



Testimony of  
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U.S. House of Representatives  
Committee on Energy and Commerce  
Subcommittee on Energy and Power Hearing on  
“H.R. 906, to Modify the Efficiency Standards for Grid-Enabled Water Heaters”

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Mr. Chairman and members of the Subcommittee, thank you for the opportunity to share NRDC’s views on grid-enabled water heaters, which we believe present a promising opportunity for a more efficient, more economic, and ultimately lower-emissions electricity system overall. We appreciate your leadership on this issue.

#### **IN BRIEF**

NRDC Supports H.R. 906 to allow continued use and evaluation of Grid Enabled Water Heaters (GEWH).

- **Diverse Interests Support H.R. 906.** The language of H.R. 906 was developed through extensive, thoughtful discussion among diverse stakeholders including manufacturers, utilities, and efficiency and environmental interests.
- **Grid Enabled Water Heaters Offer Low-Cost Energy Storage and Ancillary Grid Services.** GEWHs use thermal energy storage to make a water heater something like a battery. This allows grid operators to manage the water heater load to follow the output of variable electricity supply and heat the water at low-cost times, and may also allow for providing ancillary services such as frequency regulation.
- **Grid Enabled Water Heaters May Allow Electricity System Benefits.** Electric resistance water heaters are significantly less energy efficient than heat pump water heaters, which may use less

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than half the energy at the *component* level. But grid-enabled electric resistance water heaters offer a reasonable prospect of advancing a cleaner, more economic, and more efficient electricity *system*, by, for example, facilitating the economic uptake of increasing amounts of variable output renewable generation;

- **H.R. 906 Will Allow Improved Analysis of consumer and environmental impacts from Grid Enabled Water Heaters.** There is much to be learned about the effectiveness of grid enabled water heaters. Analysis of the consumer and environmental impacts of these products, and of the underlying electricity grid operational attributes, are at an early stage and complex, particularly within the context of other water heater technologies and diverse regional and local grid characteristics;
- **Water Heating energy use is large and merits more attention.** Water heating accounts for about 15% of household energy use in the United States, so even small improvements in system or component efficiency can deliver large consumer and environmental benefits, making the additional attention and analysis worthwhile;
- **The Grid Enabled Water Heater market and this legislation present no inherent impediment to heat pump water heaters.** GEWHs focus on a small market segment where heat pump water heaters may not be most well suited. Further, the added attention to the energy used by water heating and methods of managing that energy may increase the opportunities for advanced technologies including HPWH.
- **Energy efficiency standards continue to deliver great benefit.** Federal standards implemented since the passage of the National Appliance Energy Conservation Act in 1987 will deliver cumulative energy savings of about 70 quadrillion British thermal units through 2020 (about 70% of annual US energy use), and reduce annual carbon dioxide emissions by over 250

million tons in 2020, while saving consumers more than enough on utility bills to pay for higher product purchase prices.

## **FURTHER DISCUSSION**

NRDC is a private nonprofit environmental organization with more than 1.4 million members and online activists. Since 1970, our lawyers, scientists, and other environmental specialists have worked to protect the world's natural resources, public health, and the environment. NRDC's top institutional priorities include curbing global warming and creating a clean energy future. To that end, NRDC has advocated for stronger federal and state energy efficiency standards for household appliances and equipment including water heaters, and for effective implementation and enforcement of these standards for more than 30 years. NRDC also advocates for carbon pollution reduction under EPA's power plant standards, and recognizes the important contribution that energy efficiency can and must make.

Given NRDC's strong support for energy efficiency, it may seem surprising that NRDC supports legislation that would enable the continued production of large electric resistance water heaters which may use two or more times the energy of the heat pump water heaters that would be required absent this legislation. But there is a good reason: we explored the opportunities that grid-enable water heaters may offer for environmental and consumer benefit, found the case persuasive, and worked together with colleagues from manufacturing, utilities, and other efficiency and environmental organizations to develop legislation that would deliver on the opportunity while not undermining the benefits of existing water heater efficiency standards. Attachment 1 is a 2013 letter that accompanied the proposed legislative language, showing the diversity of parties that came to agreement on the proposal.

