COOPERATIVE EXTENSION
Washington State University
ENERGY PROGRAM

Hot Water Conservation

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EB1858e

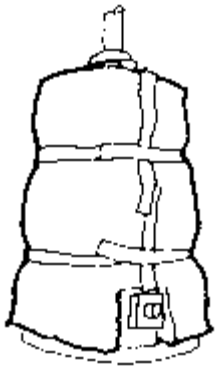
Home Hot Water

Your water heater uses more energy than any other appliance in the home except your heating system. It costs a typical family of four between $280 and $310 per year for water heating. For many families, this represents a significant portion of their utility bills. This factsheet will discuss ways to reduce water heating costs by increasing efficiency and reducing consumption. Topics include water heater and pipe insulation, water saving showerheads and faucet fixtures, thermostat setbacks, and superinsulated water heaters.

Energy Savings

For most households, the energy used to heat water can be reduced by 25-50 percent through conservation. This amounts to a savings of approximately $55-$155 per year at current rates.

One of the first things to do is to estimate your annual hot water consumption. This will help you better understand how you are using hot water and identify potential savings. This is especially important if you are contemplating the purchase of an alternative water heating system. Next you should implement some, or all, of the suggestions on the following pages. Finally, you may want to recalculate your hot water consumption after you have adopted conservation measures.



Hot Water Use of Various Activities

Showering, bathing, and laundry activities are the biggest hot water uses in your home. You can save the most energy and the most money on utility bills - by focusing your conservation efforts on these uses.

Annual Water Heater Energy Consumption and Cost

WSU/CE Energy Program Library

925 Plum St. SE, Bldg. #4
P.O. Box 43165
Olympia, WA
98504-3165
Tele:(360) 956-2000
Fax: (360) 956-2217

Spokane Office

1212 N. Washington #106
Spokane, WA
99201-2401
Tele: (509) 625-5319
Fax: (509) 625-5315

	kWh-2	Cost-2
Demand	4000 - 5000	$200 - $250
Standby	440 - 1170	$22 - $60
Total	**4440 - 6170**	**$222 - $310**

1. For a 52-gallon electric water heater set at 120°F with 30 feet of distribution piping used by a family of four at $.05/kWh.

2. Ranges in kWh consumption and dollar costs account for variations in water usage (64-80 gallons per day and variations in tank insulation levels and ambient air temperature.

Reducing Demand for Hot Water

Reducing your household's demand for hot water simply means using fewer gallons of hot water. This can be achieved in three ways: 1) changing a few of your habits; 2) reducing the water flow in your plumbing system; and 3) increasing the efficiency of your hot water system.

Reducing Water Flow

The easiest way to reduce consumption is to reduce water flow. There are two ways to do this:

- Add low-flow faucet aerators to existing fixtures, or
- Install new energy-efficient fixtures.

Older showerheads use five to eight gallons of water per minute. Watersaving showerheads use two to three gallons per minute. At a cost of $10 to $40, the payback in energy savings is one to three years.

Faucet aerators at bathroom, utility room, and kitchen sinks can reduce water flow somewhat, but a changeover to low-flow aerators can reduce flow to a more effective and usable level (two gallons per minute).

If you have unusually high water pressure in your home, you may want to install a pressure reducing valve that can slow the flow rate of water 20-50 percent. The valves themselves cost about $50-$60. Having a plumber install one will cost $50-$100. Reduced pressure, in addition to saving water, can help reduce an existing water hammer problem in your plumbing.

