

December 2nd, 2011
Via Electronic Mail



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U.S. Environmental Protection Agency
Office of Air and Radiation
Washington, DC 20460

Re: Energy Star Water Heaters; Proposed v2.0 Product Specification, Draft 2

The following comments are submitted for the record of the Agency's above-captioned proceeding regarding the **Version 2.0 Product Specification, Draft 2 for Energy Star water heaters**. They are submitted on behalf of the Northwest Energy Efficiency Alliance (NEEA).

The Northwest Energy Efficiency Alliance is a non-profit organization working to encourage the development and adoption of energy-efficient products and services. NEEA is supported by the region's electric utilities, public benefits administrators, state governments, public interest groups and efficiency industry representatives. This unique partnership has helped make the Northwest region a national leader in energy efficiency.

Overview

It is clear from the revisions and discussion in the second draft of the specification that EPA is carefully considering the concerns and input of all stakeholders. We very much appreciate the care and thought that EPA is devoting to this important area for residential energy savings. We are particularly pleased with the progression of the specifications for the heat pump water heater products.

While progress is being made with all elements of the specification, we still have concerns with regard to the comprehensiveness and utility of the specifications for heat pump water heaters, the inclusion of electric point-of-use water heaters (POUs) as currently defined, and the resolution of the warranty issues for add-on heat pump water heaters. In these comments we will focus only on these areas, with the intent of helping EPA make further progress toward a specification that will maximize the benefits of the Energy Star Water Heater label to organizations such as ours that will invest substantial resources in promoting significant improvements in residential water heating efficiency.

Heat Pump Water Heater Specifications, Generally

In our September 9th comments on the specification first draft, we explained in some detail why we strongly believe that the Pacific Northwest's Northern Climate Heat Pump Water Heater Specification and its associated test methods can provide EPA the means to assure product performance commensurate with their ratings and consumer satisfaction, in all regards, with their

Energy Star-rated products. In the absence of such a comprehensive specification, we fear that many heat pump water heater products will fail to deliver their promised energy savings and fail to meet consumer expectations in other regards, as well. This has happened before; the energy efficiency community in the Pacific Northwest has suffered through more than one period of heat pump water heater market failure in the past, and we are determined not to repeat the experience again.

The final version of the specification is available here: <https://conduitnw.org/Pages/File.aspx?rid=289>.

While we're pleased that EPA sees value in some of the elements of the Northern Climate HPWH Specification, we're not confident that the two requirements chosen by EPA (the compressor audible alarm and reporting of the compressor low ambient temperature cut-off), taken out of the context of the rest of the specification, will accomplish what is needed from a consumer perspective.

First, only one of the HPWH products currently on the market has such an audible alarm. Because NEEA's Northern Climate HPWH Specification is tiered and forward-looking, with this requirement being hard and fast only for Tier 2, we will not be eliminating substantial numbers of existing products based on this requirement alone. If EPA adopts this element as proposed, only one product currently on the market will qualify. We doubt this is EPA's intent.

NEEA has taken a two-pronged approach to the condensate drain-plugging problem by also specifying a 3/4"-diameter condensate drain line for all Tier 2 and Tier 3 qualified products. It may be that the larger diameter condensate drain line will prove to be sufficient insurance of performance so as to make the audible alarm unnecessary. While we have already confirmed problems with the smaller drain lines used in Tier 1 products, we have not had sufficient time to see if similar problems will develop with the larger lines. Because this is such a critical issue, we are taking a very conservative approach, and we recommend that EPA do the same. Given the November 2012 proposed effective date of the Energy Star v2.0 specification, we urge EPA to contact manufacturers of products now on the market to get a sense of whether or not compliance with this element of the specification constitutes an unmanageable burden.

Second, the reporting of the lower compressor ambient temperature cut-off in manufacturer literature will have little or no impact on the performance of the product or the knowledge base of consumers. Most consumers will have no idea how to use this information. This is required in the Northern Climate HPWH Specification because it is the basis for part of the associated test procedure – this temperature is verified in the test procedure and then used to assign COP performance in the ten temperature bins that provide weights for the EF calculation. Out of context, this provision will have little practical impact.

Regardless of EPA's specification decisions, NEEA and Pacific Northwest utilities intend to proceed with the Northern Climate HPWH Specification and its test procedure as the basis for the marketing programs and incentives that will be necessary to jump-start the market for these products.

It is highly likely that other utilities and organizations in the northern half of the country (and perhaps even in Canada) will adopt the Northern Climate Specification as well, as a means of

ensuring energy savings and consumer acceptance of these products. As the federal test procedure for these products is updated (for instance, with new draw patterns), NEEA will update the Northern Climate Specification to align it with any changes. Because NEEA is a direct participant in that rulemaking process, some portions of the Northern Climate Specification may find their way into the federal procedures.

