

Appliance Standards Awareness Project
American Council for an Energy-Efficient Economy
Consumer Federation of America
National Consumer Law Center, on behalf of its low-income clients
Natural Resources Defense Council

May 16, 2022

Ms. Julia Hegarty
U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
Building Technologies Office, EE-5B
1000 Independence Avenue SW
Washington, DC 20585

RE: Docket Number EERE–2017–BT–STD–0019/RIN 1904–AD91: Notification of Availability of Preliminary Technical Support Document for Energy Conservation Standards for Consumer Water Heaters

Dear Ms. Hegarty:

This letter constitutes the comments of the Appliance Standards Awareness Project (ASAP), American Council for an Energy-Efficient Economy (ACEEE), Consumer Federation of America (CFA), National Consumer Law Center, on behalf of its low-income clients (NCLC), and Natural Resources Defense Council (NRDC) on the preliminary technical support document (PTSD) for energy conservation standards for consumer water heaters. 87 Fed. Reg. 11327 (March 1, 2022). We appreciate the opportunity to provide input to the Department.

DOE's preliminary analysis shows that amended energy conservation standards for consumer water heaters could achieve more than 30 quads of cost-effective energy savings.¹ The greatest energy and cost savings would result from setting standards at heat pump levels for electric storage water heaters with rated storage volumes from 20-55 gallons. DOE's analysis shows that the maximum technologically feasible ("max-tech") levels for this product class would provide average life-cycle cost savings of about \$1,600 with a payback of less than 4 years.²

Overall, we generally support DOE's approach for the preliminary analysis. However, we encourage DOE to evaluate additional technology options for gas storage water heaters including gas-actuated non-powered dampers and gas-fired heat pump water heaters (HPWHs). We also encourage DOE to analyze 120V/15A electric storage water heaters. In addition, we encourage DOE to investigate how the analysis could address price learning specifically associated with heat pump and condensing technology. Finally, we urge DOE to evaluate one or

¹ <https://www.regulations.gov/document/EERE-2017-BT-STD-0019-0018>. pp. 10-17 – 10-18.

² <https://www.regulations.gov/document/EERE-2017-BT-STD-0019-0018>. pp. 8-46 – 8-47.

more alternate natural gas price scenarios that reflect electrification and other trends that could result in significant increases in natural gas prices. These issues and others are discussed in further detail below.

We encourage DOE to evaluate gas-actuated non-powered dampers as a technology option for gas storage water heaters. Gas-actuated non-powered dampers require no external power source and use a self-powered gas valve to generate the power needed to operate.³ A study from the Northwest Energy Efficiency Alliance (NEEA) found that a 50-gallon product with a non-powered damper could reach a UEF of 0.68 with an incremental cost of only \$38 over the baseline model.⁴ While DOE evaluated other flue damper technology that does not require external power (e.g., thermopile flue dampers), we believe that gas-actuated non-powered dampers may potentially represent a lower-cost alternative that DOE should consider evaluating.

We encourage DOE to evaluate gas-fired HPWHs as the max-tech level for gas storage water heaters. In the preliminary analysis, DOE considered absorption and adsorption HPWHs as technology options but tentatively decided to screen them out due to the lack of manufacturer development and challenges with wide-scale manufacturing, installation, and service of the units.⁵ As DOE notes in the PTSD, gas heat pump technology is commercially available in space cooling, space heating, and commercial water heating applications. Additionally, a recent field study in California evaluated energy savings from a pre-commercial residential gas absorption HPWH that was shown to achieve a 1.2 UEF through lab testing and observed average yearly gas savings of 54% compared to baseline.⁶ Furthermore, EPA recently proposed a draft specification for consumer water heaters that would set the ENERGY STAR V5.0 criteria for gas storage water heaters at heat pump levels.⁷ Thus, we expect that the landscape of this emerging technology may change in the near future, and we therefore encourage DOE to evaluate heat pump technology as the max-tech level for gas storage water heaters.

We encourage DOE to evaluate the energy performance of 120V/15A HPWHs for the notice of proposed rulemaking (NOPR). In the preliminary analysis, DOE did not consider 120V/15A HPWH products because they were not commercially available at the time of the analysis. However, these water heaters are now commercially available from at least one manufacturer⁸

³ A.O. Smith currently uses this technology in their ProLine® XE models. <https://www.hotwater.com/water-heaters/residential/gas/proline/xeproline%20AE-xe-high-efficiency-flue-damper-gas-tank-water-heater-gcd-40/>.

