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Abigail Daken
Energy Star Water Heater Program Manager
U.S. Environmental Protection Agency

Dear Ms. Daken,

I would like to provide feedback for the Energy Star Water Heater discussion, Section IV. Consideration of new Categories, which includes point-of-use (POU) electric water heaters. While POU water heaters may address many of the challenges related to whole house hot water systems (remote fixtures, reduced delivery times and water savings), they are not the only option that should be considered for a new category of the Energy Star program. Hot water recirculation (HWR) should be considered as well. HWR should be part of a comprehensive program to reduce water and energy waste. When added to low-flow faucets and showers and low volume toilets, HWR can make a substantial contribution to reaching the goal of a 20% reduction in water usage.

Hot water recirculation has been used very successfully for many, many years to address the same issues. HWR can save an average of 8000 to 12000 gal/yr per household. There are primarily two types of HWR installed today:

➤ ***Return-Line systems ...***

A return line is installed from the end of the hot water line back to the water heater. A circulator pump is used to circulate hot water through the hot water supply line to keep hot water available throughout your home. Pumps are fitted with controls (typically timers and aquastats) to maximize water and energy savings.

➤ ***Retrofit (By-Pass) System ...***

A “by-pass” device is installed under the sink at the furthest point from the water heater. A pump is used to move the cold and cool water in the hot water line through the “by-pass” (installed under the sink) to the cold water line. This cold water line is part of the cold water supply for the water heater. By returning the water to the heater rather than running it down the drain to get hot water you save water and energy. A thermostat within the device stops the “by-pass” when the hot water (95° F - 105° F) reaches the device. This “by-pass” system keeps hot water available throughout your home without the additional cost of installing a return-line.

While the primary focus of HWR is water savings, there is energy savings associated with HWR as well. I refer to these water related energy savings as *equivalent energy* (EE) or "hidden energy" (HE) as referred to by Dave Grieshop of Realty, LLC. EE or HE can be defined as the energy consumed during the acquisition, treatment, pressurization, transportation/delivery and reclamation of potable water. These EE or HE costs have been identified and quantified by the WasteSense, an EPA partnership program. I will be using WaterSense (WS) published numbers relating to the water and energy savings of switching to WS labeled toilets for my comparison.

In following quotes from WaterSense documents "Benefits of Water Efficiency" and "What are the Environmental Benefits of Water Efficiency"; several statements are made regarding energy savings realized through saving water. Let's look at a few of them in more detail.

"Save Water, Save Energy

It takes a considerable amount of energy to deliver and treat the water you use everyday. American public water supply and treatment facilities consume about 56 billion kilowatt-hours (kWh) per year—enough electricity to power more than 5 million homes for an entire year. For example, letting your faucet run for five minutes uses about as much energy as letting a 60-watt light bulb run for 14 hours."

The previous example, put into water and energy terms would look like the following:

"faucet run for five minutes" -- (post 1992) is equal to 11 gal of water ... " 60-watt light bulb run for 14 hours." is equal to .84 kWh.

"By reducing household water use you can not only help reduce the energy required to supply and treat public water supplies but also can help address climate change. In fact:

- *If one out of every 100 American homes retrofitted with water-efficient fixtures, we could save about 100 million kWh of electricity per year—avoiding 80,000 tons of greenhouse gas emissions. That is equivalent to removing nearly 15,000 automobiles from the road for one year!*
- *If 1 percent of American homes replaced their older, inefficient toilets with WaterSense labeled models, the country would save more than 38 million kWh of electricity—enough to supply more than 43,000 households electricity for one month."*

The previous example, put into water and energy terms would look like the following:

"If 1 percent of American homes replaced their older, inefficient toilets with WaterSense labeled models, the country would save more than 38 million kWh of electricity" ...

It is estimated there are 110 mil American homes therefore, 1 percent would be approx. 1.1 mil. ... WS labeled toilet save 4000 gal/yr times 1.1 mil. homes would equal more than 4 bil gal/yr water savings.

In an article, "A Home With a Higher IQ, WaterSense Looks to Cut Residential Water Use by 20 percent" Tim denHartog writes:

"Running water down the drain while waiting for hot water to get to the tap wastes 10,000 gallons each year in the average American household."

If we extrapolate this 10,000 gal/yr of wasted water into the previous statements made in WS articles, we can see that HWR provides approximately 2.5 times the savings realized by installing WS labeled toilets. The realized water savings then become more than 10 bil gals/yr with an EE or HE of more than 95 mil kWh of electricity.

Therefore, HWR should be considered as a new category for Energy Star Water Heater program because it can provide significant environmental benefits through realized water and energy savings.

Thank you for this opportunity to contribute.

Very kind regards,

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