



American Council for an Energy-Efficient Economy

529 14th Street, N. W., Suite 600 Washington, D.C. 20045 202.507.4000 202.429.2248 www.aceee.org

April 16, 2012

Ms. Abigail Daken  
ENERGY STAR Water Heater Program Manager  
U.S. Environmental Protection Agency  
1200 Pennsylvania Ave NW  
Washington, DC 20460  
[Daken.Abigail@epamail.epa.gov](mailto:Daken.Abigail@epamail.epa.gov)

Dear Abigail:

This letter comprises the comments of the American Council for an Energy-Efficient Economy on the March 2012 *ENERGY STAR Product Specification for Residential Water Heaters Version 2.0: Draft 3* (henceforth referred to as the "Specification"). We remain impressed with the open, collaborative development of this specification.

The American Council for an Energy-Efficient Economy (ACEEE) is a non-profit research organization formed in 1980. We have worked extensively with EnergyStar® since its beginning. ACEEE is also an active participant in the DOE appliance testing and standards programs, the DOE/EPA Energy Star program, and many utility and state energy efficiency programs. ACEEE has carried out policy-related work on water heaters for many years, as investigators and as advisors to research projects led by others. Some of ACEEE's work was offered in the development of the original EnergyStar Water Heater Program, and we are most appreciative of the efforts EPA and DOE have made to start this key program. After all, hot water was the last major residential energy user *not* addressed by EnergyStar, for understandable reasons.

## Overview

ACEEE supports much of the specification as outlined in the draft document. We offer a few comments on areas that we feel warrant additional attention:

- ACEEE favors early announcement that EnergyStar expects to require that all gas water heaters be condensing in the next round. However, the proposed qualifying criteria for electric storage, gas storage, and solar water heaters seem appropriate levels for now.
- We continue to have concerns about the treatment of "FVIR" in the draft specification.
- ACEEE still supports inclusion of add-on heat pump water heaters, but understands EnergyStar's desire for more time to work out a specification.
- We support including solar water heaters, but defer to others on specification details for these products.

## Our Perspective.

**On Condensing Gas Requirements.** In the long run, safety and indoor air quality considerations mandate that major combustion appliances in houses draw combustion air from outside, as well as venting outdoors. The question is how EnergyStar equipment can support EnergyStar homes and comparable programs (as well as improving efficiency and minimizing risks) by adopting condensing criteria for all water heaters. We see this as the first of two steps. The second step should be "direct power vent" (outdoor air supply as well as power vent) following the appearance on the market of advanced technologies.

Among other issues, the 2015 DOE standard for large gas storage water heaters will require condensing. Next year, the DOE furnace standard will require condensing in northern climates. One of the major perceived barriers to this has been concerns about "orphan" atmospheric gas water heaters with insufficient draft when the furnace no longer keeps the chimney hot. Canadian experience (mandatory condensing furnaces) suggests that few problems arise, but the market perception is real. It is important for EnergyStar to phase out inclusion of non-power-vent equipment as soon as possible. However, all of the present non-condensing, power-vent, storage water heaters we know about rely on large amounts of dilution air from the house to cool the exhaust vent to temperatures safe for PVC vent piping. This means they actually exacerbate depressurization issues and the potential for indoor air quality problems (except back drafting, if the furnace has a positive pressure vent).

Thus, ACEEE urges EnergyStar to announce intent to end recognition of non-condensing water heaters, whether tank, tankless, or hybrid, in the next cycle. We understand the considerations that led to developing the 0.67 EF tank recognition level, but we feel that its time is rapidly passing. We note that this will also end the current anomaly of comparing tankless products, virtually all of which qualify for EnergyStar, with storage technologies.

**FVIR.** Fundamentally, FVIR is one of several technologies that would be available to manufacturers to reduce the risk of fires started by consumer error (such as spilling gasoline near a water heater, or leakage from gasoline containers that violate law and/or good judgment). At minimum, “power direct vent” achieves the same end, with additional safety benefits. If safety is the motivating concern, this certainly should be an acceptable alternative.

