



# Energy Facts

## Controlling Costs for Home Hot Water Production and Use

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Americans expect hot water at their fingertips, yet we pay a high cost for that instant comfort. An average family spends 14% of their monthly energy bill on hot water. Heating water is the third largest energy expense in the home.

Four destination points in the home are end users for hot water: faucets, showers, dishwashers, and the washing machine. At each of these end use points, there are ways to conserve water usage and control energy costs.

### Faucets and Showers

Repairing leaky faucets and showers saves hot water. A leak of one drip per second can cost \$1 per month, yet it could be repaired in a few minutes for less money. Using less hot water will reduce your energy costs.

A family of four uses 700 gallons of water a week. This represents a three-year supply of drinking water for one person. Turning the hot water faucet off while shaving or brushing your teeth can reduce water-heating costs. Another option is to limit the amount of time in the shower or the number of whirlpool baths a week.

Other actions may require a small investment of time and money. Installing low-flow showerheads and faucet aerators can save significant amounts of hot water. Low flow showerheads can reduce hot water consumption for bathing by 30%, but still provide a strong, invigorating spray.

A quick test can help you determine if your shower is a good candidate for a showerhead replacement. Turn the shower on to the normal pressure you use and hold a bucket that has been marked in gallon increments under the spray. Now, time the number of seconds it takes to fill the bucket to the one-gallon mark. If it takes less than twenty seconds, you could benefit from a low-flow showerhead.

### Dishwashers

A relatively common assumption is that washing dishes by hand saves hot water. If properly used, an efficient dishwasher can consume less energy than washing dishes by hand, particularly when you only operate the dishwasher with full loads. Heating the water for an automatic dishwasher can represent about 80% of the energy required to run this appliance, and new dishwashers use about half the electricity of a 25-year-old model.

Average dishwashers use 8 to 14 gallons of water for a complete wash cycle and require a water temperature of 140° F for optimum cleaning. But setting your water heater this high could result in excessive standby heat loss. Standby heat loss occurs because water is constantly being heated in the storage tank, even when no hot water is actually being used. Furthermore, a water heater temperature of 120° F is sufficient for other home hot water uses.

A "booster" heater can increase the water temperature as it enters the dishwasher to the 140° F recom-

mended for thorough cleaning. Some dishwashers have built-in boosters that will automatically raise the water temperature, while others require manual selection of this option before the wash cycle begins. A booster heater can add about \$30 to the cost of a new dishwasher but it should pay for itself in water heating energy savings in about one year if you also lower your water heater temperature. Reducing the water heater temperature is not advisable, however if your dishwasher does **not** have a booster heater.

Another way to reduce hot water use in your dishwasher is taking full advantage of cycle selections. Shorter cycles require less water, thereby reducing the energy costs. The most efficient dishwasher currently on the market can cost half as much to operate as the most inefficient model. If you are planning to purchase a new dishwasher, check the EnergyGuide and EnergyStar® labels required by the government and compare the approximate yearly energy costs among brands.

Dishwashers fall into one of two categories: compact capacity or standard capacity. Although compact capacity dishwashers may appear to be more energy efficient, they hold fewer dishes and may require you to use the appliance more frequently than you would use a standard capacity model. In this case, your energy costs could be higher with a compact machine than with the standard capacity dishwasher.

## Clothes Washing Machine

The clothes washer is second only to bathing in hot water consumption. A standard size clothes washer uses about 25 gallons of hot water when operated in hot water/warm rinse mode. A large capacity washer can use as much as 40 gallons of hot water, so the best way to lower energy costs is to reduce the amount of hot water you use. According to the Soap and Detergent Association (SDA), only about 10% of the energy used by your washer goes to operate the motor; 90% of the cost is heating the water.

The average household washes about 50 pounds of laundry per week, more than 6,000 articles a year, since the average person generates well over a quarter of a ton of dirty clothes per year. The hot water demand for these activities is very high.

One approach to reducing demand is to use the warm wash/cold rinse setting on your washing machine. This can save about 65% of the energy you would use with the hot/warm rinse. But you should

note that perspiration and oily stains could be difficult to remove from synthetic fabrics without using hot water. And, in addition to cleaning, hot water helps destroy bacteria.

When looking for a new washing machine, look for an energy-efficient, low water volume model. The new high-efficiency (HE) washers are the biggest news in decades. You can save energy and water and still get clothes cleaner than before. The SDA says HE washers use only 1/3 to 2/3 the water used by traditional washers so energy use can be 1/3 to 1/2 that of traditional washers. They suggest using high-efficiency detergents specifically formulated for this type of washer.