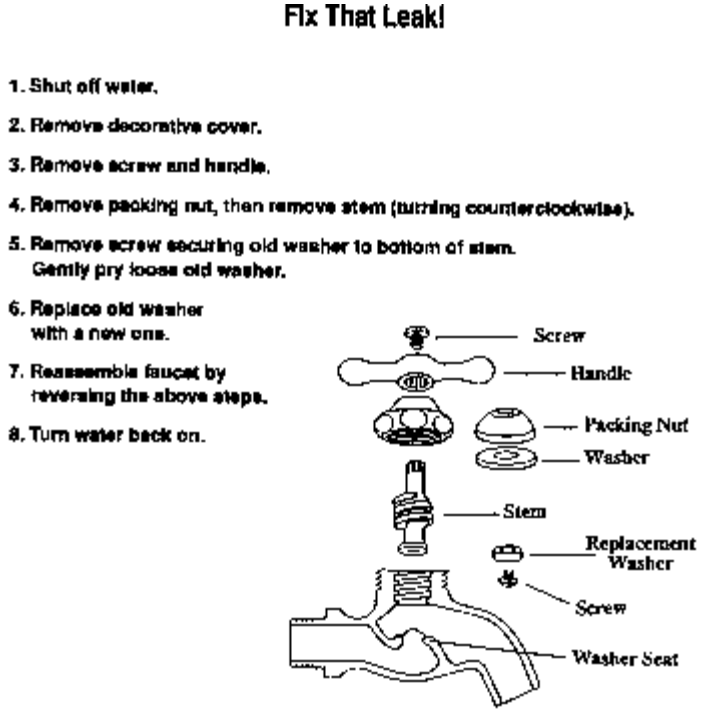
Hot Water Leaks

The Faucet Leak

Leaky hot water faucets waste both water and energy. A hot water leak that fills a cup in 10 minutes will waste over 3,000 gallons of hot water in a year. Many leaks can be repaired by replacing the faucet washer. Occasionally, the valve stem packing is leaking and may also need to replaced.

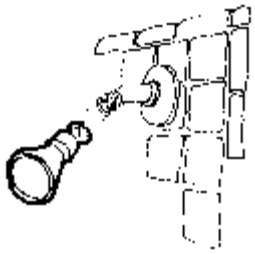
Some faucets in older homes will continue to leak even after the faucet washer and packing has been replaced. This is because the valve seat that the washer presses against has become worn and pitted. An inexpensive grinding tool can be used to resurface the valve seat so the washer will sit tightly against it.

Some modern fixtures are more difficult to repair than standard designs of the past. For complex tasks, it's best to consult household plumbing repair manuals beforehand, or seek a plumber to make the repairs.



Showerheads

Water-saving showerheads use two to three gallons of water per minute. Conventional showerheads use five to eight gallons per minute. Water-saving showerheads vary in feel from misty to needle-like to pulsating to vigorously pounding. In selecting a water-saving showerhead, it's important to find a model that fits your personal preference. A shut off button at the top of the head allows you to conveniently stop water flow while soaping up.



The Relief Valve Leak

The pressure relief valve on top of your hot water tank can be another source of expensive leaks. If the drain pipe which connects to this valve is warm over its entire length, your valve is leaking. Before replacing the valve, try to flush it out by moving the control lever attached to the valve. This will sometimes flush out foreign matter stuck in the valve. If this doesn't work, you probably need a new pressure relief valve.

The Hidden Leak
Lastly, you may have hidden leaks. To find them, perform this simple test. Find the two pipes which come out of the top of your water heater. One supplies the cold water to the tank and the other is the hot water outlet. When your hot water has not been in use for a few hours, the temperature of the two pipes will equalize. Feel both pipes. If temperatures are unequal, repeat the test in two hours, making sure not to use hot water in the meantime. If both pipes are equally warm, you don't have a hot water leak. If only the hot water outlet is still warm you have a leak. The pipe will be warm all the way from the tank to the location of the leak.

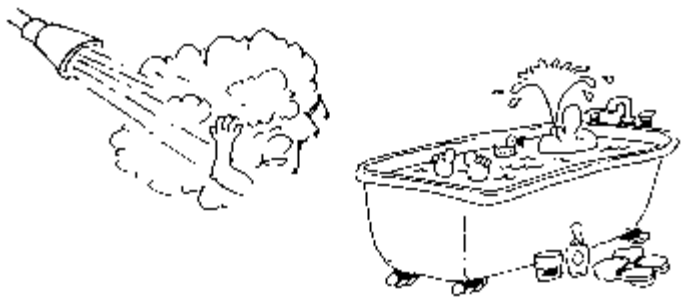
Buying a New Water Heater
Water heaters have an estimated life of 10-12 years. After that time, most water heaters develop leaks from corrosion and need to be replaced. When it's time to replace your old water heater:

Buy an Energy-Efficient Heater
They cost somewhat more to purchase than conventional water heaters, but the savings in reduced heat loss can offset this in two to four years.

