

# Tankless Water Heaters

A Fact Sheet for Members of the *Rural Electricity Resource Council*

## Tankless Units, Large and Small:

The term *tankless water heater* can refer to two designs that differ greatly in size and capacity. The first is a central, whole-house unit that takes the place of a conventional storage water heater. Due to concerns about electrical demand created by whole-house units, this fact sheet deals primarily with issues surrounding this type of tankless heater.

The second type is a smaller under-the-sink unit that is often called a *point-of-use* water heater. This style delivers hot water to a single faucet. Although smaller in capacity than the whole-house modules, their electrical demand could still be an issue, particularly if several were used within a home.

The issues discussed below relate to electric tankless water heaters of high capacity, and the resulting consequences on electrical demand and energy use.

## Capacity for Electric Units (kW):

Tankless heaters draw large amounts of power. Most designs use sensors that vary the electrical demand (watts) according to the amount of hot water required. In other words, resistance electric elements are activated in stages, to deliver just the wattage needed for the water flow rate going through them, to maintain the set temperature. The following description is taken from one manufacturer's Web site (Siesco) that describes this:

**POWER RATING:** The four-chamber models contain four electric heating elements whose combined wattage is the total power rating of the heater. The standard model contains four 7,000-watt elements for a total of **28,000 watts**, or 28 kilowatts (kW) of power. The two-chamber model contains only two 7,000-watt elements for a total power rating of 14,000 watts, or 14 kilowatts (kW).

## Documenting Energy Savings Potential:

For any water heater, the vast majority of energy is used in heating the incoming water (at about 50 ° F) to the desired setting (120 ° F). Relatively minor energy consumption is associated with standby losses from tank walls, or line losses from piping in the home. Of the total energy used by an electric water heater, approximately 80 to 95% of the electricity goes to the purpose of heating incoming water. Any savings in energy (and water) of a tankless unit over a conventional water heater would come from two areas:

**Reducing standby losses** – a tank of hot water will lose heat through the sidewalls over time. For a well-insulated conventional water heater, these standby losses are relatively low. When the water tank is located in an unheated basement, standby losses can be higher but still in the range of 10 to 15% of total energy use. Tankless units would eliminate these losses.

**Reducing line losses** - the heat that is lost from the water remaining in the pipes between the tank and the faucet represents line losses. In winter months, this heat is not "lost", because it helps heat the home (if pipes are run through interior walls). Typical values for line losses are 4 to 12% of total water heating energy use. For long houses with lengthy pipe runs, standby losses will be greater. Also, water waste is higher as family members run water down the drain waiting for it to heat up.

Of the two designs of tankless water heaters, *only* the point-of-use models have the potential to reduce line losses. Because these "under-the-sink" units heat the water at the tap, they do not leave warm water in the pipes. But a home would need to have multiple point-of-use water heaters, to serve the dishwasher, each shower, the clothes washer and the hot tap at each sink.

A central whole-house tankless water heater on the other hand will still experience line losses. This is because it distributes water to multiple locations from a single location, just like a conventional water heater.

One other point - There must be an electrical disconnect panel installed at each location adjacent to the water heater, as specified by the National Electrical Code, for servicing the unit. In the case of point-of-use styles, this means a disconnect switch under the sink at each location.

## Some Web Sites With Interesting Information:

Below is a partial listing of Web sites that contain information about gas & electric units:

[www.seisco.com/](http://www.seisco.com/)

[www.tankless-water-heater.com](http://www.tankless-water-heater.com)

[www.meikib.com/](http://www.meikib.com/)

[www.eemaxinc.com](http://www.eemaxinc.com)

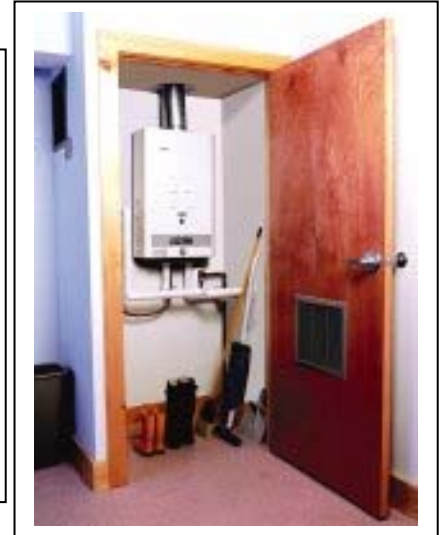
[www.dulley.com/search.shtml](http://www.dulley.com/search.shtml)

[www.tanklesswaterheater.com](http://www.tanklesswaterheater.com)

[www.ControlledEnergy.com](http://www.ControlledEnergy.com)

[www.hotwaterheater.com](http://www.hotwaterheater.com)

[www.houseneeds.com/shop/HeatingProducts/WaterHeating/ProductsWaterHeaters.htm](http://www.houseneeds.com/shop/HeatingProducts/WaterHeating/ProductsWaterHeaters.htm)



### Customer Considerations (And Added Costs) For Going Tankless

1. Tankless water heaters can cost up to twice as much as conventional water heaters.
2. Electric service equipment (transformers, electric panels & conductors) may need to be larger. This is more costly for the utility to install and maintain, particularly since it is sized to serve just the few hours of peak demand.
3. Energy savings will be minimal. The only opportunity for savings (over a tank unit) is reduced standby losses from the tank walls and pipes. This is commonly less than \$90 per year.
4. Other sensitive electrical equipment (like computers) may be affected. Larger tankless units may draw down current, causing dimming lights, when all heater stages are activated. This can cause computers and similar sensitive devices to trip or reset if household voltage drops significantly.
5. Hard water can cause premature corrosion and added expense for component replacement.

**Where They Make Sense** – There are certain situations where tankless water heaters can be a logical choice. Listed below are those cases where either an under-the-sink unit or a whole-house tankless water heater might be the right choice.

#### Tankless Under-The-Sink Unit:

1. Single faucet with infrequent use.
2. A sink in a half bathroom (no shower) at the far end of the home.
3. Detached garage, shop, barn or stable with occasional hot water needs.

#### Whole-House Tankless Unit:

1. Seasonal cabin or cottage where turning off and draining a conventional water heater tank is cumbersome.
2. Infrequently used guesthouse or garage apartment with a full bath (same issue as above).