



April 30, 2014

Abigail Daken
United States Environmental Protection Agency

Re: Draft 1 Version 3.0 ENERGY STAR® Water Heater specification

Dear Ms. Daken:

The National Rural Electric Cooperative Association (NRECA) appreciates the opportunity to submit comments on Draft 1 Version 3.0 ENERGY STAR® Water Heater specification. NRECA's comments below focus on specifications for electric water heaters.

NRECA is the national service organization for more than 900 not-for-profit rural electric utilities that provide electric energy to over 42 million people in 47 states. Cooperatives own and maintain 2.5 million miles or 42 percent of the nation's electric distribution lines covering three-quarters of the nation's landmass. Electric cooperatives provide electric service in all or parts of 2,500 of the nation's 3,141 counties.

NRECA and our members have long supported the ENERGY STAR program as an important tool to help consumers identify and purchase products with superior energy performance. Our members often make use of the ENERGY STAR product program in their energy efficiency programs through provision of rebates and other incentives.

ENERGY STAR has achieved tremendous success in its labeling program by offering a consistent brand that promises cost-effectiveness to the consumer and credible and reliable energy savings without a sacrifice in product features or performance. NRECA is concerned that ENERGY STAR as well as the Department of Energy's appliance standards program has strayed from these principles in the area of electric water heating by overlooking the function of electric water heaters, and specifically electric resistance water heaters, in valuable and beneficial demand response and electric thermal storage (ETS) programs across the country. Key overlooked benefits of these water heaters as they relate to co-ops include:

- Co-op electric resistance water heater load control programs save at least 500 MW of electricity demand and hundreds of millions of dollars per year for consumers.
- Approximately 250 co-ops in 34 states have voluntary demand response programs using large capacity electric resistance water heaters that allow co-ops to reduce demand for electricity during peak hours. Benefits include:
 - Load shifting
 - Energy Storage
 - Grid regulation and balancing

There are **MANY** Federal policies that support the DR benefits and cheap energy storage highlighting the importance of these programs for the efficient operation of our nation's electricity grid. As more



clean, variable energy resources continue to be integrated into the grid, these technologies will become even more valuable as an energy storage tool.

1. EPA should consider that the DOE Federal minimum efficiency standards precipitating changes to the ENERGY STAR specifications for electric water heaters overlooked key functions of electric resistance water heaters and that DOE and a broad stakeholder coalition are working to mitigate the unintended consequences of this oversight

NRECA appreciated the opportunity to attend the EPA hosted stakeholder webinar on the draft specifications on April 16, 2014. During the Webinar, EPA made clear that revisions of the ENERGY STAR specification were primarily motivated by the new Federal minimum efficiency standards set to take effect in April 2015. As discussed above, the efficiency standards for electric water heaters overlooked a key function of resistance water heaters: their significant role in our nation's demand response programs. DOE is aware of this oversight and has issued a notice of proposed rulemaking (NOPR) to mitigate the impacts of the 2010 rule. In the NOPR, the Department concluded that ETS programs utilizing large-volume electric resistance water heaters provide significant value to consumers, utilities, and the nation.¹ Moreover, the NOPR concluded that action by the Department is required to² mitigate the adverse impacts that the April 2010 final rule efficiency standards would have on those DR programs.³ It is imperative that EPA consider the function of these water heaters when conducting analyses for its program – these products provide real efficiency benefits to our nation's grid, saving consumers money, and providing environmental benefits.

In addition to DOE's efforts to mitigate the adverse impacts that the 2015 DOE federal minimum efficiency standards have created by effectively banning the production of the large electric resistance water heaters that are used in demand response programs, NRECA and other various stakeholders are conducting ongoing efforts to create a legislative fix to the problem. This stakeholder group includes a wide-variety of interests from efficiency advocates to environmental advocates, manufactures, and utility associations and includes:

- A.O Smith
- Air-Conditioning Heating and Refrigeration Institute (AHRI)
- American Council for and Energy-Efficient Economy (ACEEE)
- American Public Power Association (APPA)
- Edison Electric Institute (EEI)
- General Electric Company (GE)
- HTP, Inc.,
- National Rural Electric Cooperative Association (NRECA)
- National Resources Defense Council (NRDC)
- Northwest Energy Efficiency Alliance (NEEA)
- PJM Interconnection, LLC
- PVI Industries, LLC
- Rheem Manufacturing Company,
- Steffes Corporation

¹ Energy Conservation Standards for Residential Water Heaters, 78 Fed. Reg. at 12,974.

