Fact Sheet

Department of Energy Residential Water Heater Final Rule

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The Department of Energy (DOE) finalized a new standard for residential water heaters that will transition most electric storage water heaters to heat pump technology starting in 2029. Gas storage water heaters will also advance, becoming more efficient than current gas models.

Given that water heating is the second-largest energy expense in most homes, this new standard will significantly cut energy use and reduce utility bills throughout the US. These updated standards are also important because priority is often given to the repair and replacement of broken water heaters, and these new standards will help ensure the default replacement products are energy-efficient options.

Heat pump water heaters are already a common choice in the Northwest, representing 18% of electric water heater sales and achieving high rates of awareness (~60%) and satisfaction (~90%) among consumers as well as installers. The market is entering a critical period between now and 2029, as manufacturers introduce new products and installers scale up their installations of heat pump water heaters.[1]

The standard is a result of long-term collaboration—between utilities, manufacturers, trade allies, efficiency organizations, and consumer advocates—and will deliver lasting market change, leading to energy savings for all Northwest customers.

This fact sheet covers some key details of the new DOE rule and answers frequently asked questions.

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[1] neea.org/resources/northwest-heat-pump-water-heater-market-progress-evaluation-report-6

What does the new standard require?

Electric storage water heaters: The standard will effectively require most electric storage water heaters to be heat pumps. Small electric water heaters—defined as water heaters with storage volume of <36 gallons and first hour ratings <51 gallons, such as a lowboy—can still be electric resistance. Additional exceptions include grid-enabled water heaters and very large water heaters (>120 gallons).

For water heaters required to be heat pumps, modest required Uniform Energy Factors (UEFs) will allow manufacturers to innovate and bring low-cost, high-performance products to market. In total, DOE estimates that the rule will shift 61% of the market to heat pump water heaters once the rule becomes effective in 2029.

Product Class	Storage Volume	First Hour Rating (gallons)	Representative Volume	Current Required UEF	2029 Required UEF
Electric Storage Water Heaters	>20 gal and ≤55 gal	<18	36	0.85	2.3
		18 to 50	36	0.91	2.3
		51 to 74	40	0.92	2.3
		>74	50	0.93	2.3
	>55 gal and ≤120 gal	<18	56	1.9	2.5
		18 to 50	56	2.0	2.5
		51 to 74	60	2.1	2.5
		>74	80	2.2	2.5
Small Electric Storage Water Heater	≥20 gal and ≤35 gal	<18	25	N/A	0.86
		18 to 50	30	N/A	0.92

Gas storage water heaters: The standard will require gas-fired water heaters to be 8% to 16% more efficient, depending on the size category. No improvements were documented for gas storage water heaters >55 gallons.

This modest efficiency improvement can be achieved without the need to install updated venting or add an electric outlet—keeping costs and down and encouraging manufacturer innovation.

Product Class	Storage Volume	First Hour Rating (gallons)	Representative Volume	Current Required UEF	2029 Required UEF
Gas-fired Storage Water Heater	>20 gal and ≤55 gal	<18	25	0.30	0.34
		18 to 50	30	0.54	0.59
		51 to 74	40	0.58	0.64
		>74	50	0.63	0.68
	>55 gal and ≤100 gal	<18	56	0.61	0.61
		18 to 50	56	0.74	0.74
		51 to 74	60	0.77	0.77
		>74	80	0.78	0.78

Why is DOE updating the standard?

The Energy Policy and Conservation Act mandates that the DOE implement standards and test procedures for certain appliances and equipment, including consumer water heaters. In total, the DOE sets standards for 60 product categories, representing 90% of residential energy use. The DOE is required to update product standards every six years and follows a structured and multi-year process involving significant analysis, public input, manufacturer interviews, and data collection.

Notably, the DOE is required to set standards at the highest levels that it finds to be "technically feasible and economically justified." These standards offer significant consumer benefits: Energy efficiency standards currently in place save the average household $320 per year on their energy bills.[2]

[2] www.regulations.doe.gov/eecompass/energy-efficiency

The DOE last updated the water heater standard in 2010. That standard went into effect in 2015 and required large electric resistance water heaters >55 gallons to be heat pump water heaters. However, the market largely responded to this standard by shifting to smaller water heaters—often paired with mixing valves—rather than installing large heat pump water heaters.

