

THE ENERGY OBSERVER

*Energy Efficiency Information for the
Facility Manager*

Quarterly Issue – December 2008

Increasing your Water Heater's Efficiency

The Energy Observer summarizes published material on proven energy technologies and practices, and encourages users to share experiences with generic energy products and services. This quarterly bulletin also identifies informational sources and energy training for facility managers and staff. *The Energy Observer* is a service of the **Energy Office, Michigan Department of Labor & Economic Growth.**

This issue discusses options for improving the energy efficiency of your facility's hot water heater. This issue focuses on the options that apply mainly to facilities that use residential water heating systems. Many smaller municipal and buildings fit into this category. Most of the improvements outlined here can also be applied to storage tanks found in larger commercial buildings. Check with the water heater manufacturer before installing them on a larger system.

Insulate the Tank

Unless your water heater's storage tank already has an insulation value of at least R-24 or greater, adding insulation to it can reduce standby heat losses by 25-45%, which can reduce water heating costs by 4-9%.

An easy way to determine if your facility's water heater tank needs insulation is to simply touch it. If it feels warm, it needs more insulation. Insulating your tank is relatively easy and inexpensive.

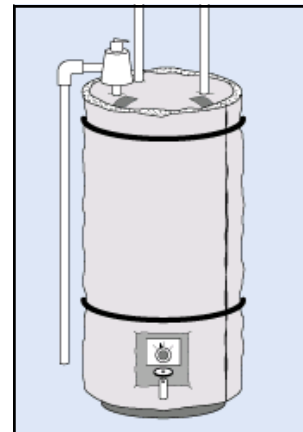
A pre-cut jacket usually sells for \$10-\$20 and will pay for itself in energy cost savings in a year. Be sure to choose insulation that is rated at least R-8 or greater.

Electric Water Heaters. Installation of a pre-cut jacket or blanket on an electric water heater often can be done by your building maintenance staff. Read and follow installation directions carefully, and leave the thermostat access panel uncovered. On an electric water heater with an insulating jacket, do not set the thermostat above 130° F, since this could cause the wiring to overheat.

A piece of rigid insulation or bottom board under the tank can help prevent heat loss to floor, potentially saving another 4-9% of heating energy. Generally, this is easiest to install when the tank is first installed.

Gas Water Heaters. Generally, it's best to have a qualified plumbing and heating contractor add an insulation jacket or blanket to a gas water heater due to the difficulty of the task. If you want to have your staff install it themselves, they should read and follow the directions very carefully. Keep the jacket or blanket away from the drain at the bottom and the flue at the top. Keep the airflow to the burner unobstructed, and be sure to leave the thermostat uncovered. Do not insulate the top of a gas tank, since the insulation is combustible

and can interfere with the draft diverter.



Source: U.S. Department of Energy

Insulate the Pipes

Insulating your hot water pipes reduces heat loss and allows lowering the temperature setting on the water heater by 2-4° F.

Insulate all accessible hot water pipes, especially within the first three feet of the water heater. Also, cold water inlet pipes should be insulated the first three feet.

On gas water heaters, keep insulation at least 6 inches away from the flue.

Lower Water Heating Temperature (Gas heaters only)

Water heating costs can be reduced by lowering the temperature setting on your facility's water heater. For every 10° F reduction in temperature, there can be a 3-5% reduction in energy costs.

Although some manufacturers set water heater thermostats at 140° F, most places usually only need

settings at 120°F (Do not set them any lower for health reasons). After adjusting the temperature on the tank, test the temperature of the water at the tap using an ordinary thermometer. You may need to readjust the temperature dial several times.

If you have an uninsulated electric water heater, do NOT lower the water temperature below 140°F because of the risk of Legionnaire's Disease. For electric water heaters with insulation, keep the temperature at or just slightly below 130°F.

Timers (electric heaters only)

For electric water heaters, an additional 5-12% of energy can be saved by installing a timer. Water in the tank can remain hot for more than eight hours while the water heater is not in operation, depending on the insulation and age of the system. It is usually best to set the timer during hours when the hot water use it lowest, typically at night for most buildings. Timers may have to be readjusted if the facility experiences a shortage of hot water.

Timers can cost more than \$60, but usually pay for themselves in about a year, and you can install them yourself. For gas water heaters, timers are not cost effective due to their pilot lights.

Drain-Water Heat Recovery

The principle behind drain-water heat recovery is quite simple: just

capture the heat that would normally be lost when hot water goes down the drain. Drain-water (or greywater) heat recovery systems recover this energy to preheat cold water entering the water heater or going to other water fixtures.

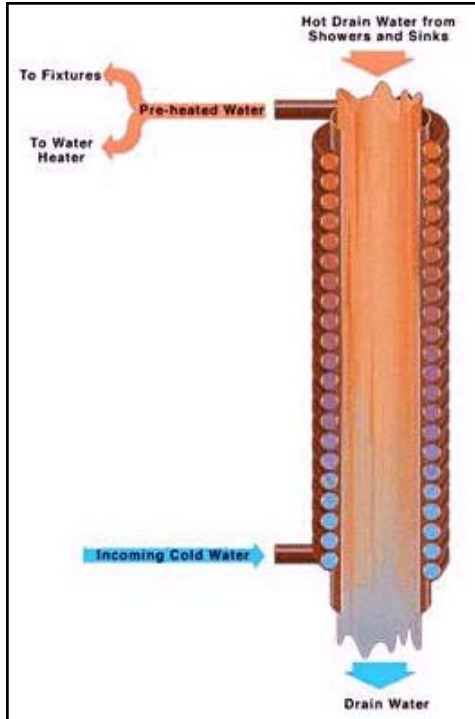


Image Source: KQED.org

Drain-water heat recovery works well with all types of water heaters, including demand and solar heaters. These systems also have the ability to recover heat from the hot water used in showers, sinks, dishwashers, and clothes washers. Drain-water heat recovery systems are available with and without storage capacity. Non-storage systems consist of a copper heat exchanger that

replaces a vertical section of a main waste drain. As warm water flows down the waste drain, incoming cold water flows through a spiral copper tube wrapped tightly around the copper section of the waste drain (see diagram). This preheats the incoming cold water that goes to the water heater or a fixture such as a shower.

Storage systems have tanks containing a reservoir of water, which is heated when drain water flows through a heat exchanger at the bottom of the tank. The cold water supply is preheated by a coil of pipe that is also in the tank.

Cost and installation. Prices for drain-water heat recovery systems are usually in the \$300 to \$500 range. It is best to have a qualified plumbing and heating contractor install the system. Paybacks range from 2.5 to 7 years, depending on how often the system is used.

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