Use the Energy Guide Label
Affixed to all new water heaters, it helps you compare the energy use and cost of deferent models. The information on the label is derived from standard testing procedures established by the U.S. Department of Energy. A bar scale offers the range of operating costs for similar models so you can see how the deferent models compare. Also, a yearly cost table allows you to estimate the cost of operation at your local rate.

Your Habits Can Reduce Demand

Shower Vs Bath
A bath generally uses more hot water than a shower. A bath takes 15-25 gallons of hot water whereas a shower takes 10-15 gallons. You can compare the amount of water used in a shower to that of a bath by closing the drain before showering. If your tub is less full after a shower than it would have been after a bath, then you know you can save hot water by showering. If it's just as full, or even fuller, you may want to stick to baths or take shorter showers. When showering, turning off the water while soaping up is an effective way to reduce consumption.



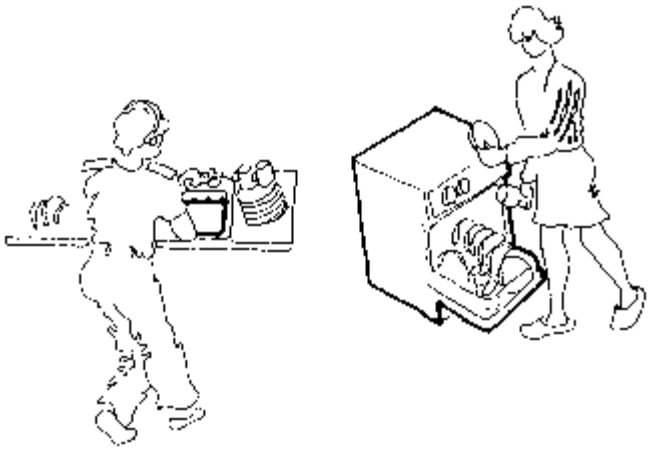
Cold Water Wash - Laundry
The clothes washer is second only to bathing in consumption of hot water. A standard size clothes washer uses about 25 gallons of hot water when operated in hot wash/warm rinse mode. A large capacity washer can use as much as 40 gallons of hot water.

One approach to reducing demand is to use a warm wash/cold rinse setting on your washing machine. This can save about 65 percent of the energy you would use with a hot wash/warm rinse. You should note that perspiration and oily stains can be difficult to remove from synthetic fabrics without hot water. Also, in addition to cleaning, hot water helps destroy bacteria.

Using cold water only for washing can be appropriate for some loads. This setting offers the greatest savings since no hot water is used. It is important to use a suitable cold water or liquid detergent for best results.

When shopping for a new washing machine, look for an energy-efficient, low water volume model.

Washing Dishes
Automatic dishwashers use about 10-15 gallons per load. Washing dishes by hand may use less or more than this depending on how careful you we. Newer, efficient dishwashers use as little as 5 gallons per load, so it pays to shop. To conserve energy, only use the dishwasher when it's fully loaded, and use the air-dry cycle. The dishes will dry from the heat of the washer. Don't pre-rinse dishes just scrape clean and load.

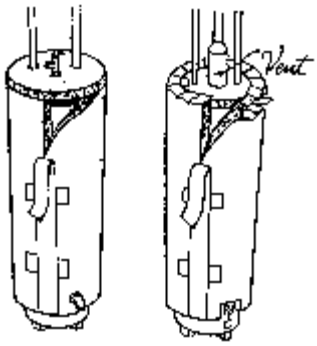


Conserve Water When Using Your Washing Machine
Wash clothes in cold water when you can, or use the cold setting during the rinse cycle.

Use the lowest water level setting for the amount of clothes you are washing.

