



Via e-mail only

April 30, 2014

Abigail Daken  
United States Environmental Protection Agency

Re: Draft 1 Version 3.0 ENERGY STAR<sup>®</sup> Water Heater specification

Dear Ms. Daken:

The Edison Electric Institute (EEI) appreciates the opportunity to submit comments on the above referenced matter.

EEI is the association that represents all U.S. investor-owned electric companies. Our members provide electricity for 220 million Americans, operate in all 50 states and the District of Columbia, and directly employ more than 500,000 workers. They serve 70 percent of all customers in the United States. Many of our members are combination gas and electric companies, and provide services for both energy types.

1. The Environmental Protection Agency (EPA) should make every effort to ensure participation in the development of new or revised ENERGY STAR specifications by a wide and diverse range of stakeholders. While the ENERGY STAR program creates voluntary standards, these often become industry minimums and are relied upon by other federal agencies as they set mandatory energy conservation standards. EEI was not included in the select group of parties that were notified directly by EPA of its decision to revise the ENERGY STAR water heater specifications. EEI has participated in the past by filing comments and, as a supplier of energy, EEI's members are directly and materially affected by EPA decisions on EPA ENERGY STAR program requirements. To that end, kindly include EEI on future notices of changes to ENERGY STAR programs.
2. EEI commends EPA on its marketplace success with the ENERGY STAR appliance program. Consumers have grown to recognize the ENERGY STAR label as evidence of a product's elite, highly efficient status.
3. EEI is concerned that the draft specification may inadvertently exclude heat pump water heaters as currently written. Many, if not all, heat pump models include electric resistance elements so that the water heater can operate in a "hybrid" mode (part heat pump, part electric resistance) or in a fully electric resistance mode (due to compressor

malfunction, consumer preference, or lack of air circulation in the space where the water heater is installed). Accordingly, a draft specification that excludes electric resistance water heaters technically could be interpreted as excluding heat pump water heaters that contain electric resistance elements for hybrid and backup operations.

4. In addition, EEI disagrees with EPA's decision to exclude electric resistance water heaters from participation in the ENERGY STAR program while including less efficient, atmospheric draft gas water heaters. As discussed briefly below, such treatment is both inequitable and technically unjustified. In the past, EPA has advanced two principal arguments in support of its decision not to allow Electric Resistance Water Heaters (ERWHs):
  - a. That from a "source energy" perspective, ERWHs were much less efficient than either:
    - i. A gas water heater, or
    - ii. An electric heat pump water heater.
  - b. That ERWHs are already efficient (>90%) and so there is not much room to distinguish a minimum efficiency water heater from a very efficient ERWH.

Neither of these rationales supports EPA's determination to exclude electric resistance water heaters.

5. On the matter of equity, the proposed levels are especially unfair as electric water heaters will have to improve efficiency much more than other competing products when comparing the Department of Energy's (DOE's) minimum efficiency standards to EPA's proposed ENERGY STAR requirements. For instance, while a gas storage water heater with a rated capacity of 55 gallons or less will only have to improve from a 0.59-0.64 to a 0.67 Energy Factor (EF), which corresponds to an increase of 4.6% to 13.6%, an electric water heater with a rated capacity of 55 gallons or less will have to improve from a 0.95 to a 2.0 EF – an increase of over 110%! No other water heater product (or any other ENERGY STAR product, to our knowledge) has to meet such a high hurdle. It is especially ironic, considering that a baseline electric resistance water heater has a higher EF than all of the current and future Energy Star rated gas water heaters!
6. Moreover, EPA's conclusion that an atmospheric draft, gas fired water heater is deserving of ENERGY STAR status but that an electric resistance water heater is not is unsupported. EPA appears to have relied on a simplistic approach to EF to convert from site efficiency to source energy (See <http://www.aham.org/ht/a/GetDocumentAction/id/33223> and [http://www.energystar.gov/ia/business/evaluate\\_performance/site\\_source.pdf](http://www.energystar.gov/ia/business/evaluate_performance/site_source.pdf)). Such a simplistic site/source conversion fails materially to provide a technically sound basis of comparison between an atmospherically vented gas water heater and an electric resistance water heater for a number of reasons including the following:

- a. EF is demonstrably not a measure of annual efficiency. It is only accurate under the conditions of DOE's current test procedure. Gas water heater cycling losses are grossly underestimated using the EF approach.
  - b. EF for gas water heaters falls off quickly with reduced daily or per event hot water consumption. EF's for electric resistance water heaters do not.
  - c. Homes with an atmospherically vented gas water heater incur larger amounts of infiltration than do homes with an electric resistance water heater but this added space conditioning load is not captured in the simplistic site to source conversion model.
  - d. The site to source factor for electricity used by EPA.
    - i. Tends to overstate the conversion factor for electricity.
    - ii. Fails to distinguish between a Btu derived from wind or solar or hydroelectric or nuclear facilities from a Btu derived from oil or coal.
    - iii. Tends to understate the production losses for gas, propane, and fuel oil including losses incurred in drilling, flaring, compressor stations, pipelines, and local distribution .
    - iv. Tends to overstate electricity losses due to transmission and distribution (T&D).
    - v. Incorrectly attributes theft of electricity as a T&D loss.
7. With respect to the difficulty distinguishing between a minimum efficiency ERWH and a higher, potentially ENERGY STAR qualifying ERWH, EEI responds that there are nearly 4,000,000 electric resistance water heaters sold in the United States every year. Further, there are many locations in the United States where natural gas is not available. Notwithstanding the fact that EPA has designated electric heat pump water heaters with the ENERGY STAR designation for the past few years, the market has not responded rapidly, with only several thousand sold every year. Thus, if EPA wanted to move the market for the many electric water heaters sold every year, an ENERGY STAR designation for an ERWH would be appropriate and could have a real energy savings impact.
8. To that end, EEI proposes that any electric storage water heater with an Energy Factor that is greater than or equal to 0.96 EF receive an ENERGY STAR label. This will make the program fuel and market neutral, and will ensure that all customers that replace current electric water heaters (e.g., a 50 gallon unit with a 0.86 or 0.90 EF) will save energy and money when replacing their water heater.
9. EEI and other stakeholders are conducting ongoing efforts to create a regulatory and/or legislative fix to the problem that DOE's 2015 federal minimum efficiency standards have created by effectively banning the production of very efficient large ERWH that are used by consumers in demand response programs. EPA should consider the effort to preserve utility sponsored demand response programs that use highly efficient electric resistance water heating technologies as it moves forward with any revisions to their specifications.

10. While grid-connectivity of water heaters is a topic that is worth exploring in general, the application is not a good fit for large heat pump water heater products, since there could be negative impacts on the compressor from cycling that could be required for full grid interactivity, and an optional ENERGY STAR specification is not the appropriate venue for advancing this technology.
11. ERWHs used for demand response programs provide benefits to the overall energy efficiency of the grid. Therefore, electric resistance water heaters designed for use in these programs should be able to qualify for an ENERGY STAR label so that customers can identify their benefit and utilities can incentivize their purchase.
12. Again, EEI commends EPA on its ENERGY STAR programs and hopes the EPA will consider EEI's comments for inclusion in any future changes to the program specification it may publish. EEI would also like to discuss its comments with EPA in more depth and will contact you shortly. Accordingly, EEI respectfully requests a meeting with EPA before the next version of the specification is published.

Thank you for your review of our comments.

Respectfully submitted,

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Senior Manager, Energy Solutions

cc: Rick Tempchin, EEI  
Emily Fisher, EEI