⁴ Non-Powered Damper Gas Storage Water Heater Lab Testing. <https://neea.org/resources/non-powered-damper-gas-storage-water-heater-lab-testing>.

⁵ <https://www.regulations.gov/document/EERE-2017-BT-STD-0019-0018>. p. 4-3.

⁶ https://www.etcc-ca.com/sites/default/files/u2292/etcc_webinar_gti-cec_ghp_demo_projects_draft_2021-06-24_v2_clean_version.pdf.

⁷ ENERGY STAR Version 5.0 Residential Water Heaters Draft 1 Specification. https://www.energystar.gov/sites/default/files/ENERGY%20STAR%20Version%205.0%20Residential%20Water%20Heaters%20Draft%201%20Specification_5.pdf.

⁸ <https://www.nyle.com/water-heating-systems/units/e8/>.

and are expected to be available more widely throughout 2022.⁹ Therefore, we encourage DOE to analyze 120V/15A electric storage water heaters.

We encourage DOE to investigate how the analysis could reflect price learning associated with heat pump and condensing technology. In the preliminary analysis, in analyzing historical prices of water heaters, DOE examined prices of water heaters as a whole.¹⁰ However, we would expect that the price trends associated with heat pump and condensing technologies, which currently represent a very small portion of the water heater market, will be significantly different than the overall price trends of water heaters. In particular, components used in heat pump water heaters, such as compressors and heat exchangers, are similar to those used in other air conditioning and heat pump equipment. In the 2017 Direct Final Rule for standards for residential central air conditioners and heat pumps, DOE assumed that heat pumps would experience the same price trend as central air conditioners and applied a learning rate (defined as the fractional reduction in price expected from each doubling of cumulative production) of 10.7±1.1%.¹¹ Similarly, in the recent proposed rule for room air conditioners, DOE estimated a learning rate of 25.0±3.5%.¹² We therefore encourage DOE to investigate how the analysis could address price learning specifically for heat pump and condensing technologies.

We urge DOE to evaluate one or more alternate natural gas price scenarios. In the preliminary analysis, DOE utilized projections from the Energy Information Administration's Annual Energy Outlook (AEO) 2021 to estimate future natural gas prices.¹³ However, we believe that DOE may be significantly underestimating future natural gas prices using this approach. As the movement towards electrification continues and the efficiencies of gas-fired appliances increase, customers and sales of natural gas will likely decline over time. Multiple studies indicate that a consistent decline in gas customers and/or consumption will result in an increase in gas prices for the remaining customers.^{14,15} For example, as the NRDC outlines in their comments on the PTSD, their analysis found that gas prices will exceed 600% of the AEO projections in the Pacific and Mid-Atlantic regions in multiple electrification scenarios. Thus, DOE may be significantly underestimating the operating cost savings from potential amended standards for gas water heaters. We therefore encourage DOE to evaluate one or more alternate natural gas price scenarios to better understand the effect of increased gas prices.

DOE's preliminary analysis provides a thorough evaluation of installation costs, including for challenging installations. We understand that space and venting constraints could make it

⁹ A.O. Smith, Rheem, and GE currently have 120V/15A products in development.
<https://cleantechnica.com/2021/11/29/120-volt-heat-pump-water-heaters-hit-the-market-make-gas-replacements-even-easier/>.

¹⁰ <https://www.regulations.gov/document/EERE-2017-BT-STD-0019-0018>. pp. 8-14 – 8-16.

¹¹ Final Rule TSD for Residential Central Air Conditioners and Heat Pumps.

<https://www.regulations.gov/document/EERE-2014-BT-STD-0048-0098>. p. 8-21.

¹² <https://www.regulations.gov/document/EERE-2014-BT-STD-0059-0030>. p. 8-12.

¹³ <https://www.regulations.gov/document/EERE-2017-BT-STD-0019-0018>. p. 8-26.

¹⁴ <https://thefutureofgas.com/content/downloads/2022-03-21/3.18.22%20-%20Independent%20Consultant%20Report%20-%20Decarbonization%20Pathways.pdf>. p. 101.

¹⁵ <https://www.nber.org/papers/w28955>.

challenging to install higher-efficiency water heaters in certain retrofit applications, particularly when switching between technology types. For the preliminary analysis, DOE accounted for space-constrained installations, flue venting issues, condensate removal, and additional costs that may be associated with installing HPWHs. We believe that DOE's analysis of installation costs for various scenarios is reasonable for HPWH and condensing water heater installations.

Thank you for considering these comments.

Sincerely,



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