Hot Water Heater
Adding a blanket to your hot water tank is an easy do-it-yourself job that can save you money on water-heating bills. Be careful not to insulate too

close to intake or exhaust vents on gas water heaters.



Increasing Water Heating Efficiency

In addition to reducing the demand for hot water, there are a number of measures you can take to improve the efficiency of your hot water system.

Set Back the Water Heater Thermostat

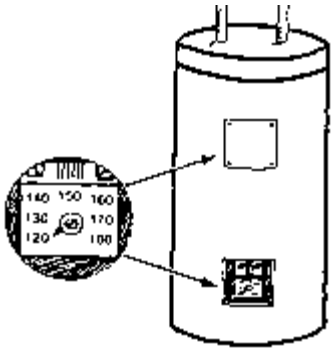
The state of Washington now requires that all new water heaters be set at 120°F at the time of sale. This increases the safety and energy efficiency of the heater.

If your water heater was purchased prior to 1984, however, it's likely that the thermostat is set higher than this, probably between 140°F and 150°F. You should set it back if this is the case. Most people shower at a temperature of 105°F, so a setting of 120°F will still require mixing with cold water for a comfortable temperature.

Hot water temperatures greater than 120°F are not necessary and should be reduced for several reasons:

- It can cause scalding. Children and seniors are most often scalded. Scalding occurs in: 2 seconds at 150°F, 30 seconds at 130°F, 15 seconds at 140°F, 10 minutes at 120°F
- It causes the water heater to lose heat at a much greater rate than would occur if the temperature was kept lower; and
- It increases the rate of corrosion on internal fittings and other surfaces.

By setting back the thermostat to 120°F (down from 150°F), energy demand is reduced by 15 percent.



You can reduce energy demand and increase safety by setting back the thermostat on your hot water heater to 120°F. (If your water heater was purchased before 1984, It's likely that the thermostat was set higher than 120°F.)

Insulate Your Water Heater
Older water heaters lose heat quickly because they contain only an inch or two of fiberglass insulation (R-5). To reduce heat loss, they should be wrapped with an additional fiberglass insulation.

Insulating kits can be purchased at home supply and hardware stores, and some electric utilities will install them at no charge for customers. Most have an insulating value of R-11 and will save $20-$28 per year at current rates.

Rigid foam board insulation placed under the water heater can further reduce heat loss. About two inches of extruded polystyrene board is recommended since it resists compression and does not absorb water.

Gas water heaters should be wrapped with insulation specifically made for gas water heaters. These kits are designed so that they won't block the air intake and insulation will not come in contact with the flue. This is essential for proper functioning of the heater and to avoid a fire hazard.

Insulate Pipes
Your house is a good candidate for pipe insulation if you use water frequently throughout the day, if the pipe runs are long, or if they pass through an insulated crawlspace or basement. It is necessary to wrap hot water pipes only. Pipe insulation comes in different forms:

- Closed-cell flexible foam tubes (R-3 to R-5);
- Rigid foam (R-7); and
- Fiberglass batts (R-11).

Other Water Heating Alternatives
If you have already taken basic hot water conservation measures, and seek further reductions of your hot water bill, other water heating alternatives may be considered. These include tempering tanks and demand water, heat pump, solar, and wood-fired water heaters. In general, these systems are most cost-effective in new homes or for families using greater than average quantities of hot water.

Anti Convection Valves
If the hot and cold water outlet and inlet run vertically up from the water tank convection up these pipes causes heat loss when the tank is not being used. To reduce heat loss, anti convection valves, essentially tiny ball check valves, can be purchased at plumbing outlets and installed on both the inlet and outlet of the water heater. You may need a plumber to install them for you. If so, wait until other plumbing work needs to be done. This will save on costs.

Water Heater Timers
Timers are not very effective at reducing energy use unless time of use (or "peak") rate structures are in use. Washington does not have these rate structures. Also, if the tank is well insulated, the savings from timers would be relatively small.

A water heater timer might save 36 kWh (or $1-$2) per year on a well insulated water heater. Tank insulation wraps, because they are simpler, less expensive and more effective, are a preferable means of saving energy.

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