## Hot Water Heater

Most hot water heaters last for 10-15 years. It's best to start shopping for a new one if yours is more than seven years old. A new energy-efficient water heater may cost more initially than a standard water heater, but the energy savings will continue during the lifetime of the appliance.

## Temperature Setting

Lowering the thermostat on your water heater cuts the cost of energy use, but if you have a dishwasher, it should not be set lower than 140° F for good dish cleaning unless your dishwasher has a booster heater. It should not be set lower than 130° F for hot water wash of laundry with greasy soils.

## Pipe Insulation

When hot water is wanted at a faucet, cold water already in the pipes must be drawn before hot water comes out. Then, when the water is shut off, the hot water in the pipe cools off, so that heat is lost. This loss can be reduced by:

- Locating the water heater close to where the heaviest use occurs (this reduces the length of the pipes)
- Insulating the hot water pipes by wrapping them with insulation

Cover your hot water pipes with pipe insulation wherever they are accessible, especially within three feet of the hot water tank. Be sure to keep foam insulation at least six inches from the flue of a gas hot water heater. If you use split rubber foam pipe insulation, use the right size so the split closes; put the split on the underside and tape the insulation.

## Heater Insulation

Studies have shown that 20 - 30% of the heat added to water by the hot water heater is lost through the walls. If the outer wall of your heater feels warm to the touch, it is losing heat. Adding insulation to the outside can cut up to half of this loss. Batt insulation can be fastened around the sides and top of electric water heaters. Only specially designed insulation jackets should be used on gas water heaters and the installation instructions must be followed very carefully. One caution when adding insulation to an existing oil or gas fired water heater is be sure your tank has a good pressure relief valve. A pilot light continues to heat water all the time so if no hot water is drawn for a long period of time, the water may be overheated.

## Heater Maintenance

Once a month, draw off water from the spigot at the bottom of the heater tank until the water runs clear. Sediment on the water heater will prevent it from operating efficiently. When you leave home for more than a day, turn down the temperature setting. Or if leaving for more than two or three days, turn off the heater. It will take about two hours to heat back up again when you turn it on, so don't plan to take baths or wash clothes immediately upon returning from a trip.

## Off Peak Heating

Electric water heaters don't actually use less electricity in off peak hours, but it's cheaper for the utility company to produce electricity in those hours (usually at night), so some utilities offer lower rates during those times. If your electric utility company does this, schedule large uses of hot water such as laundry during the evening, or turn on the dishwasher before going to bed.

### Sources of information:

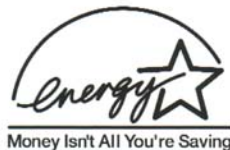
Energy Savers, U.S. Department of Energy, DOE/GO 10098-584.

Energy Facts, Michigan State University Bulletin E-1146

Hot Water Conservation, EB 1858e, Cooperative Extension, Washington State University

The Soap and Detergent Association, 1500 K Street NW, Washington, D.C., 20005,

[www.cleaning101.com](http://www.cleaning101.com)



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the 1990s, the number of people in the world who are under 15 years of age is expected to increase from 1.1 billion to 1.5 billion (United Nations 1998). This increase is expected to be particularly rapid in the developing countries.

There are a number of reasons why the number of children in the world is increasing. One of the main reasons is that the death rate for children under 5 years of age has fallen significantly in many developing countries. This is due to a number of factors, including improved nutrition, better access to health care, and the widespread use of vaccines.

Another reason for the increase in the number of children is that women are having children at a younger age than in the past. This is due to a number of factors, including the widespread use of contraception, which has allowed women to control their fertility, and the fact that women are now more likely to be employed outside the home, which has led to a decline in the number of children per woman.

The increase in the number of children in the world is a cause for concern because it has led to a number of problems, including overcrowding, poverty, and environmental degradation. It has also led to a decline in the quality of education and health care for children. As a result, many children are living in poverty and are at risk of malnutrition and disease.

There are a number of ways in which the number of children in the world can be reduced. One of the most important ways is to improve the quality of education and health care for children. This will help to reduce the death rate for children and will also help to ensure that children are better educated and healthier. Another way to reduce the number of children is to encourage women to have children at a later age.

It is important to note that the number of children in the world is not just a problem for the developing countries. It is also a problem for the developed countries. In the developed countries, the number of children is increasing because of the high birth rate. This is due to a number of factors, including the fact that women are now having children at a younger age than in the past.

The increase in the number of children in the world is a complex problem that requires a number of different solutions. It is important to focus on improving the quality of education and health care for children, and to encourage women to have children at a later age. Only by taking these steps can we hope to reduce the number of children in the world and to ensure that all children have a better future.