NRDC has also supported a regulatory approach to enable the continued manufacture of grid-enabled water heaters. In particular, we supported the U.S. Department of Energy's efforts to develop an

appropriate approach to a waiver for GEWHs.<sup>1</sup> We continue to support this regulatory approach, and would welcome the next step in this rulemaking. We have also supported the requests to the Department of Energy's Office of Hearings and Appeals from two manufacturers seeking to be granted exceptions to the standard, allowing for the production of what are effectively grid-enabled water heaters. Attachment 2 is a joint letter of support for one of those manufacturers' request, and includes much of the discussion in my testimony. In light of the urgency of the April 2015 deadline for manufacture of large electric resistance water heaters, however, H.R. 906 may offer the most effective and timely solution.

Our position in support of H.R. 906 does not reflect any weakening of our support for improved energy efficiency. There continues to be great potential for stronger energy efficiency standards to deliver consumer and environmental benefits. Indeed, we continue to support the Department of Energy's standard for most water heaters. For large non-grid-enabled water heaters, residential heat pump water heaters offer significant energy and cost savings. High quality, energy-efficient heat pump water heaters are available today and the technology continues to improve rapidly, promising to deliver increasing consumer and environmental benefits over the foreseeable future. We anticipate significant growth in the take-up of high-efficiency heat pump water heaters over the short and long term, with resulting consumer and environmental benefits. The Department of Energy's efficiency standards play an important role in delivering these benefits to consumers.

However, we also hold the view that for grid-enabled water heaters there appears to be a large potential for electric-resistance water heaters to be operated in a way that reduces high-cost system peaks, provides additional operating flexibility to the electricity grid, and could facilitate the expansion of variable output generation with low or zero emissions and marginal costs, such as wind and solar. Further, we recognize that in addition to the potential to shift electricity load, grid enabled water heaters may provide utilities a low cost and environmentally preferable means of regulating the electricity frequency on the

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<sup>1</sup> Docket Number EERE-2012-BT-STD-0022; RIN 1904-AC78.

grid. Such frequency regulation may be able to deliver significant economic and environmental benefits by reducing the need to rely on the fossil-fueled generators that currently serve this function.

We need to continue to evaluate the opportunity presented by grid-enabled water heaters. The technical, economic and environmental analysis of grid-interactive and storage water heating is complex, dynamic, and at a nascent but rapidly improving state. It is not clear whether the increased use of grid-interactive and storage water heaters will increase or decrease the use of high-emissions generation in many cases under *today's* generation mix. However, in our view the prospective benefits for a more efficient, more economic, and ultimately lower-emissions electricity system overall make it important to continue to evaluate grid enabled water heating and thermal energy storage. The approach proposed in H.R. 906 will provide significant experience and understanding. Importantly, H.R. 906 does this without undermining the current energy efficiency standards. It does this by requiring that grid-enabled electric resistance water heaters be shipped with a utility-controlled software activation key and clear labeling, thereby ensuring that only participants in a utility demand-response water heating program purchase these units.

Finally, we note that it may at some point prove possible to achieve the same or greater consumer and environmental benefits using grid-interactive heat pump water heaters rather than electric resistance units. Indeed, further analysis and improvements in heat pump water heaters may show that the far lower energy use of heat pump water heaters makes these products superior. However, the ability of heat pump water heaters to successfully operate as grid-enabled water heaters has not yet been demonstrated and is an area for further development. Again, we expect that the increased attention, experience and analysis of advanced water heating approaches that will come with allowing for grid enabled water heaters will facilitate better decisions by utilities, manufacturers, regulators and consumers that ultimately deliver improved economic and environmental outcomes.

We appreciate the opportunity to provide these comments, and would welcome any question on this issue.

Respectfully submitted,

Robin Roy