In this context, we respectfully suggest that the “fairness” argument on slide 8 of the April 5 webinar uses a fallacious argument. EnergyStar writes:

“In particular, if EPA includes EPACT covered products with storage volume 20-100 gallons and burner rates up to, say, 80,000 Btu/hr, we would anticipate that all the current units that are 50 gallons with a 75 kBtu/hr burner (with FVIR) would disappear in favor of units that are 50 gallons with a 76 kBtu/hr burner (without FVIR). This seems to provide an arbitrary way to circumvent the intended consumer protection, and EPA is not comfortable with it. If these units are not included, no such problem exists.”

Checking the on-line AHRI product directory, we find no “current units that are 50 gallons with a 75 kBtu/hr burner (with FVIR)” from the three dominant incumbents: None offers 50 gallon units with burners larger than 67 kBtu input (13 models from Bradford-White). Rheem-Ruud and AO Smith have one and two models respectively at 65 kBtu. A quick scan suggests that none of these are close to the 0.67 EF EnergyStar minimum criterion. Thus, we infer that substantial product and process investment would be required to bring to market a 50 gallon, 75 kBtu, FVIR-equipped product. Why should manufacturers make that investment instead on one that might respond to EnergyStar signals that condensing products are a much better opportunity for this capacity? Indeed, this might be a logical investment for manufacturers who feel that DOE’s next round of standards might move the condensing category down to include 50 gallon units. Thus, we reject the “fairness” argument, because it is based on a counterfactual assumption – and seems not to understand potential manufacturer responses to alternative influences on the market.

**Hybrids.** The specification as written allows inclusion of hybrid products up to 200,000 Btu/hour input. This is at odds with the written intent of including products that can be installed “without requiring a larger gas line to be installed in retrofit applications.” The typical ½” gas line found in residential buildings can supply up to around 100,000 Btu/hour.

Additionally, we are unsure why the Specification has singled out hybrid water heaters among EPACT-covered equipment. This is inconsistent with the intent of moving toward a configuration-neutral specification. If ENERGY STAR chooses to include EPACT-covered water heaters, we recommend allowing both hybrid and storage water heaters to qualify for recognition. Condensing storage water heaters with gas inputs of 76,000-100,000 Btu/hour and storage capacities up to 80 gallons can offer significant energy savings that ought to exceed those of hybrid water heaters with an EF rating of  $\geq 0.75$  or TE rating of  $\geq 80\%$ . Our analysis of non-condensing hybrid water heaters found them to be much less cost-effective than condensing hybrid and condensing storage water heaters.<sup>1</sup> We suggest limiting the inclusion of EPACT-covered water heaters to condensing products with TE ratings of  $\geq 90\%$ . There are currently six models of EPACT-covered water heaters from three manufacturers that would meet this requirement and offer meaningful energy savings.

**Add-on Heat Pump Water Heaters.** As noted above, we understand and accept the reasons for postponing inclusion of these products. We understand the warranty issues raised by the incumbent manufacturers. However, their perspective might also reflect a different business consideration: some fraction of add-ons sold to customers with existing electric tank water heaters will be lost sales for the incumbents. On the other hand, to utilities, add-on products as retrofits for products that meet the current DOE standard might be attractive ways to save a lot of energy, quickly and cost-effectively. A utility program restricted to retrofits of existing products that comply with the current standard would assure that these are early replacements, but would sacrifice some marketing strategies (such as emergency replacement followed by later delivery and installation of the add-on

---

<sup>1</sup> <http://www.aceee.org/sites/default/files/publications/researchreports/a112.pdf>

product). We urge EnergyStar to keep investigating models that might allow including these products, and to keep seeking input from utilities and organizations like CEE that represent them.

**Discussion**

The basic thrust of this letter is that EnergyStar needs to work even harder to identify long-range goals for technology and performance. As important, EnergyStar needs to dive more deeply into interactions with other programs, such as DOE appliance standards, evolving energy codes (IECC), and voluntary programs such as “EnergyStar for new Homes” and “Home Performance with EnergyStar,” and RESNET. There is also international competition, and all evidence suggests that lax standards leave incumbents ill-prepared to protect markets and jobs.

Thank you for your consideration, and we appreciate EPA’s concern for getting this right.

Harvey Sachs  
Senior Fellow

Jacob Talbot  
Senior Analyst