The DOE took care to preserve the ability to keep electric resistance products that met specific space-constrained applications without undercutting the rest of the rule with the current standard update to ensure that this type of market shift would be more limited when the new standard takes effect.

When does the standard take effect?

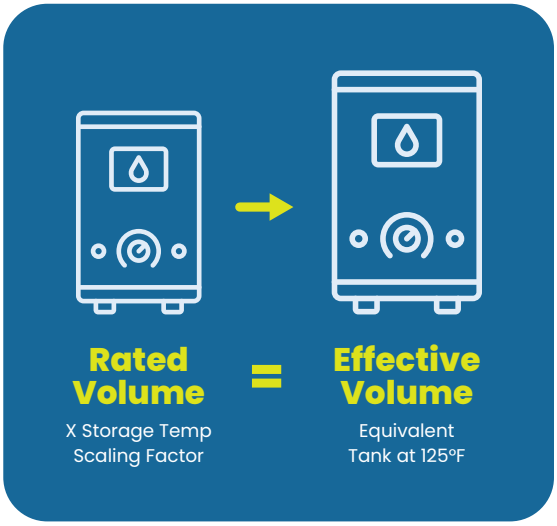
The new standard will apply to products manufactured on or after May 6, 2029. Products manufactured *before* this date can still be sold until stock runs out.

What's the impact of the new test procedure?

In coordination with the updated standard, the DOE has also updated the test procedure for water heaters, which governs how water heaters are tested for compliance with the standard. The DOE has included several test procedure changes that aim to limit the use of small electric resistance storage water heaters in applications better served by larger water heaters that are required to be heat pumps.

Effective storage volume: One of the important test procedure changes is the shift from "rated storage volume" to "effective storage volume."

While "rated storage volume" is a measure of the literal volume of water stored in the tank, "effective storage volume" takes into account the volume of water and the storage temperature. If a tank is capable of permanently storing water above 135°F, the effective storage volume accounts for this by boosting the measured storage volume.



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High temperature test: Another change to the test procedure is the introduction of a high temperature test, which requires water heaters to be tested at their highest permanent temperature setting.[3] This effectively requires any water heater with a permanent high temperature mode to be a heat pump water heater, as electric resistance water heaters can't meet standards when tested at higher storage temperatures.

Together, the effective storage volume and high temperature test help ensure that spaces served by 40- and 50-gallon water heaters today will be primarily served by heat pump water heaters when the standard takes effect in 2029.

What are the estimated benefits?

DOE estimates that the rule will save 17.6 quadrillion Btu over the 30-year compliance period, equivalent to the annual energy use of 116 million homes—the most energy savings ever achieved by a DOE rule! Cumulatively, the rule will save consumers $124 billion on their energy billsand avert 332 million metric tons of carbon dioxide emissions over three decades of sales.[4]

How will this impact the cost of heat pump water heaters?

In addition to the anticipated savings on utility bills, this standard is expected to stabilize the upfront cost. As plumbers become more comfortable with installing heat pump water heaters and experience increased competition, they will need to price their services accordingly.

Manufacturers are also anticipated to develop new products to address differing installation locations, driving product innovation and market competitiveness. In terms of product prices, historically, when the DOE sets appliance and equipment efficiency standards, the average actual prices do not change after adjusting for inflation.[5]

Does this standard require electrification?

No. While the standard applies to both gas and electric water heaters, it is not anticipated to influence fuel switching, as the cost to fuel switch is often more than any difference in water heater cost.

[3] There are several exceptions to this, including demand response water heaters and water heaters with temporary boost controls.

[4] Per the U.S. Department of Energy's DOE Finalizes Efficiency Standards for Water Heaters to Save Americans Over $7 Billion on Household Utility Bills Annually

[5] Per ACEEE's 2013 Appliance Standards: Comparing Predicted and Observed Prices study

What about gas instantaneous water heaters?

