

Frequently Asked Questions (FAQs) About Drain Water Heat Recovery (DWHR) Units and Operation

How does a DWHR unit work?

A drain water heat recovery (DWHR) unit consists of copper tubes wrapped around a copper drain pipe. The waste water from your shower flows down the copper drain pipe, clinging to the inner surface as a very thin film. At the same time, cold fresh water travels up through the wrapped copper tubes. The heat in the waste water travels safely and efficiently through the copper and into the cold fresh water.

What are some of the benefits of DWHR units?

There are many benefits to using a DWHR unit, including comfort, convenience, energy conservation, decreased energy usage to heat water, ease of installation, and long life with little or no maintenance.

DWHR units seem so simple; how can I be sure it works?

The National Research Council of Canada and Natural Resources Canada have jointly tested DWHR units and found them to work efficiently to reduce the water heating costs in homes. It is also recognized by the ENERGY STAR for New Homes program as being able to reduce water heating costs by up to 40%.

Typically, how much energy is used to heat water in an average home?

On average, 15% to 25% of the energy costs for a typical home are due to water heating requirements. Drain water heat recovery (DWHR) systems can recover up to 40% of that energy.

How much of this energy goes down the drain?

Water requires a lot of energy to heat and can hold onto this energy for a long time. Without a DWHR unit, about 90% of the energy used to heat water is dumped down the drain.

What is the typical payback and how much can I expect to save?

Payback periods for DWHR units tend to be relatively short—typically 4–9 years—and will depend on the physical characteristics of the installation as well as hot water consumption (e.g., number of people in the home and number of showers taken daily) and energy costs. When translated to real dollars, the average for a four-person home is approximately \$200 per year, subject to your utility's rates.

Will it save energy when I take a bath?

Some energy would be saved, but the system is most effective for showers. This is because as the shower is running, there is a continuous stream of warm water flowing down the drain to provide heat for the incoming cold fresh water.

Where should it be installed?

The DWHR unit essentially replaces a section of the main **vertical** drainpipe in a house or other building. In a house, it is important that the drain water from the primary shower is fed into this drainpipe.

Does a DWHR unit need to be installed directly beneath a shower?

No. The hot wastewater from the shower retains its temperature well as it travels down the walls of the drainpipe at around one meter per second. The first rush of drain water will tend to heat the drain line, but the energy used to do this is negligible. This allows for some flexibility in locating the DWHR unit so that it may more easily service the desired fixtures.

Doesn't plumbing the cold side of all of our fixtures waste hot water (i.e., flushing with warm water)?

No, warm water will be present on the cold side of the fixtures **ONLY** when you are using hot water. If you were to flush the toilet while hot water is being used, then yes, some warm water will be used, but that heat was recovered from hot water that would have flowed down the drain anyway, so flushing with that warm water would not waste any hot water.

Is installation difficult?

Installing a DWHR unit is straightforward. The unit replaces a **vertical** section of your existing drain stack (whether it is plastic, cast iron, or copper) and is connected to your fresh water system. For the best possible results, the heated fresh water leaving the DWHR unit should be routed to the inlet of your water heater as well as to the cold side of your water fixtures. Now when you have a shower, both your hot water and your cold water contain safely recycled energy.

Can the DWHR unit be installed horizontally?

No. The Power-Pipe relies on the falling-film phenomenon, and the effectiveness of the unit will be drastically reduced if it is not placed vertically. Aside from this restriction, DWHR units are fairly flexible in terms of location in the house.



Why is it better for the DWHR unit to feed both the water heater and plumbing fixtures?

When the DWHR unit is plumbed to feed preheated water to the water heater as well as the cold water side of the shower, the flow rates through the drain pipe and coil are equal. This is known as equal flow, and results in the highest heat exchanger efficiency. In this case, the temperature drop in the drain water and the temperature rise in the cold water will be equal.

If the DWHR unit supplies preheated water only to the cold water side of the shower, or only to the water heater, the flow rates are no longer equal. In these two cases, the temperature rise in the cold water will be greater than the temperature drop in the drain water, but since the flow rate of cold water is lower, there is actually less heat being extracted from the drain water than in the equal flow case. While these two cases result in less efficient performance, the energy savings are still substantial. In cases where installation for equal flow is not feasible, it is still useful to use an unequal configuration.

What about On-Demand (a.k.a., tankless or instantaneous) water heaters?

Although there is no stored energy in this case, the DWHR unit will still provide a significant benefit. On-Demand water heaters often have trouble keeping up with demand, especially in the winter when the temperature of the supply water is lower. The DWHR unit can be used to bridge that gap, as well as reduce the amount of energy used by the water heater as it does not have to raise the temperature of the water as much.

How will the DWHR unit affect electric water heaters? How do I qualify for Minnesota Power's DWHR rebate?

The DWHR unit will increase the water heating capacity of the water heaters as well as reduce the amount of energy required to bring the water up to the desired temperature. This means that there will be an increase in the length of time the shower may be run without running out of hot water.

To qualify for Minnesota Power's DWHR rebate, you must install a qualifying unit in a home with an existing or new electric water heater and it must be installed by a manufacturer-trained installer/plumber. Visit www.mnpower.com/h2o for more details.

What about slab on grade construction?

DWHR units are not recommended for existing slab on grade homes unless the shower is located on an upper level. For slab on grade new construction, the DWHR unit can be built into the design of the water heating system.

Note: These FAQs are provided by RenewABILITY Energy