² *Id.* at 12,970.

³ *Id.* at 12,972.



- Vaughn Thermal Corporation
- Zodiac Pool Systems, Inc.

ENERGY STAR should consider this broad effort to preserve and grow utility sponsored demand response programs that use electric resistance water heating technologies as they move forward with any revisions to their specifications. (See the attached letter of support to Congress and proposed legislative language for more details).

2. EPA should consider including a category of ENERGY STAR qualified electric resistance water heaters because heat pump water heaters do not currently provide the same functionality as electric resistance water heaters in demand response programs, do not perform as well in certain regions of the country, and have no equivalent available alternative for consumers without access to natural gas in their homes

Electric resistance water heaters 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. Additionally, these products do not perform as well in certain areas of the country with cold climates and have other undesirable characteristics that reduce product quality for certain consumers. The following issues highlight the difference in functionality between heat pump and electric resistance water heaters.

a. Elevated Temperature Water Storage

Hybrid heat pump/resistance water heaters as designed (and in distribution in the United States) leverage both heat pump and resistive heating elements concurrently. Hybrid heat pump water heaters gain their high Energy Factor ratings by operating nearly entirely as heat pump water heaters, with minimal or no supplemental electric resistance heating at the rating conditions. This high efficiency operation mode limits the maximum heat pump generated storage temperature to approximately 130°F. If the accompanying electric resistance elements were used to store at higher temperatures for the sake of energy storage and renewable integration, the effect is to decrease the use of the heat pump, thereby lowering aggregate efficiency. Though technology may develop to allow heat pumps to operate as grid interactive resources, they presently cannot effectively support the needs of utility energy storage programs.

b. Compressor Cycling

Heat pump water heater systems, like HVAC systems, are more efficient when run for extended “on” cycles. Practically speaking, compressors and other moving parts of a heat pump water heater are designed with duty cycles consistent with longer run cycles. Attempting to “short cycle” the heat pump water heater circuit to take advantage of variable renewable energy production that often comes in shorter-term duration “events” would result in, at a minimum, dramatic reduction of life for these components and practically would result in loss of reliability due to short cycling of compressors. This precludes the heat pump water heater from being an option for utility peak-shaving, renewable integration and energy storage, and grid balancing programs, in which the water heater is controlled to stop or start operating at different times of the day and sometimes for multiple on/off cycles per day or per hour.



c. Space, Noise, and Cold Climate Issues

Heat pump water heaters utilize ambient heat from the area where they are installed. These units are required to maintain a specific minimum area around the heat pump water heater to function per manufacturer design specifications. As an example, a fifty-gallon heat pump water heater must typically have a minimum space requirement of approximately 700 square feet or a 9'x9'x8' room. One would assume that a larger unit such as an eighty-five gallon unit must have an even larger space requirement to operating efficiently. Many homes, especially older housing stock, do not allow for such a large space to house a water heater. Many homes simply use a closet or small area in a basement to stage a water heater that do not have the large space the water heater needs to make its thermal transfer effectively. There is also a significant noise issue associated with the heat pump water heaters if the system is located within the living area. A large percentage of co-op consumers have no access to natural gas service and have no other alternative option for a product that performs equivalent to electric resistance water heating, and therefore specifications that eliminate electric resistance water heating as an ENERGY STAR option violates a key principle of the label by sacrificing product performance.

3. ENERGY STAR's new specification is not the appropriate venue for advancing grid-connectivity options for water heaters at this time.

While grid-connectivity of water heaters is a topic that is worth exploring in general, the technology is not a good fit for large heat pump water heater products, and an optional ENERGY STAR specification is not the appropriate venue for advancing this technology. In the proposal, the grid-enabling components will have no testing procedures and manufacturers have other means of marketing such product functionalities outside of the ENERGY STAR program. For these reasons, and the reasons stated by the manufacturers at the April 2014 stakeholder webinar, this venue is not a good fit for advancing this technology.

Thank you for your review and consideration of our comments.

Respectfully submitted,

A handwritten signature in black ink that reads "Keith Dennis".

Keith Dennis
Senior Principal, End-Use Solutions and Standards
NRECA

cc: Jay Morrison, NRECA
Dave Mohre, NRECA

Attach: Letter of Stakeholder Support, Final Draft Water Heater Language