level. When the hot water side of the fixture is closed, the heater unit shuts off. Except for the energy source, electric tankless heaters work in the same way. —A.F.

► **RINNAI.** The R75Lsi delivers continuous hot water on demand up to 7.5 gallons per minute. The unit features a redesigned commercial-grade heat exchanger, an integrated condensate collector, an integrated digital temperature controller, and direct electronic ignition with no pilot light. The combustion unit is sealed, so it doesn't use interior combustion air. Two units can be connected together without a control board. The whole-house unit measures 10 inches by 14 inches by 26 inches and weighs 46 pounds. The temperature can range from 98 to 140 degrees. Energy factor: 0.82. 678.829.1700. www.foreverhotwater.com. Circle 334.



INFRASTRUCTURE & INSTALLATION

While both gas and electric tankless water heaters are generally considered more energy efficient than tank models, builders should note that tankless units actually consume more energy than tank water heaters, but for shorter periods of time. To accommodate these significant surges of energy, gas units must be connected to a large gas line and electric models require extra breakers to support the heating modules in the system.

"I think the infrastructure to support them is the biggest challenge when you're using this technology compared to a conventional tank," says Aaron Siegel, vice president of sales and marketing for Eemax. "Everything else is a gigantic plus."

Unlike 200-pound tank water heaters, tankless units can be installed virtually anywhere. Most tankless units weigh only 40 to 60 pounds, and some are so compact they can fit in a closet or in between wall studs.

Space savings and efficiency are the top reasons Mike Moon of Urban Renaissance Group is installing tankless units in the Walnut Hill Townhomes in Tennessee. "I find buyers understand that tankless water heaters are an upgrade and add value over conventional water heaters," he says. "This helps differentiate our product from the competition."

Tankless water heaters currently comprise about 4% of the total U.S. water heating market, but the demand is growing. Over the last eight years, the industry has increased 20% to 40% a year, according to Rinnai. In addition, the Department of Energy estimates that Americans can save 78% in utility costs, avoid 4.2 million tons of carbon dioxide emissions, and achieve energy savings of 3.9 billion kWh and 270 million therms of natural gas by using high-efficiency tankless water heaters in five years.

As more builders look for energy-efficient technology, tankless water heaters may one day be the norm, rather than the exception, in homes nationwide.

Amy Fischbach is a freelance writer based in Overland Park, Kan.

✳ For more green products, visit ecohomemagazine.com.

◀ **EEMAX.** The Series Four large-capacity electric tankless water heater is rated at 99% efficient. The whole-house unit features microprocessing temperature control. The flow activates each of the EX380T2T2's heating elements in stages based on hot water demand. Thermostatic control delivers unlimited hot water at precise outlet temperature. Energy factor: 0.99. 800.543.6163. www.eemax.com. Circle 335.



► **BOSCH.** The Bosch AquaStar 2700ES gas tankless water heater enables users to operate two to three hot water applications simultaneously. The unit delivers more than 7 gallons per minute. The product's built-in power vent enables horizontal or vertical vent termination, and the unit offers direct, room-sealed electric combustion. The unit can plug into a 120V electrical outlet and uses natural gas or liquid propane. Energy factor: 0.83. 866.642.3199. www.boschhotwater.com. Circle 336.



RESOURCES

Energy Star: www.energystar.gov

Database of State Incentives for Renewables & Efficiency: www.dsireusa.org

Association of Appliance & Equipment Manufacturers: www.gamanet.org

Tankless Water Heater Buying Guide: www.tanklesswaterheaterguide.com