Gas instantaneous water heaters were not included in the DOE rule because they are still considering stakeholder comments on those proposed standards. The DOE is expected to issue a separate ruling with updated standards for gas instantaneous water heaters.

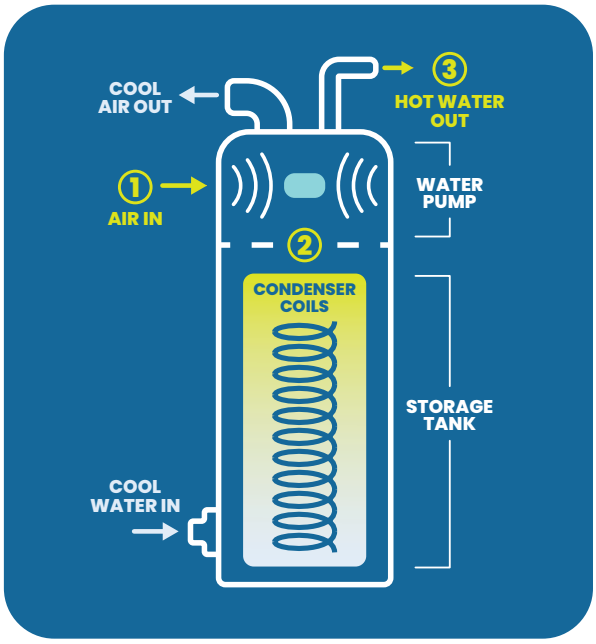
How does the rule affect utility program incentives?

The rule does not affect utility programs until it takes effect in 2029. Once it does, it will become the new baseline *above* which utility incentives can be offered. Given the relatively modest UEFs for both gas and electric storage water heaters, it is possible that utility incentives for higher efficiency equipment will still be available, if shown to be cost-effective.

How does a heat pump water heater work?

A heat pump water heater has a compressor on top of the tank that uses a refrigeration cycle to transfer heat from the surrounding air into the tank, rather than using electric elements to create heat. This efficient process allows the water heater to produce hot water using one-third or less of the energy than a standard electric water heater.

A heat pump water heater is simply a standard electric resistance water heater with a heat pump placed on top. The presence of an electric resistance element provides backup assurance that the water heater can keep up with demand on the coldest days or during periods of high use.



Do I need any special licensing to install HPWHs? Where do I go for training?

Anyone licensed to install a standard water heater in their state is also eligible to install a heat pump water heater. For training on how to install heat pump water heaters, visit Hot Water Solutions' on-demand trainings.

What does this mean for installers?

The new federal standard presents a competitive opportunity for forward-looking installers and plumbing companies. Those willing to become knowledgeable about heat pump water heaters now will have a business advantage over those who do not prepare themselves for this change until the standard takes effect.

The demand for heat pump water heaters is changing, as well. Consumer awareness of heat pump water heaters and their benefits has steadily grown over the past several years. The benefits of heat pump water heaters—including $550 average annual savings, the 10-year warranty, smart features like leak detection and vacation mode, and lower greenhouse gas emissions—have become attractive to consumers, as well as the utility incentives and a federal tax credit via the Inflation Reduction Act.

Hot Water Solutions interviewed a Northwest plumber who has made heat pump water heaters his company's solution. A case study is available for businesses interested in developing a similar business model:

- Northwest Installer's Bet on Heat Pump Water Heaters Pays Off

What resources are available for installers? Hot Water Solutions has developed a number of resources to help installers familiarize themselves with heat pump water heaters, including:

- What are Heat Pump Water Heater Tiers and Why Do They Matter?
- The Best Locations for Heat Pump Water Heaters Installs in the Northwest Region
- New Opportunities for Installing Heat Pump Water Heaters in Small Spaces: The "Shrinking Room" Experiment
- Where to Run Condensate from a Heat Pump Water Heater
- How to Right-Size a Heat Pump Water Heater

Scan this QR code to visit the Hot Water Solutions Resource Hub