As we stated in our September 9th comments, we strongly believe that the integrity of the Energy Star brand depends on its ability to identify for consumers products that deliver significant energy savings with a high degree of reliability and user satisfaction. We also strongly believe that, for heat pump water heaters, this requires a specification that ensures, to the maximum extent possible, such performance in all climates and installations. So we again suggest to EPA that the Northern Climate Specification and its associated test method is the best means to that end at this time.

Point-of-Use Water Heaters

We are encouraged by EPA's discussion with regard to these products. We agree that an Energy Star label may be ineffective (if not irrelevant, given limited energy savings) in guiding consumer purchase and use of POU water heaters. We believe EPA has described very well many of the factors that govern the choice of products used for hot water fixtures that are distant from the whole-home water heater. None of these has to do with energy savings, given that there are other options that can provide similar or better savings at lower cost. For instance, on-demand circulator systems can provide the same level of service at an incremental installed cost that is often less than \$500. If the whole-home water heater in such cases is a heat pump water heater, then a POU solution would have substantial negative energy savings.

The concerns expressed in our comments of September 9th remain, in part due to the excessive capacity allowed as a POU product (25 kW):¹

- ***These products impose the same or more electric demand on the grid compared to a typical electric storage water heater, and substantially more demand than a heat pump water heater.***
- ***There are almost no energy savings associated with this technology now that typical electric storage water heater efficiency is 90 percent or higher.***
- ***The installation costs of these products are very high.***

We continue to believe that while there may be valid reasons for using POU water heating products in a residential setting, energy and cost savings are not among them. Therefore there is no valid rationale that we can see for including them in the Energy Star program. As we've stated before, NEEA's funding utilities would no doubt be forced to exclude these products from their water heater efficiency programs, if not on the basis of the electric demand profile of the technology, then on the basis of a lack of cost-effectiveness.² Again, if EPA has data on electric demand profiles,

¹ We have seen 28 kW on-demand electric water heaters used as whole-home products in some projects.

² While this may seem obvious, we remind EPA that regulated utilities, several of which fund NEEA's energy efficiency market transformation work, cannot recover costs incurred in promoting technologies that do not deliver cost-effective energy savings for their ratepayers.

energy savings and/or system installed costs that would support different conclusions than presented here, we ask that it be provided to stakeholders to examine.

Add-on Heat Pump Water Heaters

The EPA discussion of these products has progressed well. While we admit that there may be some questions outstanding with regard to rating methods and installation impacts on storage tank warranties, we observe that there have been thousands of installations of add-on products without any repeated evidence of safety concerns. If EPA can find such evidence, we would be more than pleased to consider it. We believe it would be unfair to the manufacturers of these products if EPA were to exclude them without any evidence of safety issues. It would also needlessly limit consumers' choices of product with which to significantly reduce their water heating energy use. There are a number of installation situations where an integrated HPWH product cannot (or should not) be installed, but where an add-on product is perfectly suitable.

We believe these can be appropriately included as qualifying products, and that they should be rated with a standard 50-gallon electric resistance storage water heater that meets minimum federal efficiency standards. We also find EPA's proposal for using an "energy factor multiplier" intriguing, and might very well support such a metric. We suggest that the storage tank size may be a reasonable proxy for hot water usage for EPA's rating purposes. Since larger storage tanks start with a lower EF, and based on the results of NEEA's laboratory testing for the Northern Climate HPWH test procedure where larger storage tanks often yielded better system EFs, EPA may well find that the effects of greater standby losses and better compressor performance offset one another in larger storage tanks, and that simply rating the product with a standard 50-gallon storage tank (or the smallest storage tank recommended by the manufacturer) will yield perfectly acceptable ratings. The storage tanks of many integral HPWH products are less well insulated than a comparably sized electric resistance water heater, and for that reason, some add-on products may provide performance equal to or better than the Energy Star-rated integral equivalents. Our September 9th comments cover this subject in more detail.

We support EPA's proposal to make add-on HPWH manufacturers responsible *only for their own products*. While we find little reason for alarming consumers about their storage tank warranties, we're not averse to the use of the warning proposed by EPA if this is what it takes to reach sufficient consensus on this part of the specification.

Summary

Overall we're very pleased with evolution of the water heater specification. We continue to believe that the Northern Climate HPWH Specification and its associated test procedure and ratings are essential for identifying products that will meet consumer expectations in the northern half of the country. We also believe that the market for the most efficient electric water heaters would be best served if the Northern Climate Specification and the Energy Star Specification were optimally aligned. Thank you for the opportunity to provide EPA with the benefits of our rapidly growing body of knowledge and experience with these products.



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